Clean Energy and Climate Plan for 2025/2030 Public Comment – Letters Submitted by 5/1/2022

April 30, 2022

Executive Office of Energy and Environmental Affairs
gwsa@mass.gov

The HeatSmart Alliance provides our input for the Buildings sector of the CECP. The CECP for 2025 & 2030 is self-described as a "roadmap" for achieving GHG limits. Using this roadmap metaphor, we believe the map shows some larger roads, but as maps go, this one falls short of helping one get from Point A to Point B. There are several ways this roadmap should be improved.

1) **The model and its assumptions should be open to review**. Transparency is important.
2) **Goals need to be better defined.** For example, "deep weatherization" should be defined in empirical, measurable terms.
3) **Progress should be measured, verified and benchmarked.** Going forward, deemed savings should be grounded in contemporary, empirical data from a representative sample of buildings. Data should come from measured consumption of fuels (e.g. natural gas, oil and propane), heat captured from combustion of these fuels, size of building, type of building, weather conditions, etc.
4) **Hybrid heating systems operations need to be measured and reported**.
   a.) Particular attention needs to be paid to controls, hours of operation, outdoor temp, time of day, and more. A hybrid system that gets 90% of its heat from a fossil fuel combustion, and 10% from a heat pump should not be receiving the same incentives as another system that gets 90% of heat from a heat pump and 10% from fossil fuel combustion.
   b.) Hourly demand, not just seasonal consumption should be included, as demand peaks are a relevant and important aspect of electrification of heating.
5) **Emissions reductions for 2025 and beyond should include comparison to 2020 figures.** Using 2020 as an alternative baseline is more useful than 1990, as the conditions in 2020 are more relevant than 1990 priors (e.g. power from coal, no heat pumps, no condensing boilers, etc.)
6) **Municipal opt-in building scorecards are a good idea**. However, this still needs to be defined, and incentives and penalties should be considered to help make this a reality soon.

Achieving decarbonization goals in the building sector is going to be extremely challenging. Past achievements were easy by comparison, as much of the gain is attributable to a shift to natural gas in the power generation sector, and higher efficiency from technology upgrades in heating and lighting. All of those improvements are now baked in, and future achievements require much more complex and costly changes to buildings and their energy systems.

Adding to the challenge is that much improvement needs to take place in Environmental Justice communities, where past incentives have failed to make much of an impact.

Best Regards,
George Whiting, Member, HeatSmart Alliance and Medfield, MA resident
Michael Duclos, Member, HeatSmart Alliance & MA Clean Heat Commission, and Stow, MA resident
Stephen Breit, Member, HeatSmart Alliance and Wayland, MA resident
Robert A. Zogg, Member, HeatSmart Alliance and Carlisle, MA resident
Arnold Epstein, Member HeatSmart Alliance & Chair Stow Green Advisory Committee, Stow MA resident

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About the HeatSmart Alliance

The HeatSmart Alliance is a group of volunteers with members and associates from 29 communities in the Boston metrowest area. Our mission is to reduce greenhouse gas emissions by accelerating adoption of energy-efficient heat pumps in Massachusetts homes, municipal buildings, and commercial buildings. We primarily work at the grassroots level to achieve this mission.

Our experience is primarily with single-family homes. A number of us are veterans of the MassCEC HeatSmart initiative and we also have members who are knowledgeable in the areas of retrofits, heat-pump technology, community outreach, and overall approaches to reducing greenhouse gas emissions.

Learn more about the Alliance at https://heatsmartalliance.org

Final 2030 CECP Preview Comments

Michael Duclos

4/30/22

I would like to thank the GWSA IAC, as well as all the DOER staff and consultants that have worked long and hard to update the 2030 Interim CECP published on 12/30/2021.

I find I am disappointed by what I have seen to date outlining the Final 2030 CECP - a slide deck and verbal explanation at such a high level of abstraction it is difficult for me to understand how we can be at such an undeveloped, superficial level of detail at this late date, after all this time.

I am disappointed that the 4/29/2022 GWSA IAC meeting was announced to the public fewer than 24 hours in advance, making it difficult or impossible for some interested parties to attend. The importance of such a meeting would dictate more advanced notification.

When I first read the GWSA IAC Buildings Working Group October 23, 2018 report which roughly estimated that 100,000 homes per year would need thermal enclosure improvements and electrification to meet our then existing GHG emissions target, I was shocked at the magnitude of this transformation. It's difficult to accept that was over 3 ½ years ago.

In the slides I see a significant retreat from this 2018 estimate, i.e. for 2025, using as a baseline of 400,000 residences in 2019 with whole home (and another concession to 'hybrid heat') an increase of only 100,000 in five years, not one.

The rough hand writing has been on the wall since 2018, and yet this is the goal we now set, particularly realizing the Interim 2030 CECP GHG target was made more, not less, aggressive by the Climate Act of 2021 ? So aren't we, once again, 'kicking the can down the road,' leaving an already over-burdened future with even larger problem, and with less time to solve it ?

The goal of 'Deep weatherization in 10% of Stock by 2025" roughly defined as a 30% load reduction feels too aggressive. Why ? Because the state has not demonstrated results from a pilot program achieving such a reduction to indicate they have 'reduced to practice, ' have not demonstrated the ability to do this at the necessary scale. This appears to me to be speculative, as if numbers like this input to a simulation produced the desired result, absent reasonable assurance we know we can do this. 'Technically possible' is the phrase I recall.

Nor do we have the broad based acceptance by our fellow citizens that would be a requisite precursor to enable this number of buildings transformed to this performance level in reality.

After all, it is our citizens who must embrace doing this to their homes.

The latter point I find most disturbing because, following the release of the Interim 2030 CECP on 12/30/2020, and the signing by the governor of the Climate Act of 2021 into law, I have yet

to see a program of public outreach and education of the size and scope commensurate with, and appropriate to, achieving in reality this unprecedented transformation of our buildings.

The number of homeowners needed to take such aggressive action will, in my opinion, not undertake to 'transform' their homes with which they are currently comfortable, absent a shared understanding of why this transformation is critically important. In my opinion, achieving that shared understanding will take substantial time and effort, and I don't see we are any significant distance down this long, difficult road.

The need for such outreach appears to me to be obvious, or perhaps better, 'self evident.'

'Self evident,' I think, to anyone who takes the GWSA and Climate Act of 2021 seriously.

To be clear, I'm not blaming the GWSA IAC (after all they raised the alarm with the above mentioned October 23, 2018 Buildings working group report), or DOER, or their consultants.

I lay the blame for this squarely at the feet of an administration whose chief executive has found a way to circumvent the will of the legislature, even as he signed the Climate Act of 2021, without, to date, being called to account. I see this as a failure of leadership.

Given this history of inaction, is it realistic to expect a significantly different outcome, given we continue on a similar path with a Final 2030 CECP ?

If not, I think we must seriously consider other options, a different route.

It seems we are focused on producing 'plans', not on changing the real world we live in.

Thank you for the opportunity to comment.

April 30, 2022

Secretary Kathleen Theoharides
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
gwsa@mass.gov

RE: Draft Clean Energy and Climate Plan for 2025 and 2030

Dear Secretary Theoharides and Undersecretary Chang,

Thank you for the opportunity to comment on the Executive Office of Energy and Environmental Affairs ("EEA") proposed 2025/2030 CECP. Please accept the comments below on the proposals presented for the Buildings Sector as part of April 14th and 29th presentations.

Buildings Sector

	In Interim 2030 CECP	New for 2025 CECP	New for 2030 CECP
Key Elements of Policy Portfolio ✓ Ongoing ✓ Completed • Not Started	✓ High-performance stretch energy code for Green Communities opt-in Mass Save®: ✓ Limiting fossil fuel heating system incentives in the 2022-2024 Plan ✓ Phase out fossil fuel heating incentives in next plan ✓ State appliance standards by statute • Declining emissions cap on heating fuels by 2023 in consultation with the Commission on Clean Heat regarding the cap structure and levels	• Declining cap on building heat emissions and develop approaches to meet the cap, including a Clean Heat Standard by 2024 • Develop comprehensive Energy Transition approach to enhance Mass Save®, recommendation to legislature by Dec. 2023 • Develop building performance reporting methodology for the State no later than Dec. 2023 • Explore frameworks to provide clear guidance, technical assistance, and financial resources for all relevant state programs • Long-term utility infrastructure planning aligned with decarbonization; balance and mitigate consumer costs by 2024 ✓ Enhance consumer outreach and workforce development programming • Municipal Opt-In building scorecards at point of sales and lease in 2028 *(All above policies are in development based on discussion with the Commission on Clean Heat)*	
GHG Emission Sublimits	10.4 $MMTCO_2e$ (56% below 1990)	19.6 $MMTCO_2e$ (17% below 1990)	14.3 $MMTCO_2e$ (40% below 1990)
Key Targets & Metrics	• Deep weatherization in 20% of stock by 2030 • Electric heating in ~1 million residences • Equivalent effort (300-400 million square feet) in Commercial Sector. • 20% blend for fuel oil, 5% for pipeline gas by 2030	• Deep weatherization in 10% of stock by 2025 • Electric heating in ~500,000 residences: both whole home and hybrid heat (~400,000 households as of 2019) • Equivalent effort (100 million square feet) in Commercial Sector	• All metrics the same as in Interim 2030 CECP, except: • Expanded definition of electric space heating to explicitly include hybrid heating solutions (e.g., a heat pump serving greater than 50% of heating demand, with a back-up fossil fuel system)

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Screen-grabbed slide #7 from April 29, 2022 GWSA IAC Meeting presentation

- **Deep weatherization.** Great, the more weatherization the better.

- **Hybrid heat**. The 2025/2030 CECP should not be downgraded from 100% electric heat shown for the Interim 2030 CECP to be fossil-backed, or only electric-assisted, hybrid heat. Although EEA on the April 29th Zoom call claimed its "hybrid heat" does not mean "keep the gas pipeline distribution system forever," that is exactly what the gas industry defines the term "hybrid heat" to be in the DPU 20-80 proceeding. Without a definition provided, just bullets on a slide, the presumption is made that EEA has adopted the gas industry approach. Heat pumps do not need fossil fuel backup as shown for the New for 2030 column, certainly not when temperatures drop to below 32 degrees as mentioned during the April 29 presentation. Hybrid heat and backup fossil fuel systems are the fossil fuel industry's talking points that EEA must not adopt.

    - Homeowners installing a heat pump for efficient air conditioning, the example given on the April 29 Zoom call, are not "electrifying their heating" - they are installing an air conditioner. Not a single fossil fuel molecule is being displaced therefore they are not part of the 1 million residences Key Target of electrification.

    - Buildings that are hard-to-electrify may indeed install some sort of hybrid setup, hopefully as just a short-term initial step on the eventual path of electrification. Hybrid installs should be exceptions.

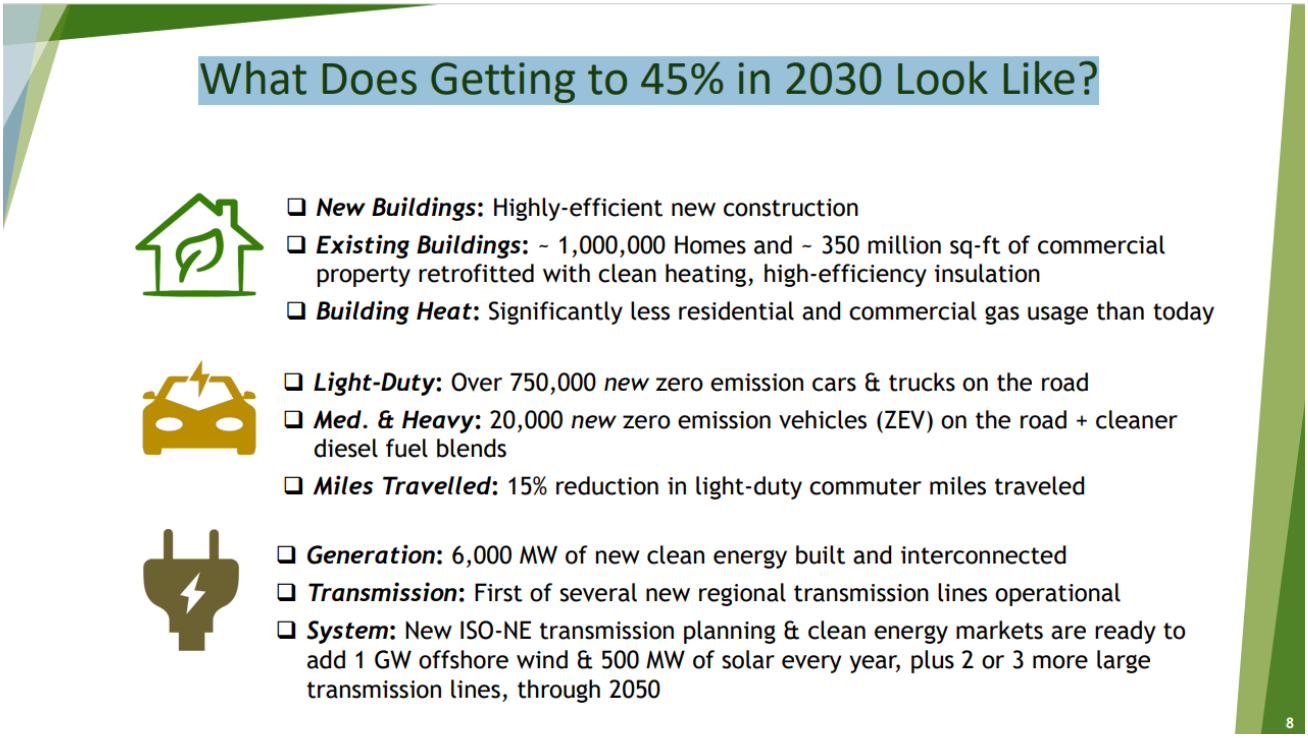
    - Fossil fuel backup in a home where only "greater than 50% of heat demand" is provided by a heat pump is not electrifying home heating. They should not be counted as part of the 1 million residences Key Target.

- **Electric space heat definition.** The definition of electric space heat should not be expanded to include fossil fuel systems. The theory that heat pumps need fossil fuel backup - for below 32 degrees, for below 10, for "shoulder seasons" - is a gas industry talking point, it should not be part of the 2025/2030 CECP Key Targets & Metrics.

- **5% blend for pipeline gas.** What is to be blended at 20%? Biomethane, hydrogen, SNG..? Blending for pipeline gas to delay and derail electrification while entrenching the gas distribution system is not a climate solution. Methane is methane, whatever the source they produce greenhouse gas emissions that must be reduced. Pinning the Commonwealth's future on hopes for short feedstock of biomethane or long-term technology to provide truly green hydrogen should not be a Key Target of the 2025/2030 CECP.

- **GHG Emission Sublimits.** The Interim 2030 CECP showed the Building Sector would accomplish emission reductions down to 56% of 1990 emissions, the update shows only 40%. The initial goals for emission reductions should not be abandoned or weakened.

One year ago, the "What Does Getting to 45% in 2030 Look Like?" slide[1] of the Clean Energy and Climate Plan for 2030 included for the Building Sector not only ~1 million homes and ~350 million sq feet of commercial property retrofitted with clean heating, high efficiency insulation, but also "Significantly less residential and commercial gas usage than today." Notable is the fact this also a backtrack on the previous "Fewer residential and commercial gas customers than today[2]" which is further evidence of switching to retaining the gas distribution system forever.



The target of transitioning off the gas distribution system has now been lost to EEA's apparent adoption of the fossil fuel industry's "hybrid heat" scheme. The 2025/2030 CECP is aligned with the gas companies' proposals in the DPU's 20-80 proceeding to not only maintain their distribution systems forever but to also expand those distribution systems and their ratepayer bases. EEA must not adopt the lower goals and positions of the fossil fuel industry fighting to retain their climate damaging business as usual. Please be as bold as the climate emergency requires - return the 2025/2030 CECP to the goal of fully electrifying 1 million homes and the rapid transition off all fossil fuels in the Building Sector.

Respectfully submitted,
Cathy Kristofferson
244 Allen Road
Ashby, MA 01431

[1] https://www.mass.gov/doc/2030-interim-cecp-march-public-webinar-slides/download at Slide 8
[2] https://www.youtube.com/watch?v=Sp4c-Xef9bQ at 14:30

CAN | CLIMATE ACTION NOW
WESTERN MASSACHUSETTS

www.ClimateActionNowMA.org

Massachusetts Office of Energy & Environmental Affairs
100 Cambridge St., Suite 900
Boston, MA 02114

As submitted by email to: gwsa@mass.gov on April 29, 2022

To EEA:

Climate Action Now Western Massachusetts (CAN), an organization of approximately 2,500 members in the Connecticut River Valley, submits to you the following comments and recommendations on the current draft Clean Energy & Climate Plans (the Plans) for 2025 and 2030.

We appreciate the opportunity to comment on the draft Plans and are pleased to see that some of the concerns raised about the 2030 Interim Plan have been incorporated into the new outlined revisions.

Some remaining overall questions and concerns that CAN has are:

- Clean, renewable energy incentivized by the state should exclude biomass (biomass burning not only is highly emitting of carbon and other pollutants but also contributes to removal of forests that are key carbon sinks and provide a range of essential "services" such as supporting declining biodiversity and flood protection).
- It is unclear what is meant by prioritizing a least-cost approach as an objective. Cost evaluations should be based on ongoing and long-term energy costs, as well as costs of climate adaptation and of addressing increasing climate emergencies, not simply upfront costs.
- We are pleased to see a commitment to environmental justice (EJ) and equity in the Plans but would like to see those fleshed out more specifically to include targeted goals, participation in decision-making and funding for EJ communities.
- The Plans have ambitious goals for adoption of air source heat pumps (ASPHs), EVs, etc. but do not identify costs, potential funding sources, and specific plans for achieving these goals.
- The Plans should specify that they apply to all state agencies and entities involved in energy-related regulations and programs, including but not exclusive to the Department of Utilities, the Department of Energy Resources, the Department of Environmental Protection, and the Board of Building Regulation and Standards.

Transportation:

- To limit vehicle miles travelled, the Plans should include the expansion of Broadband in neighborhoods and communities where it is still unavailable, such as some small rural towns. This would enable increased telecommuting, access to resources such as online healthcare, education, and job training, and would reduce travel and congestion.
- While we support reforming the MOR-EV program to create a point-of-sale incentive and additional incentives targeting high mileage, and low- and moderate-income drivers, the additional incentives needed should be specified and funding sources sited.
- The Plans need to specify the importance of full funding to electrify Regional Transit Authorities and expanding and electrifying East-West trains, to reduce driving necessary in rural areas and for low-income residents who may not be able to afford EVs.

Buildings:

- To reach the ambitious goal of installing 500,000 ASHPs in residences by 2025 and 1 million by 2030, the Plans need to provide an equally ambitious and specific outreach plan.
- The Plans do not specify a focus on installing ASHPs for low-income and EJ residents, an essential component to equitable energy transitions.
    - They should ensure that incentives for low-income and EJ residents and landlords of low-income housing are sufficient to make this rapid transition viable and likely.
    - The Plans should consider ways to ensure that low-income and EJ residents who transition to ASHPs have *overall* utility bills that are no higher than their previous utility bills, after factoring in higher electric usage and payments.
- Cold climate ASHPs, sized correctly using heat load calculations for whole-home installations, can meet the heating needs of residences that have had energy efficiency measures installed. This should be clarified as the goal.
- The definition of electric space heating should <u>not</u> include hybrid heating systems with fossil fuels.
- The Plans should identify a clear metric to measure energy efficiency, such as the HERS rating.

Electricity:

- Funding to MassCEC for workforce development should have a strong focus on training residents from low-income and environmental justice communities.
- Grid modernization must be required to allow for the increased demand for electricity.
- Investor-owned utilities should be required to provide for time-of-use billing.

Non-Energy & Industrial

- The Plans' commitment to using lower Global Warming Potential (GWP) hydrofluorocarbon (HFC) refrigerants is especially important as relates to the planned rapid adoption of air source heat pumps and should be accelerated as lower GWP HFC's become available.
- The Plans' changed approach for Gas System Enhancement Plans should *focus on* the replacement of gas systems with alternatives such as electrification, retirement of gas pipelines and transforming gas heating to networked groundsource heat pump systems, as being piloted by Eversource Gas.

Natural & Working Lands

- Massachusetts should track existing solar development siting to identify the number of forested acres cleared for PV installations and to plan for solar development that avoids more significant losses of MA forests (according to Clark University's mapping, as of 2019, 49% of all land in PV was previously forested, equaling thousands of acres lost).
- We recommend that the Plans provide more meaningful incentives and disincentives to encourage solar development on rooftops and developed and degraded lands and strongly discourage solar that replaces forests, agricultural land and other valuable open spaces.
- The new acres of tree cover for urban areas in the Plans are important to help reduce heat island effects, but in addition, re-forestation of functional forest ecosystems is an essential component to significant carbon sequestration in trees and forest soils.

Thank you for consideration of CAN's recommendations.

Sincerely,

Sally Pick

On behalf of Climate Action Now (CAN), Western Mass

April 30, 2022

Secretary Kathleen Theoharides, Undersecretary Judy Chang, and Undersecretary Beth Card
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900 Boston, MA 02114

RE: A Better City's Comments on the 2025/2030 Clean Energy and Climate Plan

Dear Secretary Theoharides, Undersecretary Chang, and Undersecretary Card:

On behalf of our 130 member businesses and institutions, thank you for your leadership in developing the 2025/2030 Clean Energy and Climate Plan (CECP). A Better City appreciates the Baker Administration's commitment to identifying cost-effective and equitable strategies to ensure that Massachusetts meets or exceeds its ambitious climate goals.

A Better City is honored to sit on the Global Warming Solutions Act Implementation Advisory Committee (IAC) and to serve on both the Transportation Working Group and Buildings Sector Working Group. A Better City appreciated the opportunity to review the publicly available CECP presentation, as well as the more detailed sector-specific policy description slides that were shared with IAC members on the evening of April 26th. The public comment process would have been more meaningful and robust if additional detail were provided with adequate time for review. The enclosed comments focus primarily on the CECP transportation and buildings sector strategies and include additional comments for consideration regarding natural and working lands, electricity, and climate justice. All comments are informed by A Better City's participation on the IAC and ongoing collaboration with the business community.

A Better City recognizes the many improvements made to the interim CECP and encourages EEA to further refine the proposed policies to address two key shortcomings: 1) the CECP transportation sector policies fail to prioritize investment in public transit, instead focusing almost exclusively on the promotion of zero emission vehicles (ZEVs)—this strategy contradicts Governor Baker's own Commission on the Future of Transportation report and represents a missed opportunity to maximize co-benefits that will create a more vibrant, equitable, and connected Commonwealth for all, and 2) the CECP building sector policies do not adequately address some of the major hurdles that must be overcome to electrify systems in existing commercial, industrial, and institutional building stock, including the scale of existing building retrofits that must be prioritized, technical and financial constraints, and access to clean, reliable, and affordable electricity.

In summary, A Better City offers the following recommendations to strengthen the CECP as the Baker Administration considers final changes before the end of June deadline:

- **Transportation Sector Policies**: A Better City urges EEA to revise the CECP to include a new standalone strategy to modernize, expand, and improve public transit throughout the Commonwealth and to decarbonize passenger train and bus fleets. More specifically, this policy should include commitments to fully fund and expedite the MBTA Bus Modernization Plan; advance Regional Rail as endorsed by the MBTA Fiscal Control and Management Board in November 2019, including electrification of the commuter rail network, frequent all-day service, and accessible stations with high-level platforms; establish a new MBTA low-income fare program to increase ridership; and launch an integrated workforce development program to train existing MBTA/RTA employees and to build the skilled labor force of the future. Beyond prioritizing investment in public transit, the CECP should provide point of sale incentives to support a more comprehensive category of LEVs (not just e-bikes); support Transportation Management Association (TMA)-led transportation demand management (TDM) strategies as well as the development of active transportation infrastructure; advance smart roadway pricing strategies; consider offering incentives for the purchase of select used ZEVs and LEVs for both individual and businesses; support the electrification of commercial and government fleets; and prioritize the build out of fast, adaptable charging infrastructure at MBTA-owned parking lots, including commuter rail lots, in addition to other state and municipal government facilities.

- **Buildings Sector Policies**: To further improve the CECP, A Better City recommends enhancing the proposed buildings sector policies to include: prioritizing deep building weatherization—both passive efficiency and digital technologies, which are currently not addressed in the CECP; continuing the discussion of advancing hybrid heating solutions for unique, hard-to-decarbonize commercial and industrial buildings; including comments made during the update to the Massachusetts Stretch Energy Code and development of the Municipal Opt-In Specialized Stretch Energy Code considering the use of source energy for building performance calculations and an update to the Straw Proposal's data modelling to account for COVID-19 impacts; working with Boston and Cambridge to develop a streamlined state reporting structure that is aligned with existing building energy and emissions reporting mechanisms within municipalities; clarifying how energy scorecards at point of lease/sale are anticipated to work within commercial buildings; and conducting a building electrification sequencing study to understand the optimal timing of building electrification as a key step in a comprehensive and strategic energy transition. A Better City also supports: the development of a climate finance mechanism pilot to support the equitable decarbonization of the built environment; the management of energy price impacts and reduced electricity rates for heating; the development of GHG accounting for biofuels, biogas, and green hydrogen; and the expansion of workforce development, with a recommendation that career training and job placement for residents of historically excluded and environmental justice communities be prioritized.

- **Other Policies:** A Better City has also enclosed comments to improve the Natural and Working Lands (NWL), Electricity, and Climate Justice recommendations of the CECP. Primary points for NWL include: incorporating carbon sequestration data into the Massachusetts Greenhouse Gas Inventory; including targets for reduction of methane emissions from agriculture; tracking tree canopy coverage on public and privately owned lands and partnering with institutional landholders on implementation; engaging construction companies, engineering firms, and developers in scaling up

MA Timber; prioritizing environmental justice communities across all NWL strategies; encouraging community and climate resilience co-benefits alongside decarbonization, and; considering the recommendations of A Better City's June 2021 caron offsets report for carbon removal best practices. Primary points for the electricity sector include: initiating a grid decarbonization planning process, including a timeline and strategy for new clean energy procurement, as well as sequencing for grid, transmission, and interconnection capacity upgrades; including grid resiliency through the expansion of district-based microgrids, storage, and peak demand management, and; including financial subsidies to transition to a decarbonized future, with a carve out for lower income and environmental justice communities. Finally, primary recommendations for enhanced CECP climate justice include: considering the cross-sector recommendations from the IAC Climate Justice Working Group as well as including sector-specific commitments to climate justice in the CECP; establishing a Massachusetts Climate Bank to help leverage public-private partnerships, regional initiatives, and multi-year climate solutions to help equitably fund the critical infrastructure needed to achieve our statutory climate commitments, and; establishing the state-level Environmental Justice Council, as statutorily mandated by the Climate Act of 2021.

The Commonwealth must take bold action now to achieve our climate goals and to create the clean economy of the future, and the business community remains ready and committed to helping achieve these goals. Thank you again for your leadership, and for your time and consideration.

Sincerely,

Richard A. Dimino
President and CEO

Enclosures: 5

cc:

Jamey Tesler, Secretary and CEO, Massachusetts Department of Transportation
Steve Poftak, General Manager, MBTA
Patrick Woodcock, Commissioner, Department of Energy Resources
Michelle Wu, Mayor, City of Boston
Jascha Franklin-Hodge, Chief of Streets, City of Boston
Rev. Chief Mariama White-Hammond, Chief of Environment, Energy, & Open Space, City of Boston
Alison Brizius, Commissioner of Environment Department, City of Boston

ATTACHMENT A: DETAILED COMMENTS ON PROPOSED TRANSPORTATION SECTOR POLICIES

Summary

Overall, the CECP transportation sector policies fail to prioritize investment in public transit, instead focusing almost exclusively on the promotion of zero emission vehicles (ZEVs). This short-sighted, one-dimensional focus on ZEVs contradicts Governor Baker's own Commission on the Future of Transportation report, which stated that "high-frequency, high-capacity public transit is the most efficient and sustainable way to move large numbers of people as they go about their daily lives. This is true today and will be true in 2040." The current approach does not adequately encourage near-term vehicle miles traveled (VMT) reduction to reduce crippling roadway congestion and represents a missed opportunity to maximize co-benefits that will create a more vibrant, equitable, and connected Commonwealth for all.

While we recognize and appreciate the inclusion of the MBTA Communities & Housing Choice Program and commitment to fully implement the MBTA Bus Modernization Plan, the CECP's ZEV-focused approach still falls short. A Better City urges the EEA to revise the CECP to include a new standalone strategy to modernize, expand, and improve public transit throughout the Commonwealth and to rapidly decarbonize train and bus fleets, including the MBTA's commuter rail and bus systems and Regional Transit Authority (RTA) fleets. More specifically, this policy should include commitments to fully fund and expedite the MBTA Bus Modernization Plan; advance Regional Rail as endorsed by the MBTA Fiscal Control and Management Board in November 2019, including electrification of the commuter rail network, frequent all-day service, and accessible stations with high-level platforms; establish a new MBTA low-income fare program to increase ridership; and launch an integrated workforce development program to train existing MBTA/RTA employees and to build the skilled labor force of the future.

Beyond prioritizing investment in public transit, the CECP should provide point of sale incentives to support a more comprehensive category of LEVs (not just e-bikes); support Transportation Management Association (TMA)-led transportation demand management (TDM) strategies as well as the development of active transportation infrastructure; advance smart roadway pricing strategies; consider offering incentives for the purchase of select used ZEVs and LEVs for both individual and businesses; support the electrification of commercial and government fleets; and prioritize the build out of fast, adaptable charging infrastructure at MBTA-owned parking lots, including commuter rail lots, in addition to other state and municipal government facilities.

New Policy: Modernize, Expand, and Improve Public Transit Operations Throughout the Commonwealth and Decarbonize Trains and Bus Fleets

- A Better City urges the Commonwealth to set a clear goal for modernizing, expanding, and improving public transit—this should be a standalone strategy and the objective should also be woven into the other existing strategies, as appropriate.
- The final CECP should declare that additional resources for the MBTA are necessary in the short and long-term. The CECP presentation classifies the goal to "fully fund the MBTA Bus Modernization Program" as an ongoing effort. Unfortunately, in the current 5-year capital investment plan of the MBTA, which addresses years FY23-FY27, the MBTA will not be able to achieve this CECP goal, at least in the short-term. The effort to modernize the bus fleet and maintenance facilities is estimated to cost $4.5 billion over the next 15 years. There is some progress in the next five years and $450 million planned for bus facility modernization, with most of this amount going to build one new bus maintenance facility in North Quincy. This amount is not sufficient funding to keep pace of delivering a

new bus maintenance facility every two - three years. By way of example, the MBTA's second new bus maintenance facility is to be built at Arborway in Boston's Jamaica Plan neighborhood. Although the MBTA says it will construct this new facility by 2007, its latest investment plan provides zero funds for the construction of it.

- The CECP should include the critical foundational investments to needed for the MBTA to advance Regional Rail as endorsed by the Fiscal Control and Management Board (FMCB) in November 2019, including electrification of the commuter rail network, frequent all-day service, and accessible stations with high-level platforms. Full transformation of this mode could result an 150% increase in daily commuter rail boardings (+122,400 new transit trips), thus fewer vehicle hours and miles traveled and reduced congestion, reduced GHG emissions, and positive benefits to environmental justice communities in terms of accessibility, mobility, and environmental quality. Delaying transition to a fully electric commuter rail system, including procurement of EMUS, will prevent the Commonwealth from achieving its statewide decarbonization goals, but this investment plan is essentially ignored in the current MBTA capital plans. See A Better City's recent report, *Keeping the MBTA on Track: Review of Prior Commitments*, which provides status updates on key FMCB initiatives and offers recommendations for making continued progress toward implementing some of the FMCB's most consequential commitments.
- The CECP should include the establishment of and MTBA low-income fare program to encourage ridership, support low-income communities, and encourage equitable economic growth. A low-income fare policy enjoys broad public support across the state.
- Especially considering current operations and maintenance staffing shortages, the CECP should stablish an integrated workforce development program to train existing MBTA/RTA employees and to build the skilled labor force of the future.

T1: Promote Alternatives to Personal Vehicles

- **Clarifying support for the MBTA Bus Modernization Plan:** As discussed in more detail above, investment in the modernization, expansion, improvement, and decarbonization of the Commonwealth's transit infrastructure should be the foundation of the State's transportation climate policies. Prioritizing mode-shift to a decarbonized transit system will also help the Commonwealth achieve some of its equity and climate justice objectives by providing environmental justice communities with clean, reliable, affordability transit service. Nonetheless, the inclusion of the MBTA Communities & Housing Choice Program and MBTA Bus Modernization Plan are important initiatives that the CECP should clarify and expand upon.
    - A Better City recommends clarifying the specifics of the MBTA bus modernization plan, especially the timeline for transitioning to all Battery Electric Busses (BEBs) and exploiting opportunities to expedite that timeline. In addition to full funding for the MBTA's Bus Modernization Plan, A Better City suggest that the CECP provide new regulatory and financial incentives for the MBTA and RTAs, including: (a) reducing, if not eliminating, peak-load and peak-demand utility charges to public transit agencies for power used to fuel battery electric buses (BEB) vehicles and fleets; (b) taking necessary steps to immediately provide for off-peak utility pricing to public transit agencies for power used to fuel BEB vehicles and fleets; (c) requiring that all new public transit bus maintenance facilities be designed and constructed with all electrical substation and conduits to enable direct current fast charging (DCFC) access for each BEB vehicle to be housed at any such new facility; (d) providing immediate and substantial direct financial incentives to the MBTA and RTAs to encourage purchase of BEB vehicles and fleets and install complimentary DCFC infrastructure as needed. See A Better City's August 2019 report *New MBTA Bus Maintenance Facilities & Evolving Battery Electric Bus Technology, Case*

Study: Albany Street Garage for additional context and recommendations.

- **Enhancing incentives:** Incentives for Light Electric Vehicles (LEVs), including e-bikes, e-cargo delivery bikes, e-cargo family bikes, and e-mopeds, should be an important part of the CECP's strategy to encourage mode-shift from single occupancy vehicles. Additionally, enabling legislation may be needed to clarify the definition and classification of e-bikes and additional study may be needed to fully quantify the potential impact of investment in this sector.
    - **A Better City recommends expanding the incentive program to include a more comprehensive category of LEVs (not just e-bikes); providing incentives at the point of sale instead of rebates; advancing legislation to clarify the definition and classification of e-bikes; and performing a comprehensive LEV survey to understand the current and potential impact of these vehicles on GHG and VMT reduction targets.**

- **Enhancing employer-focused efforts and complete/shared streets programs:** Employer-led efforts to encourage alternatives to single occupancy commutes should be a key component of the CECP, but these efforts should not be limited to the encouragement of remote or hybrid work policies, which are only applicable to certain sectors and may have widespread impacts on the economic vibrancy of our downtowns. Transportation Management Associations (TMA) are well-positioned to lead transportation demand management (TDM) strategies as well as the development of active transportation infrastructure.
    - **A Better City recommends reinstituting state funding for Transportation Management Associations (TMAs), which are uniquely positioned to advance employer-led efforts to coordinate the use of private shuttles and ferries to complement public transit and to encourage commuter transit use and active transportation.**

- **Advancing smart roadway pricing strategies:** Massachusetts must move toward roadway pricing as a stable source of transportation revenue to maintain and create modern and safe transportation infrastructure, while encouraging mode-shift. Pricing strategies should be rooted in robust stakeholder engagement and provide exemptions and/or rebates for low-income families. Additionally, revenue investments should prioritize transit enhancements that service environmental justice communities and transit-dependent communities.
    - **A Better City urges the Commonwealth to develop and implement a smart roadway pricing/toll equity strategy to more accurately price the use of roads and bridges through smarter roadway pricing/tolling to create a regionally equitable road pricing network, raise new revenue for public transit, reduce GHG emissions, and improve air quality, especially for environmental justice population.**

T2: Implement Vehicle Emission Standards

- **Implementing California vehicle emission standards:** A Better City appreciates the Commonwealth's leadership in pursuing the implementation of California vehicle emission standards, which have the potential to transform market for market for clean vehicles.
    - **A Better City supports the implementation of the California Advanced Clean Cars II Standard and California Advanced Clean Trucks rule.**

T3: Improve Electric Vehicle Incentives

- **Enhancing MOR-EV and MOR-EV Truck:** A Better City appreciates the commitment to improve EV incentives to be more equitable and cost-effective by providing incentives at the point of sale for

individual and commercial purchases alike. Additionally, as referenced above, A Better City recognizes the state's effort to extend point of sale incentives to e-bikes.

- **To further enhance these programs, A Better City recommends considering the needs of low-income, not just moderate-coming consumers, and assessing the feasibility of offering incentives for select used ZEVs and LEVs for both individual and businesses.**

T4: Electrify Markets with Critical Health and Equity Implications

- **Including commercial and government fleets, as well as transit:** A Better City recognizes the importance of electrifying school busses, vehicles for hire, and delivery trucks. However, if the objective it to electrify markets with critical health and equity implications, then the primary focus should be on the electrification of transit, including the MBTA's commuter rail and bus system, as well as RTA fleets across the Commonwealth. Additionally, electrification efforts should also support business and government fleets.
  - **A Better City again encourages the Commonwealth to prioritize the decarbonization of MBTA and RTA transit systems. Additionally, A Better City suggests providing additional incentives and pilots to expedite both government and commercial fleet conversion across the commercial, industrial, and institutional sectors. Delivery sector opportunities should also include strategies to encourage the use of LEV delivery vehicles like e-bikes and e-trikes.**

T5: Build Charging Infrastructure and Encourage Smart Charging

- **Expanding charging infrastructure:** A Better City appreciates the intent of the proposed actions to build out the charging infrastructure needed to facilitate a widespread transition to ZEVs, including the opportunity to leverage federal funding, building codes, and climate finance strategies. Charging infrastructure should be designed to accommodate multiple forms of electric vehicles, including smaller-scale Light Electric Vehicles (LEVs), including e-bikes, e-cargo delivery bikes, e-cargo family bikes, and e-mopeds, rather than favor a single form-factor.
  - **A Better City recommends prioritizing the build out of fast, adaptable charging infrastructure at MBTA-owned parking lots, including commuter rail lots, in addition to other state and municipal government facilities. Additionally, A Better City suggests further exploring opportunities for public private partnerships to deploy charging infrastructure more rapidly. Infrastructure should be designed to accommodate both EVs and LEVs and prioritize equitable access to charging infrastructure, including in environmental justice communities.**

T6: Support Outreach and Education

- **Enhancing outreach and education:** A Better City supports the intent of the proposed policies to expand fleet advisory services and broader outreach and education efforts. Robust engagement will be needed to facilitate larger fleet conversions and individual LEV and ZEV purchases alike, and the CECP should focus on supporting the needs of low-income and environmental justice communities. Additionally, outreach and education efforts should include TDM and TMA-led strategies to reduce single occupancy vehicle trips and to encourage the use of transit and active transportation.
  - **A Better City recommends enhancing outreach and education efforts to catalyze rapid commercial fleet conversion and to prioritize the needs of low-income and environmental justice communities. Additionally, A Better City suggests expanding outreach and education efforts to include TDM and TMA-led strategies to reduce single occupancy vehicle trips and to encourage the use of transit and active transportation.**

ATTACHMENT B: DETAILED COMMENTS ON PROPOSED BUILDINGS SECTOR POLICIES

Summary

A Better City's comments on the buildings sectors policies are specifically relevant to commercial, industrial, and institutional buildings, although in many cases, can be applied to residential buildings as well.

The CECP strategies for reducing building emissions by 2025 and 2030 have been enhanced to include some of A Better City's recommendations from the interim CECP in March 2021 including: developing a climate finance mechanism; expanding workforce development opportunities; planning for electric distribution upgrades; managing energy price impacts including specialized electricity rates especially for low-income consumers; evaluating alternative natural gas options including biofuels, biogas and green hydrogen; and expanding the definition of electric space heating to include hybrid heating solutions.

To further improve the CECP, A Better City recommends enhancing the proposed policies to include: prioritizing deep building weatherization—both passive efficiency and digital technologies, neither of which are currently addressed; advancing hybrid heating solutions for hard to decarbonize buildings; including comments made during the update to the Massachusetts Stretch Energy Code and development of the Municipal Opt-In Specialized Stretch Energy Code; working with Boston and Cambridge to develop a streamlined state reporting structure that is aligned with existing reporting at the municipal level; clarifying how energy scorecards at point of lease/sale are anticipated to work within commercial buildings; and conducting a building electrification sequencing study to understand the optimal timing of building electrification as a key step in a comprehensive energy transition. A Better City also supports: the development of a climate finance mechanism pilot; the management of energy price impacts and reduced electricity rates for heating; the development of GHG accounting for biofuels, biogas, and green hydrogen; and the expansion of workforce development with a recommendation that career training and job placement for residents of historically excluded and environmental justice communities be prioritized.

New Policy: Enable Deep Weatherization

- We are concerned that deep weatherization, also referred to as deep energy retrofits, is not featured prominently in the CECP, as it will be the most important transformation within the buildings sector to ensure electrification is successful and climate goals are met. Traditionally, we think of deep weatherization as passive efficiency measures that include upgrades to the building envelope (walls, windows, roofs, and floors), as well as improvements to the performance of HVAC systems and lighting. These practices reduce the amount of energy demand within buildings, but the return on investment (ROI) is often more than 15 years, well beyond the ROI currently required by most commercial building owners. What is not discussed in the CECP is the role of digital technologies to complement deep weatherization. Digital technologies, like Building Automation Systems, provide greater flexibility in building operations by developing setpoints and optimizing for energy efficiency by space and occupancy at different times of the day. Recent studies have found ROIs for such digital technologies averaging 8 years.
- A Better City recommends that deep weatherization be prioritized within the CECP and include both passive efficiency and digital technologies like building automation systems, so these complementary approaches ensure the greatest energy efficiencies in the operation of our buildings.

B1: Clean Heat Cap

- **Advancing hybrid heating solutions for hard to decarbonize buildings:** A Better City is eagerly awaiting the outcomes of the Clean Heat Commission recommendations that will include residential and commercial sublimits for 2025 and 2030. We were grateful that the buildings sector key targets and metrics for 2030 have expanded the definition of electric space heating to include hybrid heating solutions that allow back-up fossil fuel systems. This is especially important for the limited commercial and industrial market segments (e.g., healthcare, manufacturing) that can still benefit from emissions reductions associated with Combined Heat and Power's (CHP) energy and non-energy benefits in the near term, while alternative technologies and fuels that can meet their unique needs are developed and scaled up.
    - **A Better City supports the allowance of hybrid heating solutions that allow back-up fossil fuel systems for hard to decarbonize buildings.**

B2: Performance Benchmarks & Standards

- **Considering improvements to the Stretch Energy Code and Municipal Opt-In Specialized Stretch Energy Code:** A Better City provided substantive comments to the Straw Proposal drafted to update the Massachusetts Stretch Energy Code and to develop the Municipal Opt-In Specialized Stretch Energy Code. We encouraged consideration of the following recommendations to: 1) address grid reliability, capacity, resiliency, and affordability (addressed in electricity sector below); 2) consider using source energy for building performance calculations; 3) share and consider updates to the Straw Proposal's data modelling to account for COVID-19 impacts; 4) fill the Board of Building Regulations and Standards' Commercial & Industrial expert seat vacancy; 5) prioritize equitable workforce development opportunities; and 6) reassess requirements in light of supply chain constraints.
    - **Please see the enclosed comments from A Better City.**

- **Developing a streamlined state reporting structure:** A Better City supports the development of a state reporting structure to gather building performance data on large buildings. Most of A Better City's member buildings in Boston report to the Building Emissions Reduction and Disclosure Ordinance (BERDO 2.0). We have worked closely with the City of Boston to ensure the updated Ordinance is workable for all parties involved.
    - **A Better City recommends working closely with the City of Boston and City of Cambridge in the development of the reporting structure so that it aligns with the BERDO and BEUDO reporting structures to alleviate the need for "double" reporting for those building owners with portfolios across municipalities.**

- **Clarifying energy scorecards at point of lease/sale:** A Better City would like to understand how the program for energy scorecards at point of lease/sale is anticipated to work within commercial buildings. Commercial buildings work with tenants at the beginning of a lease to develop a tenant-specific contract that often lasts 10-15 years. To begin to discuss the tenant/owner split incentive in commercial buildings, A Better City published a report on Green Leasing in 2014 as an effective strategy for energy efficiency.
    - **A Better City recommends clarifying how the energy scorecard would work within commercial buildings.**

B3: Delivering Results at Scale

- **Conducting a building electrification sequencing study:** A Better City supports the development of a comprehensive energy transition approach and suggests this start with a study to understand the phasing of large existing buildings electrification and whether our grid can support this kind of transformation. A recent report on powering New York City's buildings with electricity, *Grid Ready: Powering NYC's All-Electric Buildings*, looks at exactly this question of electrification sequencing. The report provides an excellent model to understand the sequencing of the electrification of our economy, as it investigates how power is delivered to NYC, how building electrification will increase electricity demand, and therefore, how electrification can be sequenced to ensure the increasing demand is safely and strategically managed. Included with the report is a *Grid Ready Mapping Tool* that shows the capacity for electrification by network area with the current grid and allows forecasting to plan infrastructure updates for the future. By adopting a similar approach, the Commonwealth could understand the current capacity of the ISO-NE electricity grid by load zone, model the increased demand from the electrification of the building, transportation, and other sectors, and then be able to effectively sequence this transition safely and cost-effectively over time. We see this as a key part of a comprehensive energy transition.
    - **A Better City recommends the 2030 CECP include a study of the current capacity of the ISO-NE electricity grid by load zone, detailing the anticipated increased demand on these zones with the electrification of the building and transportation sectors of the economy, and the recommended sequencing of the state's electrification process considering the increase in electricity capacity and transmission that will be required.**

- **Establishing a climate finance mechanism pilot:** Scaling up building sector decarbonization will require a comprehensive funding and financing strategy to support deep weatherization, equitable workforce development, renewable energy generation and accessibility, and clean heating, cooling, and ventilation. As this kind of building upgrade happens infrequently, a dedicated funding source beyond Mass Save incentives should be established to advance this work.
    - **A Better City supports the development of a climate finance mechanism pilot, which could be explored through the creation of a Massachusetts Climate Bank, as also referenced in the natural and working lands and climate justice recommendations included below.**

- **Expanding workforce development:** Career training and job placement for residents of historically excluded and environmental justice communities should be elevated through existing and developing programs at vocational schools, community colleges, technical institutes, high schools, and within a municipality's equitable workforce development programs.
    - **A Better City supports workforce development expansion to meet the growing needs of deep building weatherization, the installation of heat pump technologies, and the increasingly digital operation of buildings to ensure maximum efficiency (as discussed under the deep weatherization section above).**

B4: Infrastructure Planning & Utility Oversight

- **Managing energy price impacts and specialized electricity rates:** Ensuring the cost of transitioning to a decarbonized economy is managed equitably across fuels and populations is essential to all ratepayers, including residential and commercial customers alike. As stated in more detail in our Climate Justice comments below, we support the development of a funding mechanism like a Massachusetts Climate Bank to help leverage public-private partnerships, regional initiatives, and multi-year climate solutions

to uplift all communities but to prioritize solutions in environmental justice, low-income, and historically disinvested communities.

  - **A Better City supports the management of energy price impacts and the development and implementation of reduced electricity rates for heating, especially for low-income consumers.**

- **Developing GHG accounting:** For large commercial and institutional building types that operate 24/7, require extensive emergency backups, and/or are more difficult and expensive to electrify, it is important to understand how low-and-zero carbon fuels can support building decarbonization. It is also important to understand the optimal application for these low-and-zero carbon fuels within these hard to decarbonize buildings.
  - **A Better City supports the development of GHG accounting for biofuels, biogas, and green hydrogen.**

ATTACHMENT C: COMMENTS ON PROPOSED NATURAL & WORKING LANDS POLICIES

Summary

A Better City's comments and recommendations for the Natural and Working Lands (NWL) sector's policies, sublimits, and key targets and metrics focus on the inclusion of carbon sequestration data in the Massachusetts Greenhouse Gas Inventory, tracking tree canopy coverage data, incorporating methane emissions, ensuring climate and community resilience co-benefits, prioritizing environmental justice and historically disinvested communities in our nature-based solutions, scaling up suppliers and distributors of durable wood in the construction and building industry, and clarifying and defining best practices for carbon removals and carbon sequestration accounting.

L1: Protect Natural & Working Lands/Keep Natural & Working Lands As Natural & Working Lands

- **Including carbon sequestration data in the Massachusetts Greenhouse Gas Inventory**: A Better City supports the intent to protect and expand NWL for community benefit, ecosystem benefits, carbon sequestration, and carbon storage opportunities. As detailed below, we recommend the inclusion of carbon sequestration data in the Massachusetts Greenhouse Gas Inventory (MA GHG Inventory) to support the protection of existing NWL, and to help prevent land conversion. We also support the watershed-scale conservation of existing NWL, as this will help to encourage regional climate resilient solutions and benefits that operate across jurisdictional boundaries in Massachusetts.
    - **A Better City recommends incorporating carbon sequestration and carbon removals data into the Massachusetts Greenhouse Gas Inventory (MA GHG Inventory).**

L2: Manage Natural & Working Lands

- **Tracking tree canopy coverage data**: A Better City supports and appreciates the commitments to expanding new tree canopy coverage in 2025 and 2030 and commitments to climate-smart forestry, but we are concerned that there is no intent to track carbon sequestration or carbon removals associated with baseline tree canopy and/or expanded tree canopy in NWL over time. In addition, we are curious how the NWL sector targets and metrics for tree canopy expansion will relate to privately owned land, particularly institutional land. Given the large amount of tree canopy found on higher education and other institutional land in Boston, for example (and the lack of data that Boston's 20-Year Urban Forest Plan has on tree canopy located on privately owned land), it would be helpful to find solutions that partner with large institutional private landowners across the state.
    - **A Better City recommends that the 2030 CECP track tree canopy coverage data over time on both public and privately owned land and include carbon removal and carbon sequestration data as inputs into the Massachusetts Greenhouse Gas Inventory (MA GHG Inventory), as mentioned above. In establishing baseline and ongoing data for tree canopy coverage, we recommend partnering with private institutional landholders on data collection, implementation, and ongoing financing required for tree canopy expansion.**

- **Incorporating methane emissions**: While we support the 2030 CECP's focus on heathy soil management best practices for achieving peak carbon sequestration potential on NWL, we are concerned at the lack of consideration or strategy for reducing methane emissions from agriculture. Given the higher global warming potential of methane vs. carbon, and the recent report from the National Oceanographic and Atmospheric Administration showing that atmospheric methane levels in 2021 were the highest on record, we suggest that the 2030 CECP also consider including methane emissions in tracking progress in

the NWL sector, and/or incorporating agricultural methane emissions data through carbon dioxide equivalent metrics in the MA GHG Inventory.

- **A Better City recommends including methane emissions reduction targets and priorities within the natural and working lands sector of the CECP as they relate to agricultural emissions.**

- **Ensuring climate and community resilience co-benefits**: Beyond the CECP's focus on climate-smart forestry practices that benefit decarbonization and resilience, A Better City recommends prioritizing nature-based solutions that enhance community and climate-resilience co-benefits whenever possible across the strategies of the NWL sector. Given the opportunity for nature-based solutions to provide co-benefits that can help to address extreme heat, extreme precipitation and storm damage, coastal and inland flooding, sea level rise, storm surge, and other severe climate impacts, we believe that ensuring co-benefits across community and climate resilience in this sector will be vital to achieving our climate goals and protecting our communities in as cost-effective a manner as possible. While we appreciate the reference to the Municipal Vulnerability Preparedness program in strategy L3 to increase carbon sequestration and lessen heat islands, and the mention of climate resilience co-benefits in climate smart forestry in strategy L2, we recommend expanding the prioritization of community and climate resilience initiatives across all CECP strategies in the NWL sector.
    - **A Better City supports the CECP including the consideration of community and climate resilience co-benefits in climate-smart forestry, and we recommend prioritizing such co-benefits in environmental justice and historically disinvested communities in particular, across all strategies in the NWL sector. We also recommend encouraging regional community and climate resilience co-benefits to ensure nature-based solutions that work across jurisdictional boundaries and benefit multiple communities.**

L3: Restore Natural & Working Lands

- **Prioritizing environmental justice and historically disinvested communities in our nature-based solutions:** We appreciate the commitments included to add at least 5,000 new acres of tree cover by 2025 and at least 16,100 acres of new tree cover by 2030, and the intent to increase tree planting funding for the Greening Gateway Cities Program. Beyond the Greening Gateway Cities Program, we also believe that it will be vitally important to prioritize retaining and expanding tree canopy in environmental justice populations that have disproportionately high risks of asthma and other negative health impacts from air pollution, high heat exposure during heat waves, and disproportionately low tree canopy coverage. In the example of Boston, we support the 20-Year Urban Forest Plan's effort to prioritize historically disinvested and environmental justice communities in expanding urban tree canopy coverage. We also appreciate Boston's emphasis on equity and climate justice in the recommendations of the recently released *Heat Resilience Solutions for Boston* report. At a state-level, both in urban and rural areas, it will be important to prioritize new tree cover in areas like Springfield, with some of the highest rates of asthma in the country, as well as in areas that are heat islands during heat wave events, within historically excluded and disinvested communities.
    - **A Better City recommends that the suggested targets for tree canopy coverage expansion explicitly prioritize environmental justice and historically disinvested communities whenever possible and emphasize co-benefits across tree canopy coverage and heat resilience solutions. We recommend following the 20-Year Urban Forest Plan model currently under development in Boston, as well as the *Heat Resilience Solutions for Boston* report. We also recommend prioritizing Municipal Vulnerability Preparedness grants that operate at a regional scale whenever possible.**

L4: Incentivize Durable Wood Products

- **Scaling up suppliers and distributors of durable wood in the construction and building industry:** In order to effectively scale up the use of durable wood products that store carbon in our new construction and major renovations across the Commonwealth, it will be important to incorporate the perspective of construction companies, engineering firms, and developers in the design and implementation of durable wood product incentive programs and the expansion of MA Timber usage.
    - **A Better City recommends including the expertise of construction companies, engineering firms, and developers in the design and implementation of durable wood product incentive programs to ensure the scaling up of MA Timber in new construction and major renovations.**

L5: Develop Accounting and Market Frameworks by 2025 for Achieving Net Zero with Sequestration Beyond our Natural & Working Lands

- **Clarifying and defining best practices for carbon removals and carbon sequestration accounting**: We appreciate the ongoing efforts to include carbon sequestration accounting, measurement, and market frameworks in the Commonwealth's climate solutions in the NWL sector. However, we are concerned that there are no targets or metrics for carbon sequestration included in the CECP, nor are there any recommendations for the ongoing governance and stakeholder engagement needed for effective, transparent, and equitable carbon removals in Massachusetts. As mentioned previously, as a first step, A Better City recommends including a mechanism for the accounting of carbon sequestration within the Massachusetts Greenhouse Gas Inventory to help establish an accurate baseline and track progress of carbon removals over time. Such data within the GHG Inventory will help the Commonwealth to better track net emissions reductions in real time, and to also provide the evidence for why carbon storage in existing natural and working lands must be prioritized over land conversion when possible. Additionally, A Better City suggests including the suggested targets and metrics for carbon sequestration from the 2050 Decarbonization Roadmap Study within the CECP itself, as well as the establishment of a Carbon Sequestration Task Force to leverage carbon sequestration and carbon removal expertise. Finally, A Better City recommends referring to our June 2021 report *Establishing a Regional Offsetting Program for Emissions Reduction Compliance in Massachusetts: Challenges and Opportunities* and its associated recommendations for effective, transparent, and equitable carbon removal best practices in the Commonwealth. A Better City members like Novartis, Boston Properties, Mass General Brigham, and Boston University all have substantial expertise in the purchase, verification, and selling of verified carbon credits and their associated carbon removals. We suggest inclusion of A Better City member experts on carbon removals in the recommended Carbon Sequestration Task Force.
    - **A Better City recommends including suggested targets for carbon sequestration from the 2050 Roadmap Study into the 2030 CECP and establishing the suggested Carbon Sequestration Task Force to help with carbon sequestration implementation, governance, and monitoring over time. We strongly recommend clarifying best practices for effective, transparent, and equitable carbon removals in Massachusetts as detailed in A Better City's June 2021 carbon offsets report.**

ATTACHMENT D: COMMENTS ON PROPOSED ELECTRICITY SECTOR POLICIES

A Better City offers general comments and recommendations for the 2025-2030 electricity sector's policies, sublimits, and key targets and metrics, with a focus on grid cleaning, capacity and reliability, resiliency, and affordability to ensure a just and equitable transition to a decarbonized economy.

- **Greening the grid:** The interim CECP for 2030 listed key metrics and targets as 7GW of new capacity (solar, hydro, and offshore wind), and a project pipeline of 8GW of additional clean energy projects for 2030 in planning. Combined, this totals 15GW of new clean energy capacity. However, the new CECP key metrics and targets listed for 2030 are 2.8GW of offshore wind operational by 2030. We understand that the status of the Hydro-Quebec project has had a major impact on the state's ability to expand reliable clean energy capacity as quickly as anticipated, but we are concerned that this significant decrease in clean energy electric capacity will impede decarbonization actions within the building and transportation sectors. For example, if the electricity grid's cleanliness isn't keeping pace with the Commonwealth's statutory climate commitments, then building policies like the emissions reduction standards for existing buildings in Boston and Cambridge (BERDO 2.0 and BEUDO, respectively) will result in building owners being penalized for non-compliance.
    - **A Better City recommends including a planning process for the cleaning and greening of the ISO-NE grid and existing district-based operators in the 2030 CECP, detailing a recommended timeline and strategy for new clean energy procurement, to ensure that existing and developing building and transportation policies can realistically meet required emission reduction goals.**

- **Ensuring grid capacity and reliability:** The Energy Pathways to Deep Decarbonization report states that electricity demand will double by 2050 because of the electrification of our economy. A WBUR interview last week with ISO-NE CEO and President, Gordon van Welie, also said the ISO-NE electricity demand will double in the next 25 years or so, and winter peak loads will triple in the same period. Increases in electricity demand will increase the need for transmission infrastructure, site-specific capacity upgrades within buildings and transportation hubs, and interconnection capacity (a long-standing barrier to clean energy deployment). All these factors will also impact grid reliability. Particularly with the failure of the Quebec-Hydro project moving ahead to provide reliable, clean energy to Massachusetts, there is a substantial gap in ensuring a reliable and safe transition to renewable energy economy.
    - **A Better City recommends a planning process, including a timeline, be undertaken to increase grid, transmission, and interconnection capacity. Such a process would ensure that buildings, transportation, and other sectors of the economy can reliably transition to electricity for all their energy needs, and upgrade site infrastructure to carry increased electrical loads in a timely manner. We understand this may be a step-by-step process and recommend as a first step – as referenced above within buildings – a planning process similar to *Grid Ready, Powering NYC's All-Electric Buildings* that includes a *mapping tool*. This step would allow us to understand the current grid, transmission, and interconnection capacity within each load zone, and the anticipated demand within each load zone, including anticipated changes from a summer to winter peak in demand, and therefore, how long each load zone can meet increased electricity demand before capacity is reached. Such strategic planning is essential to understanding which zones can handle increased electrical loads now, and which will need additional infrastructure to meet the increased demand.**

- **Improving grid resiliency:** With the anticipated increase in electricity demand, the resilience of our electricity supply is also essential for a safe transition to a decarbonized economy. We are concerned that the current plan does not directly address grid resiliency alongside decarbonization. Some key elements we would like to see supported and incentivized include district-based microgrids, expanded energy storage, and peak demand management to ensure the grid's peak demands are reduced as much as possible. In addition, it will be important for critical grid infrastructure to be resilient to the impacts of climate change, like extreme heat, extreme precipitation and storm damage, sea level rise, storm surge, and both coastal and inland flooding.
    - **A Better City recommends the Plan include strategies and incentives for programs like microgrids, storage, and peak demand management to ensure grid resiliency. We also recommend ensuring that the 2030 CECP encourage critical electric grid infrastructure upgrades to be resilient to the impacts of climate change, including extreme heat.**

- **Ensuring grid affordability:** As electricity demand is expected to double in the next 25 years, costs associated with this increase in capacity like upgrading the distribution and transmissions systems and renewable energy and storage infrastructure, will be borne by ratepayers. In addition, upgrades will need to be made onsite, e.g., within a building, to handle the increase in electricity load. For large commercial buildings, these upgrades will come at a significant cost, especially when these will be added to the costs of new distribution systems. In addition, we are concerned that as wealthier, more resourced communities are likely to move towards electrification more quickly than others, that lower income rate payers and environmental justice communities will be left behind with higher energy burdens and fossil fuel infrastructure costs as stranded rate payers. Currently, there is nothing in the Plan to subsidize and finance the transition to a decarbonized economy, especially for lower income and environmental justice communities.
    - **A Better City recommends the Plan include financial subsidies to transition to a decarbonized future with a carve out for lower income and environmental justice communities. This could potentially be done through the establishment of a Massachusetts Climate Bank, as mentioned in several recommendations throughout this document.**

ATTACHMENT E: OTHER COMMENTS

- **Climate Justice & Ensuring an Equitable Transition to a Decarbonized Economy**: We are concerned that there was little to no inclusion of the cross-sector climate justice priorities put forward by the Implementation Advisory Committee's Climate Justice Working Group in the 2030 CECP. In addition to considering these cross-sector priorities for climate justice across all components of the CECP for 2030, we also recommend including climate justice commitments in each sector detailed in the CECP. Without committing to such targets upfront, we risk leaving behind our most vulnerable and historically disinvested communities as we transition to a decarbonized economy, and risk perpetuating ongoing harms in our climate policy. We also recommend including overarching CECP recommendations on the equitable funding and financing of a transition to a decarbonized economy. In particular, we recommend establishing a Massachusetts Climate Bank to help leverage public-private partnerships, regional initiatives, and multi-year climate solutions to help fund the critical infrastructure needed to achieve our statutory climate commitments. Such a climate or green bank should specifically uplift and prioritize solutions in environmental justice, low-income, and historically disinvested communities, to ensure that we have a truly equitable transition to a decarbonized economy and are not leaving communities behind to achieve our climate commitments. Finally, we suggest the CECP consider equitable climate governance commitments that can help govern, implement, and finance our climate solutions over time. We strongly recommend the overdue establishment of a state-level Environmental Justice Council as mandated by the Climate Act of 2021. Specifying and affirming equitable climate governance, implementation, and financing commitments in the 2030 CECP will help to hold the Commonwealth accountable in ensuring that no one is left behind as we transition to a decarbonized economy.
    - **A Better City suggests considering the cross-sector CECP recommendations from the IAC Climate Justice Working Group, as well as including sector-specific climate justice commitments in the CECP. We also recommend establishing a Massachusetts Climate Bank to help fund and finance an equitable transition to a decarbonized economy. Finally, we recommend the overdue establishment of an Environmental Justice Council in Massachusetts.**

Advancing the Clean Energy Future

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April 30, 2022

Secretary Kathleen Theoharides
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
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RE: Draft Clean Energy and Climate Plan for 2025 and 2030

Dear Secretary Theoharides, Undersecretary Chang, and the 2025 and 2030 Clean Energy and Climate Plan Team:

Acadia Center appreciates the opportunity to offer comments on the Updated Interim Clean Energy and Climate Plan (CECP) for 2025 and 2030. These plans represent an opportunity to set the Commonwealth on a prosperous decarbonization path that promotes health, safety, and the environment and centers Environmental Justice. However, there is a real danger in a plan that falls short. Short-sighted investments or pursuits that lock-in the Commonwealth into maladaptive options could threaten our Commonwealth's ability to meet its ambitious net zero greenhouse gas emissions reduction targets. Therefore, it is absolutely essential to get this right now.

In December of 2020, the Executive Office of Energy and Environmental Affairs (EEA) released a full interim CECP for 2030. This document called for bold reductions in emissions from each major sector of the economy through ambitious strategies, like the deployment of heat pumps in one million homes by 2030 and the deployment of seven gigawatts of new clean energy projects. While progressive, Acadia Center and other stakeholders believed there were areas in which the plan could be improved. These stakeholders were grateful to be afforded an opportunity to see this full document and submit comments on it. Acadia Center, both individually and as part of coalitions, submitted several sets of comments outlining ways in which it believed the plans could be improved. These recommendations included adding additional policies to commit to equity and justice, the development of a comprehensive strategy to meet the one million heat pump target, and expanding public transit operations throughout the Commonwealth.

Stakeholder input and engagement is a critical part of public process, and the CECP is no exception. Acadia Center is aware and appreciative of the difficult work that EEA has performed to incorporate stakeholder comments and revise the plans. Along the way, EEA has continued to convene the GWSA Implementation Advisory Committee, held several public meetings on the CECP for 2025 and 2030, and done outreach to stakeholders. This difficult work has led to an updated plan.

However, EEA has not released the updated plan itself. As the deadline to comment approaches, the only document upon which stakeholders can rely for updated information is a 22-slide deck posted for public hearings on April 14th and 15th. Only five of these slides document changes from the interim 2030 CECP. This lack of detail stands in stark contrast to the previous comment period. In that period, stakeholders were provided with a full draft on which we could base our comments and critiques. With the level of information provided with this update, it is unfortunately

difficult to provide cohesive and comprehensive comments. For example, the slide deck lists the anticipated number of passenger EVs on the road in 2030 as 900,000. However, without a breakdown by type (e.g. plug-in hybrid versus fully electric) this target is difficult to evaluate. Acadia Center fully understands the difficult task that EEA has in getting the plan out by the statutory mandate of July 1st. However, more information is necessary to enable a healthy and full response to the Updated CECP that incorporates all voices meaningfully.

Updated CECP vs Interim CECP Comments

What was included

As stated earlier, Acadia Center submitted several sets of comments with recommendations for improvements to the Interim CECP. The organization appreciates that some of these recommendations appear to have been incorporated, including:

- Buildings
  - Developing building performance reporting methodology for the Commonwealth
  - Continuing to support weatherization and electrification, though Acadia Center would like to see this expanded to include pre-weatherization barriers and has concerns with hybrid heating proposals, which will be outlined below.
- Transportation
  - Accelerating the coordinated deployment of EV charging stations
  - Electrifying transit buses
  - Modifying EV rebate programs to accelerate deployment and expand access to electric mobility options
- Power Generation (the modifications to this section were required by the Climate Act)
  - Setting Municipal Light Plant GHG emissions standards
  - Continuing aggressive promotion of timelines for solar and offshore wind
  - Raising the Renewable Portfolio Standard
- Gas
  - Changing the approach to Gas System Enhancement Plans
  - Long-term utility infrastructure planning aligning with decarbonization

Acadia Center also commends EEA for creating a declining cap on building for heating emissions, developing municipal opt-in building scorecards at point of sale and lease, implementing the MBTA Communities and Housing Choice program, and launching a program to electrify vehicles for hire. The inclusion of these policies show the foresight necessary to achieve our decarbonization requirements.

What Wasn't Included

Unfortunately, based upon the available information, a number of critical recommendations from stakeholders appear not to have been incorporated, such as explicit protections for farmlands and forests in solar development, a regulatory or legislative target to ensure rapid progress and jump-start the marketplace for zero-emissions-ready technologies in buildings, or developing and implementing strategies to reduce vehicle miles traveled. Most

concerning, despite requests for Environmental Justice themes to be weaved into every program along with specific asks in that sector, the available information indicates a lack of explicit Environmental Justice provisions. In fact, it appears that the only explicit Environmental Justice provisions are to reform the MOR-EV program to target low- and moderate-income drivers and require equity and Environmental Justice to be included in siting board decisions. While both of these are welcome inclusions, it is not enough. There is no mention at all of other recommendations, such as requiring a diverse hiring and workforce development process, prioritizing investments in overburdened and underserved communities, and allocating funds and jobs for climate adaptation projects that benefit Environmental Justice populations. Additionally, most of the focus of the transportation sector is on electric vehicles, while public transit expansion tends to benefit Environmental Justice populations more. While all of these may end up in the final CECP, that information is not clear given the current information.

Unclear Whether Incorporated

A number of recommendations provided by Acadia Center and other stakeholders could be viewed as included in this Updated CECP. For example, Acadia Center requested the development of a specific framework for electrifying one million homes and 300-400 million square feet of commercial real estate by 2030. Acadia Center also recommended addressing Mass Save program design and cost-effectiveness accounting methods that limit electrification. The Updated CECP calls for the development of a "comprehensive Energy Transition approach to enhance Mass Save®," with a recommendation to the legislature by December 2023. This program has the potential to address those two recommendations, but without more information about the specific details of this program, it is impossible to judge. This evaluation is emblematic of the difficulties of evaluating the plan updates overall. Other stakeholder recommendations, like greatly expanding public service, are also possibly touched upon in the slide deck. The Updated CECP slides reference fully funding the MBTA Bus Modernization Program, but without more specific details it is difficult to judge on the merits.

In-Depth Modeling Concerns

As stated earlier, it is difficult to comprehensively judge the updated CECP with the level on information provided. However, Acadia Center does have major concerns about some of the provisions outlined in the slide deck. Acadia Center will cover those issues more in-depth here.

Concerns Related to Hybrid Heating

As it relates to the building sector, slide 14 of the April 14th presentation mentions: *"Expanding the definition of electric space heating to explicitly include hybrid heating solutions (for example a heat pump serving greater than 50% of heating demand, with a back-up fossil fuel system)."* This is a significant change from the metric included in the Interim CECP, which called for the full electrification of approximately a million housing units and full electrification of 300-400 million square feet of commercial building space by 2030.

All-electric buildings have a clear path to carbon neutrality as the electric grid becomes carbon-free over the ensuing decades – however, homes and businesses that have a long-term dependence on hybrid electric/gas heating systems do not, particularly if these buildings are relying on gas to supply nearly half of their total heating demand. This less aggressive hybrid heating metric results in a proposed GHG emission sublimit for the buildings sector by 2030 that is *37% higher* than the sublimit initially proposed in the Interim CECP. In addition,

promoting hybrid heating systems has potential ramifications beyond 2030 if not executed properly, as many of the fossil fuel boilers and furnaces installed over the next decade will still be operational well into the 2040s and even 2050s, and perpetuate the investment in gas distribution infrastructure that consumers may be paying for into those later decades as well.

Acadia Center encourages EEA to instead adopt policies that promote full electrification at every decision point, relying on hybrid heating solutions only when full electrification is not possible, for economic or technical reasons. Even then, any plan or policy promoting hybrid electrification as an intermediate step to full electrification of buildings needs a clearly articulated plan that details 1) Why hybrid heating is the best short-term approach; 2) How this near-term hybrid heating approach cost-effectively sets up buildings up for an eventual transition to all-electric heating, and; 3) How does the proposal to promote hybrid heating take into consideration the fact that we need to strategically decommission the gas distribution system over the coming decades? The details provided to stakeholders so far in the CECP process do not offer enough answers to any of the above questions. For this reason, it is impossible to fully articulate a response to the proposal.

Acadia Center hopes that the CECP proposal to rely heavily on hybrid heating systems is not the result of the findings of the recently released D.P.U. 20-80 Future of Gas report. The study pushes the narrative that a heavy reliance on hybrid gas heating systems offers one of the most cost-effective pathways to decarbonization of the buildings sector, but the analysis underlying this narrative is significantly flawed. The Future of Gas modeling, led by consulting firm Energy and Environmental Economics (E3), relies heavily on biomethane (often referred to as "RNG") in the Hybrid Electrification Scenario. For example, RNG accounts for over 80% of the total energy flowing through the pipes to homes and businesses in 2050 under the Hybrid Electrification Scenario.

Several of the key flaws in the analysis that undermine the validity of the Hybrid Electrification scenario as a viable path to economy-wide decarbonization by 2050 are listed below. For more information on these concerns, please see Acadia Center's December 2021 comments related to the Future of Gas draft scenario analysis found here. All of these concerns still hold true in the final analysis developed by E3.

- **Concern #1: Making a blanket assumption that all forms of RNG are carbon neutral.** This is simply not the case, particularly when considering significant methane leaks along the entire RNG supply chain.[1] RNG is methane and the same problems natural gas presents from a methane leak perspective hold true with RNG. The GHG accounting in the Massachusetts Greenhouse Gas Inventory ("MA GHG Inventory") has serious problems – these problems are amplified when decarbonization modeling, like that conducted by E3 in the Future of Gas, are repeated and used as the basis for making policy recommendations. **In Appendix 1 at the end of this document, Acadia Center has included our December 2021 letter to EEA on considerations for Massachusetts GHG accounting methodologies.**

[1] Emily Grubert 2020 Environ. Res. Lett. 15 084041 https://iopscience.iop.org/article/10.1088/1748-9326/ab9335

Just like the MA GHG Inventory, E3's analysis significantly underestimates the level of methane leaks in the current gas distribution system, ignores the GHG impacts of methane leaks occurring outside of the Commonwealth, uses an outdated global warming potential value for methane, and does not consider the global warming impacts of methane on a 20-year timescale. New York Switching from one form of methane to another (natural gas to RNG) does nothing to solve this problem. Switching from one form of methane to another (natural gas to RNG) does nothing to solve this problem. Switching from one form of methane to another (natural gas to RNG) does nothing to solve this problem.[2] Switching from one form of methane to another (natural gas to RNG) does nothing to solve this problem.

- **#2: Overestimating the supply of RNG that will realistically be available to the Commonwealth in the future and downplaying the intense level of future competition for biomass feedstocks from other states and other sectors of the economy.** Truly sustainable biomass that can be utilized to produce biofuels is extremely limited. The same biomass feedstocks that could be used to produce RNG for use in buildings, a sector that is relatively easy-to-electrify, will be needed to help decarbonize the sectors of the national economy that are hardest-to-electrify; including high-heat industrial applications, marine shipping, and aviation.

  There is near-universal consensus among experts that limited supplies of biofuels and green hydrogen should be prioritized for the hardest-to-electrify sectors - this is one of the reasons that none of the five decarbonization pathways modeled in the Princeton Net-Zero America (NZA) Project found it cost effective to use biomass to produce biofuels for use in buildings, instead prioritizing these fuels for hard-to-electrify sectors.[3]

- **#3: Underestimating the future price of RNG, assuming that it will be available at a significantly lower price than more reasonable projections suggest.** In E3's Hybrid Electrification Scenario, once the supplies of RNG are exhausted and the blending limitations of hydrogen in the gas system are reached, the only remaining fuel available to *theoretically* decarbonize the gas system is synthetic natural gas (SNG). Production of SNG relies on three separate incredibly expensive processes: 1) Green hydrogen production via electrolysis, 2) Direct air capture of CO_2, and 3) Methanation which converts hydrogen and CO_2 to SNG.

  Despite the two fuels being chemically identical - they're both just methane - E3's analysis assumes that there is no connection between the market clearing price of the SNG and the market price of RNG. This defies basic supply and demand economics. In reality, the higher cost of SNG will set the market clearing price and drive up the cost of chemically identical RNG. The end result is a significantly higher price for

[2] New York State Department of Environmental Conservation 2021 Statewide GHG Emissions Report, Page 17, Table A1 https://www.dec.ny.gov/docs/administration_pdf/ghgsumrpt21.pdf

[3] Princeton University Net Zero America Project Final Report, pages 30-33. https://netzeroamerica.princeton.edu/the-report

RNG than the Hybrid Electrification Scenario assumes, significantly driving up the overall cost of the scenario.

Simply put – there is no viable path to full decarbonization of the building sector using hybrid gas heating systems as a long-term approach. Proposals that suggest there is a viable path gloss over the lifecycle GHG emissions of biofuels, the extremely limited supplies of biofuels and green hydrogen, the massive opportunity cost of using these fuels in buildings rather than hard-to-electrify sectors, and the extremely high cost of these fuels. **The above points articulate why the CECP's proposal to pursue 20% biodiesel blending in heating oil and 5% "decarbonized fuel" blending (presumably RNG of hydrogen) in the gas distribution system by 2030 is badly misguided.**

If EEA and the Clean Heat Commission see hybrid electrification over the next 10 years as a viable intermediary step to whole-building electrification in the 2030s and 2040s, they need to provide more detailed information to stakeholders including:

- What analysis is informing the decision to purse hybrid heating rather than whole-building electrification? What are the results of the updated EnergyPATHWAYS analysis that led to this decision?
- Why was the definition of electrification adjusted to a heat pump serving greater than 50% of annual heating demand for a building? Why not greater than 70%? 80%? 90%? What are the cost-benefit tradeoffs with these different levels of hybrid electrification?
- What policies and programs are needed to eventually transition customers from a partially electrified home to a fully electrified home?
- How will these policies address system design challenges associated with multiple customer intervention points (e.g. one intervention to design and electric system capable of serving a fraction of total heating demand, a second intervention X years later to design and install an electric heating system capable of serving the full heating demand)? Are the downsides of this multiple intervention approach worth the benefits?
- Is EEA envisioning policies promoting hybrid electrification to only incentivize cold climate heat pumps that are capable of providing space heating well below 0 degrees Fahrenheit? Why or why not? It's Acadia Centers view that there is no downside to exclusively incentivizing the use of cold climate heat pumps. The upside is two-fold: 1) In the short-term, hybrid heated buildings would be able to electrify and decarbonize a greater share of their space heating demand through the use of cold climate heat pumps and 2) Cold climate heat pumps better position these hybrid heated buildings for an eventual conversion to all-electric.
- Perhaps most importantly, what does the EnergyPATHWAYS model envision as the long-term role of the gas distribution system and how does this interact with the promotion of hybrid heating solutions? What is the scale and timing of gas system decommissioning that the EnergyPATHWAYS analysis finds most cost-effective?

The above represents just a small portion of the questions that need to be answered for stakeholders to make truly informed, substantial comments on the CECP proposal to pursue hybrid electrification.

Concerns Related to EV Charging Infrastructure

As it relates to the transportation sector, intelligently and efficiently deploying electric vehicle charging infrastructure at scale will be essential to achieving the 2030 GHG transportation sector sublimits. However, Acadia Center has several concerns related to proposed EV charging targets in the CECP.

Slide 13 of the April 14th presentation references a transportation sector target of achieving "*75,000 public, level 2 and DC fast chargers installed*" by 2030. This target should be broken out into two metrics – one for the number of public level 2 chargers installed and one for number of public DC fast chargers installed (DCFC). Bundling these targets together muddles the fact that these two types of chargers – with very different speeds of charging - serve dramatically different roles in accelerating EV adoption. Most public level 2 chargers are a "nice to have," while having a sufficient number of DC fast chargers located along key corridors is absolutely essential for quelling range anxiety and accelerating EV adoption at the scale the Commonwealth desperately needs. No one is going to buy an EV because their local grocery store offers a level 2 charger they can use for 30 minutes while they go shopping. They're going to buy an EV when they have access to overnight charging at or near their home and DCFC along key transportation corridors.

None of the EV metrics shared with stakeholders reference targets for the deployment of EV charging in either new or existing multi-family construction. This is one of the areas where policies driving investments in level 2 chargers, and even the even slower level 1 chargers, are desperately needed to drive EV adoption. The Stretch Code and Net Zero Stretch Code proposed by DOER only call for 10% and 20%, respectively, of parking spaces in multi-family residential buildings to be "EV Ready". Simply put, this is not nearly enough charging for residents living in multi-family buildings given the anticipated speed of EV adoption called for in the CECP. Not all residents of multi-family buildings need parking, but each housing unit that *does* come with dedicated parking needs access to at least one EV charger. This principle also doesn't just apply to new construction – the Commonwealth must also prioritize rapidly expanding EV charging infrastructure to existing multi-family buildings that already have on-site parking.

Please see Acadia Center's March 18th comments on DOER's Stretch Code Straw Proposal for more details on our concerns related to the proposed levels of EV charging in the Stretch Code and Net Zero Stretch Code. Access to EV charging in multi-family residential buildings isn't just a climate issue, it's an environmental justice issue. EV adoption has been disproportionately concentrated among wealthy, white, single-family homeowners. Prioritizing expanded EV charging access to multi-family residents is a critical part of making EVs more accessible to less advantaged residents of the Commonwealth.

Massachusetts desperately needs an overarching EV charging infrastructure plan that strategically identifies policies and programs that will most effectively deploy EV charging infrastructure in a manner that supports the scale of EV adoption needed to achieve overarching climate targets, including the 2030 transportation subsector target in the CECP. Some example of plans from neighboring or nearby states with a focus on EV charging infrastructure deployment include those developed in Pennsylvania, Rhode Island, and Connecticut.

Acadia Center urges EEA to consider establishing aggressive, measurable metrics related to deployment of DC fast charging along key corridors and the deployment of EV chargers in multi-family residential buildings. A comprehensive plan guiding these efforts will also be critical to this effort.

Implications for Aggressive Sector-specific GHG Reductions Projected for 2025-2030

Slide 10 of the April 14th presentation provides information on historic GHG emissions by sector for 1990 and 2020 and the proposed GHG sublimits by sector for 2025 and 2030. The slide focuses on the percent change in emissions by sector from a 1990 baseline to the future year, either 2025 or 2030. However, what the slide doesn't directly focus on is the proposed percent change in sector emissions over the 2020-2025 and 2025-2030 five-year time periods. Below, the data from slide 10 is presented in a different format.

Table 1: CECP Proposed Emissions Sublimits by Sector for 2025 and 2030 and Proposed Percent Change in Emissions from 2020-2025 and 2025-2030

Sectror	2020 GHG Emissions	2025 GHG Emisisons Proposed Sublimit	2030 GHG Emisisons Proposed Sublimit	% Change GHG Emissions 2020-2025	% Change GHG Emissions 2025-2030
Power	12.9	13.2	8.5	2%	-36%
Comm. & Indus. Heating	11.7	11.4	7.5	-3%	-34%
Industrial Processes	4.1	3.6	2.5	-12%	-31%
Residential Heating	12.9	11.1	8.6	-14%	-23%
Transportation	23.9	23.1	18.7	-3%	-19%
All Other Sources	1.2	1.0	0.9	-17%	-10%
Natural Gas Dist. Services	0.5	0.4	0.4	-20%	0%
TOTAL	**67.2**	**63.8**	**47.2**	**-5%**	**-26%**

What jumps off the page is that the proposed 5-year percent changes in total GHG emissions is *significantly* higher in the 2025-2030 time period (26% decrease) than in the 2020-2025 time period (5% decrease). This difference is even more pronounced in particular sectors. For example, the Power Sector shows a projected 2% *increase* in emissions from 2020-2025 compared to a 36% decrease from 2025-2030. The Commercial and Industrial Heating Sector shows a projected 3% decrease from 2020-2025 compared to a 34% decrease form 2025-2030.

While it will be a terrific accomplishment if these aggressive sector-specific emissions reduction sublimits are achieved, it's extremely difficult to comment on these targets without more detailed information on the proposed policies and programs that will be needed to drive these sharp declines in emissions, particularly over the 2025-2030 period. For example, a 34% decrease in Commercial and Industrial Heating emissions between 2025 and 2030 would be nothing short of a heroic accomplishment, but the details provided to date on the actual approach for accomplishing this monumental undertaking have been few and far between. Stakeholders need more information if we're expected to provide informed comments on whether the specific sub-sector targets make sense in the context of the Commonwealth's overarching 2030 emissions reduction target. For example:

- What is the logic behind targeting a 23% reduction in residential heating from 2025-2030, but a much higher target of a 34% reduction in commercial and industrial heating over the same time period?

- Did the EnergyPATHWAYS model determine that a more aggressive 5-year reduction in commercial and industrial heating emissions was more cost-effective than an equivalent reduction in residential heating emissions?
- What are the key policies and programs that will be needed to drive the 34% reduction in commercial and industrial heating emissions over five years? What is the relevant GHG reduction contribution from each policy and program?
- What is the average level of electrification anticipated in the 300-400 million square feet of commercial building space that is being targeted by 2030? Is electric heat assumed to account for 55% of space heating demand in those buildings? 70%? 80%?
- Is the 19% reduction in residential space heating from 2025-2030 aggressive enough given the potential risk of not achieving the significantly more aggressive targets in commercial and industrial heating (34% reduction) or power generation (36% reduction)?

These questions represent just a small subset of the questions that stakeholders need answers to in order to be able to intelligently comment on the proposed subsector targets and the policies and programs that are needed to actually achieve these targets.

Thank you for the opportunity to provide additional comments in this incredibly important process. If you have questions or concerns, please do not hesitate to reach out.

Sincerely,

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Appendix 1: Acadia Center December 21, 2021 Letter to EEA on Considerations for Massachusetts GHG Accounting Methodologies

Via Email

December 21, 2021

Undersecretary Chang
Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Considerations for Massachusetts GHG Accounting Methodologies

Dear Undersecretary Chang,

Thank you for taking the time to meet with Acadia Center on November 16, 2021. One of the topics that came up during our discussion was current greenhouse gas (GHG) accounting practices in the MassDEP Emissions Inventories ("MA Inventory") and how limitations related to these accounting practices could potentially hinder the ability of policymakers to make fully informed decisions on the most optimal decarbonization pathways for the Commonwealth. Acadia Center has four key areas of concern related to GHG accounting in the MA Inventory and thinks there is an opportunity to bring the MA Inventory in line with more accurate accounting practices by:

1) Capturing out-of-state emissions from extraction and transmission of fossil fuels that are ultimately consumed in the Commonwealth.

2) Relying on 20-year global warming potential (GWP) values that are on a timescale well aligned with the Commonwealth's GHG emissions reduction targets.

3) Accounting for the net GHG impacts of producing biofuels and measuring biomethane emissions against the counterfactual (e.g., not intentionally producing biogas in the first place or diverting biogas from flaring).

4) Quantifying emissions associated with "green" and "grey" hydrogen imported from out-of-state based on the emissions resulting from the production of the fuel.

Acadia Center outlines these concerns in greater detail below and suggests potential paths forwards for improved GHG accounting practices in the Commonwealth.

Fossil Fuel Extraction and Transmission Accounting

Acadia Center recommends that Massachusetts account for emissions resulting from the extraction and transmission of fossil fuels (ultimately consumed in Massachusetts) occurring outside the borders of the Commonwealth. This GHG accounting change will put electricity and fossil fuels consumed in Massachusetts on a more equal playing field from a GHG accounting perspective and more accurately capture the true GHG implications of continued fossil fuel consumption in the Commonwealth.

In the case of natural gas, the MA Inventory only accounts for GHG emissions resulting from natural gas transmission and distribution losses occurring within state borders. In contrast, the MA Inventory accounts for GHG emissions resulting from electricity transmission and distribution losses that occur outside of the state as required by M.G.L. c. 21N, section 1:[4]

" 'Statewide greenhouse gas emissions', the total annual emissions of greenhouse gases in the commonwealth, including all emissions of greenhouse gases from the generation of electricity delivered to and consumed in the commonwealth, ***accounting for transmission and distribution line losses, whether the electricity is generated in the commonwealth or imported****; provided, however, that statewide greenhouse gas emissions shall be expressed in tons of carbon dioxide equivalents."*

This inconsistency between electricity and fossil fuel accounting is one of the reasons the New York Climate Leadership and Community Protection Act (CLCPA 2019) required adjustments to New York's GHG accounting practices to account for the GHG emissions resulting from both the extraction and transmission of fossil fuels imported into New York:[5]

"The statewide greenhouse gas emissions report shall also include an estimate of greenhouse gas emissions associated with the generation of imported electricity and with the ***extraction and transmission of fossil fuels imported into the state which shall be counted as part of the statewide total.****"*

The New York State Department of Environmental Conservation (NYSDEC) is taking what is referred to as an "upstream fuel cycle emission factor" approach to comply with the CLPCA.[6] This approach quantifies GHG emissions resulting from the extraction, processing, and transmission of fossil fuels (natural gas, coal, petroleum products) outside the state borders of New York. For example, with natural gas, this approach would account for GHG emissions associated with extraction, gathering and boosting, processing, and transmitting the fuel by using National Energy Technology Laboratory (NETL) natural gas model data and U.S. Greenhouse Gas Inventory (GHGI) emissions data.

One question that came up during our call on November 16th was around the topic of potential issues from considering upstream emissions from fossil fuels while simultaneously not considering the upstream emissions from renewable electricity generation (e.g., embodied wind turbine emissions from streel production). While NYSDEC has

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[4] M.G.L. c. 21N, section 1 https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter21n/Section1

[5] New York Senate Bill S6599 ("CLCPA") https://www.nysenate.gov/legislation/bills/2019/s6599

[6] NYSDEC Technical Conference: Oil and Gas Emissions Accounting webinar: https://meetny.webex.com/recordingservice/sites/meetny/recording/c70b87ddede64ec891f87fde6803080c/playback

not directly addressed this topic to date, Acadia Center thinks New York's approach is reasonable and warranted given the following two points:

1) There are embodied emissions associated with both fossil fuel extraction and the construction of renewable electricity generation technologies. Just as the New York approach is not capturing embodied natural gas drilling rig emissions from steel production, it is also not capturing embodied wind turbine emissions from steel production.

2) The equivalent of accounting for embodied wind turbine emissions (e.g., from steel production) would be accounting for the embodied natural gas power plant emissions (e.g., from cement production). The New York approach is not capturing embodied emission of either.

100-year vs. 20-year GWPs GHG Accounting

Acadia Center recommends that Massachusetts quantify GHG emissions using GWP-20 values. This approach more accurately reflects the GHG impacts of methane on timescales relevant to the Commonwealth's and global GHG reduction targets.

The MA Inventory currently relies on 100-year GWPs. In New York, the CLCPA required that the state's GHG accounting switch from utilization of 100-year GWPs to 20-year GWPs given that a 20-year time horizon is more relevant to the goal of net zero emissions by 2050:[7]

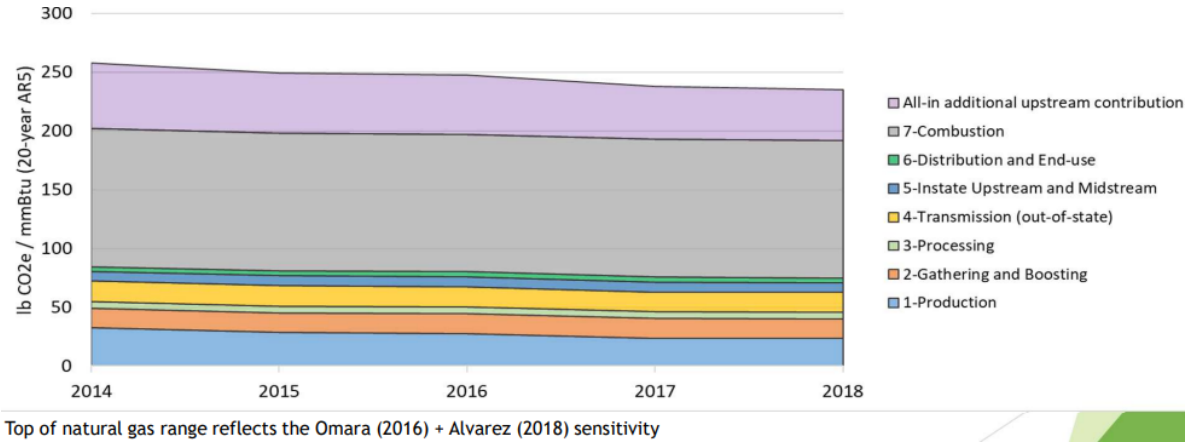
" 'Carbon dioxide equivalent' means the amount of carbon dioxide by mass that would produce the same global warming impacts as a given mass of another greenhouse gas over an integrated ***twenty-year time frame*** *after emission."*

Figure 1 below is a screenshot from the NYSDEC *Technical Conference: Oil and Gas Emissions Accounting* webinar held on March 26, 2021. This figure demonstrates the overall impact on the natural gas emission factor resulting from the two accounting changes (out-of-state extraction and transmission, 20-year GWPs) currently being implemented in New York. The 235.4 lbs CO_2e/MMBtu 2018 natural gas emission factor from the figure below is over two times higher than the combustion-only emission factor of natural gas of 116.98 lbs CO_2e/MMBtu, highlighting the magnitude of this change in accounting principles.[8]

[7] New York Senate Bill S6599 ("CLCPA") https://www.nysenate.gov/legislation/bills/2019/s6599

[8] NYSDEC "Upstream Fuel Cycle Emission Approaches and Sensitivities: Methodologies and Results", slide 33. https://www.dec.ny.gov/docs/administration_pdf/upstreamerg.pdf

Figure 1: NYSDEC Preliminary Natural Gas "Well-to-Combustion" Emissions Factor



Biomethane GHG Accounting

One of the key limitations of the MA Inventory is that it treats biogenic emissions as an informational item and does not consider the impact of biogenic emissions on overall statewide emissions totals. The use of biofuels that are purported to be low carbon or carbon-neutral is likely to increase in coming years, and certainty regarding that accounting will become even more necessary. Acadia Center recommends that the Commonwealth establish GHG accounting principles that clearly assert that 1) Biogenic emissions should impact total reported emissions in the MA Inventory and 2) Biogenic emissions from biofuels need to be measured against the counterfactual (e.g., not intentionally producing biogas in the first place or diverting biogas from flaring to produce biomethane). These accounting practices are critical to establish now given they significantly impact modeling assumptions of studies like D.P.U. 20-80 (which relies heavily on biomethane across multiple scenarios).

As an example of current biofuel GHG accounting the MA Inventory, only the CH_4 and N_2O GHG emissions resulting from combustion of biogas are captured in the "non-biogenic" portion of the MA Inventory. These CH_4 and N_2O emissions represent a small fraction of total biogas combustion emissions and even a smaller fraction of the total net GHG emissions resulting from the biofuel supply chain (including production, processing, and transmission). This accounting of biofuels is gross simplification of a complex issue, particularly in instances where biogenic emissions result from the production, processing, and transportation of biomethane.

Energy crops, sometimes referred to as "intentionally produced biogas", are the most problematic biomethane feedstock for a number of reasons, including the net GHG implications of indirect land use changes. Even excluding energy crops, many of the pathways for producing biomethane via biogas are problematic from a GHG emissions perspective. Typically, biogas produced at facilities, including wastewater treatment plants and landfills, is either vented or flared. While both processes release GHG emissions, flaring is much preferable from a GHG emissions perspective since it converts CH_4 to CO_2 prior to being released into the atmosphere.[9] This is one of the reasons

[9] Greenhouse Gas Protocol "Global Warming Potential Values" https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

California requires all municipal waste landfills to install gas collection and control systems that have a "methane destruction efficiency" of at least 99%.[10] Alternative to venting or flaring, biogas can be captured and processed to produce biomethane.

Research suggests that total supply chain methane leakage from RNG intended for pipeline injection typically ranges from 2.8-4.8% but can range as high as 15.8%.[11] The same study assumed a reasonable natural gas supply chain leak rate of 2.8%. Assuming an average 3.8% RNG supply chain leak rate, a 2.8% natural gas supply chain leak rate, and using 20-year global warming potential (GWP) values, the methane leakage GHG footprint of RNG derived from intentionally produced sources of biogas (e.g., energy crops) is 50% of the combustion plus methane leakage GHG footprint of natural gas. Using the same assumptions, the methane leakage GHG footprint of RNG derived from waste biogas diverted from flaring is 33% of the GHG footprint of natural gas.[12] Under any scenario where the RNG supply chain leak rate exceeds 5.8% for RNG produced using intentionally created biogas or 6.8% for RNG produced using biogas diverted from flaring, the RNG GHG footprint exceeds that of natural gas.

Considering the GHG implications of CH_4 leaks, RNG produced through biogas upgrading can only potentially be considered a carbon-neutral replacement for natural gas if the RNG supply chain leak rate is 0% (for intentionally produced biogas) or held under 1% (for waste biogas diverted from 99% efficient flaring). Given this information, and the extreme technical challenges with achieving these leak rates, sensible climate policy aimed at minimizing net GHG emissions would 1) Require biogas that is currently being vented to instead be captured and 2) Dictate that the biogas be flared or used in a CHP plant on-site, rather than upgraded to RNG. Understanding this concept is critical to understanding why the MA Inventory's current approach of treating all biogenic emissions as having no impact on the Commonwealth's total reported emissions is problematic – the net GHG implications of biomethane are highly variable depending on the original source of the biogas and the methane supply chain leak rate.

While there is currently no certification process or mechanism in place for tracking types of biogas production (e.g., intentionally produced biogas from energy crops, biogas diverted from flaring, etc.), it is likely that such a system will be needed at a state, regional, or national level if reliance on biomethane grows. In the meantime, it's reasonable that the baseline assumption should be that the biogas used to produce biomethane has either been intentionally produced or diverted from flaring – if it can be captured to produce biomethane it can be flared.

Hydrogen GHG Accounting

Acadia Center recommends that, given the energy carrier nature of both hydrogen and electricity, the Commonwealth establish GHG accounting principles that clearly assert that imported gray hydrogen and imported green hydrogen will not both be treated as carbon neutral fuels and that the emissions resulting from the production

[10] California Air Resources Board, Subchapter 4, Article 4, Subarticle 6. https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2009/landfills09/landfillfinalfro.pdf
[11] Emily Grubert 2020 Environ. Res. Lett. 15 084041 https://iopscience.iop.org/article/10.1088/1748-9326/ab9335
[12] Ibid.

of hydrogen, regardless of whether that production occurs in or out of state, will directly impact the reported emissions total in the MA Inventory.

Hydrogen, like electricity, is an "energy carrier" that allows the transport of energy in a usable form from one location to another. Like electricity, hydrogen must also be produced from another substance. For example, hydrogen can be produced in a carbon neutral process using electrolyzers powered by 100% renewable electricity. At the other extreme, hydrogen can be produced through the emissions-intensive process of steam methane reforming. The emissions associated with creating 1 MMBtu of hydrogen via steam methane reforming are approximately 45% greater than the emissions resulting from the combustion of 1 MMBtu of natural gas (76.92 kg CO_2 per MMBtu for hydrogen vs. 53.06 kg CO_2 per MMBtu of fossil gas).[13] And like electricity, the GHG intensity of the production should be included in the inventory for products produced in state and imported.

The MA Inventory is currently set up in such a way that the emphasis is on the eventual "end use," rather than the GHG intensity of the fuel production, where more significant concerns arise. For example, imported hydrogen from New Hampshire produced via steam methane reforming has zero impact on GHG emissions in Massachusetts if the hydrogen is consumed in a fuel cell. Using this logic, there is no emissions reduction benefit to Massachusetts of importing carbon-neutral green hydrogen versus importing carbon-intensive gray hydrogen. It's the equivalent of treating imported electricity generated via coal and imported electricity generated via wind as carbon neutral forms of electricity from a Massachusetts GHG perspective, and quite problematic.

New York has not begun to address GHG accounting of hydrogen because the CLCPA GHG accounting language was limited to fossil fuels. This is concerning given the recent focus, both in New York and Massachusetts (see D.P.U. 20-80), on exploring the potential of blending hydrogen into the gas distribution similar. While there is currently no certification process or mechanism in place to track the GHG intensity of hydrogen production, it is likely that such a system will be needed at a state, regional, or national level if reliance on hydrogen grows as many projections expect it to. In the meantime, it's reasonable to assume that hydrogen is "grey" unless proven otherwise given that 95% of global hydrogen production is produced through steam-methane reforming.[14]

[13] EPA Emission Factors for Greenhouse Gas Inventories, 2018. https://www.epa.gov/sites/default/files/2018-03/documents/emission-factors_mar_2018_0.pdf

[14] U.S. Department of Energy "Hydrogen Production: Natural Gas Reforming." https://www.energy.gov/eere/fuelcells/hydrogen-production-natural-gas-reforming

Conclusion

The recommendations outlined in this letter have the potential to significantly improve the overall accuracy of GHG accounting in the Commonwealth and, as a result, the effectiveness of state policies aimed at reducing GHG emissions that are ultimately attributable to Massachusetts. Thank you for taking the time to review Acadia Center's concerns and recommendations related to these GHG accounting issues.

Sincerely,

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April 29, 2022

Kathleen Theoharides, Secretary
Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: *Comments on Interim Emissions Reduction Targets and Carbon Sequestration Goals for 2025 and 2030 and the Proposed Plan to Achieve those Targets and Goals*

Dear Secretary Theoharides:

Conservation Law Foundation ("CLF") appreciates the opportunity to provide comments on the Interim Clean Energy and Climate Plan for 2030 ("CECP") and the proposed interim emissions reduction targets for 2025 and 2030.

CLF is a non-profit, member-supported environmental advocacy organization working in Massachusetts and across New England to protect our environment for the benefit of all people, to build healthy communities, and to sustain a vibrant economy. CLF is working throughout New England to advance policies and decision-making that reduce greenhouse gas ("GHG") emissions and incentivize clean energy sources. The CECP and the sub-limits established therein are essential not only to meet the Commonwealth's mandatory net-zero emissions goal by 2050, but also to CLF's mission.

It is urgent that EEA take immediate action to prevent GHG emissions in the Commonwealth. According to the Intergovernmental Panel on Climate Change's ("IPCC") Sixth Assessment Report on the Mitigation of Climate Change, immediate action is required to prevent the further growth of GHG emissions in order to limit warming to 2 degrees Celsius.[1] As CLF has stated before, EEA also has the opportunity and responsibility to integrate more precise language into the CECP that provides details about actions that will advance climate justice. Climate justice focuses on the root causes of climate change—human-made GHG emissions and related pollution—and making systemic changes that are required to address unequal burdens on our communities and realign our economy with our natural systems. Unless justice, equity, and worker rights are central components of our equitable climate agenda in the CECP, the inequality of the carbon-based economy will be replicated in the new pollution-free economy.

[1] IPCC, 2022*:* Summary for Policymakers. In: *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001

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CLF has previously provided extensive comments on sector limits and sub-limits in the CECP, which are attached[2] to this letter for EEA's convenience and consideration. These comments will focus on those areas which are of particular importance as EEA finalizes the 2025/2030 Interim CECP goals and plan. CLF also endorses the comments that are submitted by the Climate Justice Working Group on this matter.

1. **EEA must center climate justice in its actions and plans.**

EEA has both a moral and legal responsibility to consider climate justice in all of its planning.[3] In the context of CECP planning, EEA must enact holistic and people-centered policies that are developed and implemented with the participation of environmental justice communities. To this end, EEA should prioritize applicable program enrollment by low- and moderate-income ratepayers and focus efforts on environmental justice communities. EEA should also ensure that all building codes and environmental regulations in the state aimed at meeting CECP goals include equity standards. All sector plans and cross-sector strategies should also prioritize analysis of cumulative impacts, ensuring that environmental justice communities see reduced burdens and increased benefits. EEA should also ensure that a minimum percent of conservation funds and resources collected by and designated for state programs are allocated to projects in and near environmental justice communities.

2. **Buildings Sector: EEA must prioritize evaluation of GHG accounting for Biofuels, Biogas, and Green Hydrogen.**

EEA indicated in its recent public hearings its intention to evaluate GHG accounting mechanisms for biofuels, biogas, and green hydrogen in the buildings sector by 2024. CLF strongly urges EEA to prioritize finalizing this evaluation as soon as possible. As CLF has communicated to the Department of Environmental Protection ("MassDEP") on several occasions, a framework that fully accounts for the lifecycle emissions associated with biogenic fuels is necessary to allow for an accurate and transparent evaluation of the Commonwealth's progress towards its GWSA goals.[4] The Massachusetts 2050 Decarbonization Roadmap ("2050 Roadmap") stresses that the Commonwealth will need to transition from a gross emissions accounting framework to a net accounting framework to accurately track the progress toward its GWSA goals, and that such a framework must account for emissions from burning biogenic

[2] Exhibit A.
[3] M.G.L. c. 21N, § 5.
[4] *See* Miller, C. A., Characterizing Emissions from the Combustion of Biofuels. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/069, 2008 (finding that GHG emissions that occur during a biofuel's "production and use cycle" must be understood to assess a biofuel's environmental impacts), https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=191572.

fuels.[5] Indeed, any credible gross emissions accounting framework should incorporate the end use combustion emissions from biofuels by default, as net emissions assumptions are required to claim carbon neutrality or benefit from biofuels (with netting effects often manifesting outside of the state). The 2050 Roadmap also noted that a net emissions accounting framework may consider accounting for "leakage" if the rise in biofuel use incentivizes deforestation in other states and reduces sequestration.[6]

Given the amount of biofuel feedstock needed for building use in a heavy blending scenario and the current location of biofuel feedstocks in the short term, it is highly likely that most of the Commonwealth's biofuel use would result from such leakage. Additionally, the 2050 Roadmap's modeling assumes that biogenic fuels have a GHG emissions value of zero, which is incompatible with the science on biogenic carbon accounting. For these reasons, improving the emissions assumptions around solid and gaseous biomass will help set the Commonwealth on a path to truly reach net zero emissions by 2050.

Additionally, when new emissions factors were adopted by MassDEP in 2015, the dramatic "reduction" in methane leaks was not accurately presented, including in Figure 9 of the 2030 CECP. EEA should work with MassDEP to ensure they are accurately measuring and monitoring atmospheric methane levels to account for all methane leaks, including those independent of the natural gas distribution system, to correctly assess whether the Commonwealth is in fact making progress towards its goals under the CECP. Science is becoming increasingly clear that current accounting measures are missing a lot of the methane that's being emitted in the Commonwealth.

It is essential that the evaluation of emissions accounting for biofuels, biogas, and green hydrogen happens as soon as possible for EEA to be able to say with confidence that the goals and projections for emissions reductions and generation in years to come are accurate and on track.

3. Working Lands: EEA should support wetland protection and environmental justice.

EEA has also proposed several changes to protect Natural and Working Lands. CLF supports the emphasis on strengthening wetland protection, particularly the no-net loss provision (L3). This provision should require that any lost wetland function be restored by enhancing

[5] *Massachusetts 2050 Decarbonization Roadmap*, Massachusetts Executive Office of Energy and Environmental Affairs, at 88 (Dec. 2020), https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download.
[6] *Id*. at 90.

existing wetland functionality or creating new wetlands.[7] Regulations under the Wetlands Protection Act ("WPA") (M.G.L. c. 131, § 40) can be amended, particularly 310 CMR 10.01(2) to "ensure no overall net loss but long-term net gain in the quantity, quality, and permanence of wetland acreage" in Massachusetts.[8] Wetlands and other blue carbon ecosystems should be protected and restored as they sequester and store more carbon per unit than terrestrial forests.[9]

Second, while CLF supports the no-net loss provision, we are concerned about the expedited permitting process in the outer 50-foot of wetland buffer zone (L1). Currently, the WPA provides for a 100-foot buffer zone pursuant to 310 CMR 10.04. EEA has not provided resources to demonstrate how development on the outer 50-foot buffer zone would protect wetlands. Instead, this provision is likely to cause more damage to wetlands and may be counterproductive in mitigating climate change. New England has lost many of its coastal habitats and wetlands to development,[10] so it is imperative that the CECP and its policies restore these ecosystems which provide a wide array of environmental and climate benefits.[11]

Third, EEA can incorporate additional regulatory changes that support wetland protection and promote environmental justice. Amendments should be made under 310 CMR 10.05 to require the commission to consult with environmental justice populations before approving development projects. EEA should review and incorporate content from the Blue Carbon Protection Act, a proposed federal bill, which includes language that wetlands provide buffers against storm surges, "especially for communities of color, low-income communities, and Tribal and Indigenous communities."[12]

Fourth, EEA should set numerical goals for Natural and Working Lands and carbon sequestration up to 2050. Currently, the Roadmap Law specifically mandates the EEA to "contain a statewide baseline measurement and measure the current carbon flux on natural and

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[7] *See Comments on Interim Clean Energy and Climate Plan for 2030*, Conservation Law Foundation, at 48-49 (March 22, 2021); *see also No Net Loss of Wetlands*, Tex A&M, https://coastalresilience.tamu.edu/home/wetland-protection/policy-framework/federal-framework/no-net-loss-of-wetlands/#:~:text=The%20No%20Net%20Loss%20policy,the%20official%20policy%20since%20then.

[8] *See* Exec. Order No. W-59-93 (1993); *see also Wetland Riparian Area Protection Policy*, California Water Boards, https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html#:~:text=Executive%20Order%20W%2D59%2D93,of%20wetland%20acreage%20in%20California.

[9] *See Blue Carbon*, IUCN, https://www.iucn.org/resources/issues-briefs/blue-carbon.

[10] *Massachusetts Wetlands*, Massachusetts Office of Coastal Zone Management, https://www.mass.gov/service-details/massachusetts-wetlands.

[11] *Natural Climate Solutions*, CLF Mass Audubon Letter to The House of Representatives, at 8 (Sept. 27, 2021) ("Wetlands, floodplains, saltmarsh, and seagrass systems provide critical environmental, public safety, and economic benefits including flood resiliency, water quality protection, wildlife and aquatic vegetation habitat, groundwater recharge, erosion control, carbon storage, and recreational and educational opportunities.").

[12] *See* Blue Carbon Protection Act, H.R. 3906 § 4(a)(2)(B)(ii), 117th Congress (2021-2022).

working lands," as well as to "adopt statewide goals to reduce greenhouse gas emissions and increase carbon sequestration on natural and working lands."[13] 50% of land in Masachusetts is not protected.[14] According to the Massachusetts Audubon Society, 25.2% of land in Massachusetts has already been permanently protected as of April 2013.[15] The EEA should protect more than 28% of natural and working lands in Massachusetts by 2025 and 30% by 2030. The EEA should also clearly state emission targets up to 2050 to reach net zero emissions and ensure the no-net loss provision under the WPA. The EEA can also continue to review existing legislation and regulations to determine how to increase restoration projects in Masachusetts. Overall, EEA has an obligation to ensure that its goal of protecting natural and working lands is sufficiently ambitious to comply with Massachusetts' climate mandates.

Finally, CLF supports EEA's decision to work with other states to create a standardized accounting framework and measure the carbon flux/sequestration on natural and working lands (L5). Natural climate solutions are useful tools to mitigate climate change and need to complement emission reductions from energy, building, and transportation sectors in the CECP.

CLF appreciates EEA's commitment to meeting the Commonwealth's GHG emission reduction goals by establishing appropriate sub-limits and accompanying plans for 2025 and 2030 in the CECP. Thank you for your attention to this matter and for your consideration of these comments.

Sincerely,

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[13] M.G.L. c. 21N, § 5.
[14] *Losing Ground: Planning for Resilience (Fifth Edition)*
Patterns of Development and Their Impact on the Nature of Massachusetts, Mass Audubon, https://www.massaudubon.org/our-conservation-work/policy-advocacy/shaping-climate-resilient-communities/publications-community-resources/losing-ground/previous-editions/losing-ground-fifth-edition/fast-facts#:~:text=1.1%20million%20acres%20of%20the,is%20neither%20developed%20nor%20protected.
[15] *Id.*

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Exhibit A

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March 22, 2021

VIA EMAIL & EEA ONLINE PORTAL

To: gwsa@mass.gov

Kathleen Theoharides, Secretary
Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: Comments on Interim Clean Energy and Climate Plan for 2030

Dear Secretary Theoharides:

Conservation Law Foundation ("CLF") appreciates the opportunity to provide comments on the Interim Clean Energy and Climate Plan for 2030 ("CECP"). These comments are submitted pursuant to the notice issued by the Executive Office of Energy and Environmental Affairs ("EEA") on December 30, 2020.

The comments below are organized to match the structure of the CECP as closely as possible, with a summary table of CLF's specific policy recommendations for each CECP chapter followed by written comments.

Please do not hesitate to contact us with any questions.

Sincerely,

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Contents

Chapter 1. Overview

EEA has the opportunity and responsibility to integrate more precise language into the CECP that provides details about actions that will advance climate justice. Climate justice focuses on the root causes of climate change—human-made greenhouse gas emissions ("GHG") and related pollution—and making systemic changes that are required to address unequal burdens on our communities and realign our economy with our natural systems. Unless justice, equity, and worker rights are central components of our equitable climate agenda in the CECP, the inequality of the carbon-based economy will be replicated in the new pollution-free economy.

A. Add Additional Policies to Commit to Equity and Justice.

In Section 1.3 (Commitment to Equity) of the CECP, we request that EEA add the following policies:

- **Prioritize and Anchor Equity and Justice** to avoid further harm to populations most vulnerable to and most at risk from climate impacts, pollution, displacement, energy burden, and cost while prioritizing climate, environmental, energy, and health benefits to such populations. Establish enforceable protections against disparate impacts. Prioritize analysis of cumulative impacts, while reducing burdens and increasing benefits to environmental justice ("EJ") populations.
- **Support a People-Centered Approach to Policy Making, Program Design, and Implementation**, providing for and ensuring broad-based stakeholder participation, input, and oversight. The interests of and people from populations most vulnerable to effects of climate change and most at risk of pollution, displacement, energy burden, and cost must be represented and influential in this process.
- **Take a Holistic Approach to Achieving Climate Goals/Net Zero by 2050/GWSA Compliance.** Recognize that EEA has an obligation to meet and/or achieve compliance with multiple laws, policies, and Executive Orders 552 and 569. Account for and accurately value co-benefits and health impacts of action, but also costs and risks associated with delay and inaction.

The above additions to Section 1.3 will indicate that all CECP strategies should be centered in equity and justice, and that they be respectfully developed and deployed with the input, feedback, leadership, and engagement of the communities most vulnerable to the effects of climate change and most at risk from pollution, displacement, energy burden, health impacts, and other systemic inequities. Further details about these recommendations are included in the Global Warming Solutions Act Implementation Advisory Committee ("IAC") Climate Justice Working Group ("CJWG") comments, to which CLF co-authored, signed, and submitted under separate cover along with a whitepaper from Applied Economics Clinic.[1]

[1] Bryndis Woods and Elizabeth Stanton, "Initial Assessment of the Climate Justice Working Group's Recommended Policy Priorities – Tracking Equity and Justice," Applied Economics Clinic (March 2021), pages 11-14, *provided as an attachment to the CJWG comment letter*.

B. Improve Community Engagement

The final CECP should include, within each sector, a directive for agencies to implement a robust public engagement process. We applaud EEA for offering virtual webinars with simultaneous language interpretation and translation of written materials. EEA should use the lessons learned from convening the Massachusetts 2050 Decarbonization Roadmap ("Roadmap") and CECP webinars to ensure that future meetings about climate policy also are accessible to residents who speak Spanish, Cantonese, Mandarin, Portuguese, Haitian Creole, Arabic, Amharic, Vietnamese, and additional languages other than English.

In addition to ensuring language access, the CECP should include a commitment that community engagement will influence state decision-making. All state advisory committees should include representation from EJ populations. The Environmental Justice Advisory Council, created pursuant to state law,[2] should be routinely convened and invited to participate in decisions about transportation, electricity, buildings, nature-based solutions, development, and housing.

C. Require Diverse Hiring and Workforce Development Practices Across All Sectors to Achieve Quality Jobs.

The CECP should add a commitment for agency staff to work with an independent advisory council to oversee job creation. The jobs created through procurement, infrastructure projects, and implementation of climate policies should create a pathway out of poverty, with family-sustaining wages and benefits. The contract opportunities should advance women-, people of color-, and veteran-owned businesses and incentivize domestic and local quality job creation that also benefit working class immigrants, people living with disabilities, and formerly incarcerated people. Funding should be allocated for programs that directly recruit, train, and retain those underrepresented in the workforce. Training should also be provided for workers who need to learn new skills to support the just transition away from fossil fuels to clean energy.

D. Clarify Throughout the CECP Need for New Authority and Funding, and Set Clear Timelines.

The CECP should indicate throughout each chapter whether EEA has existing authority or needs new statutory authority to achieve each policy recommendation/strategy action (or commit to a timeline for doing so). The interim CECP contains vague language like "consider" incentives or "explore" policies. The CECP should include requirements (i.e., regulations; eligibility criteria and/or preferential scoring for grant funding) in the appropriate policy recommendation/strategy action. We encourage EEA to integrate timelines to commence each strategy.

The transition to a clean economy is about capital investment. The only funding sources identified in the CECP are the Transportation and Climate Initiative and the Volkswagen settlement. Additional funding will be essential to the just and equitable transition that we all desire. Low-income residents do not have the discretionary funds or credit to buy new cars, to

[2] Exec. Order on Environmental Justice No. 552 (2014).

insulate their homes, or to upgrade heating systems, or are renters with no control. Furthermore, the interim CECP lacks mention of how EEA and its agencies will be funded to carry out their many new tasks. It will take sustained funding to implement the CECP. We recommend clarifying in each chapter whether the relevant agency can achieve the strategy actions with existing funding and staff or whether it needs additional funding and new sources of revenue and staff.

Chapter 2: Transforming our Transportation Systems

The transportation sector is the largest contributor of GHG emissions in the Commonwealth and it is the area in which we must make the most improvement in the next nine years.

Summary Table of CLF Transportation Sector Recommendations

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
N/A, add a new Strategy	Maintain and expand public transit, set deadlines to electrify public transportation throughout the Commonwealth, and implement a Low-Income Fare.	No legislative or regulatory amendments are required. Notwithstanding, legislative guidance regarding the timing and priority of electrification could best direct how capital funds are used by the Massachusetts Bay Transportation Authority ("MBTA") and Regional Transit Authorities ("RTAs").
Section 2.2 Strategy T1: *Cap Transportation Sector Emissions & Invest in Clean Transportation Solutions*	Begin TCI-P public engagement process with environmental justice partners working with state officials; outline plan for how funds will be spent, and how to measure benefits to overburdened and underserved communities.	No legislative or regulatory amendments are required. Notwithstanding, legislative guidance regarding a unique fund for TCI-P proceeds will be valuable, along with raising the floor of the minimum contribution. We support bill HD3905, SD2317.
	Implement TCI-P Model Rule.	Regulatory amendments are required.
	Require air pollution reduction targets for black carbon, NOx, and ultrafine particulate matter.	Legislation is not required; regulatory amendments are necessary. We support bill HD2696, SD1742.
	Need policy about biofuels to ensure no disparate impacts regarding transportation or storage of ethanol at fuel rack terminals.	Legislation is not required; regulations outlining details to limit transportation options would help.
Section 2.2 Strategy T2: *Implement Coordinated*	Support plan to adopt CA rules for Advanced Clean Cars II and Advanced Clean Fleets rule.	Begin process to implement CA standards through regulatory action in 310 CMR 60.00.

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
Advanced Clean Vehicle Emissions & Sales Standards	Prioritize electric buses first and then move to heavy-duty trucks.	Set fleet electrification targets via legislation and require regulatory amendments to ensure additional electric vehicle supply equipment.
	Establish target dates for fleets and individual vehicles: 1. we need 50 percent ZEV sales by 2025 and 100 percent sales by 2030; 2. we need all electric transit buses for the MBTA by 2030 and for the RTAs and rail by 2035.	Legislation is not required, though CLF support several pending bills: 1. Electric vehicle fleets by 2035, HD1305, SD.2322. 2. Public transportation electrification targets: establishes requirements for electric MBTA buses by 2030 and regional transit authority buses and commuter rail by 2035, HD2144, SD1320. 3. Banning internal combustion engine vehicle registration by 2035, HD1157. Most of the above can occur through regulatory action.
Section 2.2 Strategy T3: *Reduce Upfront ZEV Purchase cost Burden*	Mandate, not simply consider, a low-to-moderate income incentive program available at point of sale.	No legislative or regulatory amendments are required. Nevertheless, legislation could establish the mandate and regulatory amendments would provide the details necessary.
	Provide incentives for school buses, medium- and heavy-duty vehicles.	No legislative or regulatory amendments are required.
	Require group purchasing program for state and municipal fleets. Identify a sustainable funding source.	No legislative or regulatory amendments are required.
Section 2.2 Strategy T4: *Deploy Electric Vehicle Supply*	Mandate that DPU establish new rate structures and establish rule that low- and moderate-income customers do not bear an inequitable share of costs for	No legislative or regulatory amendments are required. Notwithstanding, legislation (see HD1159 and SD.1066) could

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
Equipment & Enable Smart Charging	time-of-use rates and ensure that they have access to and benefit from such rates.	establish the mandate and regulatory amendments would provide the details necessary, such as the minimum percent of buildings that are EV ready.
	Develop vehicle-to-grid programs.	No legislative or regulatory action required.
	Establish requirements to install a minimum number of EV charging stations for multifamily buildings.	Regulatory amendments are required.
	Direct DOER to work with municipalities to establish bus lanes and transit signal priority in congested locations.	Legislation is not required. A regulatory amendment is needed, absent legislation.
Section 2.2 Strategy T5: *Engage Consumers & Facilitate Markets*	Fully fund MassCEC to allow it to keep doing what it is doing.	Legislation is required to establish a higher amount of funds for MassCEC.
	Create EV access to HOV lanes as part of congestion relief strategy.	Regulatory amendments are required.
	Require consideration of bus lanes and bicycle access when transportation projects go through MEPA review.	Regulatory amendments are required.
Section 2.2 Strategy T6: *Stabilize Light-Duty VMT & Promote Alt Transportation Modes*	Rather than just stabilize, reduce vehicle miles traveled and include Department of Housing and Community Development in addition to EEA, MassDEP, and MassDOT in the coordinated approach to reducing VMT. The development of housing in the right locations at affordable cost levels is a critical component of a state-wide approach to reducing VMT.	No legislative or regulatory action required.
	Improve employer transit benefits and strengthen employer ride-sharing programs (lower threshold for number of employees to participate in programs).	No legislative or regulatory action required.

CLF Recommendations to Strengthen Transportation Sector Strategies Overall

- **Add a Public Transit Strategy That Requires Preserving and Enhancing Transit Service and Electrifying Our Transit Fleets.**

The CECP has six strategies to reduce transportation sector emissions, yet none of them is focused on investments in public transportation. Pursuant to Executive Orders 579 and 580, the Commission on the Future of Transportation issued its report identifying transportation initiatives to achieve by 2040 that will both reduce GHG emissions and expand access to transportation options. The first recommended strategy in that report concludes that "investing in and expanding public transit service is critical."[3] The report goes on to add that "by 2030, all . . . buses . . . purchased with state resources will be ZEVs."[4] It would be absurd for the CECP to have an entire section devoted to the transportation sector that omits strategies to: (1) maintain and expand transit; and (2) electrify our buses and trains. We urge EEA to include a seventh transportation strategy that calls attention to investments in our public transit systems so that various reports and decisions from the Baker Administration are in lockstep with one another. Investing in public transportation has many co-benefits for public health beyond reducing congestion and reducing single occupancy vehicle trips.

We further recommend adding a climate justice component to the public transit strategy. To promote more equity in the transit systems and increase access to public transit for EJ populations, the MBTA and RTAs should adopt low-income fares. Access to transit is a lifeline to many who have no other means of transportation to safely and reliably reach destinations such as jobs, schools, grocery stores, and healthcare facilities.

CLF Recommendations to Strengthen Strategy T1 (Cap Transportation Sector Emissions and Invest in Clean Transportation Solutions)

- **Increase Percent of Transportation and Climate Initiative Investments in Underserved and Overburdened Communities;**
- **Add Action to Expand Air Monitoring and Reduce Pollution in Hotspots; and**
- **Plan to Reduce Disparate Impacts of Biofuels on EJ Populations.**

1. Add Requirement That the Administration Will Commit Much Higher Investments in Overburdened and Underserved Communities.

Strategy T1 is focused on the Transportation and Climate Initiative Program ("TCI-P"). CECP at 20. TCI-P needs to redress longstanding impacts of the transportation sector on EJ populations, which have been disproportionately impacted by GHG emissions from transportation. Specifically, the CECP should include the commitment for the Administration to

[3] Commission on the Future of Transportation, Choices for Stewardship: Recommendations to Meet the Transportation Future: Volume 1, at 35 (December 2018). https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download.
[4] *Id.* at 54.

develop a detailed public plan for a public engagement/decision-making process to determine how to spend TCI-P revenue, including specifying investment targets in walking, transit, and biking infrastructure. In addition, the CECP should note plans to increase the investments of TCI-P revenue in EJ populations from 35 percent to at least 70 percent and commit to appointing the equity advisory board by summer 2021.[5]

We further recommend adding a climate justice component to strategy T1. The CECP should commit to launching air quality monitoring programs for EJ populations that are the most overburdened by air pollution from the transportation sector in the Commonwealth by 2022. To fully account for the health impacts and co-benefits of proposed policies, the Commonwealth needs to expand the air monitoring network, actively analyze air monitoring data, and consistently review environmental and energy policies to assess what is working and what needs to be revised to achieve air quality improvement. This will require monitoring for black carbon, ultrafine particulate matter, and nitrogen oxides ("NOx"), since these pollutants are commonly associated with transportation fuels. Strategy T1 should also include a commitment for the Baker Administration to incorporate the needs and experiences of overburdened and underserved communities into the TCI-P policy-making process.

2. Add Requirement for the Commonwealth to Reduce Air Pollution in Hotspots.

Air pollution comes from various sources, with traffic being a dominant contributor to higher concentrations of air pollutants near busy roadways. NOx are emitted in vehicle exhaust and are a good indicator of traffic pollution.[6] The majority of air pollutants in urban neighborhoods, including NOx, ultrafine particles, and black carbon, result from local traffic.[7] Exposure to ultrafine particulate matter is associated with a complex set of public health impacts.[8] Most existing air monitors in the region that monitor particulate matter ("PM") only capture PM above 2.5 microns in diameter and not the ultrafine particles associated with health impacts from localized pollution hotspots. The existing array of monitors must be supplemented with new equipment and expanded to additional locations (including locations near EJ populations as discussed above) to capture traffic-related ultrafine particles, black carbon, and NOx.

A Harvard study found that an increase in long-term air pollution exposure (1 $\mu g/m^3$) leads to a COVID-19 death rate that is eight percent above the risk borne by residents of communities without such exposure.[9] The Commonwealth lacks sufficient baseline data to

[5] Two bills filed in the 192nd legislative session incorporate a requirement to direct funds to underserved and overburdened communities at a minimum of 70 percent. *See* HD3905, SD2317.
[6] University of Toronto Faculty of Applied Science and Engineering, Southern Ontario Centre for Atmospheric Aerosol Research, *Near-Road Air Pollution Pilot Study: Summary Report*, at 6 (2019). https://www.socaar.utoronto.ca/wp-content/uploads/2019/10/SOCAAR-Near-Road-Air-Pollution-Pilot-Study-Summary-Report-Fall-2019-web-Final.pdf.
[7] *Id.* at 7.
[8] Walker, D.I., Lane, K.J., Liu, K. *et al.,* Metabolomic assessment of exposure to near-highway ultrafine particles. *J Expo Sci Environ Epidemiol* 29, 469–483 (2019). https://doi.org/10.1038/s41370-018-0102-5.
[9] Wu, X., Nethery, R. C., Sabath, M. B., Braun, D. and Dominici, F., 2020. Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis. Science advances, 6, p.eabd4049, https://projects.iq.harvard.edu/covid-pm.

begin to address this inequity and prevent further harm. Expanded air monitoring for black carbon, NOx, and ultrafine particulate matter will be necessary for the Commonwealth to determine baseline conditions and track improved air quality trends.

We recommend that the CECP require the Massachusetts Department of Environmental Protection ("MassDEP") to engage a broad stakeholder group that includes representatives of EJ organizations, academic institutions, and labor to identify air pollution hotspots throughout the Commonwealth. Once those hotspots are determined, the Commonwealth should update its Air Quality Monitoring Network and Annual Plan to expand its monitoring network. To do so, MassDEP should establish baseline air quality conditions in 2021 and set annual targets to reduce the average air pollution for ultrafine particulates, black carbon, and NOx in those locations. Data from the air monitors should be publicly accessible and provide near-time information. By 2022, the Commonwealth should set enforceable annual air pollution improvement targets to ensure that air pollution hotspots achieve significantly improved air quality by 2032. We support using funding allocated for clean transportation to help cover the costs associated with improving air quality in pollution hotspots. For example, funds from the Regional Greenhouse Gas Initiative, already allocated for clean transportation purposes through the MOR-EV program, could be used to expand the Commonwealth's air quality monitoring network along with other funding sources, such as TCI.

3. *Plan to Reduce Disparate Impacts of Biofuels on EJ Populations.*

While we support a Low Carbon Fuel Standard ("LCFS") for transportation fuels, the CECP should specify which fuels qualify. For example, will biofuels meet the LCFS? If biofuels will be incorporated into the LCFS, then the CECP must acknowledge the need to ensure the safety of the transportation of those fuels. Transportation of biofuels by truck or rail would result in increased GHG emissions in communities along truck routes and near fuel blending facilities. At present, those facilities are disproportionately located in EJ populations. Moreover, biofuels, such as ethanol, are highly flammable, especially when transported in large quantities. The CECP needs to outline a plan that avoids negative impacts associated with the transportation of biofuels and eliminate potential burdens on EJ populations.

CLF Recommendation to Strengthen Strategy T2 (Implement Coordinated Advanced Clean Vehicle Emissions and Sales Standards)

- **Require Fleet Electrification Targets for Medium- and Heavy-Duty Vehicles.**

Electrifying our public transit systems and school buses will result in improved air quality and will reduce the burdens associated with air pollution hotspots. We recommend that the CECP include:

- Implementing the MBTA Bus Transformation Office approved by the Fiscal and Management Control Board recommendations from November 2019 by prioritizing new electric bus procurements on routes serving EJ populations. The MBTA must begin immediate planning and design work for 100 percent electric bus facilities to meet the goal of having a 100 percent electric bus fleet by 2030.

- Implementing the MBTA Rail Vision approved by the Fiscal and Management Control Board in November 2019 with priority electrification for the Fairmount Line, Newburyport/Rockport Line through Lynn, and Providence/Stoughton Line by 2024, and planning to electrify the remainder of the commuter rail system by 2035. All state vehicle purchases must be zero-emission vehicles ("ZEV") starting January 1, 2026, excluding municipalities, regional school districts, MBTA, and RTAs. The CECP must set targets to electrify state and municipal fleets by 2030: fleets owned, leased, or operated by the Commonwealth or municipalities should transition to ZEVs with priority in locations that are air pollution hotspots in EJ populations. In addition, Transportation Network Company fleets should be ZEV by 2025.
- The CECP should set targets to ensure that no internal combustion engine vehicles are sold to any purchaser, public or private, or newly registered, after 2034.

CLF Recommendation to Strengthen Strategy T3 (Reduce Upfront ZEV Purchase Cost Burden)

➢ **Require Incentive To Be Paid at the Point of Sale.**

The CECP notes that the Department of Energy Resources ("DOER") "will explore providing MOR-EV rebates at point of sale in 2021" and "investigate the development of a low and moderate income ("LMI") consumer program for ZEVs". CECP at 22. We recommend that the language be revised to commit to these actions so that it reads: "the Department of Energy Resources will provide MOR-EV rebates at point of sale in 2021" and will "develop an LMI consumer program for ZEVs by 2022." To incentivize electric vehicle ("EV") adoption for larger fleets, including municipalities and the Commonwealth, Massachusetts should establish a group purchasing program to lower costs for state/municipal ZEV procurements by the end of 2021.

CLF Recommendation to Strengthen Strategy T4 (Deploy Electric Vehicle Supply Equipment & Enable Smart Charging)

➢ **Set a Numerical Target for Charging Stations and Require Utilities to Implement Rate Structures to Promote Low-Cost Electric Vehicle Charging.**

To achieve widespread adoption of EVs for both individual and commercial vehicles, the Commonwealth must increase EV charging infrastructure and set goals for the number of charging stations for both commercial and residential properties. To achieve success, the Commonwealth should:

- Set a numeric target for the number of charging stations that need to be built in the next decade to meet ZEV goals. The EV- Pro Lite tool can be used to estimate the charging needs and impacts on load profile.[10]
- Launch curbside/utility pole charging programs in collaboration with municipalities and establish incentives for other challenging sectors.

[10] EV-Pro Lite Tool, https://afdc.energy.gov/evi-pro-lite.

- Require utilities to propose alternative rate structures and consumer incentive programs to encourage charging overnight or at other beneficial times.
- Require utilities to install a public charging station upon a municipality's request and include the costs in the rate base.
- EV charging should be designed to accommodate EVs, e-bikes, and e-scooters, and other forms of micro-mobility.
- Provide incentives for purchase of residential charging stations to promote EV adoption.
- Require that all owners of existing multi-unit commercial and residential buildings who maintain more than five parking spaces for building occupant use install EV charging stations according to the following metrics: ten percent of parking spaces shall have an EV charging station or at least one EV charging station by 2022; 25 percent of parking spaces shall have an EV charging station or at least three EV charging stations by 2025; and 50 percent of parking spaces shall have EV charging stations or at least 5 EV charging stations by 2030.[11]

CLF Recommendation to Strengthen Strategy T5 (Engage Consumers & Facilitate Markets)

➢ **Commit to Consumer Education, With a Focus on EJ Populations.**

Raising awareness of EV programs like MassEVolve, MOR-EV-Trucks, and Drive Green programs is crucial to further adoption of EVs statewide. To gauge the success of these initiatives, EOEEA should provide an annual report on the strategy actions in the CECP including the ACTNow and the Massachusetts Clean Energy Center ("MassCEC") pilot programs on medium- and heavy-duty ZEVs, urban delivery & fleet electrification, and EV charging infrastructure discussed in this section. In addition, DOER should consider folding incentives for EVs, including e-bikes, and residential charging stations into the Mass Save program brand to easily raise awareness for these initiatives.

CLF Recommendation to Strengthen Strategy T6 (Stabilize Light-Duty VMT & Promote Alternative Transportation Modes)

➢ **Stabilize Vehicle Miles Traveled and Promote Mode Shift.**

While rapid electrification of the transportation sector is essential, this transportation decarbonization strategy is incomplete without long-term investments in a robust and reliable public transit system and changes in our land use policy to support more dense, affordable, mixed-use development near transit. By depending almost exclusively on electrification and

[11] These metrics are aimed at ensuring available charging infrastructure to accommodate future demand of our electrified transportation systems. *See* Marie Rajon Bernard and Dale Hall, "Efficient planning and implementation of public chargers: Lessons learned from European cities," *International Council on Clean Transportation,* (Feb. 2021), Available at: https://theicct.org/sites/default/files/publications/European-cities-charging-infra-feb2021.pdf.

telecommuting, this approach runs the risk of perpetuating the inequities evident in our transportation system today. Telecommuting is not a policy solution. Promoting "telecommuting" would exacerbate inequities, resulting in higher-income office workers staying home during the workday, and lower-income service and retail workers needing to commute via car or on transit that would be even harder to fund due to reduced ridership.

As noted in the interim CECP, "the increase in VMT and vehicle size has largely offset the emissions benefit from more stringent federal fuel efficiency standards". CECP at 17. To mitigate the increase in emissions associated with rising VMT, the interim CECP relies heavily on vehicle electrification. This misses an opportunity to address the problem at its source and to achieve the multitude of co-benefits associated with reducing VMT through enabling more compact growth near transit. These include:

- Alleviating traffic congestion and promoting job access: Massachusetts has been home to some of the nation's worst traffic congestion. Furthermore, reducing VMT through investments in public transit will help improve access to jobs and services for residents without a personal vehicle.
- Improving public health outcomes: In addition to the economic benefits, there are several public health advantages to getting more people out of cars and onto public transit, walking, and biking. Auto travel causes 360 deaths annually in Massachusetts due to crashes.
- Reducing building energy demand: Multifamily housing has a more efficient building envelope and shared systems which enable more cost-effective implementation of high efficiency systems during construction.
- Ensuring more land is available for preservation and carbon sequestration and alleviating pressure on the grid to accommodate the influx of electric vehicles: Importantly, land use strategies are much more cost-effective than the proposed investment in EV subsidies. They can also be designed equitably so that low-income residents are benefitted and not harmed by changes in land use, pricing, and transit service.

These strategies fall into a "no-regrets" zone in which there are few reasons the Commonwealth would regret acting on them. They will only be an effective pathway forward, however, if we make long-term investments in a robust, reliable, and affordable public transportation system. The interim CECP greatly underestimates the important role public transit plays in advancing an equitable decarbonization strategy. We strongly urge the EEA to elevate the need to invest in a robust, reliable, and affordable public transportation system in the CECP. The primary way to achieve this is to move more trips from single-occupant vehicles to public transit.

The CECP can also promote alternative transportation modes by directing DOER to require all highway projects subject to an environmental impact report to consider the feasibility of adding a high-occupancy vehicle lane and/or bicycle lanes. Additionally, the CECP should direct DOER to work with municipalities to establish bus lanes and transit signal priority in congested locations.

Chapter 3. Transforming our Buildings

The buildings sector closely follows the transportation sector in emissions reduction priority for the next nine years, given the slow rate of turnover for building heating and cooling equipment.

Summary Table of CLF Buildings Sector Recommendations

GHG Reduction Strategy Proposed by EEA	**CLF Recommendation**	**Need for Legislation / Regulation**
N/A	Justify modeling assumptions utilized in Figure 7.	No legislation or regulations are required.
B1: *Avoid Lock-In of Building Systems That Are Not 2050 Compliant*	Allow all municipalities to opt-in to new net zero code by 2022, then phase in net zero code as base building code with benchmarks in 2025 and 2028.	No legislation or regulations are required.
	Develop action plan and contingency measures for decarbonizing Mass Save incentives.	No legislation or regulations are required.
B2: *Pivot the Market for Building Envelope Retrofits and Clean Heating Systems*	Direct state funds to ensure EJ populations are participating in the transition at rates comparable to other communities in the Commonwealth.	No legislation or regulations are required.
	Actively manage gas transition to ensure equity.	No legislation is required; regulations would be beneficial to set guidance about the transition away from gas.
	Require DOER to lead the Administration in reforming Green Communities Act.	Legislation is required.
	Direct DOER to provide incentives to transition low-income households to electrified heating sources and, if necessary, subsidize electricity rates temporarily.	No legislation or regulations are required.
	Allocate resources to training fossil fuel workers to prepare to work with decarbonization technologies and track diversity in workforce.	No legislation or regulations are required.
	Set benchmarks to assess whether electrification targets are being met and provide the necessary funding.	Regulatory amendments may be necessary.

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
	Target highest-emitting buildings and lower-income households for electrification and efficiency upgrades; ensure that programs are designed to assist lower-income households.	Regulatory amendments would establish criteria for priority upgrades.
	Require commercial buildings larger than 5,000 square feet to begin reporting their GHG emissions annually in 2021 and halve their 2021 emissions by 2030.	Legislation would be beneficial; regulatory amendments are required.
	Propose regulatory amendments requiring gas utilities to reduce gas consumption.	Legislation would be beneficial; regulatory amendment is required.
	Promulgate regulation requiring heating fuel providers to reduce fuel consumption.	Legislation is beneficial; regulatory action is required.
	Direct DOER to phase out incentives for fossil fuel heating systems for both new construction and existing buildings by 2022, not 2024, and direct those funds to electrification efforts.	No legislation or regulations are required; amended regulations would be helpful to ensure timeline.
	Direct Mass Save to (1) incentivize advanced controls for heat pumps that replace gas-powered equipment; (2) develop program to incentivize removal of fossil fuel equipment after installation of heat pump; (3) include heat pump target in next Three-Year Plan; (4) act as an intermediary between customers and the credit market in the event the CECP relies on an APS-like framework for increasing heat pump adoption.	No legislation or regulations are required. A DPU order is necessary.
	Direct Mass Save to provide 100 percent incentive for (1) weatherization upgrades for low- and moderate-income customers and buildings that commit to electrification, and (2) mitigating barriers for low- and moderate-income customers and customers in EJ populations.	No legislation or regulations are required. A DPU order is necessary.

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
	Provide specific direction and resources to MassCEC.	No legislation or regulations are required.
	Provide specific guidance to municipal utilities, nonprofits, and municipalities to pursue decarbonization.	No legislation or regulations are required.
	Require state agencies to ensure appropriate heating equipment is installed and that heat pumps are the least-cost option.	No legislation or regulations are required; amendments to the energy efficiency guidelines and DPU order about cost-benefit test would be beneficial.
	Use direct mandates to phase the supply chain off of fossil equipment.	Legislation would be beneficial; regulatory amendment is required.
B3: *Convene the Commission and Task Force on Clean Heat & Cap Heating Fuel Emissions*	Consider imposing the emissions cap on the purchase of space and water heating systems and based on their lifetime emissions. Alternatively, impose surcharge on heating fuels and prohibit new thermal diesel installations. Direct revenue to assist low- and moderate-income people and EJ populations to transition away from fossil fuel heating systems.	Amended regulations are required.
	Require consideration of alternative utility business models as part of the development of an emissions cap, such as regulatory amendments that would allow gas utilities to participate in electrification of the energy market.	Amended regulations are required.
	Direct DOER to propose regulations relating to consumer education, installation of appropriate equipment, and development of programs to provide upfront capital to consumers to purchase electrification equipment.	Amended regulations are required.

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
	Direct DPU to require electric distribution companies to (1) fully fund energy efficiency and decarbonization services to any residential owner earning up to 80 percent of the statewide median income and (2) fund such services on a sliding scale for residential owners earning 81-120 percent of the statewide median income and all renters located in an EJ population.	No legislation or regulations are required. A DPU order is necessary.
	Use a fuel-based emissions cap only as a supplement to policies that directly drive electrification.	No legislation is required; amended regulations are necessary.
	Remove fuel and gas blending as a Strategy Action.	No legislation or regulatory amendments are required; amended regulations would be appropriate to give the directive.
	Ensure Commission and Task Force mandate is limited to an electrification pathway.	No legislation or regulations are required.
	Revise Commission and Task Force mandate to require consideration of "Zero up-front capital solutions for moderate income residents on a sliding scale up to 120 percent of area median income or state median income."	No legislation or regulations are required.
	Provide short-term, specific policies to guide building sector in aggressive transition.	No legislation or regulations are required.
	Incorporate recommendations from IAC and CJWG reports.	No legislation or regulations are required.

CLF Recommendations to Strengthen Buildings Sector Strategies Overall

- **Justify modeling assumptions used in Figure 7.**

The CECP provides that emissions in the building sector must decrease by roughly 9.4 $MMTCO_2e$ over the next 10 years to put the Commonwealth on a path to Net Zero in 2050. CECP at 28. The CECP also models the buildings sector's emissions reductions as split proportionally between residential and commercial properties. CECP at 27. The CECP should provide more support for its modeling assumptions and data on the overall strategy for this goal, as illustrated in Figure 7, and the relative roles assigned to residential and commercial properties in meeting that goal.

CLF Recommendations to Strengthen Strategy B1 (Avoid Lock-In of Building Systems That Are Not 2050 Compliant)

- **Allow all municipalities to opt-in to new net zero code by 2022, then phase in net zero code as base building code with benchmarks in 2025 and 2028; and**
- **Develop action plan and contingency measures for decarbonizing Mass Save incentives.**

Strategy B1 provides that DOER will present a high-performance stretch energy code to the Board of Building Regulation and Standards in 2021. CECP at 30. It will allow Green Communities to opt in beginning in 2022 and it will become mandatory and effective statewide by January 1, 2028. CECP at 30. This recommendation could be improved by allowing all municipalities to opt-in to a new net zero code by 2022. Expanding adoption among municipalities would presumably ease the transition to statewide effectiveness. Indeed, if the Commonwealth adopted a net zero on-site new construction code by 2023, emissions from new buildings would be reduced by 87 percent in 2050, as compared to the standard building code. Roadmap at 54. If the code becomes mandatory in 2030, emissions are only reduced 54 percent. *Id.* In addition, by 2025, the CECP should replace the high-performance code with a net zero stretch code that combines the existing stretch code and the net zero opt-in code. Finally, by 2028, a version of this net zero code should transition to become the base building code.

Strategy B1 further provides that DOER will work to eliminate Mass Save incentives for fossil fuel equipment in new construction in 2022 and instead align incentives with a high-performance building code. CECP at 30. Given that this is not something DOER can achieve unilaterally under the current statutes, EEA and DOER staff should work with the Office of the Attorney General and Department of Public Utilities ("DPU") to ensure that this essential step is achieved.

CLF Recommendations to Strengthen Strategy B2 (Pivot the Market for Building Envelope Retrofits and Clean Heating Systems)

1. *Center equity and climate justice in the transition to clean heating.*

- **Direct state funds to ensure EJ populations are participating in the transition at rate comparable to other communities in the Commonwealth. Set annual targets for enrolling low- and moderate-income ratepayers and EJ populations in energy efficiency programs;**
- **Actively manage gas transition to ensure equity, including reforms of the Green Communities Act;**
- **Direct DOER to provide education and incentives to transition low-income households to electrified heating sources and, if necessary, subsidize electricity rates temporarily; and**
- **Allocate resources to training fossil fuel workers to prepare to work with the decarbonization technologies and track diversity in workforce.**

The CECP's focus in Strategy B2 on reducing emissions in the building sector by transitioning off of fossil fuel-driven heating systems is essential. CECP at 31. The Commonwealth must play an active role in ensuring this transition is equitable. First, the CECP should direct state funds to ensure EJ populations are participating in the transition at rates comparable to other communities in the Commonwealth. Otherwise, EJ populations will face rising heating fuel prices as consumers transition to electrification in large numbers. It may accomplish this by setting mandatory annual targets for enrolling low- and moderate-income ratepayers and congregate settings serving EJ populations in heating transition energy efficiency programs.

Second, the CECP must aggressively pursue a managed transition away from the gas system to ensure that moderate-income households and renters are not ultimately left to pay high heating fuel prices and without assistance to transition to a clean heating fuel source. Accordingly, DOER must lead the charge in docket D.P.U. 20-80 for emissions reductions and equity to avoid a pipeline gas-heavy result in the docket. Additionally, given barriers to electrification in pending Energy Efficiency Guideline revisions (DPU 20-150), DOER must also lead the administration in drafting and securing passage of a major reform to the Green Communities Act. Such a reform must ensure that state agencies are no longer able to favor gas system expansion over large scale electrification incentives on the basis of "cost efficiency."

Third, as discussed in the February 25, 2021 memorandum regarding "Design of the CECP Policy Approach for Buildings," prepared by Synapse Energy Economics, Inc. and provided here in Appendix A ("Appendix A"), the CECP should direct DOER to provide education and incentives to electrify these low-income customers' homes and, if necessary, subsidize electricity rates to offset near-term electricity cost increases. Appendix A at 11. Strategy B2 notes that DOER will work to expand access to energy efficiency and clean heating for low- and moderate-income renters and homeowners in EJ populations. CECP at 31. EEA must ensure that access to clean heating for these groups is achieved through electrification, rather than biofuels

or renewable natural gas ("RNG"),[12] which would cause low-income households to bear the rising costs associated with fossil fuels or the high costs of early replacement of fossil fuel equipment. Appendix A at 11.

Finally, the rapid and widespread adoption of electrification technologies also presents challenges and opportunities for training laborers. The CECP should allocate resources to training fossil fuel workers to prepare to work with decarbonization technologies, such as HVAC, onsite solar, and air- and ground-source heat pumps. The Commonwealth should also seize the opportunity to track diversity among this expanded workforce.

2. Plan and sequence action for a successful transition.

- **Set benchmarks to assess whether electrification targets are being met, and provide the necessary funding;**
- **Target highest-emitting buildings and low- and moderate-income households for electrification and efficiency upgrades;**
- **Require commercial buildings larger than 5,000 square feet to begin reporting their GHG emissions annually in 2021 and halve their 2021 emissions by 2030; and**
- **Promulgate regulatory amendments requiring gas utilities to reduce gas consumption and new regulations requiring other heating fuel providers to reduce fuel consumption.**

The CECP correctly emphasizes the need to scale up electrification efforts as quickly as possible to capture the maximum number of heating stock turnover points. CECP at 28. Given the significant number of heat pumps that must be installed and the uncertainty about whether the CECP's policies will achieve these goals, the CECP should set benchmarks to assess whether electrification targets are being met, and it should provide the necessary funding.

Beyond scaling up heat pump installations for all buildings, targeted efforts can lead to a greater reduction in emissions than the CECP currently contemplates. As described further in Appendix A, the CECP should target electrification and efficiency initiatives toward the highest-emitting buildings, which could reduce emissions by up to 13 $MMTCO_2E$ by 2030, exceeding the necessary reductions for the building sector. Appendix A at 2. Appendix A notes that "just 22 percent of homes (about 650,000 units) emit half of the residential fuel-combustion emissions, and the million highest-emitting homes (just over one third of the total) are responsible for 68 percent of emissions. In the commercial sector...one quarter of the floor space is responsible for between two thirds and three quarters of emissions". Appendix A at 3-4. The CECP can shore up these targeted efforts by also requiring commercial buildings larger than 5,000 square

[12] Specifically, RNG is expected to have a greater GHG abatement cost than the abatement cost derived from the electric sector. *See* Synapse Energy Economics, et al., "Avoided Energy Supply Components in New England: 2021 Report," pp. 181-184 (March 2020), https://www.synapse-energy.com/sites/default/files/AESC%202021.pdf. *See also* ICF Resources Inc., "Study on the Use of Biofuels (Renewable Natural Gas) in the Greater Washington, D.C. Metropolitan Area," (March 2020), https://edocket.dcpsc.org/apis/api/filing/download?attachId=101994&guidFileName=e69b6cb2-963c-4122-aca3-3b45e838b2b7.pdf; Sutherland, B. G. Pricing CO_2 Direct Air Capture. *Joule*, Cell Press. Volume 3, Issue 7, 17 July 2019, pp. 1571-1573 (2019), https://doi.org/10.1016/j.joule.2019.06.025.

feet begin reporting their GHG emissions annually in 2021 while mandating that they halve their 2021 emissions by 2030.

The CECP should also target low- and moderate-income households for electrification and efficiency upgrades. Appendix A at 4. Although the group of highest-emitting homes generally consists of higher-income occupants, inefficient and older buildings with low- and moderate-income occupants are also high-emitting and pose a significant financial burden to the occupants. Appendix A at 4. The CECP must ensure that throughout these electrification and efficiency efforts, programs are designed to achieve equitable outcomes by assisting lower-income households to transition from fossil fuels and access building shell upgrades. Appendix A at 4.

Targeted electrification and efficiency improvements would give rise to additional benefits, including optimizing the benefits of electrification, nearly eliminating the need for biofuel blending, and providing opportunities for district heating solutions in geographic clusters. Appendix A at 4, 5.

Strategy B2 is heavily focused on using incentives to encourage residents, companies, and renters to pivot the market toward heating electrification and building envelope retrofits. CECP at 31. These incentives and encouragement of actions by building owners and occupants are essential to achieve building sector emission reduction goals. The actions of local distribution companies ("LDCs") and other heating fuel suppliers will also play a pivotal role in planning to meet net zero by 2050. The CECP should direct MassDEP to require LDCs and fuel oil and propane suppliers to submit a plan to MassDEP for review and approval demonstrating how they will reduce gas or fuel consumption by 20 percent by 2025 and by 50 percent by 2030. This would complement the efforts currently underway at the DPU to envision the future of the gas distribution industry in Massachusetts.

Such plans should exclude pathways that rely on distributed use of biogas or biofuel blending to reduce emissions. Instead, LDCs and fuel suppliers should include plans to expand heat pump rebate programs that prevent inequitable energy cost shifts to low-income ratepayers and renters, explore new business models, and propose modifications to cost recovery rules that will be submitted to the DPU for approval. Active participation by LDCs and fuel suppliers would create another source of pressure on the market to pivot towards electrification. Additionally, LDCs should repair gas leaks to achieve zero-emissions related to lost and unaccounted-for gas. LDCs should also be required to determine whether a leak should be repaired or retired and replaced with electrification based on an economic analysis. Leaks that occur on lines serving a relatively small customer base should be retired and the end use appliances electrified.

3. *Align Mass Save with the net zero by 2050 goal.*

- **Direct DOER to phase out incentives for fossil fuel heating systems for both new construction and existing buildings by 2022 and direct those funds to electrification efforts;**
- **Direct Mass Save to (1) incentivize advanced controls for heat pumps that replace gas-powered equipment; (2) develop program to incentivize removal of fossil fuel equipment after installation of heat pump; (3) include heat pump target in next Three-Year Plan; (4) act as an intermediary between customers and the credit market in the event the CECP relies on an APS-like framework for increasing heat pump adoption; and**
- **Direct Mass Save to provide 100 percent incentive for (1) weatherization upgrades for low- and moderate-income customers and buildings that commit to electrification, and (2) mitigating barriers for low- and moderate-income customers and customers in EJ populations.**

As recommended by the CJWG, Mass Save must be aligned with the net zero by 2050 requirement in a manner that prioritizes GHG reductions and equity outcomes. Strategy B2 further provides that DOER will work to phase out incentives for fossil fuel heating systems as soon as possible, limiting fossil fuel heating system incentives in the 2022-2024 Three-Year Plan and ending all fossil fuel heating system incentives by the end of 2024. CECP at 31. In contrast, Strategy B1 notes that DOER will work to eliminate Mass Save incentives for fossil fuel equipment in *new* construction in 2022. CECP at 30. No reason is given for delaying the phase-out of incentives by two years for existing buildings. Moreover, removing the incentives, without more to encourage electrification, will not necessarily lead to support from program administrators for consumers to switch from gas to electric heat. Appendix A at 11. The CECP should direct DOER to phase out incentives for fossil fuel heating systems for both new construction and existing buildings by 2022 and direct those funds toward electrification measures. Appendix A at 11. Mass Save's targets should be amended to account for the removal of these incentives, if necessary. Appendix A at 11.

Several other concurrent programs can hasten the electrification of heating systems. Mass Save should continue to incentivize advanced controls for heat pumps that are installed to replace gas-powered equipment, similar to its current incentives for oil and propane replacement. Appendix A at 11. Additionally, Mass Save should develop a program to provide incentives and education to customers who have installed heat pumps to remove existing fossil fuel equipment. Appendix A at 11. In its next Three-Year Plan, Mass Save should include a heat pump target. This target should require program administrators to assess a building's pre-energy efficiency heating needs and install an appropriately sized heat pump, paired with advanced controls. Appendix A at 11. Finally, while the CECP does not contemplate the Alternative Energy Portfolio Standard ("APS") as a means for increasing heat pump adoption, it may consider assigning costs to energy suppliers through a market mechanism akin to the APS. Appendix A at 12. In the event it chooses this strategy, the Mass Save program should act as an intermediary between customers and the credit market to provide price stability. Appendix A at 12.

As noted above, it is essential that efficiency upgrades accompany heat pump installations. Mass Save can play a critical role by offering a 100 percent incentive for weatherization upgrades to low- and moderate-income customers and renters and to buildings whose owners commit to electrify their heating equipment. Additionally, with respect to low- and moderate-income customers and customers in EJ populations, Mass Save should offer 100 percent incentives to mitigate pre-weatherization and pre-electrification barriers.

4. Provide sufficient direction and guidance to key actors.

- **Provide specific direction and resources to MassCEC; and**
- **Provide specific guidance to municipal utilities, nonprofits, and municipalities to pursue decarbonization.**

Strategy B2 also places significant responsibility on MassCEC to facilitate the development and adoption of electrification technologies. CECP at 31-32. While MassCEC may technically be best equipped to carry out these measures, the CECP should ensure that MassCEC is given the direction and resources needed to effectively achieve its goals. The CECP should set specific, measurable goals and actions to track MassCEC's progress towards achieving its directives of workforce development, enhancing benefits to underrepresented communities, and facilitating the market and technology toward decarbonization, among many other initiatives. Similarly, given MassCEC's recent difficulties in obtaining adequate funding, the CECP must direct state funds to MassCEC sufficient for it to carry out the many actions with which it is tasked.

This Strategy also notes that municipal utilities, nonprofits, municipalities "can and must" focus on incentivizing heat pump adoption and building envelope improvements. CECP at 32. Engaging these additional actors would provide a useful opportunity for quickly scaling up heat pump adoption. The CECP fails, however, to elaborate on the types of actions that are needed, nor does it memorialize this recommendation in a strategy action. CECP at 31-32. The CECP should provide additional, specific guidance to municipal utilities, nonprofits, and municipalities to assist in these decarbonization goals.

5. Supplement incentives with specific direction and mandates.

- **Require state agencies to ensure appropriate heating equipment is installed and that heat pumps are the least-cost option; and**
- **Use direct mandates to phase the supply chain away from fossil equipment.**

EEA and its agencies must work with contractors, architects, and state building codes to ensure that appropriate equipment is installed at all times and that building owners understand the least cost option. These efforts should also ensure that heat pumps are the least cost option with incentives. Finally, as a complement to incentive strategies, the CECP should increase heat pump adoption through the use of direct mandates to phase the supply chain away from fossil equipment. For instance, effective immediately, no new oil furnaces should be installed and gas use must phase down.

CLF Recommendations to Strengthen Strategy B3 (Convene the Commission and Task Force on Clean Heat & Cap Heating Fuel Emissions)

1. *Carefully structure the Heating Fuel Emissions Cap to drive sector-wide investments for the long term, not just 2030.*

- **Consider imposing the emissions cap on the purchase of space and water heating systems and based on their lifetime emissions, with revenue used to assist low- and moderate-income people and EJ populations off of fossil fuel heating systems;**
- **Alternatively, impose a surcharge on heating fuels and prohibit new thermal diesel installations, with revenue used to assist low- and moderate-income people and EJ populations to transition away from fossil fuel heating systems;**
- **Require consideration of utility business models as part of development of emissions cap, such as regulatory amendments that would allow gas utilities to participate in electrification of the energy market;**
- **Direct DOER to propose regulations relating to consumer education, installation of appropriate equipment, and development of programs to provide upfront capital to consumers to purchase electrification equipment;**
- **Direct DPU to require electric distribution companies to (1) fully fund energy efficiency and decarbonization services to any residential owner earning up to 80 percent of the statewide median income and (2) fund such services on a sliding scale for residential owners earning 81-120 percent of the statewide median income and all renters located in an EJ population; and**
- **Use fuel-based emissions cap only as a supplement to policies that directly drive electrification.**

Both the CECP and Roadmap acknowledge that widespread electrification of the building sector is the most cost-efficient method of transition for many households and is an essential driver of emissions reductions. CECP at 28; Roadmap at 45. Given the stated need to rapidly scale-up the electrification of heating systems, the CECP must encourage electrification rather than additional fossil fuel usage. In contrast to these goals, the CECP proposes a long-term, declining emissions cap on heating fuels that may incentivize biofuel blending over electrification. CECP at 32. The CECP and Roadmap appear to assume that the emissions cap will encourage electrification for buildings for which electrification is feasible. For instance, the Roadmap asserts that the transition to electrification or decarbonized gas/biogas blending will disrupt the current market such that gas prices will rise and encourage electrification. Roadmap at 53.

An emissions cap alone, however, will not sufficiently advance the CECP's electrification targets, nor will it encourage an equitable transition. Appendix A at 7. As discussed in detail in Appendix A, the cap will presumably be structured as an upstream cap that places the initial onus on fuel suppliers. Appendix A at 6. In contrast to the CECP's focus on electrification through equipment and infrastructure replacement, the cap's disconnect between supplier and equipment purchaser would only serve to incentivize fuel supplies to rely on fuel blending,

RNG, and hydrogen. Appendix A at 6. As such, if possible, the emissions cap should be structured to influence consumers' purchase of space and water heating systems and be based on the systems' lifetime emissions. Appendix A at 7. The emissions cap should take effect in 2023, and revenue generated by the cap should be used to assist low- and moderate-income people and EJ populations in transitioning away from fossil fuel heating systems. Alternatively, the CECP should encourage electrification in the building sector by prohibiting the installation of new thermal diesel infrastructure and by imposing a surcharge on heating fuels.

Additional policies that focus directly on electrification and altering utilities' business models must be the primary strategy actions driving this transition and be designed to ensure equitable outcomes. Appendix A at 6. For instance, consideration of utilities' business models should be factored into the development of the cap structure. Appendix A at 6. Specifically, penalties or other costs associated with the cap that are imposed on a supplier should be borne by shareholders rather than ratepayers. The Commission and Task Force should consider amended regulations that would allow natural gas utilities to participate in electrifying the energy market, such as the authority to create a thermal district heating utility or to receive an incentive for fuel switching to electric heat pumps. Appendix A at 6-7.

Moreover, significant barriers such as lack of information, lack of upfront capital, and split incentives between landlords and tenants can prevent consumers from choosing electrification even if it is more cost effective to do so. Appendix A at 7. Other barriers that contribute to the slow rate of heat pump adoption include inaccurate operation and sizing of systems, lack of controls, and customer uncertainty around comfort and performance. Accordingly, a market mechanism alone will be insufficient to overcome these obstacles, and consumer education, incentives, and market transformation activities must accompany a heating emissions cap. The CECP should direct DOER to propose regulations relating to consumer education, installation of appropriate equipment, and the development of programs to provide upfront capital to consumers to purchase electrification equipment. Additionally, DPU should require electric distribution companies to (1) fully fund energy efficiency and decarbonization services to any residential owner earning up to 80 percent statewide median income and (2) fund such services on a sliding scale for residential owners earning 81-120 percent of the statewide median income and all renters located in an EJ population. An emissions cap should be used only as a backstop in the event these primary electrification strategies do not create the necessary level of electrification. Appendix A at 7.

2. Right-size use of biofuel blending.

- **Remove fuel and gas blending as a Strategy Action.**

While the intended goal of the emissions cap may be to encourage electrification over the long term, a technology-neutral design will allow existing buildings and new buildings to delay the transition to electric HVAC systems and may spur the continued growth of fossil fuel equipment and infrastructure for heating. As a metric within Strategy Action B3, the CECP strives for fuel oil to be blended with biodiesel to achieve a ~ 20 percent reduction in carbon intensity by 2030 and for pipeline natural gas to be reduced in carbon intensity by 5 percent. CECP at 29. The CECP should remove fuel and gas blending as a Strategy Action.

a. Biofuel transportation poses risks to EJ populations.

Beyond the heating system impacts of fuel blending discussed below, the transportation of biofuels poses environmental and health risks to EJ populations. Transportation of biofuels by truck or rail would result in increased GHG emissions in communities along truck routes and near fuel blending facilities. At present, those facilities are disproportionately located in EJ populations. Moreover, biofuels, such as ethanol, are highly flammable, especially when transported in large quantities. If the CECP retains the use of fuel blending as a strategy action, it must acknowledge the need to maximize safety associated with the transportation of biofuels and outline a plan that avoids negative impacts associated with the transportation of biofuels and eliminate potential burdens on EJ populations.

b. Reliance on biofuel blending delays necessary electrification.

Prolonging the Commonwealth's reliance on fossil fuels for heating in pursuit of the 2030 emissions reduction target will delay the investment in electrification needed to meet net zero by 2050, in addition to raising significant equity concerns for consumers. Appendix A at 8. As the CECP notes, it is imperative that buildings whose HVAC equipment expires in the next 10 years replace their fossil fuel systems with electrification. CECP at 28. If instead the price signals and incentives that should drive consumers to electrification are hidden by the use of biofuel at the supplier level, key electrification opportunities will be missed and legacy and new fossil fuel systems will remain in operation well past 2030. Appendix A at 8. This would add to our stock of fossil fuel systems that will need to be replaced before the end of their useful lives, posing unnecessary costs to consumers, where the Commonwealth would have to electrify more rapidly to meet its 2040 and 2050 targets because it did not sufficiently electrify in 2021-2030. Appendix A at 8-9. Appendix A, Figure 3 illustrates the slowed pace of market transformation in a low-electrification scenario. Appendix A at 9. Finally, fuel blending will also promote continued investment in new gas infrastructure. Appendix A at 10. As gas use declines, customers with fossil fuel equipment will be forced to pay increasingly higher rates. Appendix A at 10.

c. Liquid biofuel blending for building heat does not provide enough benefit to be part of a net zero economy in 2050.

The CECP's reliance on biodiesel fuel blending to achieve emissions reductions overlooks significant uncertainties about the impacts of fuel blending. In December 2020, the Connecticut Department of Energy and Environmental Protection ("CT DEEP") published its "Draft Integrated Resources Plan: Pathways to achieve a 100 percent zero carbon electric sector by 2040" ("CT Draft IRP").[13] It considered, in part, the creation of a "portfolio standard for thermal energy" ("T-RPS") that included biodiesel blended into home heating oil. CT Draft IRP at 162. CT DEEP engaged in an intensive fact-finding process and ultimately recommended against creating a T-RPS that subsidized biodiesel-blended heating fuels, instead recommending a separate study of alternative mechanisms and technology to support building decarbonization.

[13] Connecticut Department of Environmental Protection, "Integrated Resource Plan: Pathways to achieve a 100% zero carbon electric sector by 2040" (December 2020), https://portal.ct.gov/-/media/DEEP/energy/IRP/2020-IRP/2020-CT-DEEP-Draft-Integrated-Resources-Plan-in-Accordance-with-CGS-16a-3a.pdf.

CT Draft IRP at 165. CT DEEP concluded that the subsidization of biodiesel-blended fuel oil would be premature based on the many uncertainties and outstanding questions surrounding its deployment and environmental and health impacts. CT Draft IRP at 169, 171. The data and open questions militating against promotion of biodiesel blending include its impact on NOx concentrations in urban areas, standards and protocols needed to support high-biodiesel blends (such as 75 percent biodiesel and higher), and ability to restrict eligible feedstocks to waste food oils and greases. CT Draft IRP at 171-72.

Studies examining biodiesel's impact on NOx levels have produced inconsistent results, and it has been shown to increase formaldehyde levels. For instance, biodiesel fuel blends higher than B10 have been found to emit less pollutant CO, SO_2 and CO_2 than petroleum diesel, while B10 emitted higher SO_2 than traditional fuels.[14] Another study showed a reduction in CO and particulate matter ("PM") when burning biodiesel rather than heating oil, but formaldehyde levels were double in the biodiesel mix.[15] Biodiesel burning may also increase NOx levels, though research has been inconclusive.[16]

The strength of the biodiesel blend and the type of biodiesel used also play a role in determining emissions. Increasing the factor of biodiesel in fuel from B20 to B40 may reduce CO emissions even further, but the magnitude of this reduction may vary based on the type of feedstock used.[17] Similarly, an Environmental Protection Agency ("EPA") report that reviewed the impacts of two biodiesel fuels (soy- and animal-based) found that, while combustion-based CO_2 emissions were lower among the biofuels as compared to distillate petroleum fuel oil, there was an increase in NOx emissions when soy oil was used.[18]

Feedstock source is also relevant to evaluating biodiesel's GHG impact because the lifecycle emissions of the feedstock must be taken into account. The EPA report notes that GHG emissions that occur during a biofuel's "production and use cycle" must be understood to assess a biofuel's environmental impacts.[19] This includes analysis of the "production of the feedstock, the transport of the feedstock to the biodiesel production facility, the conversion of the feedstock to biodiesel, the transport of the biodiesel to the end user, and the combustion

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[14] Ghorbani, A., et al., A Comparative Study of Combustion Performance and Emission of Biodiesel Blends and Diesel in an Experimental Boiler, Appl. Energy, 88 (2011), 12, pp. 4725-4732. https://www.sciencedirect.com/science/article/abs/pii/S0306261911004016.

[15] A. Macor and P. Pavanello, "Performance and emissions of biodiesel in a boiler for residential heating," Energy, vol. 34, pp. 2025-2032 (2009). https://www.sciencedirect.com/science/article/abs/pii/S0360544208002016.

[16] Makaire et al., "The use of liquid biofuels in heating systems: a review," 33rd Task Leaders Meeting of the International Energy Agency Implementing Agreement on Energy Conservation and Emissions Reduction in Combustion, 07-11 August 2011, Lund, Sweden. https://orbi.uliege.be/bitstream/2268/95986/1/TLM_2011_Lund_110711_2.pdf.

[17] Heravi, H. M., et al., The Effect of Various Vegetable Oils on Pollutant Emissions of Biodiesel Blends with Gasoil in a Furnace, THERMAL SCIENCE: Year 2015, Vol. 19, No. 6, pp. 1977-1984. http://www.doiserbia.nb.rs/img/doi/0354-9836/2015/0354-98361500022H.pdf.

[18] Miller, C. A., Characterizing Emissions from the Combustion of Biofuels. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/069, 2008. https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=191572.

[19] Miller, C. A., Characterizing Emissions from the Combustion of Biofuels. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/069, 2008. https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=191572.

of the biodiesel."[20] For this reason, the Connecticut IRP notes that waste feedstocks have a lesser GHG impact than original-use or virgin feedstocks. CT Draft IRP at 167. Similarly, in California, the standard emissions factor for harvesting virgin soy oil is over 3 times as high as rendering used cooking oil.[21] The GHG factor for rendering canola oil is 1.3 times as high.[22] Massachusetts currently limits eligible liquid biofuel feedstocks to liquids derived from organic waste feedstocks, excluding petroleum-based waste and hazardous waste.[23]

d. Modeling assumptions do not support biofuel blending as 2030 strategy that maximizes our ability to reach net zero by 2050.

It does not appear that either the Roadmap or the accompany technical report "Energy Pathways to Deep Decarbonization" ("Energy Pathways Report") engaged in a meaningful analysis to determine the potential impacts of biofuel use on GHG or NOx emissions, nor did they limit it to certain eligible feedstocks or limit the amount of biofuel that may be blended. For instance, the Roadmap assumes that net-zero-carbon fuels have a GHG emissions factor of zero. Roadmap at 91. It does not, however, limit the feedstocks that may be used, suggesting instead that biofuels will "likely" be derived from agricultural and forestry byproducts. Roadmap at 91. The Energy Pathways Report specifies that in its modeling, woody biomass, rather than wastes, was overwhelmingly used as feedstock for biofuels. Energy Pathways Report at 66-67. The Roadmap also suggests that zero-carbon fuels are broadly derived from biomass or captured carbon. Roadmap at 32. The Roadmap further assumes that emissions from biofuel production, equipment, and consumable resources are accounted for in the states in which they occur. Roadmap at 91-92. Finally, the Roadmap assumes that the re-use of waste products for fuel, such as crop residues, landfill gas, and woody debris, have zero emissions. Roadmap at 92. It does not examine the potential environmental impacts of different feedstocks or of biofuel blends that exceed 20 percent. As a possible remedy for these uncertainties, the Roadmap seems to suggest the use of credit standards, like those for the Renewable Energy Portfolio Standard, APS, and Clean Energy Standard, to ensure low and zero carbon fuels meet certain standards. Roadmap at 91.

The Roadmap and Energy Pathways Report also appear to favor biofuel use because they do not fully account for lifecycle emissions which, as discussed, is essential to assessing the environmental viability of biofuel. The 2050 Roadmap stresses that the Commonwealth will need to transition from a gross emissions accounting framework to a net accounting framework to accurately track the progress toward net zero, and that such a framework must account for emissions from burning biogenic fuels. Roadmap at 88. The Roadmap also argues that full

[20] Miller, C. A., Characterizing Emissions from the Combustion of Biofuels. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/069, 2008. https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=191572.

[21] Tier 1 Simplified CI Calculator for Biodiesel and Renewable Diesel, California Air Resources Board. https://www.arb.ca.gov/fuels/lcfs/ca-greet/tier1-bdrd-calculator-corrected.xlsm?_ga=2.4269299.1309740305.1606832068-1783880760.1605623460

[22] Tier 1 Simplified CI Calculator for Biodiesel and Renewable Diesel, California Air Resources Board. https://www.arb.ca.gov/fuels/lcfs/ca-greet/tier1-bdrd-calculator-corrected.xlsm?_ga=2.4269299.1309740305.1606832068-1783880760.1605623460

[23] 225 CMR 16.02.

lifecycle emissions are not unique to biogenic fuels and may not be appropriate to include in a net emissions accounting framework, although it may consider accounting for "leakage" if the rise in biofuel use incentivizes deforestation in other states and reduces sequestration. Roadmap at 90. Given the amount of biofuel feedstock needed for building use in a heavy blending scenario and the current location of biofuel feedstocks in the short term, it is highly likely that most of the Commonwealth's biofuel use would result from such leakage. With respect to imported biofuels, which may be in large demand by 2040, the Energy Pathways Report notes that the cost, quantity available, and environmental sustainability of imported biofuels are major uncertainties requiring further in-depth study. Energy Pathways Report at 8.

While the 2050 Roadmap acknowledges that net emissions impacts of different bioenergy feedstocks can vary, and appears to call for a carbon accounting approach that can distinguish these impacts, the document does not acknowledge that use of forest biomass is particularly undesirable due to its long carbon payback time. The modeling used in the Roadmap assumes a GHG emissions value of zero for biogenic fuels, including wood wastes. Roadmap at 91-92. Such an assumption is not compatible with the science on biogenic carbon accounting and is bound to skew modeled results to a more favorable assessment of biogenic fuels than is actually justified. As the inefficiency of bioenergy is a simple function of physical qualities such as fuel energy density and moisture, there is no basis for assuming that these factors will be mitigated by improvements in technology. Massachusetts must not assume that any biogenic feedstocks are "zero emission" or "net zero."

3. *Ensure Commission and Task Force on Clean Heat have appropriate direction.*

- **Ensure Commission and Task Force mandate is limited to electrification pathway;**
- **Revise Commission and Task Force mandate to require consideration of zero up-front capital solutions for moderate income residents on a sliding scale up to 120 percent of area median income or state median income;**
- **Provide short-term, specific policies to guide building sector in aggressive transition; and**
- **Incorporate recommendations from IAC and CJWG reports.**

Strategy B3 also establishes the Commission and Task Force on Clean Heat. CECP at 33. The Commission and Task Force are charged with addressing a host of heating decarbonization concerns, but their chief task is to propose statutory, regulatory, and financing mechanisms to facilitate the transition to clean heating technologies. CECP at 33. The CECP can improve the efficacy and impact of the Commission and Task Force in two ways. First, to ensure that the Commission and Task Force put the Commonwealth on a path to net zero by 2050, the CECP should explicitly limit their activities to pursuing an electrification pathway rather than biofuel blending. Second, the Commission's mandate should be amended to account for moderate income residents. Specifically, the Commission is currently required to consider zero up-front capital solutions for low income and affordable housing residents. CECP at 33. The Mass Save program already achieves these solutions for low-income and affordable housing residents. No

such solution exists, however, for moderate-income residents. This mandate should be revised to require consideration of "Zero up-front capital solutions for moderate income residents on a sliding scale up to 120 percent of area median income or state median income."

Finally, Strategy B3 notes that reducing emissions in the building sector requires an aggressive pace, as compared to other sectors, due to the slow building equipment turnover rate. CECP at 33-34. The CECP concludes that the building sector caps are best achieved without dictating the means or technology by which to do so. CECP at 33. This approach counterintuitively assumes that a lack of direction will allow the building emissions sector to reduce emissions more rapidly. The CECP should consider providing short-term, specific policies that will allow the building sector to begin to quickly transition equipment that reaches its end of life in the next decade. These policies should include the following recommendations of the CJWG:

- Impose mandatory GHG emissions reduction limits on the building sector statewide by 2025, either through a $MMTCO_2e$ intensity per square feet building performance standard or a carbon fee on utility bills, with a substantial portion of the revenue returned to low- and moderate-income households).
- Set a mandatory threshold for the percentage of space heating and cooling and water heating that comes from renewable and highly-efficient clean electric sources.
- Establish a financing program or climate bank for building sector decarbonization by 2025 to fund deep energy retrofits, equitable workforce development, local and district-scale projects, renewable energy generation, and GHG reduction and climate adaptation.
- Add equity standards to the State Building Code, such as considering a project's impact on affordability and pollution, the ethical sourcing of materials, and living wages for workers.
- Set annually-increasing targets for serving populations traditionally underserved by Mass Save.
- Provide incentives to transition congregate settings and individual households within EJ populations to clean heating and cooling and align incentives between landlords and renters.
- Ensure building code enforcement and resident education, particularly in EJ populations, and ensure high performing buildings in EJ populations.
- Revise energy efficiency guidelines to account for improved air quality, public health, and worker rights.
- Assess building sector policies for their cross-sector, cumulative impacts to reduce associated burdens and increase benefits for EJ populations, including the prevention of displacement.

Chapter 4. Transforming our Energy Supply

The Commonwealth should be aiming to reduce GHG emissions from the electric sector as much as possible as soon as possible to ensure sufficient emissions reductions as the buildings and transportation sectors electrify.

Summary Table of CLF Electricity Sector Recommendations

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
N/A new Strategy needed	Address the negative impacts of energy infrastructure siting on EJ populations.	Legislative changes are required. We support HD3679, SD1418; Regulatory amendments are also required**.**
Section 4.2 Strategy E1: *Fill Current Standards & Execute Procurements*	Use this opportunity to make more significant progress, rather than limiting to existing goals, such that future circumstances do not impinge on program success.	Possible need for changes to regulations.
	Reform existing programs to remove polluting combustion technology.	Legislation is required.
Section 4.2 Strategy E2: *Develop & Coordinate Regional Planning and Markets*	Establish metrics for determining what changes the Commonwealth needs to see from ISO-NE to be satisfied that the ISO is acting in alignment with the Commonwealth's goals, as well as a timeline for such achievement.	Possible need for legislative or regulatory amendment.
	Establish an alternate strategy for decarbonizing Massachusetts' electric grid if it becomes apparent the ISO will not make significant changes to ensure alignment with the Commonwealth's climate goals.	Legislative changes likely required.
	Ensure that energy infrastructure is not sited near EJ populations except with adequate cumulative impacts review and process.	Legislative changes are required. We support HD3679, SD1418; Regulatory amendments are also required**.**
Section 4.2 Strategy E3: *Align Attribute Markets with GWSA Compliance*	Adopt a mechanism to ensure timely decarbonization of municipal light plans.	Legislation is not required, but would be appropriate; regulatory amendments are necessary.

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
	Focus review of market mechanisms on environmental justice outcomes.	Legislation is not required, but would be appropriate; regulatory amendments are necessary.
	Eliminate combustion technologies, including biomass from RPS and CES markets.	Legislation is required.
	Incorporate accounting for GHG emissions from large hydro projects into CES and inventory.	Amended regulations are required.
	Incorporate demand reduction strategies into the CECP.	Regulatory amendments are required.
	Direct EEA and DOER to end attribute markets' subsidies for energy purchased from high heat waste facilities.	Legislation would be beneficial; regulatory amendments are required.
	Phase out existing high heat facilities and prohibit the development of new high heat waste facilities.	Legislation would be beneficial; regulatory amendments are required.
	Require existing MWCs to comply with current emissions standards and, if they are unable to do so, to complete the technology upgrades necessary to cause the MWC to comply with emissions standards.	Legislation would be beneficial; regulatory amendments are required.
	Support legislation, regulations, and policies that encourage waste reduction and diversion.	Legislation, regulations, and guidance are required.
Section 4.2 Strategy E4: *Continue to Deploy Solar in Massachusetts*	Develop geospatial plan to ensure appropriate solar siting and incentivize siting solar near where it is needed.	No legislation or regulations are required.
	Adopt a "traffic light" approach to solar siting.	No amended regulations are necessary, but DOER guidance would be helpful.
	When siting solar on agricultural land, preserve the opportunity for food production and other agricultural dual-use options.	Possible need for legislative or regulatory amendment.

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
Section 4.2 Strategy E5: *Develop a Mature Offshore Wind Industry in Massachusetts*	Ensure at least 6GW of responsibly sited OSW is constructed or procured by 2030.	Legislation is needed.
Section 4.2 Strategy E6: *Incorporate GWSA into Distribution-Level Policy Considerations*	Increase level of detail on EEA's plan to modernize the electric grid.	No legislation or regulations are required; a DPU order is necessary.
	Ensure that modernization of electric grid benefits low- and moderate-income consumers and does not result in increased energy costs;	No legislation or regulations are required; a DPU order is necessary.
	Develop grid modernization and rate design with input from community groups.	No legislation or regulations are required; a DPU order is necessary.
	Support expansion of microgrids and renewable energy cooperatives.	Possible need for legislative or regulatory amendment.

CLF Recommendations to Strengthen Electricity Sector Strategies Overall

- **Make meaningful progress on addressing the disproportionate impacts of siting fossil fuel facilities near EJ populations.**

The CECP should emphasize the need for meaningful public engagement as the Commonwealth procures and develops standards for clean energy. It should also highlight the air quality and health benefits offered by clean energy resources. We recommend that the CECP acknowledge that existing fossil fuel communities are disproportionately sited near EJ populations. To begin to redress the disproportionate siting, we recommend a new strategy action requiring a project proponent to consult with the Massachusetts Environmental Policy Act ("MEPA") Office (the "MEPA Office") at least 60 days prior to filing and before an applicant files a petition with the Energy Facilities Siting Board. A 60-day advance notice period will allow time for a project proponent and the MEPA Office to develop an outreach strategy and then to allow time to conduct outreach prior to filing with the MEPA Office.

As part of this outreach strategy, the Proponent must be required to develop a written Project statement about the facility that includes detailed information about: the project need; public health, environmental, energy, economic, and climate risks and burdens; and public health, environmental, energy, economic, and climate benefits for communities within two miles of the facility. The project statement shall include reasonable alternatives. The project statement shall be shared with the EEA Director of Environmental Justice and posted to a public

website. If the Project will potentially impact an EJ population that is designated as limited English proficiency, then the MEPA Office shall provide guidance to the Proponent about the language(s) in which the Proponent should translate the project statement.

Early engagement between a proponent and the potentially impacted community prior to filing will likely require more preparation and planning for a proponent, but it could be an opportunity to improve a project and save time during the remainder of the environmental review. Within 30 days of submitting the Project statement, the Proponent shall invite community-based organizations, local elected officials, the EEA Director of Environmental Justice to a meeting to review the proposed project ("Information Meeting"). Based on guidance from the MEPA Office, the Proponent shall invite language interpreters, paid for by the Proponent, to ensure that Information Meeting attendees understand the terms of the project. During the Information Meeting, the Proponent shall review the Project statement, answer questions, and listen to attendee concerns and ideas. Following an information meeting, the Proponent shall adjust the Project that address community concerns or abandon plans to file with the MEPA Office. The MEPA Office shall ensure that staff is available to support a Proponent during the early engagement period to make connections with potentially impacted EJ populations.

Beyond early engagement, we anticipate implementation of S.9, if enacted, to further require permitting and approval processes to integrate EJ population consideration of fossil fuel facilities siting. We also support proposed legislation, HD3679, SD1418, and regulatory amendments to prevent the disproportionate impacts of fossil fuel facilities in EJ populations**.**

The "Social Cost of Carbon" must be accounted for when evaluating the impact of GHG pollution and included in any cost benefit analysis of electric sector regulations and proposed new electric generation facilities. Additionally, the health impacts of pollutants that co-occur with GHG emissions from combustion must be addressed by comparing emissions accounting of such pollutants in areas with EJ populations and areas without EJ populations. Lastly, the Commonwealth must provide support for municipal light plants to evaluate and respond to climate justice considerations in their own operations.

CLF Recommendations to Strengthen Strategy E1 (Fill Current Standards & Execute Procurements)

- **Use this opportunity to make more significant progress, rather than limiting to existing goals, such that future circumstances do not impinge on program success; and**
- **Reform existing programs to remove polluting combustion technology.**

Strategy E1 of the CECP notes that existing solar programs and procurement of offshore wind ("OSW"), when completely executed, would align with the scale of renewable energy growth contemplated in the Roadmap. CECP at 38. This strategy fails, however, to contemplate the possibility that the Commonwealth could achieve more aggressive goals, especially given uncertainty on what federal leadership on climate may be in the future. The Commonwealth should consider this an opportunity to get ahead of the ball, such that our climate goals will be

met even in the event of future impediments. In particular, DOER should have specific instructions to monitor technology costs and increase procurements and incentives if new information demonstrates that the cost of technology becomes less prohibitive before the modeling laid out in the Roadmap presently assumes it might be.

Additionally, this strategy's focus on compliance with existing programs ignores the Commonwealth's dire need to reform existing programs to eliminate combustion technologies and grapple with outdated ideas about the climate impact of combustion technology like woody biomass and waste combustion for electricity. CECP at 38. This issue is discussed further below in reference to Strategy E3.

CLF Recommendation to Strengthen Strategy E2 (Develop and Coordinate Regional Planning and Markets)

- **Establish metrics for determining what changes the Commonwealth needs to see from ISO-NE to be satisfied that the ISO is acting in alignment with the Commonwealth's goals, as well as a timeline for such achievement;**
- **Establish an alternate strategy for decarbonizing Massachusetts' electric grid if it becomes apparent the ISO will not make significant changes to ensure alignment with the Commonwealth's climate goals; and**
- **Ensure that energy infrastructure is not sited near EJ populations except with adequate cumulative impacts review and process.**

Strategy E2 focuses on the need for regional cooperation to plan for new transmission capacity, and the need to calibrate the pace of project approvals so that costs and revenues in the Clean Energy Standard ("CES") and Renewable Portfolio Standard ("RPS") energy certificate markets align. CECP at 38-39. To meet the Commonwealth's decarbonization goals, EEA will need to secure a commitment from ISO-NE to shift its planning paradigm and market design to meet those goals. The six New England states are committed to decarbonizing the electricity sector, and through their NESCOE Vision programming have sought out mechanisms and opportunities for aligning the region's electric grid and energy resources with the region's goals relating to climate change. CECP at 39.

This strategy falls short mostly due to factors not fully within the Commonwealth's control. The Commonwealth must prepare to modify its commitments if the regional structure fails to enact the changes needed to meet our requirements. ISO-NE's technology-neutral approach to short term electric system reliability has become an active impediment to the region's achievement of our collective decarbonization goals. Further, the pace of decarbonization necessary to meet the Commonwealth's goals may not be achieved by consensus among the New England states. The Commonwealth should determine, as soon as is practicable, what metrics it will use to determine if, when, and how the ISO has shifted its planning and market processes sufficiently to advance decarbonization goals. The Commonwealth should then be prepared to make the switch to an alternative strategy if, after

a specified amount of time, it is apparent that the ISO's efforts to come into alignment with the Commonwealth's climate goals are insufficient.

In addition, any proposed solutions contemplated under this section should include consideration of environmental justice populations, as was recommended by the CJWG. Future electric and gas distribution system infrastructure should not be sited near EJ populations, except after completion of cumulative impact reviews for such projects that include consideration of potential public health impacts and long-term harms, as well as meaningful community engagement processes wherein community concerns and ideas inform and influence decision-making at the initiation of the project proposal process.

CLF Recommendations to Strengthen Strategy E3 (Align Attribute Markets with GWSA Compliance)

1. *Clean Energy Recommendations for Strategy E3.*

- **Adopt a mechanism to ensure timely decarbonization of municipal light plants;**
- **Focus review of market mechanisms on EJ outcomes and long term goals;**
- **Take all necessary steps to eliminate combustion technologies, including woody biomass, from RPS and CES markets; and**
- **Incorporate accounting for GHG emissions from large hydro projects into CES and inventory;**
- **Incorporate demand reduction strategies into the CECP.**

Strategy E3 notes that municipal light plants are not currently subject to attribute market mechanisms like the RPS or CES. CECP at 39-40. The Commonwealth needs to determine a mechanism for the timely decarbonization of municipal light plants.

This strategy also calls for review of current attribute markets. CECP at 40. This review will be incomplete and insufficient if it fails to focus on EJ outcomes and the elimination of combustion technology from those markets. To meet any version of its environmental and climate justice goals and the 2050 net zero requirement, EEA must commit to working with the legislature to make the statutory changes necessary to remove harmful and polluting technology like woody biomass combustion from its renewable energy incentive programs. Such review should occur as soon as practicable and be repeated at five-year intervals to ensure that the latest scientific understanding of the impact of incentivized technologies is captured, and to allow for new technology options to be added.

It is far beyond time for Massachusetts to stop attempting to engineer economic development for the woody biomass industry at the cost of the health of the people who live near inefficient and highly polluting woody biomass combustion facilities.[24] For instance,

[24] For detailed discussion of the unsuitability of woody biomass for clean electricity technology incentives, see CLF, et al., Joint Environmental Comments on Proposed Changes to the Biomass Regulations in the Renewable Energy Portfolio Standard (July 26, 2019).

Palmer Renewable Energy LLC's proposed biomass facility in East Springfield, Massachusetts, would further threaten the health of a community that already struggles with significant and hazardous air pollution that degrades their air quality. Springfield experiences an above average number of high ozone days each year and has been named the number one Asthma Capital by the Asthma and Allergy Foundation of America.[25] Even though the RPS statute requires biomass plants to be low emission and use advanced technologies, when a facility is poorly sited, as is the case with the proposed Palmer plant in Springfield, incentivizing any level of additional particulate emissions is a dangerous policy choice and not credible in light of the statutory requirement for low emissions. The air permit for the proposed plant allows it to emit 34.55 tons of particulate matter and 13.2 tons of hazardous air pollutants annually, which includes heavy metals and carcinogens like formaldehyde and benzene.[26] In a community overburdened with poor air quality, building even a "low emission" biomass plant would only exacerbate the problem, adding damaging fine particulates and hazardous air pollutants where they can least be afforded.

In the review of attribute markets, EEA must also account for the GHG emissions associated with other technologies incentivized or compensated under the CES, including hydropower. MassDEP should require reporting of the GHG emissions from the electricity production by electricity retailers of hydroelectric or importers or producers, and the reported emissions should be included in the annual GHG inventory.

The CECP asserts the need to maintain pressure on regional markets by raising clean energy delivery obligations such that new clean generating sources continue to be developed. CECP at 40. Given the historic value of the CES as a means for the Commonwealth to capture the clean or renewable energy attributes of electricity purchased by Massachusetts electric customers through procurements or the wholesale market rather than driving the development of new generation, the level of the CES should be calibrated periodically to ensure that we are capturing all of the GHG emissions accounting value that our public policy-based electricity procurements are creating.

There is also a role for electricity attribute programs to help reduce the overall peak installed capacity of our electric generation system. The CECP should require MassDEP to explore amendments to the CES that would spur utilities to plan for peak demand reduction, including combined strategies such as energy storage systems, time-of-use rates, and energy efficiency services. This would help fill a gap between the Mass Save program (which encourages overall demand reduction) and the Clean Peak Standard (which attempts to encourage use of lower emitting sources to meet peak demand).

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[25] Am. Lung Ass'n, State of the Air 2019, Massachusetts: Hampden (2019) (air quality report for Hampden County), https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/massachusetts/hampden.html; Asthma & Allergy Found. of Am., Asthma Capitals 2019: The Most Challenging Places to Live with Asthma (2019), note 15, at 6, https://www.aafa.org/media/2426/aafa-2019-asthma-capitals-report.pdf.

[26] MassDEP Conditional Air Permit for PRE Proposed Biomass-Fired Power Plant at 1000 Page Boulevard in Springfield, MA 15 (June 30, 2011), http://www.pfpi.net/wp-content/uploads/2019/05/Palmer-Renewable-Energy_Non-Major-Conditional-Plan-Approval_06_30_11-FINAL.pdf.

2. Waste-specific Recommendations for Strategy E3.

- **Direct EEA and DOER to end attribute market subsidies for energy purchased from high heat waste facilities;**
- **Phase out existing high heat facilities and prohibit the development of new high heat waste facilities;**
- **Require existing MWCs to comply with current emissions standards and, if they are unable to do so, to complete the technology upgrades necessary to cause the MWC to comply with emissions standards; and**
- **Support legislation, regulations, and policies that encourage waste reduction and diversion.**

The combustion of petroleum-based municipal solid waste (e.g., plastics) at Massachusetts' seven municipal waste combustors ("MWC") is the largest source of emissions from the solid waste stream. Roadmap at 70. From 2010 to 2018, total CO_2, CH_4, and N_2O Emissions from municipal solid waste ("MSW") combustion for the electric sector have decreased from 2,426,817 to 1,163,977 $MMTCO_2e$, a 52 percent reduction.[27] During the same period, total CO_2, CH_4, and N_2O emissions from MSW combustion for the industrial sector have almost doubled from 22,320 to 40,954 $MMTCO_2e$, an increase of 83.4 percent.[28]

Landfills similarly contribute GHG emissions. From 2010 to 2018, total methane emissions from Massachusetts landfills declined from 449,850 to 304,408 $MMTCO_2e$.[29] That is a 32.3 percent decrease. In the same period, CO_2 oxidation emissions from MSW landfills and emissions flares, engines and turbines at landfills (not already accounted for in electric sector) have decreased at varying rates.[30]

In Strategy E3, the CECP notes that emissions from the electricity system in 2030 are expected to arise, in part, from municipal solid waste combustion. CECP at 39. The CECP implores EEA and DOER to review current attribute markets (including the RPS and APS) to "ensure those programs continue to support 'on pace' clean energy deployment in a strategic, cost effective way". CECP at 40. In Strategy N2, the CECP recognizes that the current major source of emissions from solid waste disposal is the Commonwealth's seven MWCs. CECP at 47. Strategy N2 articulates a twofold plan to stabilize these emissions. First, it relies on the Draft 2030 Solid Waste Master Plan ("Draft SWMP") to divert materials and reduce the Commonwealth's waste management needs. CECP at 47. Second, it would require MassDEP to establish tighter emissions and increased efficiency standards if an MWC seeks to modify or rebuild its facility. CECP at 47.

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[27] Massachusetts Greenhouse Gas Emissions Inventory, 1990-2017 with partial 2018 data. https://www.mass.gov/doc/appendix-c-massachusetts-annual-greenhouse-gas-emissions-inventory-1990-2017-with-partial-2018/download.

[28] *Id.*

[29] *Id.*

[30] *Id.*

In both Strategy Actions E3 and N2, the CECP should re-frame its approach to solid waste and high heat waste disposal facilities to: (1) phase out the use of existing high heat facilities; (2) ensure that no new high heat facilities are built; and (3) support waste reduction and diversion policies to reduce the amount of banned materials from entering our MWCs or landfills. For purposes of these comments, "high heat facilities" refers to any processing facility that uses or results in the use of high heat, including incineration, pyrolysis, gasification, plasma arc, and chemical recycling, to dispose of waste. For instance, a proposed biosolids gasification facility in Taunton was technically not classified as an incinerator by the EPA.[31] While incineration does not occur on site, the constituent particles produced by the facility's gasification process would be incinerated off-site and consequently contribute to the negative environmental and health impacts of high heat described herein.

a. <u>High heat facilities are a false solution to waste reduction and harm the environment and public health.</u>

High heat facilities in the Commonwealth, including its seven MWCs, are toxic, harmful, and unnecessary. First, MWCs produce GHG emissions, particulate matter, and ash that is harmful to public health and the environment.[32] Second, six of the seven MWCs are located near EJ populations, which are already overburdened with pollution, experience negative public health impacts, and often lack access to environmental benefits, such as renewable energy and green spaces. Third, aging MWCs cost more to operate and maintain than other forms of electricity generation and provide fewer jobs than alternatives such as composting and recycling.[33] The Commonwealth's MWCs have also outlasted their useful lifespans and require significant, disruptive, and expensive repairs.[34] Finally, MWCs are not needed to dispose of the Commonwealth's solid waste. Pursuing zero waste alternatives, such as composting and

[31] Aries Clean Energy, Taunton Biosolids Gasification Project: Presentation to City Council (December 29, 2020). https://www.taunton-ma.gov/sites/g/files/vyhlif1311/f/uploads/aries_taunton_council_presentation_final_12-29-20.pptx.

[32] *See, e.g.,* Energy Justice Network, Trash Incineration More Polluting Than Coal, http://www.energyjustice.net/incineration/worsethancoal; Environmental Integrity Project, Dirtying Maryland's Air by Seeking a Quick Fix on Renewable Energy?, pp. 3–8 (2011), http://www.environmentalintegrity.org/wp-content/uploads/2016/11/FINALWTEINCINERATORREPORT-101111.pdf; The New School, U.S. Municipal Solid Waste Incinerators: An Industry in Decline at 34 (2019), https://tishmancenter.org/wp-content/uploads/2019/05/CR_GaiaReportFinal_05.21.pdf; U.S. EPA, Municipal Solid Waste in the United States: 2011 Facts and Figures, pp. 143–44 (2013), https://archive.epa.gov/epawaste/nonhaz/municipal/web/pdf/mswcharacterization_fnl_060713_2_rpt.pdf.

[33] U.S. Energy Information Administration, Updated Capital Cost Estimates for Electricity Generation Plants at 7 (2010), http://large.stanford.edu/courses/2018/ph241/wang-k2/docs/eia-nov10.pdf; Tellus Institute, More Jobs, Less Pollution: Growing the Recycling Economy in the U.S., pp. 34–35 (2011), https://www.nrdc.org/sites/default/files/glo_11111401a_0.pdf.

[34] Abraham, Y., "It's time for the nation's oldest trash incinerator, in Saugus, to go," *Boston Globe,* (Jan. 23, 2021), https://www.msn.com/en-us/news/us/it-s-time-for-the-nation-s-oldest-trash-incinerator-in-saugus-to-go/ar-BB1d1XfG. *See* Budris, K., "Aging Waste Incinerators Post a Danger to New Englanders: Burning Our Trash Pollutes More, Costs More, Deepens Entrenched Inequalities," Conservation Law Foundation, (Dec. 9, 2019), https://www.clf.org/blog/aging-incinerators-pose-a-danger/.

recycling, could divert the majority of materials from going to landfills or MWCs.[35] In 2019, paper, plastic, metal, glass, or organic material, most of which could have been recycled or composted, accounted for at least 70 percent of the municipal solid waste incinerated in Massachusetts.[36] MWCs are an inefficient use of energy. Zero waste practices such as source reduction, recycling, and composting conserve three to five times more energy, per ton of waste, than incineration can generate.[37]

Finally, the use of pyrolysis, gasification, plasma arc, chemical recycling, and incineration represent false solutions to the plastic waste reduction crisis because they do not fit into the "circular economy" of plastic waste.[38] Rather than produce new plastic, these processes produce either fuel that is combusted off-site or air emissions.[39] This means that additional fossil fuels are needed to manufacture virgin plastics.[40] The final CECP should prohibit the approval of new high heat facilities.

b. Phase out existing high heat facilities and prohibit development of new facilities.

The CECP should strengthen Strategy Action E3 to phase out the use of high heat combustion by eliminating attribute markets' subsidies for energy generated through high heat processes, including MWCs. As noted above, MWCs do not produce renewable energy[41] and should not benefit from programs intended to support renewable energy. The CECP should also support amendments to regulation 310 CMR 16.00 that would phase out incinerators. Similarly, to put the Commonwealth on track to meet its 2050 goals, the CECP should seek to prohibit the development of new facilities that employ high heat technologies to dispose of solid waste. EEA expects that the volume of waste to be processed by the Commonwealth's existing MWCs will decrease, underscoring the lack of need for additional facilities. CECP at 47. The CECP should indicate the potential need for legislation that would achieve this goal. In the alternative, the CECP should direct MassDEP to propose regulatory amendments to 310 CMR 16.00 which would accomplish this as well.

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[35] *See* Massachusetts Department of Environmental Protection, Overall Waste Composition By Primary Material Category—Winter and Fall 2016 Sampling, https://www.mass.gov/doc/summary-of-waste-combustor-class-ii-recycling-program-waste-characterization-studies-includes/download; *see also* Tellus Institute, *supra* note 28, at 1.

[36] *See* Massachusetts DEP, Overall Waste Composition By Primary Material Category—Spring and Summer 2019 Sampling, https://www.mass.gov/doc/summary-of-waste-combustor-class-ii-recycling-program-waste-characterization-studies-includes/download.

[37] Marie Donahue, Institute for Local Self-Reliance, Waste Incineration: A Dirty Secret in How States Define Renewable Energy at 11 (2018), https://ilsr.org/wp-content/uploads/2018/12/ILSRIncinerationFInalDraft-6.pdf.

[38] Rollinson, A., Oladejo, J., Chemical Recycling: Status, Sustainability, and Environmental Impacts. *Global Alliance for Incinerator Alternatives*. doi:10.46556/ONLS4535, at 11 (2020), at 11.https://www.no-burn.org/wp-content/uploads/CR-Technical-Assessment_June-2020.pdf.

[39] *Id.* at 8.

[40] Global Alliance for Incinerator Alternatives, Chemical Recycling: Distraction, Not Solution, at 7 (2020), at 7.https://www.no-burn.org/wp-content/uploads/CR-Briefing_June-2020.pdf.

[41] *See* Tellus Institute, Assessment of Materials Management Options for the Massachusetts Solid Waste Master Plan Review at 9, 11 (2008), https://www.tellus.org/pub/Final_Report-Materials_Management_Options_for_MA_SW_Master_Plan_Review_-_With_Appendices_-_12-08.pdf. *See also* U.S. EPA, Solid Waste Management and Greenhouse Gases, a Life-Cycle Assessment of Emissions and Sinks at 76 (3d ed. 2006).

With respect to Strategy Action N2, while the proposal that MWCs meet higher emissions standards if they seek to modify their facilities is a positive step, it is unlikely that MWCs will be able to meet any such emissions standards. CECP at 47. The Commonwealth's MWCs already struggle to meet existing emissions standards, even with regular repairs. For instance, the 45-year-old Wheelabrator Saugus, during shutdown operations in 2018, emitted average concentrations of carbon dioxide and sulfur dioxide that significantly exceeded the incinerator's Air Quality Operating Permit emissions limits.[42] Similarly, the Saugus incinerator is permitted to comply with the NOx limits set forth in 310 CMR 7.08(2)(f)3 by purchasing emission reduction credits, rather than decreasing the NOx emissions it actually releases.[43] Finally, as discussed above, MWCs are toxic and unsustainable generating facilities that are primarily situated in overburdened EJ populations and are currently accepting significant amounts of solid waste that is legally required to be diverted. Strategy Action N2 should also require existing MWCs to comply with current emissions standards and, if facility operators are unable to do so, to complete the technology upgrades necessary to cause each MWC to comply with emissions standards in lieu of purchasing emission reduction credits.

c. Emphasize waste reduction and diversion policies.

Reducing and diverting waste is critical to phasing out high heat facilities and reducing methane production at landfills. Once an MWC is built, it requires a certain level of waste inputs to remain profitable.[44] A state or municipality may be contractually obligated to provide a certain level of waste to the incinerator.[45] In a practical sense, a municipality that has relied on an MWC for years, if not decades, may be disinclined from pursuing zero waste policies that would disrupt the status quo and require the municipality to devote time and resources to the development of new policies. In these ways, the continued existence of high heat facilities guarantees a consistent level of waste generation and will prevent the adoption of waste reduction and diversion policies.[46] While all operating Massachusetts landfills are planned to close by the early 2030s, these sites will continue to produce methane as a result of slowly decaying organic matter, mostly food waste. Roadmap at 70. Discarded food that ends up in landfills unnecessarily releases GHG emissions.

The Commonwealth has, in recent years, failed to achieve a meaningful reduction in waste. Over the last ten years, the disposal rate has remained flat despite increased diversion of food scraps, the decline of hard copies of newspapers, and the practice of "light loading" (making lighter plastic containers).[47] Specifically, the Commonwealth generated roughly 5.4

[42] Emissions data can be retrieved at http://eeaonline.eea.state.ma.us/DEP/MWC/facilityReport. Aspx; Final Air Quality Operating Permit MBR-95-OPP-011A5 at 5, https://www.mass.gov/files/documents/2019/06/27/op-wheels.pdf.

[43] *See* Emission Control Plan Modified Approval at 5-6, https://eeaonline.eea.state.ma.us/EEA/PublicApp/#.

[44] *See* Muznik, S., Deliver or Pay, or how waste incineration causes recycling to slow down, Zero Waste Europe, https://zerowasteeurope.eu/2017/10/deliver-pay-waste-incineration-causes-recycling-slow/.

[45] *Id.*

[46] *See* Taxonomy Technical Report, EU Technical Expert Group on Sustainable Finance at 292 (June 2019). https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-taxonomy_en.pdf.

[47] *See* 2019 Solid Waste Data Update, Department of Environmental Protection, at 3 (Oct. 2019). https://www.mass.gov/doc/2019-solid-waste-data-update/download.

million tons of solid waste disposal in 2010 and roughly 5.5 million tons in 2019.[48] While there has also not been a marked increase in waste given that the economy has improved since 2008-09,[49] this is a highly concerning lack of progress. Without more action by the Commonwealth, this trend suggests that waste levels will remain stagnant through 2030, contrary to the CECP's expressed expectation.

CECP Strategy Action N2 recognizes that waste reduction is needed to stabilize emissions from MWCs over the next decade. CECP at 47. Reliance on the Draft SWMP, however, is insufficient to achieve its 2030 emissions goals with respect to solid waste. Notably, since the Draft SWMP is not enforceable, there is no assurance that its waste reduction goals will be realized. Furthermore, it lacks incentives and enforcement mechanisms, making it less likely that its goals will be achieved. In addition, its waste reduction goals are too distant and conservative. The Draft SWMP proposes a diversion of 90 percent of current waste by 2050, with a shorter-term goal of reducing waste by 30 percent per decade. Draft SWMP at 7-8. To reduce the need for MWCs, the CECP should supplement the Draft SWMP by supporting the following policies, regulations, and legislation that incentivize waste reduction and divert waste from high heat facilities and landfills:

1. Municipal unit-based pricing policies, such as Pay-As-You-Throw, which are successful in reducing municipal waste disposal rates by 42-54 percent.[50]
2. Container deposit return laws that pay redemption fees to consumers and cover a broad variety of covered containers divert more materials and lead to more recycling that produces better quality materials than curbside recycling programs, all at no expense to taxpayers.[51] The CECP should direct the Administration to support HD.4039/SD.2483, currently pending before the legislature.
3. Producer responsibility for packaging policies which, if properly designed, can spur reduction, recycling, and redesign of material so they are reusable or more recyclable. The CECP should direct MassDEP to support HD.1553/SD.1123, which is currently pending before the legislature.
4. Amendments to regulation 310 CMR 16.00 that would phase out incinerators.
5. Amendments to regulation 310 CMR 19.00 that would strengthen existing food waste bans and create residential food waste bans. Banning the disposal of food scraps would decrease Massachusetts' disposal tonnage by one to two million

[48] *Id.*
[49] *See* Draft Massachusetts 2030 Solid Waste Master Plan, Department of Environmental Protection, at 3 (Sept. 2019). https://www.mass.gov/doc/draft-2030-solid-waste-master-plan/download.
[50] *See* UNH Research Finds Pay-As-You-Throw Trash Policies Cut Solid Waste Disposal (November 5, 2018), https://www.unh.edu/unhtoday/news/release/2018/11/05/unh-research-finds-pay-you-throw-trash-policies-cut-solid-waste-disposal.
[51] *See* Jenny Gitlitz, U.S. Container Recycling Rates and Trends, Container Recycling Institute (Oct. 2013), Available at https://www.legis.iowa.gov/docs/publications/SD/698850.pdf.

tons, or 22-33 percent, each year.[52] MassDEP cannot meet the goals set in the Draft SWMP unless food scraps are banned entirely from disposal, and soon.

6. Enforcement of the waste bans established by 310 CMR 19.00, which could divert 40 percent of waste (excluding food scraps),[53] through the allocation of additional resources to support at least six full-time waste inspectors at MassDEP.

CLF Recommendations to Strengthen Strategy E4 (Continue to Deploy Solar in Massachusetts)

- **Develop geospatial plan to ensure appropriate solar siting and incentivize siting solar near where it is needed;**
- **Adopt a "traffic light" approach to solar siting; and**
- **When siting solar on agricultural land, preserve the opportunity for food production and other agricultural dual-use options.**

Current solar programs are scheduled to sunset in about five years, but there is still a need for growth in solar energy, such that the system includes 40 gigawatts of solar resources by 2050. As noted in the CECP, expansion of the solar energy industry presents two major issues: interconnection and impact on natural lands. CECP at 40. The CECP unfortunately lacks any proposed solutions for the concerns raised in this section, such as incentives for research and development of solar technologies, extending current solar programs, or mandating solar roofing for new construction. The CECP should provide more specificity about how it intends to add any additional solar resources into the system, let alone an addition 40 gigawatts. When looking at the role of solar and other onshore resources to meet our goals, we need a geospatial plan for the location of solar installations, what is feasible on specific sites, and plans to eliminate barriers to building on brownfields and impervious surfaces. After creating this plan, the Commonwealth should then limit renewables siting on greenfields to ensure the least harm to such green spaces. The Commonwealth should develop a strong incentive to put solar technology where it can benefit the grid and has community support while avoiding siting where it is not needed.

The Commonwealth can support robust continued solar growth while protecting critical forest, agricultural, and other environmentally-significant lands and encouraging accelerated development of solar on developed land or through dual-use with agriculture. A comprehensive, common-sense approach to solar siting will encourage project developers to prioritize preferred siting locations and help residents understand solar development's role in the landscape. To protect our most ecologically important lands while supporting solar development on marginal lands, CLF favors a "traffic light" land classification system designed

[52] *See* Massachusetts Food System Collaborative, Food Waste Reduction, https://mafoodsystem.org/projects/food-waste/

[53] *See* Fischer, J., MassDEP Waste Ban Compliance and Enforcement (January 14, 2015), http://www.newmoa.org/events/docs/147_137/MassDEPWasteBansJan2015.pdf.

to fit with DOER's existing category-based land use classification under the Solar Massachusetts Renewable Target ("SMART") program. The "red" category includes lands with high ecological value, prime farmland, and open space that should be off limits to solar development. The "yellow" category includes some farm and forest lands that would be eligible for solar development but would require payment into a Solar Conservation Fund to help mitigate impacts. The "green" category includes disturbed lands, brownfields, rooftops, landfills, and dual use on agricultural lands that would be preferred locations for solar. CLF would be happy to provide additional details on this proposed approach, which we developed in partnership with American Farmland Trust, Vote Solar, and Acadia Center.

CLF Recommendations to Strengthen Strategy E5 (Develop a Mature Offshore Wind Industry in Massachusetts)

- **Ensure at least 6GW of responsibly sited OSW is constructed or procured by 2030.**

OSW is a promising resource, but its development requires alignment of several moving parts by local, state, and federal governments, as well as with ISO-NE. In addition to needing to ensure that multiple factors synchronize appropriately, additional research into the impacts of OSW is necessary to determine the potential for adverse impacts on local fishing industries and marine wildlife. CECP at 42.

Significant OSW development, in existing and additional lease areas off the coast of Massachusetts, is necessary and the only plausible way to fully decarbonize the electric grid by 2050 at the latest. It is crucial that this OSW leasing and development is done responsibly. Responsible OSW development avoids, minimizes and mitigates impacts to ocean wildlife and habitat—including critically endangered species such as the North Atlantic right whale—as well as traditional ocean uses. Responsible OSW development also meaningfully engages stakeholders from the start and uses the best available science and data—including data from already developed projects—to ensure science-based and stakeholder-informed decision making. As Massachusetts seeks to identify new lease areas to meet its clean energy and decarbonization goals, it is essential that a diverse array of stakeholders are involved so that siting can occur in areas that will avoid, minimize, and mitigate impacts.

Responsibly sited OSW will be the linchpin of the Commonwealth's ability to decarbonize. In addition to the six gigawatts of renewable energy that EEA will pursue between 2030 and 2040, Massachusetts' OSW procurements should total a minimum amount of clean energy deployment by 2030. We recommend that Strategy E5 set a target of at least six megawatts by 2030. In addition to enabling the Commonwealth to meet more ambitious interim limits, additional procurements of OSW will ensure that we are able to access the benefits of the lease areas off of our shores as other large states south of New England ramp up their own aggressive OSW procurements.

CLF Recommendations to Strengthen Strategy E6 (Incorporate GWSA into Distribution-Level Policy Considerations)

- **Increase level of detail on EEA's plan to modernize the electric grid;**
- **Ensure modernization of electric grid benefits low- and moderate-income consumers and does not result in increased energy costs;**
- **Develop grid modernization and rate design with input from community groups;**
- **Prioritize opportunities for ownership of renewable energy assets in EJ populations; and**
- **Support expansion of microgrids and renewable energy cooperatives.**

The CECP notes that implementation of clean energy policies will result in a need for grid modernization and distributed system planning, which in turn will promote development of clean energy resources by removing barriers to entry. CECP at 43. The Commonwealth should add detail to the CECP to thoroughly lay out a plan for modernizing the grid. This could include what EEA expects from the ongoing DPU proceedings on grid modernization and distribution planning, as well as what other agencies and ISO-NE must achieve for this strategy to be successful. As the IAC and CJWG have previously recommended, grid modernization should benefit low and moderate-income customers and not result in increased energy costs, and programs and rate design should be developed in collaboration with community groups.

Additionally, the CECP should incorporate recommendations set forth by the IAC CJWG in the area of distributed energy resources. EJ populations need to be at the forefront of all proposals and strategies contemplated under the CECP. Removal of financial barriers and mandatory minimum participation in clean energy programs will give EJ populations the opportunity to access renewable energy generation, and financial incentives and regulatory carve-outs will encourage community shared distributed energy resources and microgrids in communities with EJ populations. EEA should develop programs to enable opportunities for individual and community ownership of distributed renewable energy assets like solar in communities with EJ populations.

Summary Table of CLF Non-Energy Sectors Recommendations

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
N1: *Target Non-Energy Emissions That Can Be Abated or Replaced*	Support legislation, amend regulations, and develop additional programs to reduce methane leaks and eventually retire gas system infrastructure.	Legislation is not required; amended regulations are necessary.
	Amend regulations to establish annual methane limits from 2025-2030.	Regulations will need to be modified; statutory change may be required.
	Direct MassDEP to compare the most recent emissions results to previous results to accurately measure progress towards GWSA goals.	No legislation or regulations are required.
	Direct MassDEP to measure and monitor atmospheric methane levels.	No legislation or regulations are required.
N2: *Implement Best Practices Around Residual Non-Energy Emissions*	See Recommendations to Strengthen Strategy E3 (waste), above.	Legislation, amended regulations, and guidance are necessary.
	Fund the Healthy Soils Program.	No legislation or regulations are required.
	Direct MDAR to establish a baseline of data on soil carbon measurement in the Commonwealth.	No legislation or regulations needed; guidance may be helpful.
	Develop a program to incentivize farmers to adopt and maintain farming practices that drive carbon sequestration, improved water quality, and other benefits.	No legislation or regulations needed; guidance may be helpful.

CLF Recommendations to Strengthen Strategy N1 (Target Non-Energy Emissions That Can Be Abated or Replaced)

- **Support legislation, amend regulations, and develop additional programs to reduce methane leaks and eventually retire gas system infrastructure;**
- **Amend regulations to establish annual methane limits from 2025-2030;**
- **Direct MassDEP to compare the most recent emissions results to previous results to accurately measure progress towards GWSA goals; and**
- **Direct MassDEP to measure and monitor atmospheric methane levels.**

The CECP emphasizes that stabilizing and limiting the growth of non-energy emissions is an impactful strategy for the next decade. CECP at 45. The CECP also acknowledges that methane leaks from natural gas infrastructure are "substantial," but it fails to recommend additional action to further curb such leaks. CECP at 46. Strategy N1 relies on MassDEP's current regulation 310 CMR 7.73 and its coordination with gas companies' Gas System Enhancement Plans and the eventual deployment of heat pumps to reduce gas leaks. CECP at 46. This approach overlooks the additional action necessary to eliminate methane leaks.

First, as discussed above in Strategy B3, MassDEP should amend regulation 310 CMR 7.73(4) to require distribution companies to repair gas leaks to achieve zero-emissions related to lost and unaccounted for gas or, in some cases, retire the pipe altogether. MassDEP should further amend 310 CMR 7.73(9) to establish annual methane limits from 2025-2030.

Second, the CECP should address how the Commonwealth's legislature can play a role in reducing methane leaks. Several bills, An Act relative to eliminating gas leaks (SD.2188/HD.3552) and An Act relative to the future of heat in the Commonwealth (SD.2340/HD.3472), that are pending before the Massachusetts legislature would offer additional solutions and incentives to address gas leak emissions.

Third, EEA should take an active role in developing strategies to encourage the eventual removal of unused gas infrastructure and provide specific details on how it intends to achieve this goal in the CECP. As written, the CECP appears to rely on the hope that electrification will reduce methane leaks, stating that "it is possible that a planned, geographic contract of the gas distribution system could further reduce...[methane] emissions". CECP at 46. Finally, MassDEP can take steps to better understand historic and current levels of methane emissions. MassDEP should perform an analysis to compare the most recent emissions results to previous results (dating back to 1990) to accurately measure progress towards GWSA goals. When new emissions factors were introduced in 2015, the dramatic "reduction" in methane leaks was not accurately presented, including in Figure 9 of the CECP. CECP at 44. Additionally, MassDEP should endeavor to measure and monitor atmospheric methane levels to account for all methane leaks and correctly assess the Commonwealth's progress towards its goals under the GWSA.

CLF Recommendations to Strengthen Strategy N2 (Implement Best Practices Around Residual Non-Energy Emissions)

- **Incorporate CLF recommendations to Strengthen Strategy E3 (waste), above;**
- **Fund the Healthy Soils Program;**
- **Direct MDAR to use the program to establish a baseline of data on soil carbon measurement in the Commonwealth; and**
- **Develop a program to incentivize farmers to adopt and maintain farming practices that drive carbon sequestration, improved water quality, and other benefits.**

The CECP proposes that the Commonwealth and its agencies establish best practices to minimize the growth of non-energy emissions from solid waste disposal, wastewater processing, and agricultural activities. CECP at 47.

Improving soil health to drive carbon sequestration is an important and untapped natural climate solution for the Commonwealth. Shifting from conventional farming practices to regenerative agriculture practices can rebuild soil organic matter and store carbon into the soil so it serves as a carbon sink. Scientists estimate that farmers can increase soil carbon stock at a rate of 500 pounds or more per acre per year. As the soil becomes healthier, it can yield a range of co-benefits for farmers and for communities in addition to carbon sequestration, including cleaner water, improved crop productivity, enhanced biodiversity, and reduced need for inputs like pesticides.

Investing in climate-smart farming practices will ensure that farmers are partners in combatting climate change and building a more resilient agricultural sector in the Commonwealth. There is growing enthusiasm in the farming community for adopting these beneficial, soil-building practices, which include minimizing soil disturbance through low- and no-till practices, maximizing soil cover through cover cropping, and keeping living roots in the soil through crop rotations. The Commonwealth should start by funding the Healthy Soils Program,[54] signed into law by Governor Baker in January 2021, which will provide much-needed grants and technical assistance to farmers seeking to improve the health of their soils. The Massachusetts Department of Agricultural Resources ("MDAR") should use the program to establish a baseline of data on soil carbon measurement in the Commonwealth. From there, the Commonwealth should develop a program to incentivize farmers to adopt and maintain farming practices that drive carbon sequestration, improved water quality, and other benefits. CLF welcomes the opportunity to provide input on policy design.

[54] *See* House No. 5250, An act enabling partnerships for growth, lines 1063-1097. Filed Jan. 6, 2021. https://d279m997dpfwgl.cloudfront.net/wp/2021/01/01-06_EcoDev_H5250.pdf.

Chapter 6. Protecting our Natural and Working Lands

Massachusetts forests have the capacity to sequester about seven percent of the Commonwealth's current emissions. Over half of forested land in Massachusetts is privately owned, so efforts to conserve such land must make sound business sense to protect our natural and working lands from competing economic incentives.

Summary Table of CLF Natural and Working Land Sector Recommendations

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
Strategy L1: *Protect Natural and Working Lands*	Amend Wetlands Protection Act to include policy of no net-loss of wetlands.	Statutory and regulatory changes are required.
	Enact companion law for protection of forested lands.	Statutory and regulatory changes are required.
	Prioritize impacts of natural and working lands on environmental justice populations and public health impacts.	Regulatory amendments would be helpful.
Strategy L2: *Manage for Ecosystem health and Enhanced Carbon Sequestration*	Use best practices outlined in Healthy Soils Action Plan and Resilient Lands Initiatives as a baseline for improving ecosystem health and not as an idealistic goal.	No legislation or regulations necessary; guidance may be helpful.
	Quantify the effects of new construction and tree and forest removal on urban heat levels and air pollution under MEPA.	Regulatory amendments would be helpful.
Strategy L3: *Incentivize Regional Manufacture & Use of Durable Wood Products*	Ensure that CLT manufacturing is governed by sustainable forest management practices.	Regulatory amendments may be necessary.
	Require CLT manufacturing companies to hire persons from EJ populations and people underrepresented in the workforce.	Regulatory amendments to ensure diverse, fair, and competitive market may be necessary.
Section 6.2	Develop market framework in collaboration with community groups and stakeholders.	Statutory and regulatory changes are required.

GHG Reduction Strategy Proposed by EEA	CLF Recommendation	Need for Legislation / Regulation
Strategy L4: *Develop Sequestration Accounting and Market Frameworks*	Ensure carbon sequestration offset market is diverse, fair, and competitive by lowering barriers to entry for minority owned businesses.	Regulatory amendments to ensure diverse, fair, and competitive market may be necessary.

CLF Recommendations to Strengthen Strategy L1 (Protect Natural and Working Lands)

- **Amend Wetlands Protection Act to include policy of no net-loss of wetlands;**
- **Enact companion law for protection of forested lands; and**
- **Prioritize impacts of natural and working lands on EJ populations & public health impacts.**

EEA proposes the creation and funding of incentive-based programs designed to achieve no net-loss of forest and farmland. CECP at 49. EEA will also continue to protect and restore inland and coastal wetlands, specifically by developing blue carbon mapping and inventory techniques while monitoring potential increases in methane emissions from degraded wetlands. CECP at 49-50.

Since the late 1970s, the Wetlands Protection Act (M.G.L. c. 131, § 40) has provided a crucial mechanism for conservation of wetland resources and the areas that serve to protect them. In most municipalities in Massachusetts, this law is administered and enforced by the municipal Conservation Commission; many cities and towns also have a local bylaw to provide additional protections beyond those offered by the Wetlands Protection Act. Because most Massachusetts municipalities already have a board with expertise in conservation, EEA need not start from scratch in using natural lands in the fight against climate change. The Wetlands Protection Act should first be updated to include a policy of no net-loss of wetlands (which some municipalities already include in their local bylaws).

A companion law modeled similarly to the Wetlands Protection Act should be enacted to regulate forested lands, institute a policy of no net-loss of forested land, and incentivize re-foresting as much land as possible. These programs should include funding mechanisms for municipal conservation commissions to help alleviate the cost of administering and enforcing additional regulations and finance any necessary education and training. Finally, because of the significant impact that wetlands and natural lands have in mitigating the effects of climate change and the associated public health effects, any and all changes to the Wetlands Protection Act and any additional legislation regarding natural and working lands which arises from the CECP must prioritize funding, development, and protection of these resources in and around communities with EJ populations.

Both the IAC and CJWG have provided recommendations regarding natural and working lands for EEA to incorporate into the CECP, some of which are set forth here, and all of which

need to be incorporated to the best extent possible into the CECP. It is imperative that Strategy L1 include an explicit directive to preserve healthy, mature trees and naturally vegetated areas, especially but not exclusively in the urban environment. Too often, EJ populations are waging campaigns to preserve mature trees that provide public health benefits in the face of development plans to remove such trees in the name of new housing or safer streets. In addition to the Resilient Lands Initiative, we recommend adding a specific action to the CECP that agencies should avoid the removal of healthy, mature trees, and mitigate any loss for transportation, development, or energy infrastructure projects. All projects undertaken by the Commonwealth or receiving state funding or permits should evaluate the impacts of tree removal and the ability to retain existing tree cover and add additional carbon sequestration features.

The Commonwealth needs to establish a bold goal to plant a specific number of urban and suburban trees by a certain date, with a focus on EJ populations, and along rivers, streams, and meadows. We further recommend an action that requires the Commonwealth to identify priority locations to convert concrete and asphalt to green spaces in communities with EJ populations and ensure that trees will both survive and not violate accessibility laws and regulations. This recommendation is interconnected to the work to repair gas leaks and to ensure that new trees are not planted in places that will be killed by gas leaks.[55] Priority locations for tree planting should include public transit bus stops, school bus stops, and school grounds. The action should also include creating a network of shady green spaces in high-density neighborhoods across the Commonwealth using vacant lots, tax title parcels and other areas.

CLF Recommendations to Strengthen Strategy L2 (Manage for Ecosystem Health and Enhanced Carbon Sequestration)

- **Use best practices outlined in Healthy Soils Action Plan and Resilient Lands Initiatives as a baseline for improving ecosystem health and not as an idealistic goal; and**
- **Quantify the effects of new construction and tree and forest removal on urban heat levels and air pollution under MEPA.**

To ensure improved diversity and ecosystem health on natural and working lands, EEA proposes to implement and incentivize best management practices identified in the Healthy Soils Action Plan and Resilient Lands Initiative. CECP at 50. This presents an appropriate starting point for managing ecosystem health, as each of these programs has been lauded as robust and each has been developed with stakeholder and expert input. EEA should be careful to ensure that climate mitigation and adaptation are explicitly laid out as core principles and goals of each program. Wherever and whenever possible, EEA's efforts in managing ecosystem health and enhanced carbon sequestration should go above and beyond the best management practices

[55] Claire Schollaert, Robert C. Ackley, Andy DeSantis, Erin Polka, Madeleine K. Scammell, *Natural gas leaks and tree death: A first-look case-control study of urban trees in Chelsea, MA USA*, Environmental Pollution, Volume 263, Part A, 2020, 114464, ISSN 0269-7491, https://doi.org/10.1016/j.envpol.2020.114464.

set forth in the Healthy Soils Action Plan and Resilient Lands Initiative, as such practices should be the baseline performance, rather than an idealistic target for achievement.

We recommend adding an action to Strategy L2 that requires developers to quantify the heating and cooling implications of their projects. To ensure that transportation, housing, and commercial development do not exacerbate heat and air quality, developers should be required to quantify the effects of new construction and tree and forest removal on urban heat levels and air pollution when applying for MEPA approval. The impact of gas leaks on tree health should also be considered when deciding whether to install or repair natural gas pipes or to replace them with renewable energy sources. The Commonwealth should ensure that tree planting jobs are marketed towards and accessible to EJ populations and should quantify annual forestry jobs filled by members of EJ populations. EEA should allocate a minimum percent of any funding and resources for technical assistance to protecting resources in EJ populations. A certain amount of treed removal (which should also take into account the size, density, and maturity of trees) should be designated as triggering the need for an EIR under MEPA, and capital projects which call for the removal of healthy, mature trees should be rejected. Further, MEPA review must require that developers quantify the effects of new construction and tree removal on urban heat levels and air pollution and that developers mitigate these effects by means of replacement plantings, which should be monitored for a term of three to five years to ensure success and viability, as well as any other available mitigation methods.

CLF Recommendations to Strengthen Strategy L3 (Incentivize Regional Manufacture & Use of Durable Wood Products)

- **Ensure that CLT manufacturing is governed by sustainable forest management practices; and**
- **Require CLT manufacturing companies to hire persons from EJ populations and people underrepresented in the workforce.**

If EEA pursues incentives for cross laminated timber ("CLT") proposed in Strategy L3, it must ensure that it is appropriately balancing the tradeoffs between encouraging a CLT industry and preserving mature trees for maximal carbon sequestration. CECP at 51. Any incentives which the Commonwealth provides to encourage the manufacturing and use of CLT should be accompanied by regulations and/or policy requirements outlining sustainable forestry management practices which ensure that production of CLT results in no net-loss of forested lands, ideally requiring that harvested lumber for CLT production be replanted at a rate higher than the rate at which it is harvested. Manufacturers should be required to hire and train persons from EJ populations and incentives should be developed to ensure capital and funding for minority-owned CLT manufacturing businesses and other people underrepresented in the workforce, such as by women, people of color, veterans, formerly incarcerated people, and people living with disabilities.

CLF Recommendations to Strengthen Strategy L4 (Develop Sequestration and Market Frameworks)

- **Develop market framework in collaboration with community groups and stakeholders; and**
- **Ensure carbon sequestration offset market is diverse, fair, and competitive by lowering barriers to entry for minority owned businesses.**

Without an accounting and market framework to measure the Commonwealth's goals for 2050, the need to protect natural and working lands cannot be properly undertaken. Several frameworks are available publicly online, so EEA need not start from scratch in developing a framework. In undertaking to complete this goal, however, EEA should take into account the region's susceptibility to the harsh impacts of climate change, the need to preserve unique and local biodiversity and habitat, and the interplay between natural and working lands and matters pertaining to environmental justice. At the very least, an outline or skeleton framework should be included in the final CECP.

A regional carbon sequestration offset market should prioritize ensuring that EJ populations are able to reap any economic benefits arising from such markets, not experience harm from such markets, and should ensure that barriers to entry for any minority owned businesses are lowered such that the market is diverse, fair, and competitive. [56] While reducing emissions must remain a top priority, for those emissions which are difficult or nearly impossible to fully eliminate, use of carbon sinks to offset such emissions will be beneficial. Pursuant to research conducted by the Lancaster Environment Centre, the best approach would be to first reduce emissions as much as possible using one inventory, then to use carbon sinks to counter any recalcitrant emissions in a separate inventory. Any carbon sink which is included in accounting by the Commonwealth should be: real, in that carbon sequestration has actually occurred; verified, in that the sink is recorded and tracked by a reputable entity; permanent, in that the sequestered carbon is not re-released in the future; and additional, in that the carbon being sequestered would not have been but for this measure. Finally, any "netting," or accounting of carbon sequestration as a reduction in emissions, should not be greater than the size of carbon sinks which are real, verified, permanent, and additional, and the Commonwealth should do its best to rely on in-state carbon sequestration options in its accounting.

[56] Bryndis Woods and Elizabeth Stanton, "Initial Assessment of the Climate Justice Working Group's Recommended Policy Priorities – Tracking Equity and Justice," Applied Economics Clinic (March 2021), pages 11-14, *provided as an attachment to the CJWG comment letter*.

Conclusion

CLF is pleased to serve on the GWSA Implementation Advisory Committee and has appreciated the opportunity to offer input throughout the development of the CECP. We welcome the opportunity to meet with EEA staff to discuss our recommendations herein. Implementing CLF's recommendations will strengthen the final CECP and assist EEA in complying with S.9, An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy.

CLF, on behalf of its members, seeks a multi-agency GWSA implementation plan that puts Massachusetts on the path to be a national leader in both addressing the climate crisis and environmental injustice. Founded in 1966, CLF is a nonprofit, member-supported, regional environmental organization working to conserve natural resources, protect public health, and promote thriving communities for all in the New England region. CLF protects New England's environment for the benefit of all people. We use the law, science, and markets to create solutions that preserve our natural resources, build healthy communities, and sustain a vibrant economy. CLF serves to protect and promote the interests of its 5,300 members, including more than 2,900 members residing throughout the Commonwealth.

Appendix A: Synapse Energy Economics, "Design of the CECP Policy Approach for Buildings"

Memorandum

TO: CONSERVATION LAW FOUNDATION

FROM: ASA HOPKINS, PHD, COURTNEY LANE, JASON FROST, JON TABERNERO, PHILIP EASH-GATES, AND CHERYL ROBERTO, JD

DATE: FEBRUARY 25, 2021

RE: DESIGN OF THE 2030 CECP POLICY APPROACH FOR BUILDINGS

We have reviewed the Interim Clean Energy and Climate Plan for 2030 (CECP) with particular focus on the strategies for reducing emissions from existing buildings. These include Strategy B2 ("Pivot the Market for Building Envelope Retrofits and Clean Heating Systems") and Strategy B3 ("Convene the Commission and Task Force on Clean Heat & Cap Heating Fuel Emissions"). Together, these strategies are described as being "the most likely, cost-effective, and technologically feasible approaches" to increase thermal electrification (with electric space heating adopted across approximately one million household and 300-400 million square feet of commercial real estate) to reduce emissions by 6.8 million metric tons (MMT) in 2030; increase the performance of building envelopes (with 20 percent of the building stock receiving a deep energy retrofit) to reduce emissions by 1.3 MMT in 2030; and blend low-carbon fuels into fuel oil and pipeline gas to reduce emissions by 2.1 MMT in 2030.[1]

We have concluded that the strategies described in the CECP are not the most robust or cost-effective approach to achieving the 2030 emission reduction requirement. If the state opts to pursue these strategies, it could result in unnecessary additional costs and challenges for residents and businesses in meeting the 2040 and 2050 targets. It would also miss opportunities to center equity in the design of programs. As an alternative, we recommend an increased focus on strategies that result in changes in heating and other building systems (through electrification and efficiency), particularly targeting high-emission buildings and low-income households, with reliance on a cap structure only as a backstop. If a pricing mechanism for building heat is desired, we recommend that it be levied on thermal equipment rather than heating fuels to better align the strategy with the CECP's stated goals. This memo describes the results of our analysis and is informed by our experience evaluating the performance of different energy policy designs and programs across North America.

Targeting electrification and efficiency can reduce emissions more than identified in the CECP

Not all buildings are the same. The CECP does not explicitly recognize this fact. As a result, it is missing opportunities for additional emission reductions from targeting. We used the Energy Information

[1] Executive Office of Energy and Environmental Affairs. 2020. *Interim Clean Energy and Climate Plan for 2030*. Page 29.

Administration's (EIA) *2015 Residential Energy Consumption Survey*[2] (RECS), the *2012 EIA Commercial Building Energy Consumption Survey*[3] (CBECS), and the data provided by building owners in compliance with Boston's Building Energy Reporting Disclosure Ordinance[4] (BERDO) to estimate the distribution of on-site building emissions resulting from fossil fuel combustion. Using this proxy, we determined that if Massachusetts were to meet the electrification targets described in the CECP (1 million homes and about one quarter of commercial real estate) by targeting the highest-emitting homes and the highest-emission-intensity commercial real estate, it could reduce emissions by as much as 13 MMT by 2030, well in excess of the required reductions for the building sector. This shows that targeted efficiency and electrification should be the centerpiece of the CECP's building strategy.

There has been no state-specific energy or emissions survey of Massachusetts buildings. However, we scaled the New England region results presented in EIA's RECS and CBECS surveys to match the distribution of fuel uses in Massachusetts. RECS presents New England results from Climate Zone 5A (which covers MA, CT, RI, and southern NH), and we worked from this subset. For CBECS, we scaled up recent natural-gas heated buildings in order to represent the growth in this sector in the state during the 9 years since the survey was last completed in 2012. The scaled CBECS results align well with the overall distribution from Boston's BERDO data, which provides a critical piece of recent supporting data.

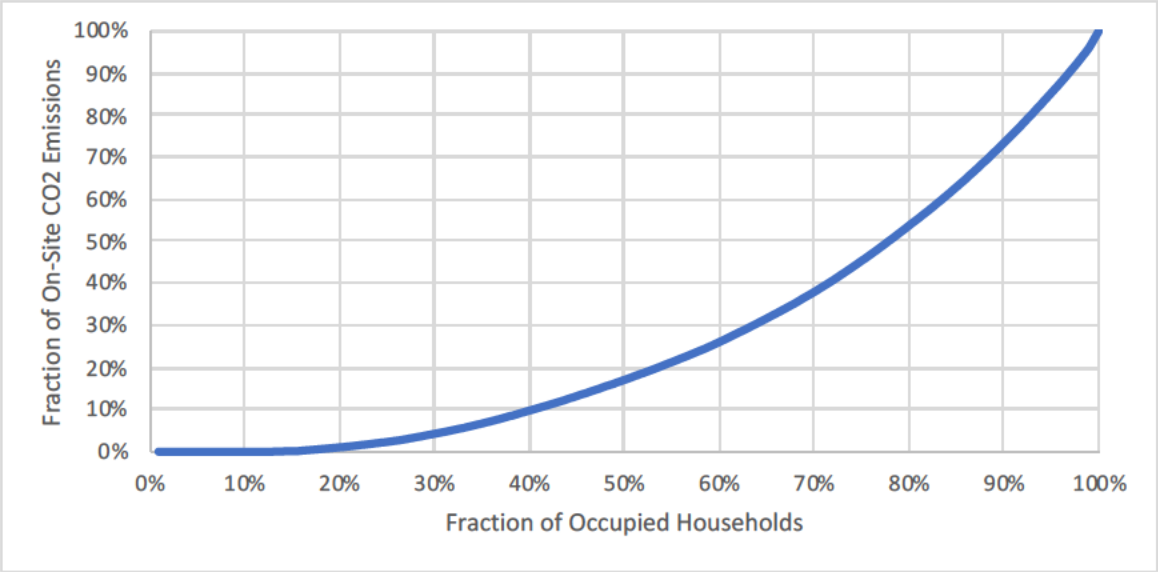
Figures 1 and 2 present the results of this analysis. Each figure shows the cumulative CO_2 emissions from fuel combustion as a function of the cumulative fraction of the stock (housing units or commercial square feet) when the stock is put in the order of increasing emissions intensity. The slopes of the lines show the intensity of the units at that point in the distribution.

[2] U.S. EIA. *2015 RECS Survey Data*. Available at https://www.eia.gov/consumption/residential/data/2015/.

[3] U.S. EIA. *2012 CBECS Survey Data*. Available at https://www.eia.gov/consumption/commercial/data/2012/index.php?view=microdata.

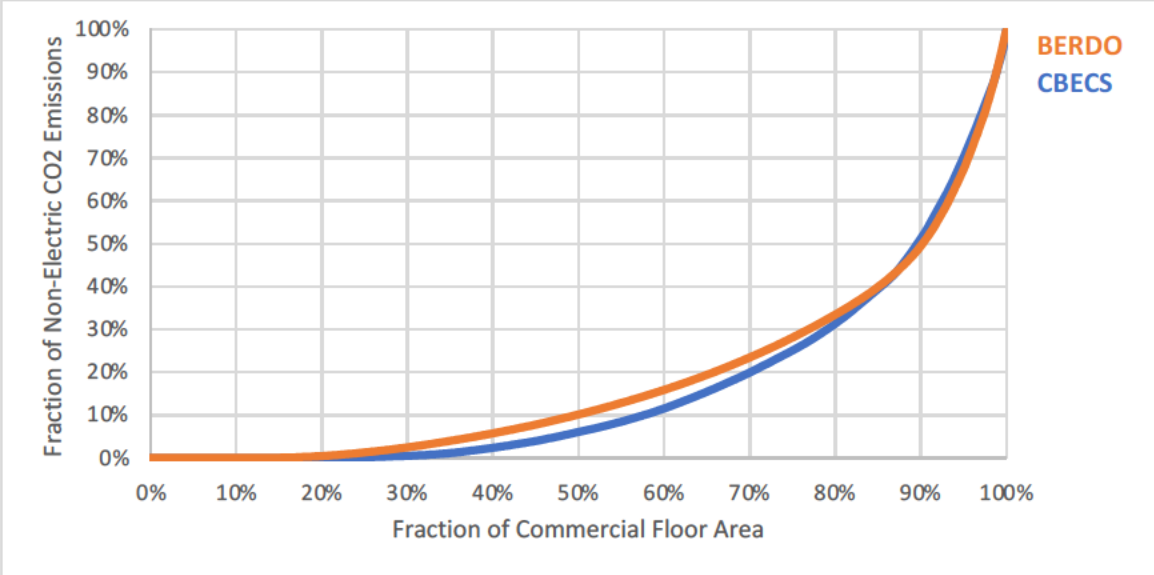
[4] City of Boston. *Building Energy Reporting and Disclosure Ordinance (BERDO)*. Data available at https://data.boston.gov/dataset/building-energy-reporting-and-disclosure-ordinance.

Figure 1. Estimated cumulative distribution of Massachusetts on-site residential CO_2 emissions versus cumulative occupied households



Source: Synapse analysis of data from EIA RECS

Figure 2. Estimated cumulative distribution of Massachusetts on-site commercial CO_2 emissions versus cumulative square footage



Source: Synapse analysis of data from EIA CBECS and Boston BERDO

From these figures we can see that it is very likely that a small fraction of Massachusetts buildings is responsible for a large fraction of on-site CO_2 emissions. In particular, ***just 22 percent of homes (about 650,000 units) emit half of the residential fuel-combustion emissions, and the million highest-emitting homes (just over one third of the total) produce 68 percent of emissions. In the commercial sector, the***

CBECS and BERDO data tell a similar story: one quarter of the floor space produces between two thirds and three quarters of emissions.

The million highest-emitting homes are not a random subsample. They include more than 85 percent of all of the state's fuel oil heated homes (which together consume more than 95 percent of residential heating oil). They include 21 percent of fossil-gas-heated homes, and burn 41 percent of residential gas. Over 95 percent of the million are single family homes, and about 90 percent are owner-occupied. About 62 percent of the million highest-emitting homes are occupied by households with incomes under $100,000 ($2015) per year, but they represent just 27 percent of such households. The 38 percent of high-emitting homes with higher income occupants house about 67 percent of such families.

These data have a number of implications for the CECP:

- Targeting high-emission buildings raises equity issues, especially in the residential sector. Larger homes with higher-income occupants are over-represented in the high-emitting group. However, many poorly performing buildings with low- and moderate-income occupants would also be in the targeted group. Even relatively smaller energy bills can be a large burden for lower-income families. Assisting lower-income households to switch to efficient electric heating and improved building shells is essential in order to limit exposure of this group to higher gas rates that could accompany transition of wealthier households off the gas system. Careful program design is required to achieve equitable outcomes that are consistent with the path to net zero in 2050. Reliance on market forces alone (including a heating fuel emission cap) would exacerbate inequity.

- Blending biofuels into heating oil or pipeline gas is not necessary to meet the 2030 emissions target. In fact, targeted electrification toward high-emitting homes would nearly eliminate heating oil use, so there would be very little remaining fuel to blend into (and very few emissions left to reduce with that blending).

- One drawback of focusing on the million highest-emitting homes (and their counterparts in the commercial sector) is that not all of these buildings are due to replace their heating systems between now and 2030 because of the 20-year expected lifetimes for most heating systems. However, sufficient emission reductions would be available from a combination of targeted high-emission buildings with other buildings to achieve the 9.4 MMT per year emission reduction requirement without the need to use fuel blending. A large portion of the high-emitting buildings will be ready for substantial electrification and/or weatherization before 2030. This is because:

    - most high-emission buildings will be due for *either* heating or air conditioning system replacement before 2030 (because heat pumps can be used to replace both of these systems, and heating and cooling equipment replacement cycles are not necessarily aligned);

- ductless heat pump systems can be added to radiator-heated homes outside of the heating system replacement cycle;
- water heaters have shorter lifetimes, and a large majority will be replaced before 2030; and
- building shell improvements can be applied even before heating system replacements, to reduce emissions prior to heating system replacement for buildings that have recently replaced both heating and cooling systems.

- Pairing building shell improvements with electrification is essential, in order to reduce the size and cost of the new heating and cooling systems, mitigate winter peak effects on the electric grid, and reduce overall energy bills (including for fossil gas customers who otherwise might have seen increased energy bills from electrification because of the current low retail price of fossil gas relative to electricity). As mentioned above, even buildings which are not due for new heating systems before 2030 could be good candidates for building shell improvements during this period. By definition, these building occupants pay more for heat than others, making them prime candidates to save money by improving their building shells.

- Geographic clustering may provide opportunities for district heating solutions, including shared heat pump reservoirs. Large commercial buildings and campuses, and neighborhoods with older or larger homes, provide an opportunity to retire gas network assets and allow gas rate base and operations and maintenance costs to fall so that gas rate pressures are mitigated. Just 107 buildings produce half of Boston's non-electricity CO_2 emissions, so targeted technical assistance and customer approaches for large emitters could be highly effective.

- The state should acquire better data than the current publicly available data used for this initial analysis. The gas utilities and fuel dealers have data regarding the consumption of their customers. These data, supplemented by a building survey, could cost-effectively generate a "Massachusetts Building Emissions and Energy Consumption Survey." These data could be used to generate more accurate versions of the analysis presented here and could be used to target emission-reduction programs to where they will be most effective at reducing emissions. These data could support a statewide building energy disclosure database (akin to Boston's BERDO) and would also be essential inputs to statewide building emission performance standards (as discussed on page 33 of the CECP).

Building sector emissions cap will not create needed level of electrification

As part of Strategy B3, the CECP proposes the development of a long-term, declining emissions cap on heating fuel (gas, oil, propane) emissions consistent with meeting or exceeding Global Warming Solutions Act of 2008 (GWSA) required emissions reduction levels. The CECP does not propose a recommended framework for this cap. Instead, it directs the Department of Environmental Protection to develop and implement the cap by 2023 after consultation with the Commission and Task Force on Clean Heat.

While the CECP does not prescribe a mechanism for the emissions cap, the safest assumption based on other fuel emissions cap programs would be that compliance with the cap will be borne in the first instance by upstream heating fuel suppliers (i.e., oil, propane, and gas distributors). While an upstream cap can simplify tracking and compliance with emissions reduction targets, it is problematic for several reasons.

The primary issue with this mechanism is that it creates a disconnect between the sale of fuel and the equipment consuming that fuel, while the CECP's metrics and stated end goals rely on equipment and infrastructure changes driving toward electrification of virtually all current fossil fuel end uses. The entities needing to comply with a cap (natural gas, propane, and oil suppliers) are not the same entities making equipment choices that will lead to compliance (users of equipment that consume these fuels). If an oil supplier must either sell less fuel to its customers or sell less carbon-intensive fuel to comply with the cap, it is going to choose the option that does not cannibalize its business. The oil dealer is going to focus its efforts on procuring biofuels instead of encouraging its customers to switch from oil to an electric heat pump. This may lead to an increase in biofuel blending but will not encourage electrification.

Additionally, an emissions cap on its own will not incentivize natural gas utilities to change their business model or promote electrification. Utilities will continue to put an emphasis on preserving their business while achieving the cap requirements. This means a continued focus on renewable natural gas (RNG) and hydrogen, despite their high cost.[5] This will allow utilities to continue to expand and invest in the delivery system, increase their rate base, and earn a return on those assets. The Pipeline Gas case examined in the 2050 Roadmap shows that this approach leads to a doubling of gas rates and a net cost to the state of more than one billion dollars relative to the All Options pathway based around electrification.[6] If the Commonwealth wants to drive the more cost-effective transition to thermal electrification for the majority of buildings, a cap must be developed alongside changes to utility business models, and act as a secondary policy behind those which directly promote electrification.

While the CECP lists utility business models as an issue for consideration by the Commission and Task Force, this should be foregrounded as part of the development of the cap itself. For example, the cost of any excess emissions allowances and/or penalties for noncompliance should be placed on shareholders, rather than ratepayers, to better align interests. This appropriately reflects where the costs would fall in a competitive market. If one heating fuel supplier meets the cap and another fails to, the competitive market won't allow the second one to charge a higher price to customers to make up the cost of the compliance fee. In addition, the Commission and Task Force should consider alternative regulatory constructs for natural gas utilities that can enable their participation in electrifying the market. This

[5] Table 11 on page 75 of the EEA's *Energy Pathways to Deep Decarbonization* report estimates that net-zero carbon gas will cost triple what fossil gas costs in 2050, on a per-unit basis.

[6] Executive Office of Energy and Environmental Affairs. 2020. *Energy Pathways to Deep Decarbonization*. Pages 72 and 75.

could include the ability to form a thermal district heating utility or to earn a financial incentive for fuel switching from natural gas to electric heat pumps.

Further, while not explicitly stated in the CECP, a common goal of an emissions cap is to increase the price of the more polluting fuel compared to cleaner options, assuming that consumers will respond to the price differential and choose the cleaner option. However, we know from over thirty years of energy efficiency programs that energy prices alone will not drive consumer behavior. There are well known market barriers in place that lead to irrational consumer response to energy prices. Some of these barriers include lack of information, lack of upfront capital, and split incentives between landlords and tenants. These barriers are particularly present for disadvantaged and frontline communities, members of which will have the hardest time mitigating the effects of a price-based approach.

Electrification has its own unique set of barriers including lack of customer and contractor awareness, inaccurate operation and sizing of systems, lack of controls, and customer uncertainty around comfort and performance. These barriers contribute to the slow update in customer adoption of heat pumps even though it is already cost-effective for customers heating with oil and propane to switch to a cold-climate air-source heat pump. This is similar to consumer behavior in the transportation sector. While there are differences in barriers to electrification of buildings compared to transportation, including access to charging infrastructure, studies have found that rebates and tax incentives have a much larger effect than fuel prices in driving consumer choice for electric vehicles. For example, a recent survey of recipients of California's EV incentive found that 73 percent of survey respondents indicated that the state rebate was very important or extremely important in their decision to purchase an EV.[7] For these reasons, it will be critical that education, incentives, and market transformation activities take place in coordination with any emissions cap.

Table 4 of the CECP includes the heating fuel emission cap as an action that will help achieve thermal electrification, building envelope improvements, and new construction goals. However, for the reasons summarized above we do not find this cap alone will contribute substantially to those desired outcomes. In addition to changing business models and addressing market barriers to electrification we recommend the following if a cap is created:

- If possible, the emissions cap should be imposed on the purchase of space and water heating systems and based on their lifetime emissions. This structure would better align the policy goal of the cap with the point of customer decision-making.
- A fuel-based emissions cap should be used only as a "backstop" in case other actions are falling short, rather than as a primary policy to drive the desired action of electrification. This reflects the real-world experience with the Regional Greenhouse Gas Initiative (RGGI), where emission reductions have been driven by RPS policies and state procurements as much or more than by

[7] Hardman, S. et al. 2017. "The effectiveness of financial purchase incentives for battery electric vehicles – A review of the evidence". *Renewable and Sustainable Energy Reviews*, Volume 80, December 2017, Pages 1100-1111.

the cap itself, and with California's comprehensive suite of climate policies, where regulatory approaches are responsible for most emission reductions and the cap-and-trade system is used as a backstop.[8]

Promoting decarbonized fuel blending may delay needed investment in electrification

The CECP identifies decarbonized fuel blending as a means to achieve a 2.1 $MMTCO_2e$ reduction. The Plan specifically indicates fuel oil blended could achieve an approximate 20 percent reduction in carbon intensity by 2030 and pipeline natural gas could reduce carbon intensity by 5 percent. The CECP appears to assume that the GHG benefits of fuel blending occur first, before the effects of efficiency or electrification.[9] This is contrary to the order of priority that is essential for long-term success to achieve net zero. Promoting low-carbon fuel in the near term will make it more difficult to cost-effectively reach the 2040 and 2050 emissions targets.

Consumers typically only replace water heaters every 10-25 years and space heating equipment every 20 years.[10] Therefore, if a customer installs a combustion heating system between 2021 and 2030, based on the assumption of blended fuel availability throughout its life, it will still be in use throughout the 2040s. This creates an outcome in which a more carbon-intensive fuel source is used over the long term, compared to a scenario in which these systems were instead replaced by high-efficiency cold climate heat pumps or heat pump hot water heaters prior to 2030.

Converting a customer from fossil fuel to electric heating near the end of the equipment's useful life is far more cost-effective in comparison with converting that customer when their equipment is relatively new. Early retirement of excess fossil fuel systems installed between 2021 and 2030 will increase the overall cost of decarbonization.

Delaying electrification increases the risk that a significant number of these fossil fuel systems will need to be replaced before the end of their useful life for Massachusetts to achieve its decarbonization goals. We used Synapse's Building Decarbonization Calculator to evaluate the impact of delayed electrification. We compared the proposed CECP adoption rate (one million heat pump systems by 2030) with a lower rate of home electrification (achieving about 500,000 heat pump heating systems by 2030) to illustrate the long-term impacts. While the lower-electrification case can be part of a net zero portfolio in 2050 (as

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[8] Energy Systems Catapult. 2018. *Interaction of Climate Policies in California: Rethinking Decarbonisation Incentives – Policy Case Studies*. Available at: https://es.catapult.org.uk/wp-content/uploads/2018/10/California-Climate-Policies-Case-Study-FINAL.pdf

[9] Petroleum use in Massachusetts buildings was responsible for 6.95 MMT of CO2 emissions in 2017 (according to the state's Annual GHG Emission Inventory 1990-2017 available at https://www.mass.gov/doc/appendix-c-massachusetts-annual-greenhouse-gas-emissions-inventory-1990-2017-with-partial-2018/download), so a 20 percent reduction would be 1.4 MMT (assuming biodiesel were fully GHG neutral). Five percent of natural gas emissions would add 0.63 MMT (if the blended gas were GHG neutral). Together these add to slightly under 2.1 MMT. The CECP provides no assurance that the blended fuels would actually be GHG-neutral.

[10] Electric Power Research Institute (EPRI). 2018. *U.S. National Electrification Assessment*. Available at: https://www.epri.com/#/pages/product/3002013582/

evidenced by the analysis presented in the 2050 Roadmap, where even the Pipeline Gas scenario can be made to meet the target, albeit at a high cost[11]), its building sector emissions are noticeably higher than they would be under the CECP trajectory. The state would then need to compensate for these emissions with reductions elsewhere, or bear the additional cost of early replacement of heating systems to align the lower-electrification case with the CECP case.

Figure 3 shows the annual sales share for residential heat pump heating systems in the CECP and low-electrification cases, and the resulting stock share. The slower pace of market transformation before 2030 in the low-electrification case has long-term implications for deployed stock and the associated emissions.

Figure 3. Annual sales share (left) and stock share (right) for heat pumps in residential space heating applications in the CECP and low-electrification cases

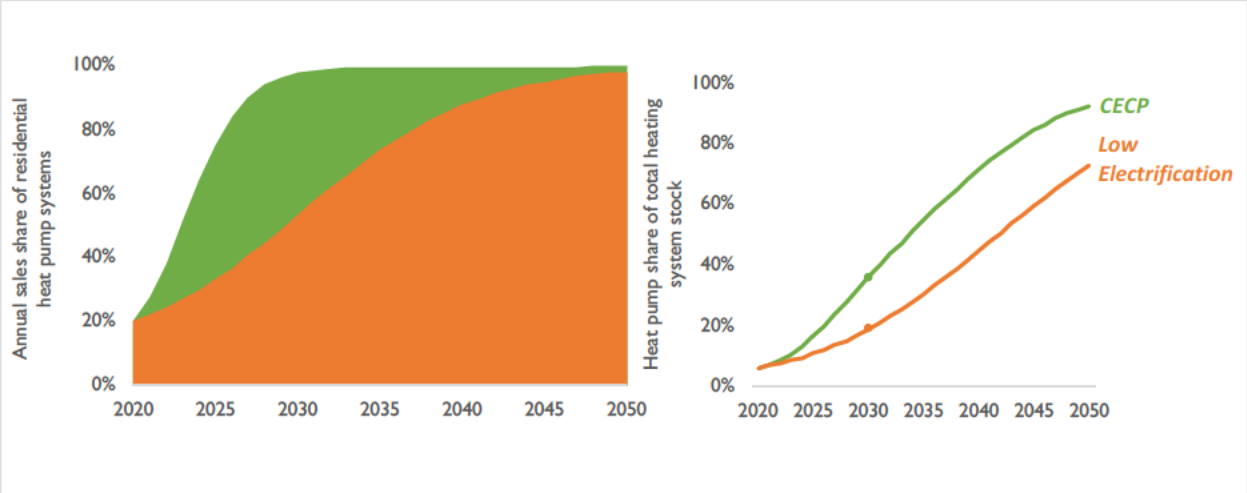
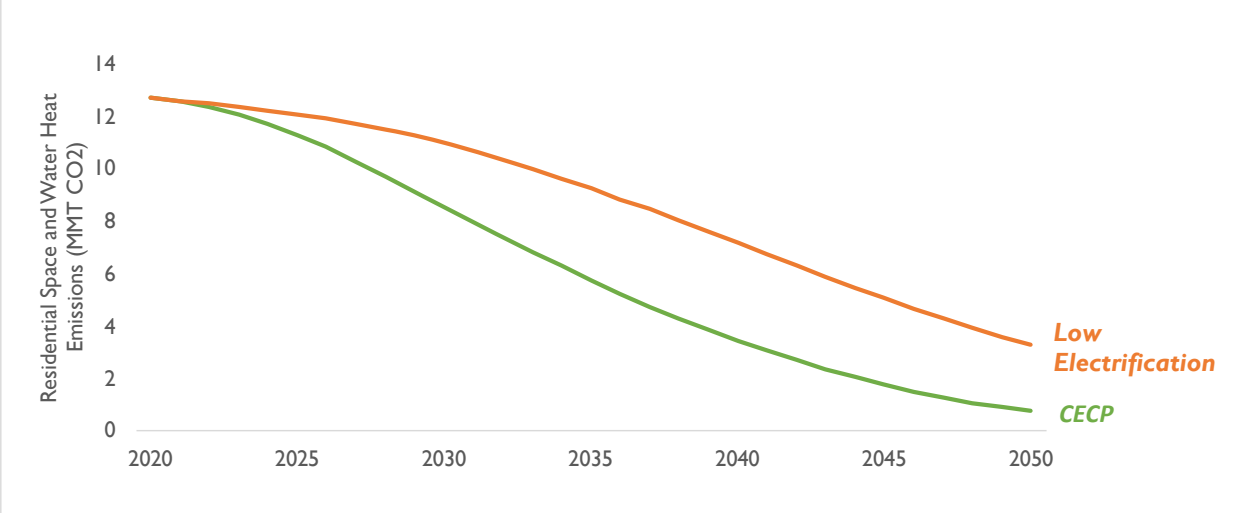


Figure 4 shows the remaining emissions from on-site residential space and water heating in the CECP and low-electrification cases. Note that the low-electrification case emissions in 2050 are 2.5 MMT higher than the CECP case. In order to reduce 2050 residential building sector emissions in the low-electrification case to the level of the CECP case, about 600,000 households would need to replace their combustion heating systems before the end of their typical useful life.

[11] Massachusetts Executive Office of Energy and Environmental Affairs. 2020. *Energy Pathways to Deep Decarbonization: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study*. Pages 39-40. Available at: https://www.mass.gov/doc/energy-pathways-for-deep-decarbonization-report/download

Figure 4. Emissions from on-site combustion in residential space and water heating applications in the CECP and low-electrification cases



In addition to the unnecessary costs imposed on customers, the continued existence of these legacy hot water and heating systems will slow the overall market transformation needed to meet the Commonwealth's electrification goals. This slower progress will itself increase costs and risks to consumers:

- ***Natural Gas:*** Promoting fuel blending will lead to continued investment in the natural gas system, along with higher fuel prices. As natural gas use declines as projected, the fixed costs needed to maintain and operate the gas system will end up being spread out over fewer units of gas sales, which in turn will increase costs for customers that remain on the gas system. This means customers that invest in new space heating equipment for fossil fuel or blended fuel before 2030 will likely be faced with both increased gas distribution rates to cover the utility's revenue requirements and increased gas supply rates.

- ***Oil and Propane:*** Fuel blending would require the ramping up to 100 percent biofuel (B100) over time and continuing at those levels, while at the same time heat pumps are becoming technologically superior and more cost-effective for customers. This is not a likely scenario because customers would act in their own interest over time and shift away from blended heating oil. There are currently no fuel blending options for propane so it is not realistic to assume there will be continued delivery within the emissions cap.

Recommendations for concurrent programs to support electrification

As part of Strategy B1 and B2, the CECP proposes several changes to the Mass Save program. While we find these to be a step in the right direction, we recommend further changes to help accelerate electrification.

Rebates for fossil-fuel measures

The CECP recommends that Mass Save incentives for fossil fuel equipment in new construction be eliminated in 2022, but seeks to phase-out incentives for fossil-fuel retrofit measures from 2022-2024. There is no need to slowly phase-out these incentives and wait to eliminate them in 2025.

Further, without firm heat pump targets as part of those plans, removing these incentives alone will not necessarily encourage program administrator support of gas-to-electric fuel switching. The natural gas utilities and joint electric and natural gas utilities will continue to have an internal bias related to existing business models to maintain natural gas sales. This bias will lead to achieving three-year energy efficiency goals from other measures that do not cannibalize the gas business.

We therefore recommend that all incentives for fossil fuel measures be discontinued in 2022 and those funds be directed towards driving electrification. If needed, the Mass Save targets could be amended to account for the elimination of these measures.

Biofuels and RNG

Strategy B2 states that DOER will work to expand access to energy efficiency and clean heating for low- and moderate-income renters. To the extent that "clean heating" solutions include biofuels and RNG, we do not find this appropriate for low-income customers.

The programmatic focus for low-income customers should be electrification, as they will be least able to escape a stranded cost-created utility death spiral and the high cost of low-carbon fuels, or bear the sunk costs of early replacement of heating equipment. Instead of promoting biofuels and RNG, incentives should be provided to electrify these homes and provide a rate-subsidy to offset near-term increases in electricity costs (if necessary).

Advanced controls and fossil equipment removal

The Mass Save programs should continue to incentivize advanced controls as heat pumps are installed in combustion-heated homes. These controls are essential to achieve maximum emission reductions from heat pump installations that use a backup combustion heating source. For customers that previously installed a heat pump for cooling only or to supplement an existing fuel source, we recommend that a program offering be developed that incentivizes removal of the existing fuel source.

Creation of Mass Save heat pump target

As indicated above, removing incentives for fossil-fuel measures will not be sufficient to drive electrification. We therefore recommend that a separate heat pump target, eligible for a performance incentive, be developed for the next Three-Year Mass Save Plan.

As part of this target, the program administrators would be required to ensure that each heat pump system is sized to meet the full heat load of the household and is paired with advanced controls. This could be based on gas utilities' monthly consumption data (vs. temperature) to determine the required size for each home before energy efficiency.

The role of energy suppliers

The CECP does not address the Alternative Energy Portfolio Standard (APS) as a potential policy mechanism to increase adoption of clean heat technologies or fuels. The current blend of Mass Save, MassCEC, and APS programs for supporting heat pumps creates customer confusion and lowers policy effectiveness, and not all of these programs support weatherization. Additionality for emission reductions from these programs is difficult to ascertain, because heat pump installations participate in more than one program if the building owner or installer can navigate all of the program requirements. Adding a heating fuel emission cap to the APS and Mass Save programs could increase confusion and undermine effectiveness unless there is additional program coordination and simplification.

One argument for retaining a role for the APS is to put some of the cost of supporting heat pumps and other clean heat options on the energy portion of electric bills, rather than only on the delivery portion. However, this is a minor benefit. Pipeline gas and delivered fuel suppliers are not subject to an APS obligation, so if the APS structure were to be used more aggressively to pursue the goals of the CECP the obligation should be expanded. This would mean that already-electrified buildings would not pay more than their fair share of the cost of this policy.

The APS shows some of the pitfalls of a market-based approach to building decarbonization. As a policy-created market, the market is subject to instability which reduces its efficacy at driving consumer behavior. As in a renewable portfolio standard, the price of Alternative Energy Credits tends to be near the cap price, or near zero, depending on whether the market is short or long in credits. Participating building owners do not know when they make a building system investment whether the market price will be high or low at the time they come to sell their credits. As a result, the effectiveness of the policy to drive building owner behavior is weakened.

If the CECP strategies include assignment of some costs to energy suppliers through an APS-like mechanism, we suggest that the distribution utilities (in the form of the Mass Save program) act as an intermediary between customers and the credit market. This offers price stability in the same way that the state's SMART solar and storage program offers a stable price for solar renewable energy credits (SRECs). Revenue from selling compliance credits to energy suppliers would reduce the revenue that Mass Save administrators would need to collect from distribution rates. This intermediary role should be limited to capital investments with upfront credits, such as heat pumps (and could be expanded to weatherization). Operating approaches such as the use of biofuel blending have no need for this intermediary role because the value of credits would average out over time.

Conclusion

The 2030 CECP has been developed at a critical time in the state's pursuit of net zero by 2050. Typical buildings in Massachusetts will undergo heating system replacements only once between 2030 and 2050—and many will have only one replacement between now and 2050. The policies established in the 2030 CECP must, therefore, be particularly effective and targeted to create the required transformation of building envelopes and heating systems and get the state on pace to cost-effectively meet the net zero requirement. As the CECP rightly identifies, this means efficient electrified space and water heating.

By targeting programs at the heating systems of high-emission buildings and homes of low-income residents (and especially high-emission buildings with low-income occupants), the state can reduce emissions more quickly than envisioned in the Interim CECP without relying on costly stopgap measures such as biofuel blending.

BY EMAIL DELIVERY ONLY: gwsa@mass.gov

April 27, 2022

Secretary Kathleen A. Theoharides
Executive Office of Energy & Environmental Affairs
100 Cambridge St., Suite 900
Boston, MA 02114

Re: *Comments on the Massachusetts Clean Energy and Climate Plan for 2030*

Dear Secretary Theoharides:

The Cape Cod Climate Change Collaborative ("Climate Collaborative") appreciates this opportunity to provide comments on the Commonwealth's Executive Office of Energy and Environmental Affairs' ("EEA") proposed Clean Energy and Climate Plan ("CECP") for 2030.

The Climate Collaborative is a nonprofit 501 (c) (3) organization whose mission is to reduce our region's contribution to climate change and to protect it from its potentially devastating impacts. Our goals are to broaden understanding, deepen partnerships, accelerate programs, and inspire individual and collective action to counter the climate crisis. Our membership of nearly 3,000 individuals includes leaders from energy efficiency, business, transportation, building, education, science, faith, clean energy, public policy, environmental protection, and activist communities across the region. While a diverse group, we are united by our shared experience of residing in and caring for Cape Cod and the Islands, an area increasingly threatened by climate change impacts.

The Climate Collaborative supports the 2030 Plan and the improvements made during this public comment period. Our perspective on the final version plan is informed by some of the Cape Cod's unique characteristcs:

1. **Buildings:** Cape Cod is largely fully developed with little area available for new residential construction. Much of the existing housing stock is older and in need up weatherization (insulation and energy efficiency measures) and updating (new systems). Therefore, we support:

    - Establishing a target of 50% deep weatherization of existing housing stock by 2030
    - Making the stretch energy code mandatory and effective statewide by 2024 and applicable to a wide range of substantial renovations of existing properties
    - Incentivizing efforts to expand access to energy efficiency and clean heat systems for low- and moderate-income residents.

2. **Transportation:** While very developed, Cape Cod is also a sprawling area without population densities that facilitate efficient mass transit systems. As a result, significant miles are traveled per vehicle. In addition, Cape Cod relies on its seasonal economy with hundreds of thousands of visitors arriving each summer, virtually all by private vehicle. In fact, according to the Cape Cod Commission's Greenhouse Gas Emissions

   Inventory, Cape Cod's highest GHG emissions are associated with transportation, equaling 55.5% of total Cape inventory emissions. Therefore, we support:

   - Establishing the 2030 target of one million new EVs on the road and creating additional financial incentives targeting low- and moderate-income drivers
   - Establishing a target of 100,000 publicly available fast-charging EV chargers
   - Deploying numerous fast-charging stations along state highways on Cape Cod for its hundreds of thousands of seasonal visitors
   - Providing financial incentives for EV charging station installations at multi-family properties.

3. **Natural Lands:** Cape Cod is highly vulnerable to ocean-related climate impacts, especially sea level rise, storm surge, erosion, and resulting loss of natural systems. Our fragile coastal systems both store carbon to mitigate climate change and protect us against the impacts of climate change. Therefore, we support:

   - Developing robust and effective sequestration accounting and market frameworks
   - Strengthening protections for forests (including woodlands) and wetlands both inland and coastal
   - Creating incentives to facilitate coastal wetland restoration projects
   - Establishing a firm, no-net-loss of forests and wetlands policy statewide
   - Including recommendations for priority measures, monitoring programs, data collection, and resources for private landowners including voluntary landowner programs, conservation easements, tax incentives, land use policies, model zoning by-laws, and other tools

The Climate Collaborative appreciates the efforts EEA has made in seeking and encouraging public input in refining the Interim CECP and preparing the final version. The changes and improvements show that EEA is listening carefully to the views of diverse perspectives, and the Climate Collaborative applauds this ambitious plan. We commend your leadership in promoting clean energy, reducing greenhouse gas emissions, and preserving and expanding natural solutions while simultaneously prioritizing environmental and climate justice considerations. This plan can demonstrate what climate leadership looks like.

Sincerely,

Richard Delaney

Richard F. Delaney
Executive Director

Via Electronic Email and Online Portal

April 29, 2022

Honorable Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
gwsa@mass.gov

Subject: Comments of the GWSA IAC Climate Justice Working Group on the Clean Energy and Climate Plan for 2025 and 2030

Dear Secretary Theoharides, Undersecretary Chang, and the Clean Energy and Climate Plan Team:

Thank you for the opportunity to comment on the Interim Clean Energy and Climate Plan (CECP) for 2025, 2030 and the proposed interim emissions reduction targets for 2025 and 2030. As members of the Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC) Climate Justice Working Group (CJWG), the undersigned organizations are committed to ensuring that the Commonwealth is on target to achieve 2030 and 2050 greenhouse (GHG) emission reductions while also ensuring targeted benefits to environmental justice (EJ) populations and other historically marginalized communities.

It is urgent that the Executive Office of Energy and Environmental Affairs (EEA) take immediate action to prevent GHG emissions in the Commonwealth. According to the Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report on the Mitigation of Climate Change, immediate action is required to prevent the further growth of GHG emissions in order to limit warming to 2 degrees Celsius.[1] The 2022 IPCC Mitigation Report also recognized that "[c]limate governance is most effective when it integrates across multiple policy domains, helps reali[z]e synergies and minimize trade-offs."[2] Therefore, as the Climate Justice Working Group has stated before, EEA has the opportunity and responsibility to integrate more precise language into the CECP that provides details about actions that will advance climate justice. Climate justice focuses on the root causes of climate change—human-made GHG emissions and the related pollution—and making systemic changes that are required to address unequal burdens on our communities and realign our economy with our natural

[1] IPCC, 2022*:* Summary for Policymakers. In: *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001

[2] *Id*. at 59.

systems. Unless justice, equity, and worker rights are central components of our equitable climate agenda in the CECP, the inequality of the carbon-based economy will continue in the new pollution-free economy.

Since first forming in November of 2019, the CJWG has sought to help define equity and climate justice for the IAC and EEA, specifically in the context of state climate planning and as a primary consideration in evaluating GWSA policy, the Roadmap to 2050, and the CECP. As a working group and within the IAC, we have discussed the importance of the following at length: (1) prioritizing and anchoring the work in equity and justice, (2) supporting a people-centered approach to policy making, program design and implementation; (3) prioritizing climate investments in environmental justice populations; and (4) complying with GWSA and Roadmap Law mandates while redressing harm of historically marginalized communities. We urge the EEA to acknowledge in the final CECP up front the Commonwealth's commitment to ensuring environmental benefits for EJ populations as we work toward our GHG emissions reduction targets for 2025 and 2030. We offer the following comments generally and sector-specific comments.

General Comments

- ***The CECP should prioritize and anchor equity and justice throughout all sections.*** The CECP must explicitly state a commitment to avoid further harm to populations most vulnerable to and most at risk from climate impacts, pollution, displacement, energy burdens and costs, while prioritizing climate, environmental, energy, and health benefits to such populations. We also encourage EEA to prioritize analysis of cumulative impacts, while reducing burdens and increasing benefits to EJ populations.
- ***The CECP should support a people-centered approach to policy making, program design, and implementation.*** We recommend language that demonstrates EEA's commitment to language access and stakeholder engagement. The implementation of the CECP should provide for and ensure broad-based stakeholder participation, input, and oversight. The interests of and people from populations most vulnerable to effects of climate change and most at risk of pollution, displacement, energy burden, and cost must be represented and influential in this process.
- ***Prioritize climate investments in EJ populations.*** An equitable response to climate change cannot be achieved through verbal commitments alone. Dollars must be directed and invested in a way that supports community-led planning and fosters climate-smart building, community resilience, and markedly increased access to clean energy solutions than currently exists for EJ populations and communities most vulnerable to climate change.
- ***Redress harm of long-standing environmental, energy and development policies that have burdened EJ populations and other vulnerable residents.*** Investments in clean energy and climate measures made to address environmental, health, and

energy burdens imposed on EJ populations and other climate vulnerable residents should not induce displacement. Instead, processes should include measures to ensure that communities do not turnover as a result of environmental, energy, housing, and economic improvements tied to CECP implementation. Further, all environmental, energy, and development projects that receive state funding should contribute to making housing within their vicinity more affordable.

Sector-Specific Comments

I. Transportation Sector

- ***Set annual air pollution reduction targets for pollution hotspots.*** Presently, pollutants known to be extremely damaging to human health -- black carbon, ultrafine particulate matter, and nitrogen oxides -- are not comprehensively monitored or tracked. These pollutants must be monitored to establish a baseline and targets must be established requiring improvement by 2030 to mitigate air pollution to the degree necessary to improve air quality and protect the health of Massachusetts' most vulnerable residents.

- ***Add A Specific Strategy to Address Public Transit.*** There needs to be more emphasis focused on investments in public transportation. Pursuant to Executive Orders 579 and 580, the Commission on the Future of Transportation issued its report identifying transportation initiatives to achieve by 2040 that will both reduce GHG emissions and expand access to transportation options. The first recommended strategy in that report concludes that "investing in and expanding public transit service is critical."[3] The CECP should include strategies to: (1) maintain and expand transit, (2) electrify our buses and trains, and (3) achieve equitable fare policies. Investing in public transportation has co-benefits for public health beyond reducing congestion and reducing single occupancy vehicle trips. EEA should also prioritize the following:

    - *Maintain and expand transit*: Massachusetts residents need more frequent bus and train service so that people with multiple transportation options choose public transit over cars. To achieve this goal, EEA must fund and implement Bus Network Redesign program.
    - *Electrify our buses and trains*: Massachusetts should also prioritize public transit bus electrification for on routes that serve EJ populations and electrify our commuter rail with priority for the Fairmount Line and Newburyport/Rockport Line through Lynn as these two routes primarily serve EJ populations. This

[3] Commission on the Future of Transportation, *Choices for Stewardship: Recommendations to Meet the Transportation Future: Volume 1,* at 35 (December 2018), https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download.

strategy also requires funding upgrades to bus maintenance facilities to support electric bus maintenance and charging.

- *Achieve equitable fare policies*: The Massachusetts Bay Transportation Authority (MBTA) and Regional Transit Authorities (RTAs) should adopt low-income fares and consider free fares. Access to transit is a lifeline to many who have no other means of transportation to reach destinations, such as jobs, schools, grocery stores and healthcare facilities, safely and reliably.

- ***Ensure electric vehicle rebates work for low- and moderate-income families.*** We support offering electric vehicle rebates at the point of sale. We encourage rebates for purchasing used electric vehicles and e-bikes.

- ***Consider the relationship between transportation and housing.*** The CECP should include consideration of different highway operations like high-occupancy vehicle lanes and congestion pricing, which should fund public transit to create modal shift. The CECP should mention ensuring affordable housing near MBTA and RTA transit nodes to prevent displacement.

II. Electricity Sector

- ***Change how we do energy siting in the Commonwealth.*** Future electric and gas distribution system infrastructure should not be sited in EJ populations, except after cumulative impact reviews for projects proposed in EJ populations that include consideration of potential public health impacts and long-term harms, as well as meaningful community engagement processes wherein community concerns and ideas inform and influence decision-making starting at the initiation of the project proposal process. Any new incentives for solar projects must prioritize opportunities for ownership of renewable energy assets in EJ populations. The CECP should include a commitment to increase low income and EJ access to solar and harmonize with land use considerations.

- ***Support expansion of microgrids and renewable energy cooperatives.*** The Commonwealth should support EJ populations in accessing the benefits of renewable energy generation, including through microgrids and solar co-operatives. Further, the CECP should include a commitment to support and work with Tribes and Indigenous

populations on ensuring benefits from renewable energy to potentially impacted populations.

- ***Participate in and implement the New England Energy Vision.*** The Commonwealth and its agencies should continue to participate in New England Energy Vision and center needs of EJ populations.

III. Buildings Sector

- ***Focus Mass Save on pre-electrification, weatherization, electrification, and diversify and develop workforce.***
    - The CECP relies heavily on heat pumps to reach its goals, requiring at least 100,000 per year on average in residential dwellings plus a large amount in commercial space. We support these quantities, as necessary, to meet the 2030 limit and allocate funds to help all households access this technology.
    - Mass Save should set annual targets for enrollment of low- and moderate-income ratepayers, renters, and schools predominantly serving Black and Brown students. To meet emissions reduction targets, it is essential to enroll low- and moderate-income homeowners and renters who currently do not participate in energy efficiency programs by making the program economically feasible for all participants.
    - During the pandemic, Mass Save offered 100-percent incentives for weatherization, an offer that thankfully continues for moderate-income customers and renters. In addition to retaining this offer in future plans, we recommend that Mass Save additionally offer a 100-percent weatherization incentive for buildings that agree to also electrify their space heating equipment, as this could help to drive adoption. Moreover, we urge the full funding and data availability needed for pre-weatherization and pre-electrification barrier mitigation, particularly for low- and moderate-income and customers living in an EJ population.
    - We urge training, education, and funding to enable whole-home conversions that do not retain back-up systems, and we urge EEA to factor realistic retention levels into their calculations. Significant funds must be devoted to deep energy retrofit programs, which will help to rightsize heat pumps and renewable systems to achieve optimal performance.
    - Massively scaled-up workforce development funding and training will be key. Transitioning the buildings sector requires training laborers in climate-smart building technologies, especially related to HVAC, onsite solar, heat pumps, deep energy retrofits, and building operations. The expansion of a largely static industry offers new opportunities for thousands of long-term, sustainable, good paying jobs installing and maintaining new technologies. Further, the CECP

should commit to resources for training workers in the fossil fuel industry to be ready for employment opportunities and benefit from decarbonization.

- ***Prevent high heat facilities.*** High heat facilities in the Commonwealth, including its seven municipal waste combustors are toxic, harmful, and unnecessary. The use of pyrolysis, gasification, and incineration represent false solutions to the plastic waste reduction crisis because they do not fit into the "circular economy" of plastic waste.[4] Rather than produce new plastic, these processes produce either fuel that is combusted off-site or air emissions.[8] Thus, additional fossil fuels are needed to manufacture virgin plastics.[5] We recommend that the CECP prohibit the development of new high heat facilities and establish target deadlines to close certain solid waste facilities, such as incinerators and other facilities that create a public health burden, especially for EJ populations and other vulnerable communities.

IV. Natural and Working Lands

- ***Prevent removal of healthy trees, especially in places vulnerable to heat island effect.*** The CECP should include an explicit directive to preserve healthy, mature trees and naturally vegetated areas, especially but not exclusively in the urban environment. Too often, EJ populations are waging campaigns to preserve mature trees, which provide existing public health benefits against development plans that aim to remove such trees in the name of new housing or safer streets. We recommend adding a specific action to the CECP that agencies should avoid the removal of healthy, mature trees, and mitigate any loss for transportation, development, or energy infrastructure projects. All projects undertaken by the state or receiving state funding or permits should evaluate impacts of tree removal and the ability to retain existing tree cover and add additional carbon sequestration features.
    - The Commonwealth needs to establish a bold goal to plan a specific number of urban and suburban trees by a certain date, with a focus on EJ populations, and along rivers, streams and meadows.
    - Priority locations for tree planting should include public transit bus stops, school bus stops, and school grounds. The action should also include creating a network of shady green spaces in high-density neighborhoods across the Commonwealth using vacant lots, tax title parcels and other areas.
- ***Incorporate additional regulatory changes that support wetland protection and promote EJ.*** Amendments should be made under 310 CMR 10.05 to require agency consultation with EJ populations before approving development projects. EEA should review and incorporate content from the Blue Carbon Protection Act, a proposed federal bill, which includes language that wetlands provide buffers against storm surges,

[4] *See* Andrew N. Rollinson, Jumoke Oladejo, *Chemical Recycling: Sutatus, Sustainability, and Environmental Impacts*, Global Alliance for Incinerator Alternatives, at 11 (2020), https://www.no-burn.org/wp-content/uploads/CR-Technical-Assessment_June-2020.pdf at 11.

[5] *Id.* at 8.

"especially for communities of color, low-income communities, and Tribal and Indigenous communities."[6]

V. Conclusion

The final CECP will establish an important framework to guide decarbonization in the Commonwealth, helping to determine the clean energy trajectory Massachusetts embarks upon to achieve net zero by 2050. Metrics are the building blocks of success, a success that will not only be measured by our ability to achieve deep]GHG emission reductions, but also by our ability to do so in a way that benefits EJ populations and other historically marginalized communities and those at risk of the most adverse effects of climate change. We urge you to incorporate these recommendations into the final CECP released in summer 2022.

For questions about these comments, please contact Staci Rubin (srubin@clf.org), CJWG co-chair.

Thank you,

GWSA IAC Climate Justice Working Group

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Cindy Luppi, Clean Water Action
Claire/Karl Muller, UU Mass Action
Deb Fastino, Coalition for Social Justice
Maria Belen Power, GreenRoots
Sofia Owen, Alternatives for Community & Environment
Staci Rubin, Conservation Law Foundation

[6] *See* Blue Carbon Protection Act, H.R. 3906 § 4(a)(2)(B)(ii), 117th Congress (2021-2022).

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April 29, 2022

Honorable Kathleen Theoharides
Secretary Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900 Boston, MA 02114
gwsa@mass.gov

Subject: UMass Lowell Climate Change Initiative and Rist Institute Comments on the Interim Clean Energy and Climate Plan for 2030

Dear Secretary Theoharides, Undersecretary Chang, and the 2030 Clean Energy and Climate Plan Team:

Given the accelerating pace of climate change and recent climate change science, Massachusetts' climate goals set a floor for the action that is needed. Recent reports from the UN's Intergovernmental Panel on Climate Change (IPCC) make it clear that **we need to reduce emissions and increase removals of atmospheric carbon dioxide much faster than the timetable envisioned in the current milestones between now and 2030.**

But even Massachusetts' current goals have little chance of being met without more ambitious and urgent action. Our comments ask the Commonwealth to do more sooner. Most of the policy proposals are already developed, many have been tested elsewhere, and others are a good start but lack sufficient ambition or clarity. Now is the time to increase ambition and implement.

In addition to the specific comments we offer below, the current plan raises three overarching concerns:

1) **It relies on temporary reductions in transportation emissions due to the COVID lockdowns** to claim that we are on track;

2) **It postpones steep emissions cuts until after 2025**, with little more than COVID-induced reductions (which are already rebounding) through 2025; and

3) **It lacks clear commitment and metrics to ensure that equity goals are central** to the plan.

These comments are endorsed by 29 experts in climate change, sustainability, and energy at the **UMass Lowell Climate Change Initiative** and **Rist Institute for Sustainability and Energy**. Our partners at Tufts University, MIT, and Woodwell Climate Research Center are coordinating with us and submitting their comments in parallel. We also note that we are eager partners in this work. **Together our programs provide the innovation, expertise, and academic and workforce development capability to help accelerate Massachusetts' transition to a climate-safe, sustainable, and thriving economy. We are offering to assist you and the Commonwealth in evaluating and developing climate strategies and policies.**

Transportation Sector

Especially given that Massachusetts withdrew from the Transportation Climate Initiative (TCI), **we must accelerate other efforts to support public and active transport, reduce transportation demand, and electrify vehicles**. Effective policies are already proposed - and now their timeline must be accelerated. **Public transit and EV incentives for low-to-moderate-income residents must be prioritized to achieve equitable access to low-carbon transportation.**

Building Sector

Energy efficiency is the cleanest, most abundant, and most affordable way to deliver energy services and resilience to climate extremes and disruptions in energy supply. It cuts energy demand, emissions, and costs. We urge the Commonwealth to accelerate and strengthen energy efficiency in the building sector by:

- **Including strong, immediate incentives for deep energy retrofits for residential and small commercial businesses in the Mass Save program**. Incentives should minimize up-front costs and enable homeowners and small business owners to reap cost-savings of energy efficiency within three years or less.

- **Implementing a state-wide program for building energy scorecards for all point of sales in 2023**. If they are not mandatory, these programs should take a state-wide 'opt-out' approach, rather than a municipal 'opt-in' approach.

- **Implementing state-wide required or opt-out installation of heat pumps** when any fossil fuel furnace, water heater, stove, or other appliance is replaced. This program should make it clear to building owners that opting out comes with a risk of losing access to fossil gas transmission or oil as they are phased out.

- **Ensuring that all new construction operates without fossil fuels, is energy efficient, and is zero net energy.**

- **Leveraging our public universities and community colleges for workforce development and training programs** for builders, insulation professionals, HVAC professionals, solar

installers, and building inspectors. These professionals must have the knowledge, skills, and training to be informed and trusted messengers for the public and to carry out the transition to an efficient and electrified building sector.

- Leveraging technology to **enable real-time feedback to ratepayers** about savings reaped through energy efficiency programs.

- **Establish a Green Bank** to reduce risk and blend private and public to fund the upfront costs of energy efficiency projects and small renewable energy installations.

- **Achieve equity in participation in energy efficiency programs among environmental justice communities** who have faced barriers to participation, including low-to-moderate-income households with limited English proficiency and renters.

Electricity Sector

The current plan's focus is on mega-scale, centralized power sources, which raises concerns about the costs, vulnerability, and environmental impact of energy supply and transmission. More emphasis and incentives are needed for distributed power sources that are more resilient to extreme events and have lower impacts on natural systems. Massachusetts has already benefited from distributed solar incentives that could be extended. About two-thirds of the behind-the-meter solar installations in New England are located in Massachusetts. In New England, distributed solar already supplies more power than our two remaining nuclear power plants when the sun is shining and about one-fifth of nuclear power over an average 24-hour period.

- **Massachusetts should set priorities and provide graduated incentives for locating solar arrays**, with the following siting options from highest to lowest priority:

    1. Distributed solar on rooftops of homes, commercial buildings, parking structures, and on private lands occupied by owners and in appropriate locations for small scale community solar owned by the partners;

    2. Arrays on landfills and brownfields, abandoned gravel and other mining sites, abandoned shopping malls and strip malls, and unused abandoned factory building sites;

    3. Arrays placed along transmission powerline rights of way, highway rights of way, and rail rights of way as are done in Europe;

    4. Cleared degraded lands that no longer support agriculture or forests;

- Massachusetts net metering rules limit the rate at which solar panels can be installed by individuals in a given year. **These limits should be lifted so that distributed solar can expand even faster.** It is a means for individuals to invest directly and rapidly in bringing more solar to the grid instead of waiting for the slow pace of installing industrial scale, wind and hydro.

- In the past and at the present time, utilities have withheld connections to the grid by individual, business and institutions like universities for more than one year after the panels are installed. **A clear time limit of no more than 2-3 months should be established.**

- Ending subsidies for forest bioenergy electricity from Massachusetts or out of state providers is an excellent recommendation as burning wood adds significant amounts of CO_2 to the atmosphere and reduces forest carbon removals. **For wood bioenergy in use, its emissions should be counted in full at the point of combustion.**

- Municipal community choice aggregation (CCA) programs should be encouraged, but **transparency and clear rules on RECs for CCAs should be required**. For example, wood bioenergy should not be included in CCAs, nor should RECs from projects in other regions that do not require additional investment to move forward.

- **Guidance must be clear on how equity and environmental justice will be included** in siting board decisions.

Non-Energy and Industrial Sector

As the plan states, we must phase out natural gas within the next few decades. The current effort to repair leaks in natural gas pipelines is a band-aid that addresses one 'symptom' of our natural gas problem but misses an opportunity to address its cause. In many cases, the cost of repairing underground pipelines is higher than the cost of electrifying buildings that those lines service. Infrastructure currently used for gas pipelines may also be adapted to build networked geothermal ('geomicrodistrict') installations that electrify heating and cooling. In all cases, leaks must be identified and addressed, but repairing them is a short-sighted fix that will ultimately delay the real action needed: phase out natural gas. Equity goals should be integrated into phasing out natural gas by prioritizing low-income communities for transitioning away from gas infrastructure.

We agree with the plan to phase out HFCs. We also encourage the state to make plans to carefully dispose of older CFCs and HCFCs in existing refrigeration and air conditioning systems as they are retired and to do so in a way that does not create new risks for marginalized communities.

Natural and working lands

Today, less than one one-thousandth of New England's original forests survive, and only 3% are managed to grow old. Less than 1.5% of Massachusetts forests are protected intact forests that meet the criteria set by IPCC. **Forests are the only form of carbon removal that can operate at scale starting now** and are therefore essential to protect.

- **Massachusetts is therefore far from meeting the goal of 30% and eventually 50% of conserved lands,** as climate science indicates is necessary to maintain the resilience of biodiversity and ecosystem services (IPCC 2022 AR6 Working Group II).

- An interim plan to 'explore incentive programs designed to achieve no-net-loss of forest and farmland' is insufficient. We must do more to conserve forests and allow them to grow and store more carbon.

- The current plan aims to incentivize the use of durable wood products. But wood boards hold just 25-50% of the carbon in a harvested tree. The rest is released shortly after harvest. Fossil fuel-based machinery is used to harvest and produce wood products, adding to emissions. A study of the fate of harvested carbon between 1900 and 2015 from the western forests found that just 19% was in long lived wood products like buildings, 16% was in landfill slowly rotting to add carbon dioxide and methane to the atmosphere, and 65% was in the atmosphere as CO_2. Therefore, increasing the use of durable wood products can worsen climate change and should not be incentivized.

- The plan calls for developing 'measurement, accounting, and market frameworks necessary to support development of a regional casrbon sequestration offset market by the end of 2025.' **Protecting forests, promoting their growth, and maximizing their carbon sequestration potential is critical for our climate. But an offset market that counts forest sequestration against fossil fuel emissions equates carbon flows that are fundamentally different. It does not reduce the amount of carbon in the atmosphere.** Burning fossil fuels transfers permanently sequestered carbon from geologic reserves to the atmosphere: it is a 'one-way street' to the atmosphere. Growing forests transfers atmospheric carbon to biomass and soils, which can be burned or respired back to the atmosphere - a 'two-way street.' If growth is accelerated by applying fertilizer that emits nitrous oxide, it may actually worsen climate change. And how are biodiversity and other ecosystem services, such as water quality and flood mitigation, provided by forests protected by carbon markets? How much of the natural carbon cycle should humans claim credit for? **Instead of offset markets, the state should pay landowners directly for the service of promoting forest growth**, like current incentives for rooftop solar arrays and EVs.

- **By allowing our existing forests to continue to grow, they will accumulate more carbon ('proforestation') than by planting new trees elsewhere ('afforestation') or by replanting harvested forests ('reforestation').** Public forests should therefore be off-limits for harvesting and allowed to mature. Private landowners should be compensated if they allow their forests to mature without harvest.

- **Wetlands are also critical for accumulating carbon and increasing climate resiliency** by evaporating large amounts of water during floods. This process also cools surrounding regions.

We recognize that some of the above plans may require new policy and budget priorities, but we urge those actions to ensure that Massachusetts achieves the goals presented in the 2021 Climate Law.

Sincerely,

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Comments on proposed 2025 and 2030 CECP

The Massachusetts chapter of Elders Climate Action (ECA Mass) is pleased to make the following comments on the draft final 2025 and 2030 CECP. Our comments fall in two categories.

- Transparency
- Outreach

Transparency

The interim 2030 CECP provided valuable information on proposed emissions reduction targets by sector along with a number of strategies to achieve these targets. But missing from the plan was information on exactly how the strategies would lead to achievement of these emissions targets and what assumptions were used in setting the targets and establishing the strategies.

We understand that it maybe difficult to provide detailed modeling data. But some basic information on assumptions and specific targets was missing that would have helped us understand how the overall targets were arrived at, and what options are available to change them with changing circumstances.In particular, the interim CECP does not provide the following information.

- Was the interim CECP aligned with one of the eight pathways explored in the administration's 2050 Roadmap study?
- How much additional clean electricity is to be generated by 2030 and what estimate of the total demand for electricity in 2030 was used?
- What is the relative percent of retrofits assumed for gas and fuel oil heating systems? What is assumed to be the average annual use of electricity and fossil fuels for homes that are retrofitted?
- What is the assumption for annual mileage for zero emissions vehicles in 2030 and annual energy use?

The proposed emissions reduction targets for the final 2025 and 2030 CECP are significantly different from those in the interim CECP. In particular, the emissions reduction in the transportation sector is far greater and the emissions reduction in the building sector is far less than in the interim CECP. We assume this is the result of changes in either the assumptions used in the interim CECP or a change in circumstances since the publication of the interim CECP. We request that the final CECP include the assumptions used in the derivation of these new targets to enable us to better help the state achieve these targets and the inevitable changes that will occur as we move forward.

Outreach

The CECP cannot be implemented without understanding by and buy-in from businesses, local governments, and residents. As we all have recognized, the work required to achieve emission goals will have a significant impact on all of us.

The EEA has a key role to play, and we are pleased to see the EEA include enhanced consumer outreach and workforce development as one of the new components of the CECP. The importance of this can't be overstressed.

We appreciate your consideration of our comments on the 2025 and 2030 CECP.

Sincerely,
Arnold Epstein on behalf of Elders Climate Action Massachusetts

Comments on the Massachusetts Clean Energy and Climate Plan for 2030

Submitted April 30, 2022

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These comments are submitted in response to the request for public comment on the Clean Energy & Climate Plan for 2025 and 2030 by the Massachusetts Executive Office of Energy & Environmental Affairs

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- Developed innovative modeling approaches for life cycle carbon abatement cost and for simplified hourly power grid production simulation

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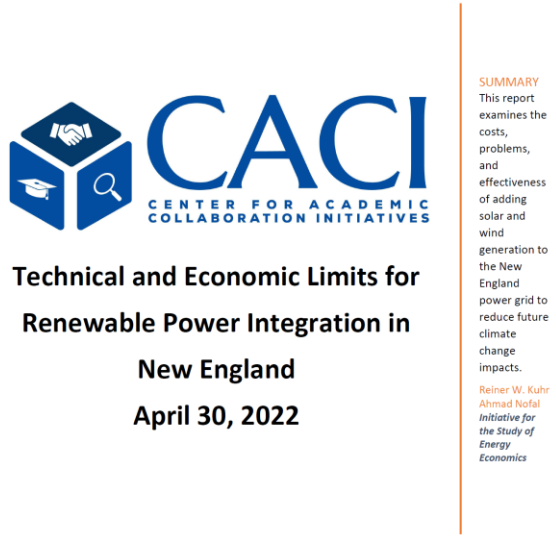
Observations and Recommendations

Problems	Recommendations
Absence of clear cost effectiveness determination	*Evaluate CARBON ABATEMENT COST ($ spent per ton CO2 avoided) of proposed climate initiatives to limit costs and prioritize subsidies.*
Consumers not aware of increasing subsidies with major tax and rate impacts	*Provide information to consumers on how much of their utility bills, taxes and other costs are impacted by changes in energy policy.*
Technical limits to wind and solar grid integration	*Recognize the declining value of adding wind and solar electricity to displace gas generation and the limitations of energy storage.*
Negative power grid impacts	*Understand how surpluses, curtailments and negative pricing will disrupt grid reliability, economics, and environmental goals.*
Need for objective independent review	*Support due diligence and independent review of decarbonization pathways and effectiveness in impacting future climate.*

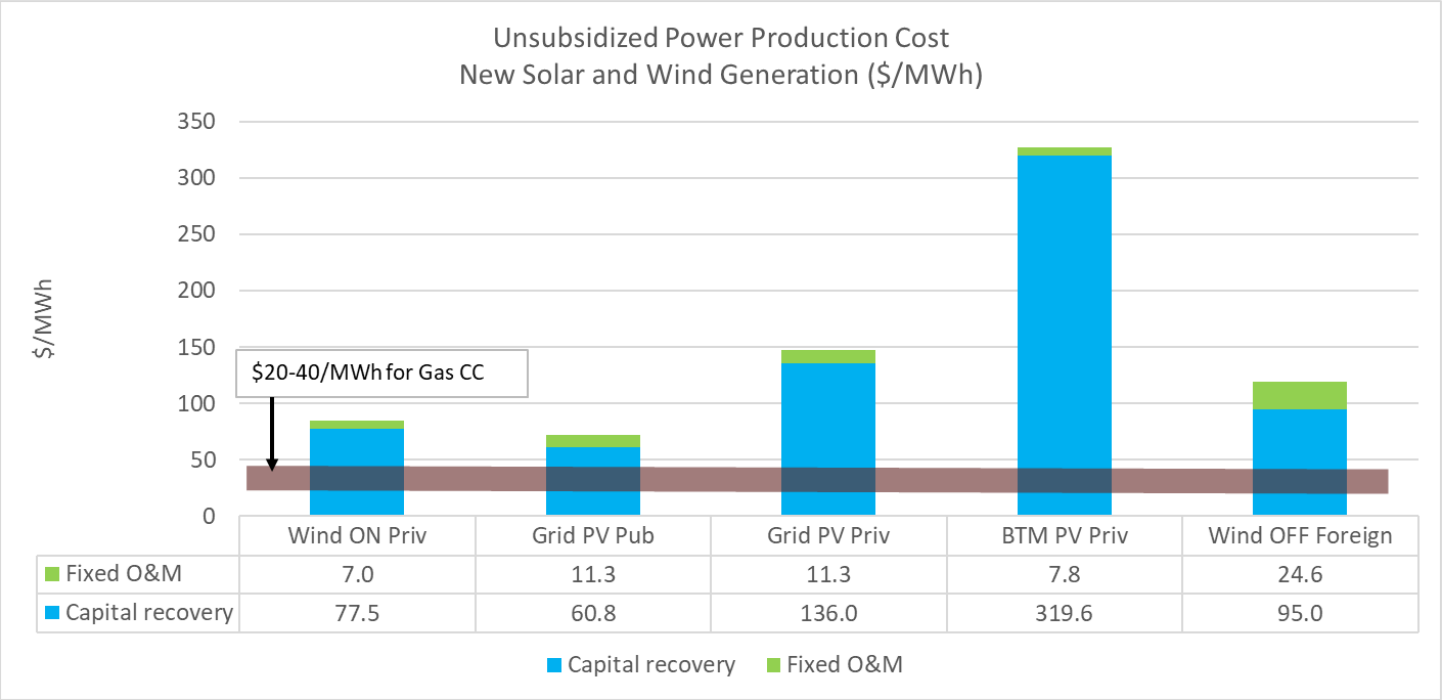
Report: Technical and Economic Limits for Renewable Power Integration in New England

- Current and projected New England Grid loads, generation and CO2 emissions
- Evaluation of Carbon Abatement Cost
- Hourly modeling to evaluate generator utilization, curtailments and pricing
- Estimated investments, subsidies and markets
- Effectiveness and consequences of adding solar, wind and storage generation capacity



Download at *WWW.CENTERACI.COM*

Solar and wind power costs in New England are much higher than from gas



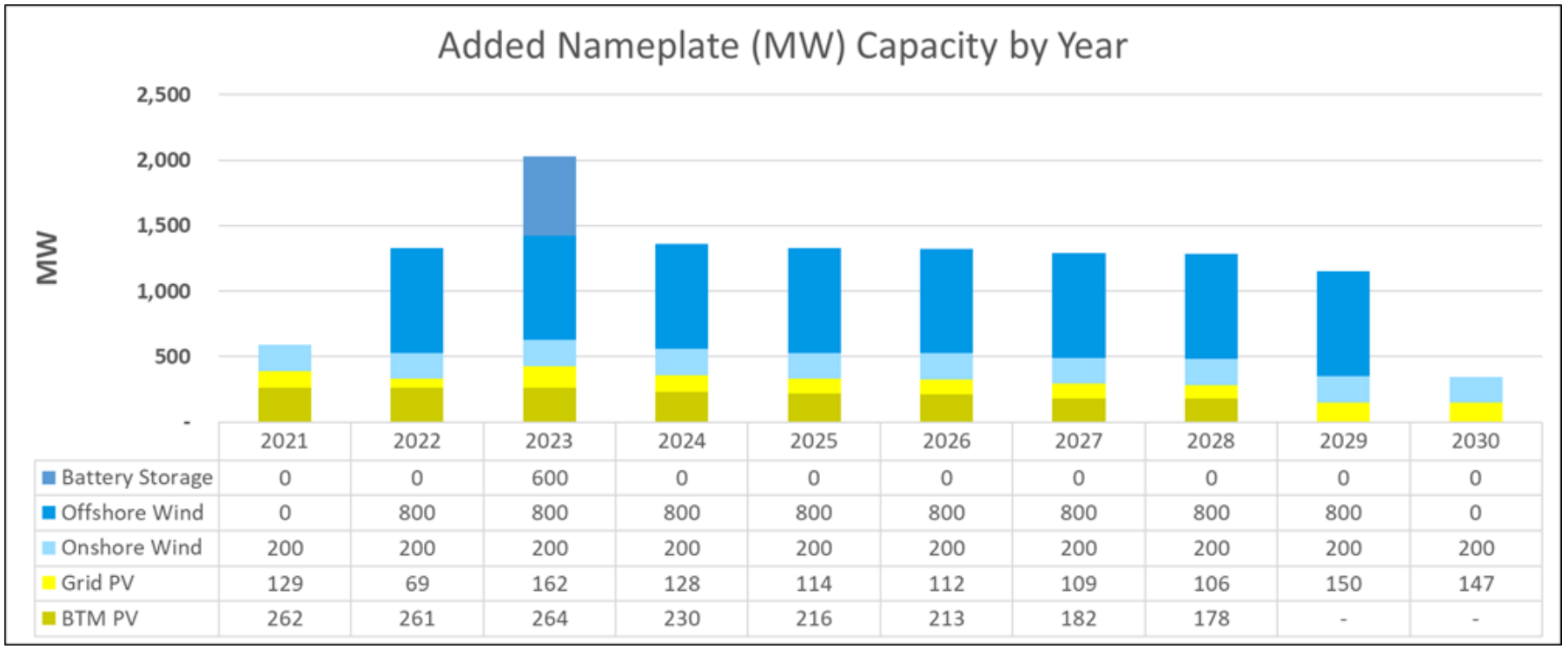
Based on EIA assumptions adjusted for New England, 2020 dollars, "Pub" = public ownership, "Priv" = private ownership,Gas CC = gas combined cycle plants

Based on DOE 2021 Energy Outlook (2020 dollars adjusted for New England)

Gas CC – gas combined cycle plants
Wind Priv – privately owned wind farms
Grid PV Pub – publicly owned grid connected PV
Grid PV Priv – privately owned grid connected PV
BTM Priv – privately owned (behind the meter) rooftop PV
OFFSW Pub – foreign owned offshore wind farm

Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

Policy growth targets for solar and wind

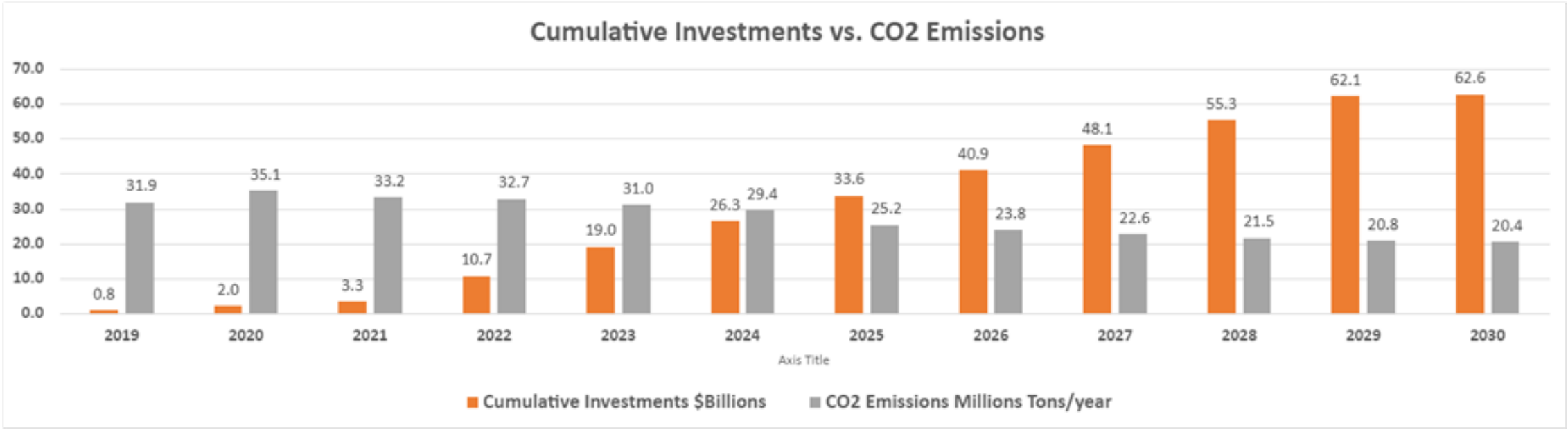


	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Battery Storage	0	0	600	0	0	0	0	0	0	0
Offshore Wind	0	800	800	800	800	800	800	800	800	0
Onshore Wind	200	200	200	200	200	200	200	200	200	200
Grid PV	129	69	162	128	114	112	109	106	150	147
BTM PV	262	261	264	230	216	213	182	178	-	-

Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

- **Rapid growth of offshore wind (800 MW per year through 2029)**
- **Doubling of existing onshore wind and solar**
- **600 MW battery storage added by 2023**

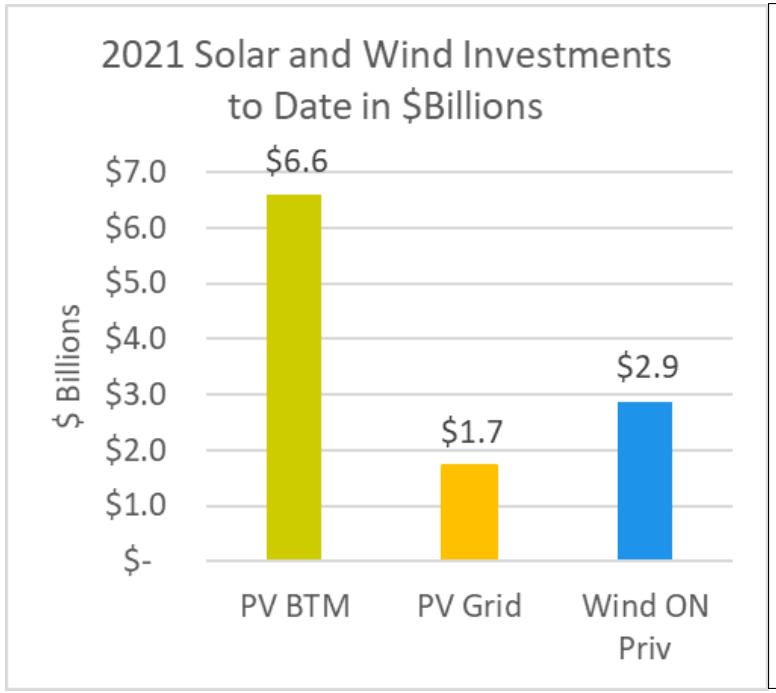
Projected reductions in CO2 emissions

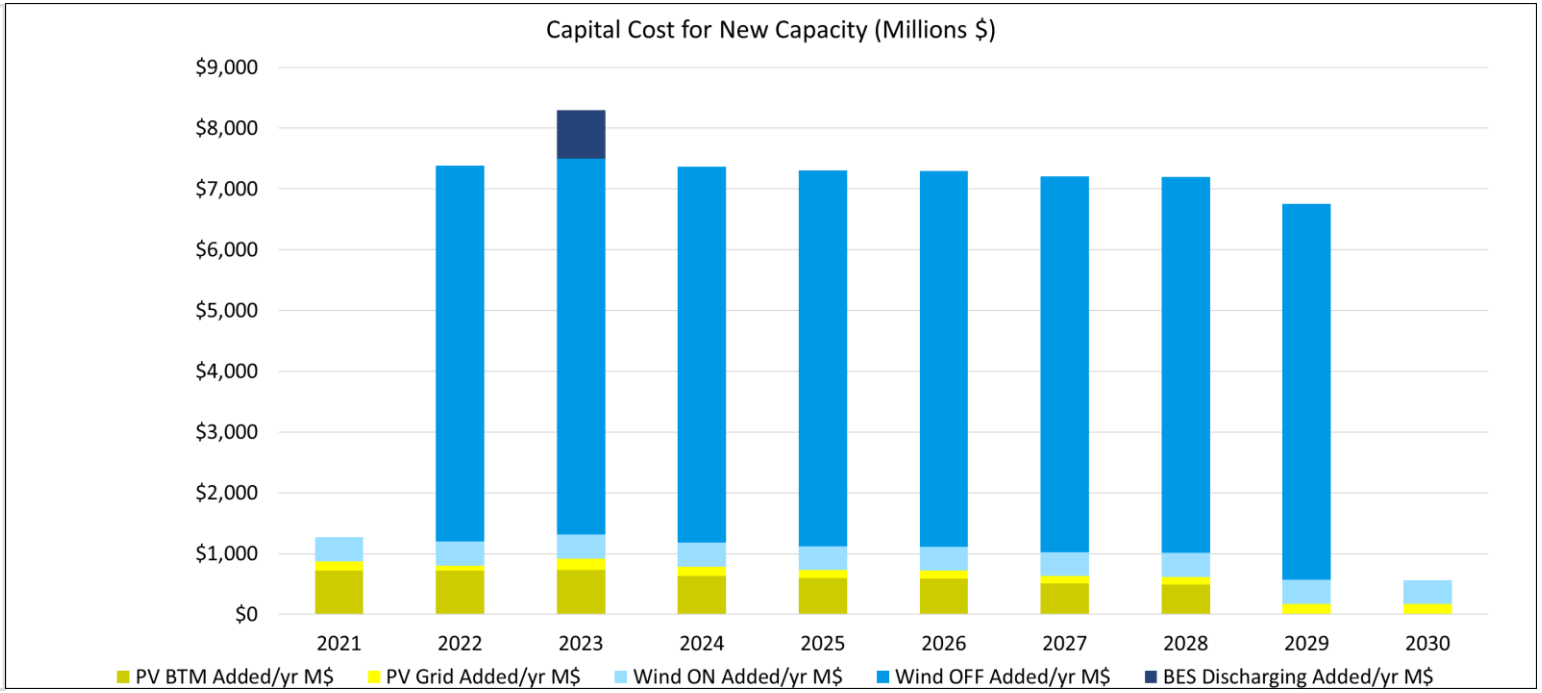


Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

CO2 emissions level off above 20 million tons/yr despite increasing investments due to increasing curtailments and the need to continue to operate gas plants for system flexibility and control.

Existing and proposed investments in solar, wind, and batteries

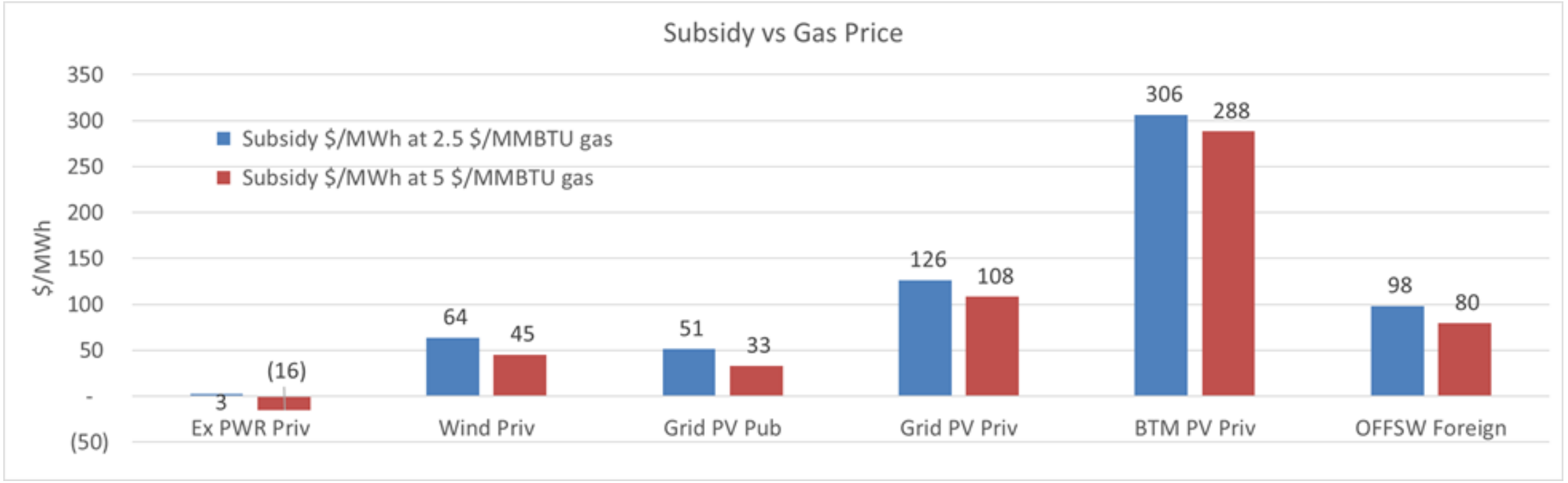




Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

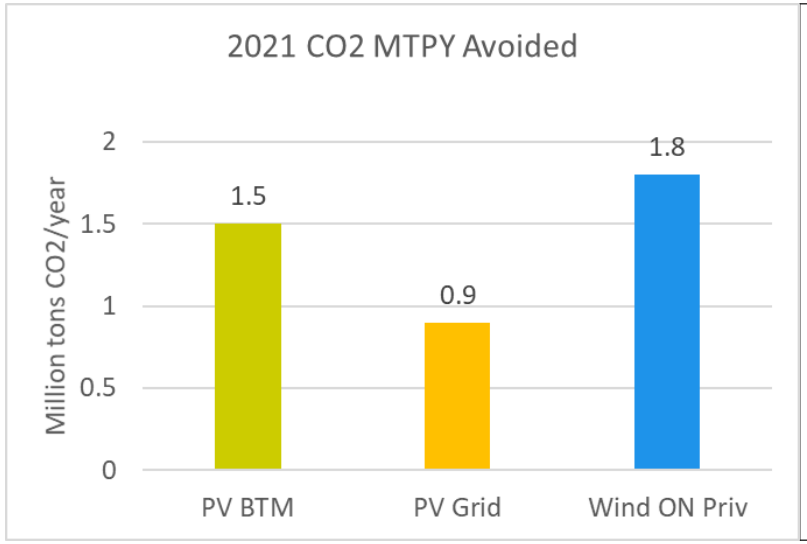
- **About $11 billion has been invested to date to achieve a reduction of about 4.2 million tons per year CO2.**
- **About $61 billion of new investment will be needed for new projects to reduce CO2 emissions 12 million tons/yr.**

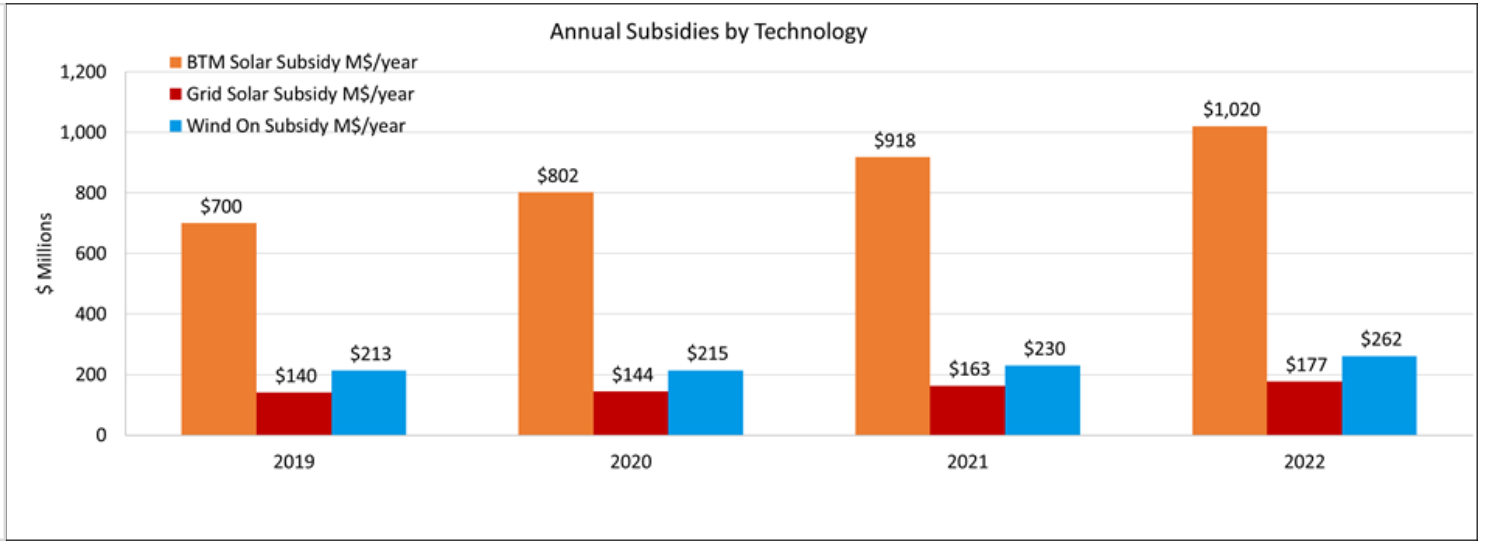
Subsidies for wind and solar vary with natural gas price



Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

Subsidies are not proportional to effectiveness





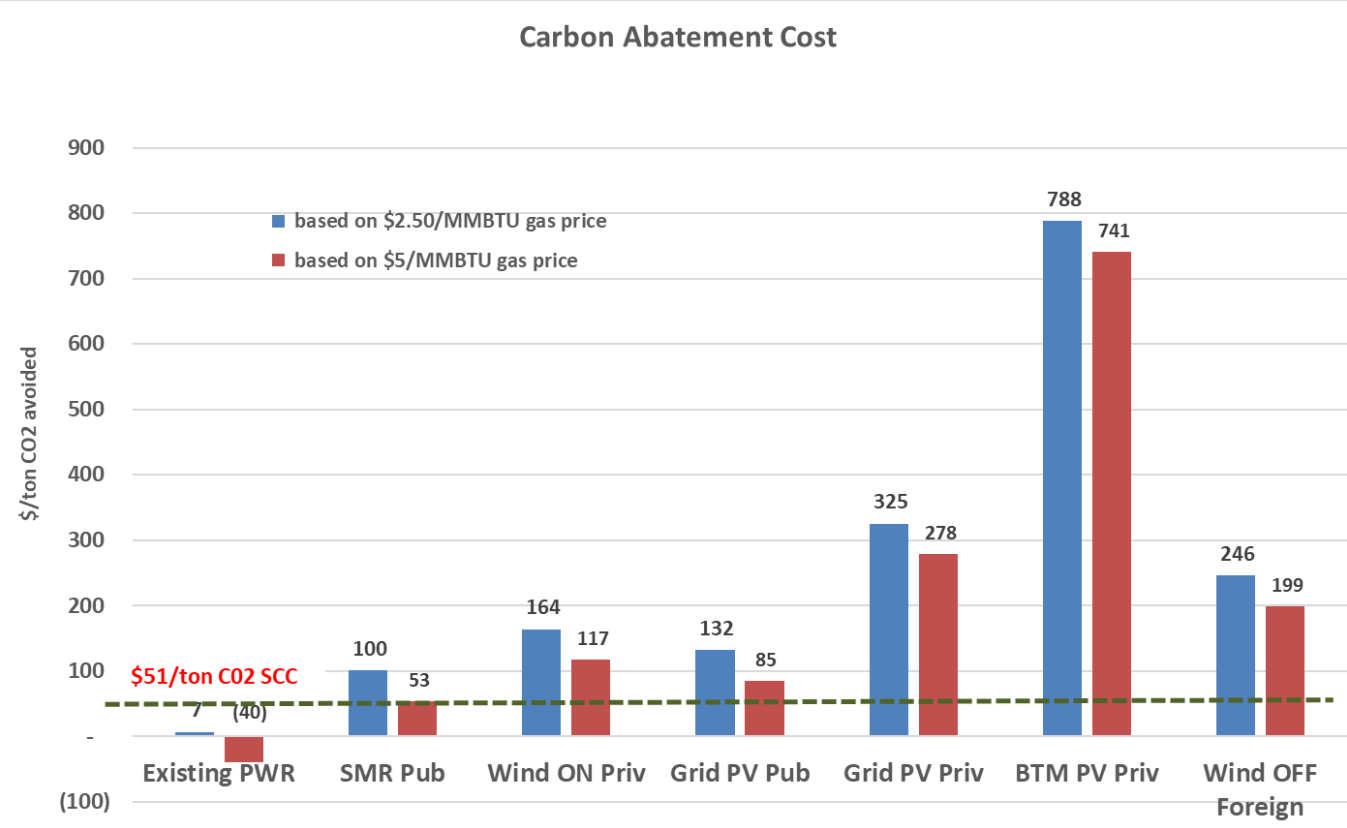
Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

$1.0 B subsidy for BTM (residential, behind the meter) solar avoids about 1.5 million ton/yr CO2.

$0.18 B subsidy for grid connected PV (PV Grid) avoids about 0.9 million ton/yr CO2.

$0.26 B subsidy for onshore wind avoids about 1.8 million ton/yr CO2.

Carbon abatement costs for wind and solar exceed current Biden policy guideline

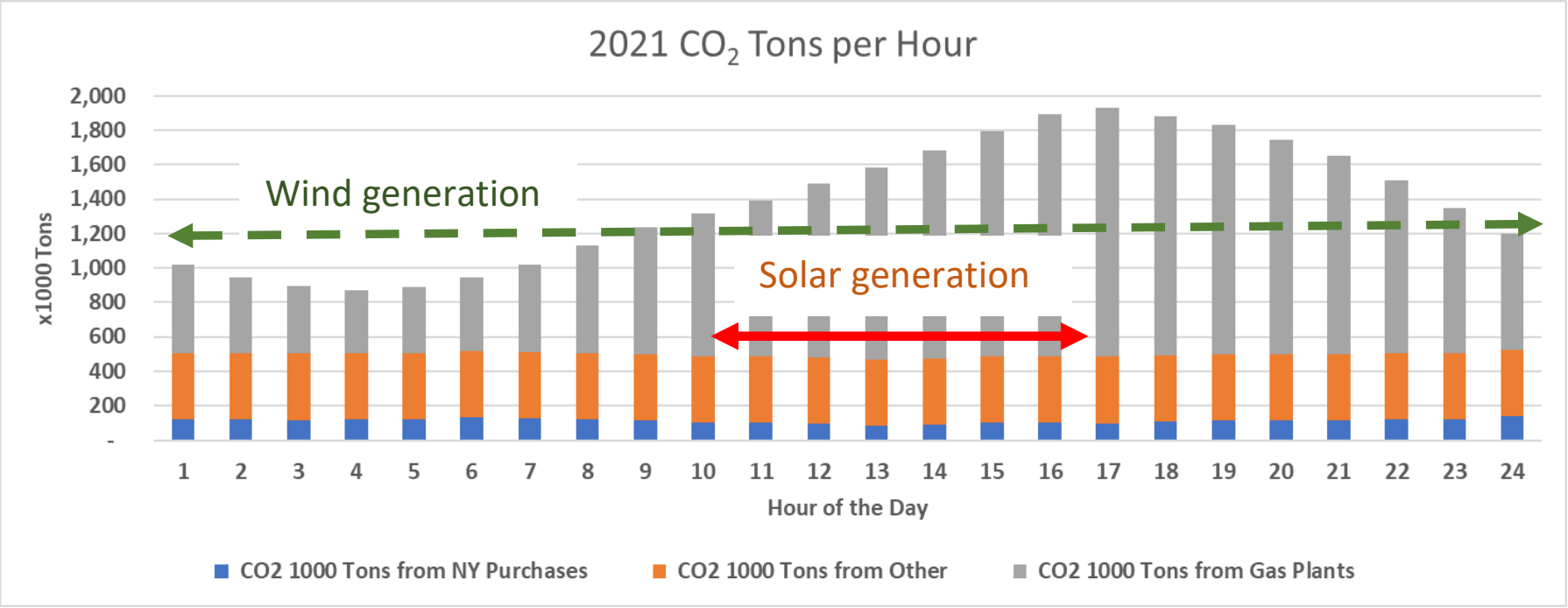


Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

Based on DOE 2021 Energy Outlook (2020 dollars adjusted for New England)

Gas CC – gas combined cycle plants
Wind Priv – privately owned wind farms
Grid PV Pub – publicly owned grid connected PV
Grid PV Priv – privately owned grid connected PV
BTM Priv – privately owned (behind the meter) rooftop PV
OFFSW Pub – foreign owned offshore wind farm
SCC – Social Cost of Carbon policy goal (value of reducing 1 ton CO2 emitted) per Biden administration

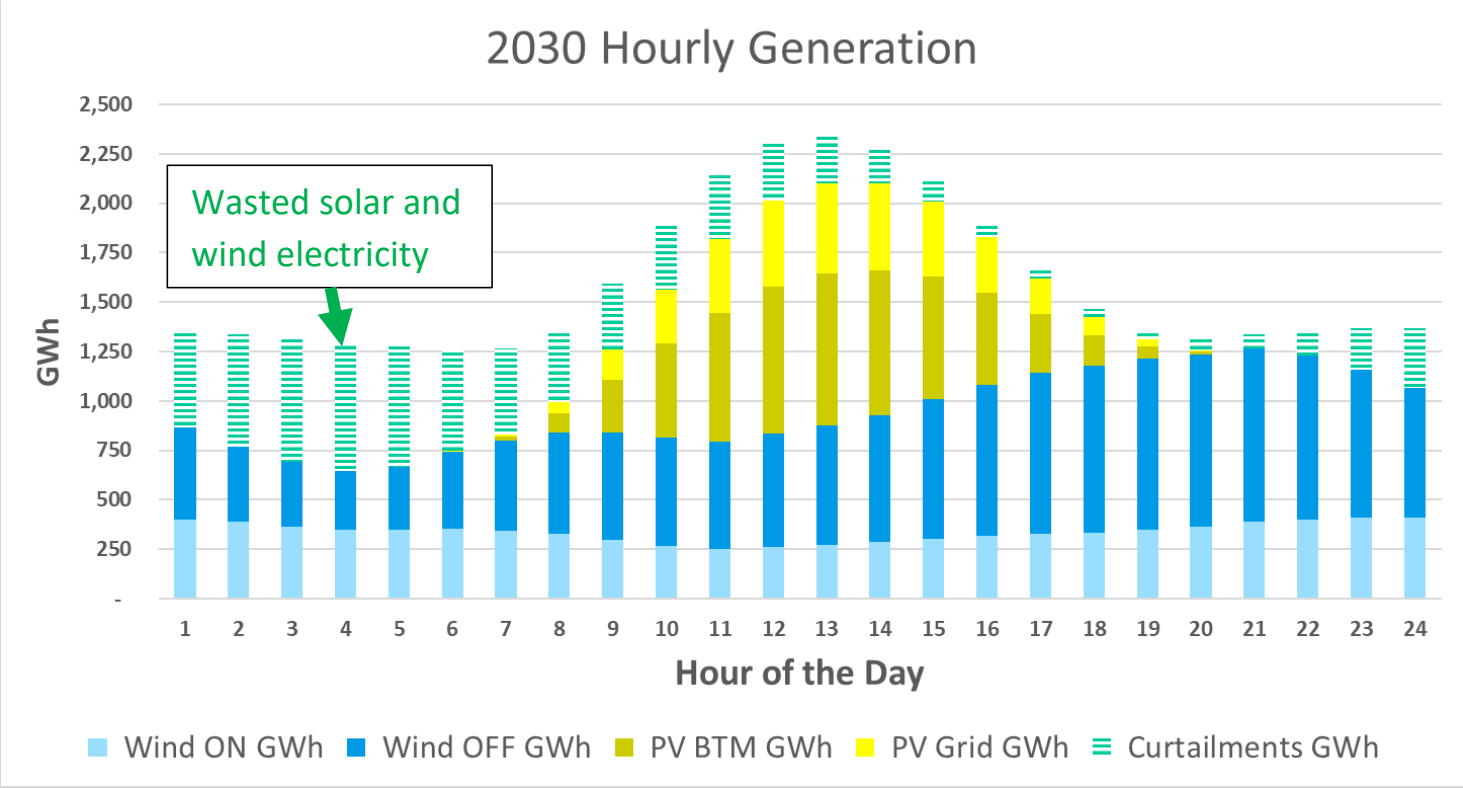
Adding solar and wind generation has a limited and declining impact on CO2 emissions



Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

- Most CO2 is produced in the evenings
- Adding solar only reduces CO2 mid-day
- Adding wind only reduces CO2 about 40% of the time
- Adding wind and solar has limited and declining impact
- Other sources of CO2 include wood, biomass and landfill gas
- NY purchases are from gas generating plants

Wasted solar and wind power increases



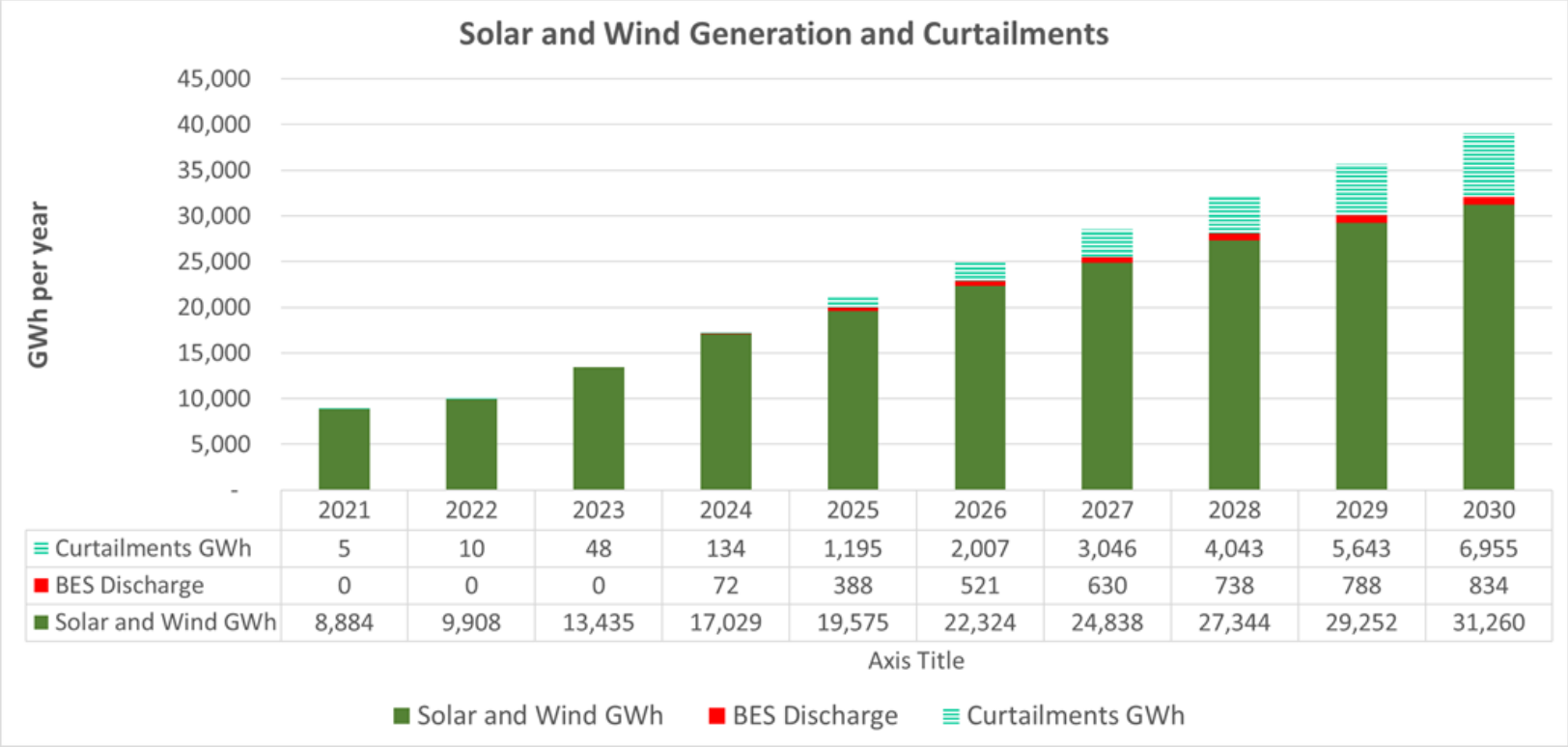
Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

Much of projected wind and solar generation is wasted as curtailments.

- **Solar generation occurs mid-day.**
- **Wind generation is distributed evenly.**
- **Highest loads are in the evenings.**
- **Almost half of wind generation in the early mornings is wasted.**

In 2030 wind and solar generation as projected exceeds loads every hour (on an annual total basis), mostly in the early mornings.

Wasted wind and solar energy grows rapidly

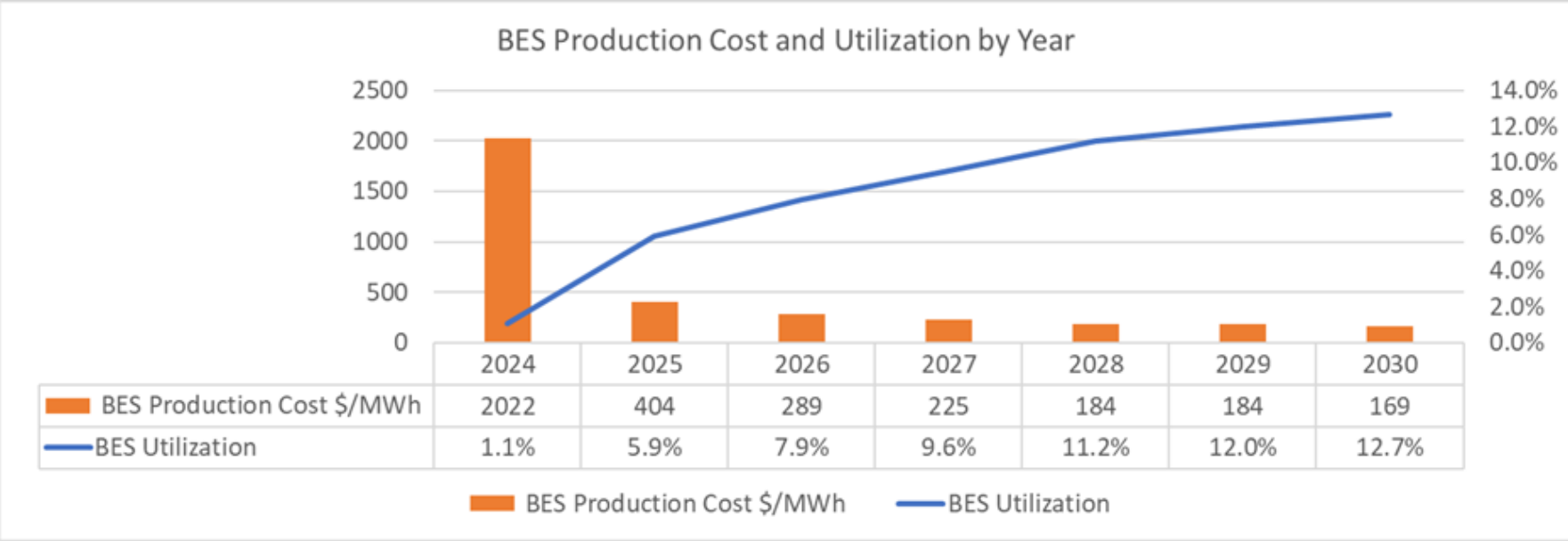


	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Curtailments GWh	5	10	48	134	1,195	2,007	3,046	4,043	5,643	6,955
BES Discharge	0	0	0	72	388	521	630	738	788	834
Solar and Wind GWh	8,884	9,908	13,435	17,029	19,575	22,324	24,838	27,344	29,252	31,260

Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

- Curtailed energy rises after 2024 as offshore wind is added
- This increases carbon abatement costs proportionally with declining utilization
- In 2030, about 7 GWh of solar and wind generation is curtailed, worth about $1.4B

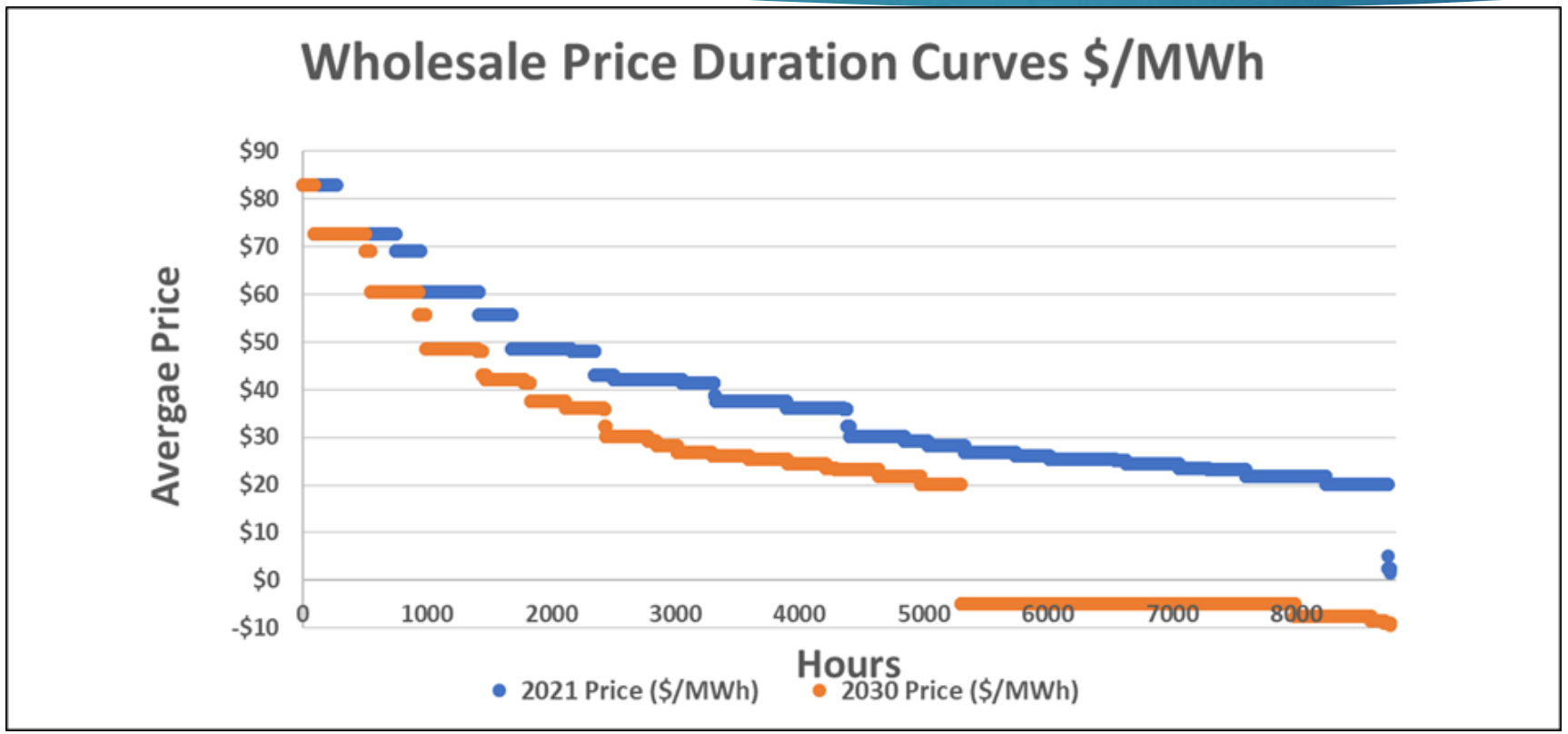
Battery energy storage (BES) to reduce CO2 emissions is impractical and too expensive



Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

- **Daily battery use to reduce CO2 emissions is limited to when surplus energy is available and when discharged to displace gas.**
- **Utilization of 600 MW of battery capacity increases as curtailments grow; battery production costs remain high.**
- **Battery costs exclude cost or credits for charging energy.**

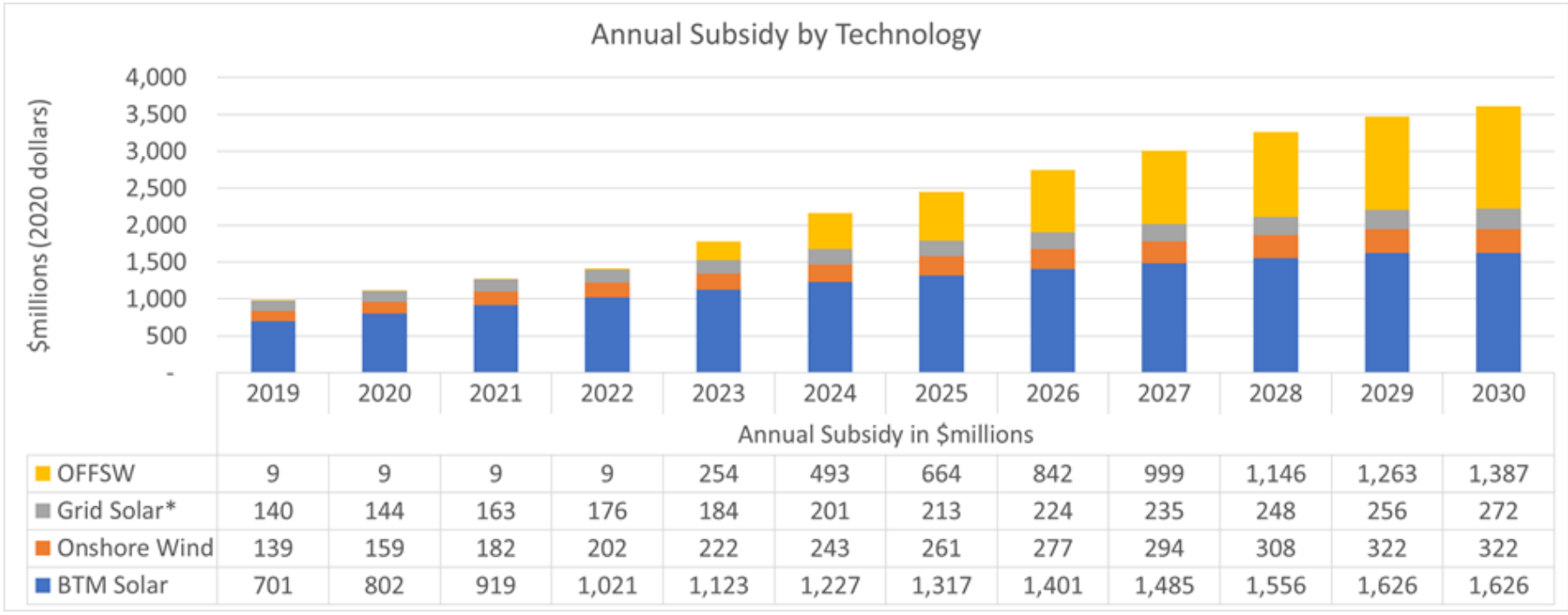
Surpluses will drive negative pricing, transferring subsidies into the market



- Some renewable and wind generators will offer negative pricing to avoid curtailment, paying to run to get their operating subsidies.
- By 2030, prices could be negative 40% of the time during surpluses.
- Negative prices reduce wholesale costs but increase need for subsidies.

Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

Subsidies for BTM Solar are very high

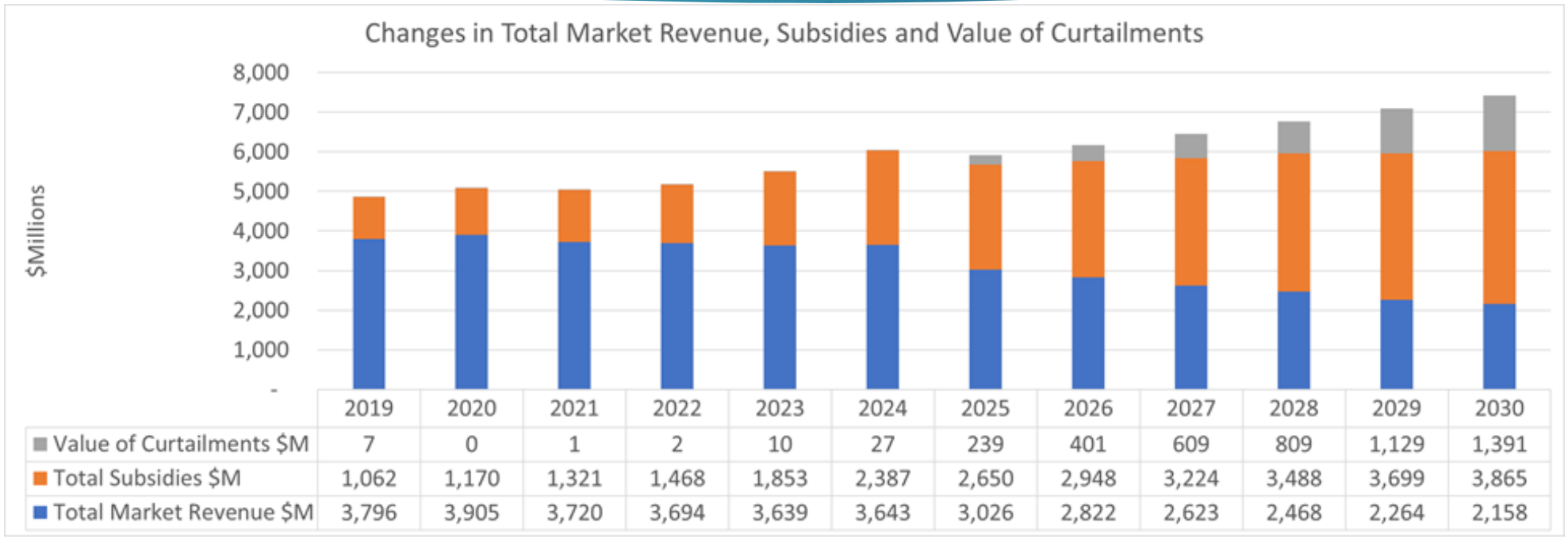


Annual Subsidy in $millions	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
OFFSW	9	9	9	9	254	493	664	842	999	1,146	1,263	1,387
Grid Solar*	140	144	163	176	184	201	213	224	235	248	256	272
Onshore Wind	139	159	182	202	222	243	261	277	294	308	322	322
BTM Solar	701	802	919	1,021	1,123	1,227	1,317	1,401	1,485	1,556	1,626	1,626

Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

- **Subsidies roughly triple by 2030.**
- **Subsidies are dominated by BTM solar which contributes little to CO2 reduction.**

Subsidies will grow from 20% to 200% of market value of electricity by 2030

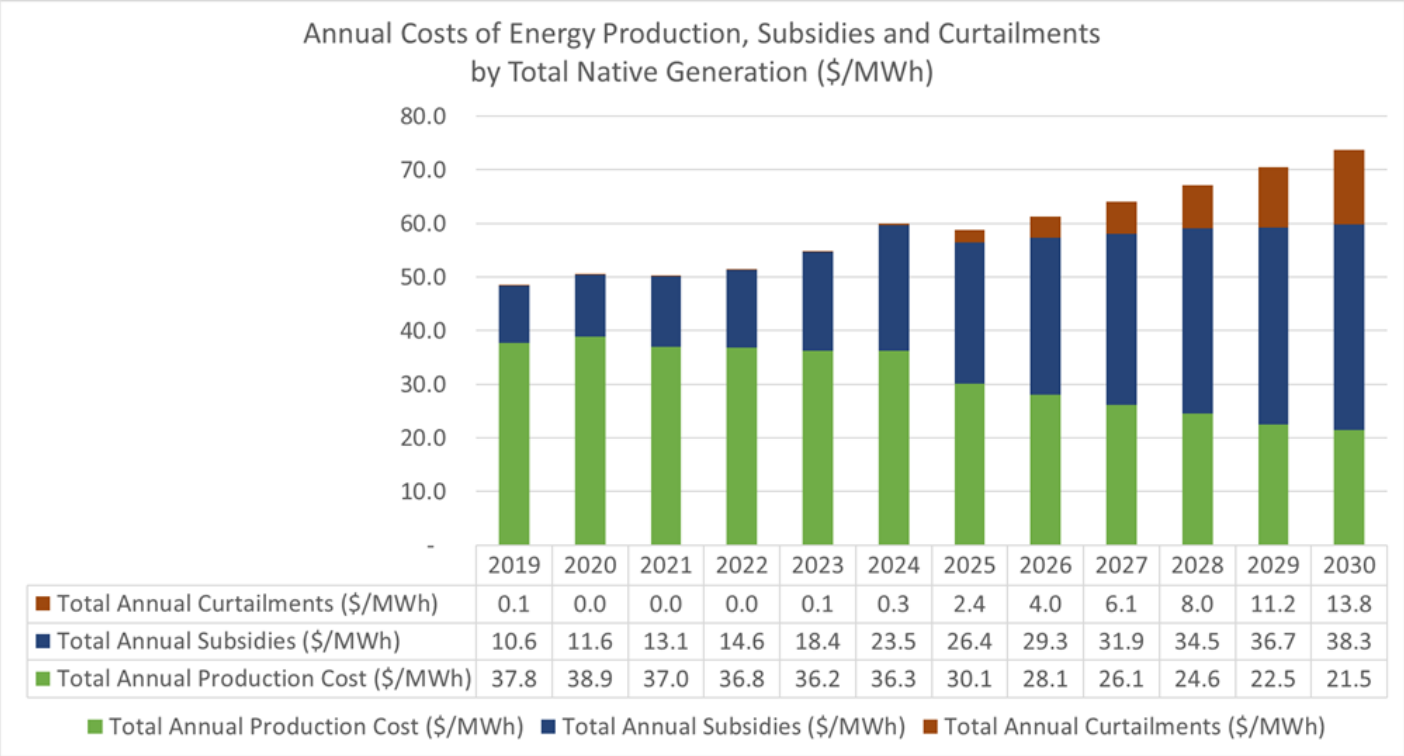


	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value of Curtailments $M	7	0	1	2	10	27	239	401	609	809	1,129	1,391
Total Subsidies $M	1,062	1,170	1,321	1,468	1,853	2,387	2,650	2,948	3,224	3,488	3,699	3,865
Total Market Revenue $M	3,796	3,905	3,720	3,694	3,639	3,643	3,026	2,822	2,623	2,468	2,264	2,158

Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

- **Declining cost of wholesale power is offset by higher subsidies flowing into electric rates and taxes, but discourages private investment needed for system flexibility and reliability.**
- **State subsidies vary causing uneven ratepayer and taxpayer burdens despite regional benefits.**
- **Represents transition from deregulation to socialization of costs**

Subsidies will dominate consumer cost



	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Annual Curtailments ($/MWh)	0.1	0.0	0.0	0.0	0.1	0.3	2.4	4.0	6.1	8.0	11.2	13.8
Total Annual Subsidies ($/MWh)	10.6	11.6	13.1	14.6	18.4	23.5	26.4	29.3	31.9	34.5	36.7	38.3
Total Annual Production Cost ($/MWh)	37.8	38.9	37.0	36.8	36.2	36.3	30.1	28.1	26.1	24.6	22.5	21.5

Source: ***Technical and Economic Limits for Renewable Power Integration in New England***

- **Estimated cost to consumers will increase from about $50/MWh to $74/MWh in 2020.**
- **Subsidies and cost of curtailments will account for over 2/3 of cost of electricity.**
- **Declining wholesale energy payments to generators may cause early retirements and undermine both decarbonization gains and grid reliability.**

(Small drop in 2025 results from increasing purchases from Canada.)

Recommendations to the MA Executive Office of Energy & Environmental Affairs

1. MA should produce **periodic reports describing how policy initiatives comply with legal requirements for cost effectiveness**. These should include

- An **analysis of carbon abatement costs** should be presented for the of proposed initiatives, including **transmission and distribution changes to support renewable generation.**
- A **ceiling on carbon abatements costs** should be established based on consideration of a determination of the social cost of carbon based on open discussion and public input.
- The impact of current technology-specific subsidies should be reviewed to determine whether **the implementation of other, more cost-effective technologies is being discouraged**.

Recommendations to the MA Executive Office of Energy & Environmental Affairs

2. Regional studies should be undertaken with ISO NE to **evaluate the curtailments and pricing impacts likely to result from projected increases in solar and wind generation**.

- Increasing curtailments should be determined to support projecting **carbon abatement costs.**
- The **projected increased occurrence of negative pricing** should be evaluated to determine impacts on generation asset values and longevity of generating resources, potentially **impacting future adequacy and reliability** as well as decarbonization effect.

Recommendations to the MA Executive Office of Energy & Environmental Affairs

3. State **RPS targets should be re-evaluated** to consider:
   - If they should be suspended or redesigned due to **declining effectiveness, excessive cost** and **negative impacts** on the wholesale power markets.
   - Rapid deployment of additional wind and solar generation will hit an **inflexion point in 2024** after which curtailments will grow rapidly with major negative effects.
   - **More uniform regional and national energy policy** is needed to achieve cost effectiveness and fair distribution of costs and benefits.

Recommendations to the MA Executive Office of Energy & Environmental Affairs

4. A comprehensive **independent regional review** should be undertaken on behalf of electric customers to examine overall cost effectiveness and rate impacts.

- Further support for **small BTM solar systems should be reconsidered** given their extremely high costs to the public and their low effectiveness in decarbonization.
- Special consideration of **carbon abatement costs, curtailments, negative pricing,** and overall effectiveness in the **context of global efforts and expected outcomes** regarding climate.
- Consumers should be **fully informed on how subsidies flow into their electric rates and taxes.**

Comments to the Executive Office of Energy and Environmental Affairs regarding Forest Carbon Goals and Policies for the Clean Energy and Climate Plan for 2025 and 2030

Respectfully submitted by Michael DeChiara on Jan. 15, 2022
56 Pratt Corner Road, Shutesbury, MA,
mdechiara@gmail.com, 413-658-4298

Dear Assistant Secretary Gaetner and H. Hanh Chu,

Thank you again for the opportunity to comment during the Jan .14, 2022 webinar regarding Forest Carbon Goals and Policies for the Clean Energy and Climate Plan for 2025 and 2030. The following comments are intended to supplement my oral comments.

As I mentioned, I am a resident of Shutesbury, a town of 1,700 just west of the Quabbin Reservoir. I am an elected Planning Board member and have also served as Chair of the Select Board. In my role on the Planning Board, I have co-authored our town's solar bylaws. As such, I have learned a great deal about solar planning and its limitations in Massachusetts and the relationship to forests in the Commonwealth.

1. EEA WORKING IN SILOS RESULTS IN FOREST DESTRUCTION
The biggest threat to Massachusetts forests is industrial solar. While we, of course, need clean electrical generation and forests, policies, documents and incentives are not consistent with EEA and its agencies. The significant expansion of large scale industrial solar is causing irreversible deforestation throughout the Commonwealth, as well as contributing specifically to fragmentation, the loss of forest services such as erosion prevent, storm water management, wildlife support, etc. As mentioned, once lost, mature forestland cannot be replaced.

SMART Program
Unfortunately the extensive development of large scale solar is actively promoted by DOER through the implementation of its SMART program. There are many SMART subsidized projects that have and continue to threaten the forests of Massachusetts. The Transition Project Exception (Section 2b) of the April 2020 SMART regulations (223 CMR 20.00) allows for development of up to 5MW developments in Category 3 land which includes undisturbed land. Only projects that applied for SMART after April 2020 are precluded from developing in BioMap2, Priority Habitat and Core Habitat areas. Given the backlog of SMART applications, one can assume many of the projects in queue will be allowed to build in forests. Additionally, it should be noted that the "greenfield subtractor" is obvious not a significant cost to the developer to de-incentivize development in forests. Looking at the explosion of forestland projects, this is a practical conclusion.

The only solution if EEA wants to genuinely preserve forests to address the climate crisis is to change the SMART regulations to prohibit all SMART subsidies for solar developments that

occur in Category 3 land, which includes undisturbed forest land, immediately, removing the placeholder for projects that applied prior to April 2020.

In addition the entire program needs to be revised to allow subsidies in disturbed land or the built environment. In reading a NY Times letter from Jan. 17, 2022 by former California Governor Schwarzenegger, a Republican, California incentivized 1 million rooftop installations; Nevada has also made great strides on rooftop installations. SMART needs to close the door on large scale forest and agricultural land developments (Category 2 and 3 land) and put its energy and money on building out Category 1 projects.

Inconsistent "Silo'ed" Messaging
On page 76 of the Decarbonization Roadmap for 2020, it states "*But because forests in Massachusetts will continue to grow and mature throughout the next three decades, they are likely to continue sequestering about 5 MMTCO2e each year regardless of such land use change impacts, however reasonably mitigated through policy.*" On page 41-42, of the CECP2030, it states, "*To support widespread electrification, New England must likely deploy more than 40 GW of solar resources by 2050, which will exceed the total area of available rooftops in the region. In Massachusetts, even with maximal rooftop deployment far in excess of historic levels, that will require the installation of ground-mounted solar on approximately 60,000 acres of land in Massachusetts over the next thirty years."*

Taken together, the takeaway message is easily that we need to build in forests. The subtlety presented in other parts of these reports and the appreciation for prioritizing the build environment and disturbed land, is lost by some readers. For example, in the neighboring town of Amherst, the town leadership is debating whether to proceed with a solar bylaw with the primary debate about clearcutting forests for solar A local climate scientist at Hampshire College has become a leading force in saying that based on the Commonwealth's reports and data, towns must cut down forests to do "their part" in addressing climate change. He repeatedly cites as proof, the two citations above. If a person with a PhD. who cares about climate and studies it professionally, can get the message wrong, I would suggest the message is either intended or needs to be changes.

2. <u>ZONING</u>
It is easy for EEA to say that it encourages local zoning that protects forests. In fact, as was pointed out in comments on the webinar, many municipalities already do that. Again, the greatest threat is industrial solar and the SMART program. Throughout the state, municipalities, especially small rural communities with lots of land, volunteer government leadership and small budgets are under frequent attack by national and multi-national corporations that have come to Massachusetts to cash in on solar subsidies. These developers, as a matter of course, threaten to sue based on the premise that municipalities cannot unreasonably regulate solar given MGL Ch. 40A, Sec. 3 Para 9.

The term unreasonably is vague which is why developers threaten municipalities with legal action. In some cases, local solar bylaws have gone to Land Court with resulting mixed legal decisions. EEA should be aware that on March 7, 2022, the SJC will be hearing oral arguments on a Waltham-based case that it elevated from the Appeals Court to clarify this statute. It is

widely expected from attorneys on both sides of the issue, that the SJC will likely interpret the statute narrowly, considerably limiting municipal ability to regulate industrial solar through local zoning. This will only worsen the deforestation in the Commonwealth. If EEA can act, an Amicus brief in favor of forests, could help mitigate the extent of narrowing by the SJC.

Additionally, there are two bills in the legislature, S2596 and H4133 that will update the language of this outdated 1985 statute to differentiate between residential solar, which should be minimally regulated and aggressively promoted, and industrial scale solar which needs responsible regulation through local zoning. EEA should support these bills because the legislation explicitly expands the reasons allowed for regulation to include protection of forests, agriculture and wetlands. A timely and concrete step EEA can do is support these two bills prior to the SJC decision which is expected in spring 2022.

Why is this important and urgent action needed? Based on my personal research in December 2022 of all Mass. zoning bylaws available online (333); by my count 206 have specific mention of solar. Of these I estimate 168 or 48% of municipalities could be out of compliance with a strict, narrow interpretation by the SJC, creating a void of local regulation. The inability to regulate solar following a narrow decision by the SJC will worsen the state of Massachusetts' forest doing considerable more damage to the ecosystem.

3. CHAPTER 61C CONCEPT

I completely support the idea of introducing a Chapter 61C program that would provide tax incentives for landowners to prioritize carbon storage and sequestration. There is currently legislation filed by Sen. Hinds that would do just that – S1880: An Act to Create a Forest Carbon Incentive Program to enhance carbon storage on private timber lands. EEA should actively support this bill for passage to advance forest resiliency.

I have two elements that I think are essential for inclusion into a Chapter 61C program that would make it effective.

1. There should be no allowance for landowners to pay back taxes and buy out of the program as they currently can for current Chapter 61 land. This is exactly what is happening with industrial solar. Large landowners find it financially advantageous to pay the back taxes and get more money through long-term leases. A Chapter 61C program should require a long-term commitment, minimum of 15-20 years with no option for changing the status of the land during that period. This would make it different than permanent conservation but ensure that short-term gain does not undermine the intent of the program.
2. As presented by Frank Lowenstein, of the New England Forestry Foundation, many of New England's forests are sub-par in regards to carbon storage and sequestration. Any land put into Ch61C should require a clear plan that includes monitoring to ensure that existing forests improve their sequestration and storage. The Payments should be contingent on hitting benchmarks for improvement that are established by EEA (based on professional input) rather than leaving them to the landowners. An automatic penalty for not meeting the benchmarks within a reasonable time period should also be included so

that the idea of improving storage and sequestration is not a casual thing that is simply ignored while landowners collect checks funded by the public.

4. "NO NET LOSS"

As I mentioned during the webinar, the "No Net Loss" (NNL) concept is problematic on its face because the subtleties of the policy as traditionally articulated are lost on most people and more importantly, because the underlying assumptions with regards to forests, are wrong. I have done research on this which I will share, in part, below:

Background

No Net Loss is about offsets - offsetting bad things done to the environment by doing some alternative things that are not destruction but not better the original. The traditional application is in regards to wetlands. - a developer can destroy a wetland if they "create" equal or more wetlands elsewhere. From my research it looks like the concept was first introduced by Jimmy Carter in regards to wetlands and has been enhanced by the feds over subsequent administrations. The approach has since been adopted internationally beyond wetlands.

Concerns and Limits to NNL Concept

I see two fundamental problems with No Net Loss as a concept and especially when applied to forests:

1. Looking at NNL for wetlands, data and research show that this is a flawed approach that is often spun well. Destroying a wetland and replacing it with a man-made one elsewhere, is a net loss environmentally. Unlike wetlands, NNL doesn't work for the climate crisis - offsets don't preserve mature ecosystems. Given the loss of carbon storage and the immediate loss of sequestration (even if younger trees' rate of sequestration is higher), cutting down a mature forest for "replacement" by younger saplings is a loss environmentally and for the climate Furthermore, allowing forest cutting creates fragmentation, damage to forest services, etc. that planting elsewhere (the offset) can never rectify.

2. The success of an offset is fully dependent on the valuation of the counter-balancing action. It is debatable whether NNL is successful as a land use approach – there is research on both sides. However, it is reported that "the most commonly cited reason for success was having high offset ratios." Source: https://conbio.onlinelibrary.wiley.com/doi/10.1111/conl.12664
   For example, is clear cutting 40 acres of forest offset by 40 acres of newly planted trees?(1:1) a success? Does it require 1:2 ratio of 80 acres, etc. Manipulating the ratio may determine success on paper but not necessarily on the ground.

NNL is the Wrong Model

The Resilient Lands Initiative touts the "No Net Loss" as the first application of the No Net Loss concept applied to forests and farms. My assumption is that the folks who wrote the Resilient Lands Initiative were trying to validate their recommendations by building off a foundation of an existing precedent (wetlands application) which is a reasonable approach for "selling" a new idea. However, reading the content of the RLI, I think the wrong model was selected since the

RLI vision is strongly oriented to protection and enhancement of climate actions and not about offsets. Introducing offsets when the first and strongly preferred approach is not only preservation of forests but improving their carbon storage and sequestration ability, is introducing a low bar immediately and giving developers an easy path to deforestation with less costs.

Dangerous Messaging

As I mentioned in during the webinar, the messaging is also very dangerous in that is tempting to policy makers looking for an easy win. It is "feel good" on the surface – everyone would like to do something without negative implications (no net loss). But hat is not the premise of NNL – removing wetlands in the traditional application of NNL was clearly the last option. But like wetlands applications, I assume most developers and policy makers will use the title of the policy as a first step and excuse for clear-cutting, saying the Commonwealth supports it as long as trees are newly planted elsewhere. As with other commercial ventures (think industrial solar), this policy will be abused, esp. if the regulations are not exceedingly clear and prohibitive and if developers can cut costs and look like good guys in the process.

As a result, I think EEA needs to jettison the mention of No Net Loss and start with the real objective – preserving and improving forests. Resilient Forests says that without diluting the goal. All policy and all incentives should address these goals. The name of the program should reflect this. Any development in forestland that would need to happen, should have to jump through hoops and be difficult to obtain; this should be known by developers at the outset, way before applying. Only if exceptions are rare, will there be a disincentive to cutting mature forests and seeking to replace them with saplings. This could be a written request, public comment, local approval (think local engagement regarding marijuana establishments in Mass.) or a process similar to applying for a local zoning special permit. But again, this should be a clear last option with no guarantee of success, so that developers do not start their business planning assuming this is possible.

In summary No Net Loss – to the uninitiated sounds like we can cut mature forests as long as we plant trees elsewhere – it is state approved approach. I don't think this is nor should it be the message.

Thank you again for your time. I welcome questions or further discussion at mdechiara@gmail.com or 413-658-4298.

Dominion Energy Nuclear Connecticut, Inc.
314 Rope Ferry Road, Waterford, CT 06385
DominionEnergy.com

April 30, 2022

VIA ELECTRONIC MAIL: gwsa@mass.gov

Secretary Kathleen Theoharides
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: 2025 and 2030 Clean Energy and Climate Plan – Written Comments Following April 14 and 15 Public Hearings

Dear Secretary Theoharides,

Dominion Energy Nuclear Connecticut, Inc. ("Dominion Energy") appreciates the opportunity to submit comments following the Massachusetts Executive Office of Energy and Environmental Affairs' ("EEA") public hearings on EEA's proposed emissions limits, sector-specific sublimits, and plans to achieve those limits in the 2025 and 2030 Clean Energy and Climate Plan ("CECP"). Dominion Energy, owner and operator of Millstone Nuclear Power Station ("Millstone") in Waterford, Connecticut, offers the following comments for consideration.

Introduction
Signed into law by Governor Baker in 2021, *An Act Creating A Next-Generation Roadmap for Massachusetts Climate Policy* ("2021 Climate Law") requires the EEA Secretary to set interim emissions limits and sector-specific sublimits every five years in order to realize the Commonwealth's long-term, economywide greenhouse gas ("GHG") emissions limit for 2050. In addition, EEA must develop plans to realize those limits and sublimits, including how, when, and to what extent the Commonwealth will act to reduce its emissions in each of six sectors.

During its public hearings in April, EEA proposed 2025 and 2030 sector-specific sublimits for the six sectors identified in the 2021 Climate Law, including the electric power sector, the transportation sector, the residential heating sector, the commercial and industrial heating sector, the industrial processes sector, and the natural gas distribution and service sector. Altogether, the sector-specific submits proposed by EEA would realize a 32% reduction in GHG emissions below 1990 levels by 2025 and a 50% reduction in GHG emissions below 1990 levels by 2030, putting the state on a path to net zero.

Dominion Energy commends EEA's efforts to clear a path towards net-zero GHG emissions by 2050. Setting interim emissions limits and sector-specific sublimits along the way ensures the Commonwealth continues to make measurable progress towards its long-term goal. Like Massachusetts, Dominion Energy has set a companywide goal to achieve net-zero carbon and

methane emissions across its electric and gas operations by 2050. Earlier this year, Dominion Energy announced it will broaden its efforts to reduce GHG emissions and also work to achieve net-zero emissions outside the company's direct operations, including emissions generated by customers and suppliers.

Millstone's Critical Role in New England

Millstone is a 2,100 megawatt ("MW") nuclear power station that produces 16 to 17 million megawatt-hours ("MWh") of carbon-free electricity each year, representing the largest carbon-free resource in all of New England. While situated in Connecticut, Millstone is critical to the entire New England region, adding significant grid reliability, energy security, fuel diversity, price stability and emissions benefits to the New England power system. Millstone's continued operation prevents roughly four million tons of carbon dioxide from being released into the atmosphere each year and helps ensure the decarbonization goals of Connecticut, Massachusetts, and other New England states remain in sight.

In 2018, Connecticut administered a competitive solicitation to procure up to 12 million MWh of carbon-free energy from a broad range of zero-carbon resources, including Class I renewable resources, existing nuclear power resources, hydropower resources, and energy storage resources to secure clean, cost-effective electricity for Connecticut consumers consistent with the state's decarbonization goals. Millstone and 11 other zero-carbon resources were selected as winning bidders. After contract negotiations, Dominion Energy executed 10-year power purchase agreements with Connecticut's two investor-owned utilities for 9 million MWh of Millstone's energy each year, representing roughly half of Millstone's output on an annual basis. Delivery under the contracts commenced in October 2019 after a rigorous review and approval process through the state's Public Utilities Regulatory Authority ("PURA").

Under the power purchase agreements, Millstone's energy is locked in at a low, fixed price of $49.99/MWh (or 4.9 cents/kWh), representing one of the lowest cost carbon-free resources procured by any state in New England. While some of the benefits of Millstone's continued operation flow directly to Connecticut, the state's zero-carbon procurement and resulting power purchase agreements have helped secure a critically important clean energy resource for the entire New England region. According to the Connecticut Department of Energy and Environmental Protection ("DEEP"), preserving Millstone has "prevented *regional* carbon emissions from increasing by 20 percent."[1]

EEA's Proposed 2025 and 2035 Emissions Limits, Sublimits and Plans

Pursuant to the 2021 Climate Law, Massachusetts is required to reduce GHG emissions 50% below 1990 levels from all sectors of the economy by 2030. As EEA explains in its public hearing presentation, the proposed limits, sublimits, and plans in the 2025 and 2030 CECP are intended to be a comprehensive set of policies to reach that goal. Dominion Energy supports EEA's proposed sublimits for the electric power sector—13.2 million metric tons of carbon dioxide equivalence ("$MMTCO_2e$") by 2025 and 8.5 $MMTCO_2e$ by 2030. The 2030 sublimit represents a 70% reduction in GHG emissions from the electric power sector and is the boldest sector-specific sublimit in the plan. According to EEA, to achieve a 70% reduction in GHG

[1] 2020 Final Integrated Resources Plan, Connecticut Department of Energy and Environmental Protection (October 7, 2021), https://portal.ct.gov/-/media/DEEP/energy/IRP/2020-IRP/2020-Connecticut-Integrated-Resources-Plan-10-7-2021.pdf, page 20.

emissions below 1990 levels from the electric power sector, more than two-thirds of electricity consumed in Massachusetts must come from renewable and clean energy resources. EEA's sublimit for the electric power sector will give the state its best opportunity to achieve sublimits for other sectors, like the transportation and buildings sectors, which will depend heavily on electrification efforts to realize their sector-specific reductions.

Dominion Energy supports the plans proposed by EEA to achieve its interim emissions limits and sector-specific sublimits, particularly the focus on clean electricity to meet a larger percentage of consumer demand in Massachusetts. Dominion Energy encourages Massachusetts to consider a broad range of new and existing clean energy resources to meet its emissions limits for the electric power sector in order to decarbonize the state's electricity supplies at the lowest possible cost. A broader range of technology choices will not only lower cost but also lower technology risk. As Dominion Energy has stated in other state proceedings, the resources needed to achieve Massachusetts' and other New England states' decarbonization goals will require the addition and retention of each and every zero-carbon resource available to the region, including wind, solar, nuclear, hydropower and others. When challenges or delays impact one technology, the Commonwealth can stand ready with others to meet its long-term decarbonization goals efficiently, cost-effectively, and reliably.

Increasing the state's Clean Energy Standard for both new and existing clean energy resources is an effective way to value the environmental attributes of clean energy resources and support their development or continued operation. Working across state lines, particularly to preserve critical regional resources like Millstone, is another way to ensure Massachusetts and the broader New England region retain resources that contribute significant grid reliability, energy security, fuel diversity, price stability and emissions benefits to the New England power system.

Conclusion
Dominion Energy appreciates the opportunity to submit comments on EEA's proposed emissions limits and sector-specific sublimits for 2025 and 2030 and looks forward to further participation and collaboration on Massachusetts' decarbonization strategies.

Sincerely,

/s/ Mary Louise Nuara

Mary Louise "Weezie" Nuara
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ENVIRONMENTAL LEAGUE OF MASSACHUSETTS

Secretary Kathleen Theoharides
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

April 30, 2022

RE: EOEEA – Draft 2025 and 2030 Clean Energy and Climate Plan Recommendations

Dear Secretary Theoharides:

Thank you for the opportunity to comment on the 2025 and 2030 Clean Energy and Climate Plan (CECP). ELM very much appreciates the hard work and serious thought put into the plan by EEA staff and the additional but necessary work to revise the plan based on passage of the Next Generation Roadmap legislation. The task before us is herculean and we are proud that Massachusetts is taking the lead to put us on a trajectory to reach our mandates.

Generally, we agree with the core elements of the plan as presented in the first slide from the public meeting on April 14th. One note is the emphasis on cost-effectiveness/least cost. We, of course, agree that cost-effectiveness is important and should be considered. However, it raises the question of whether issues of cost are limiting the inclusion of actions that would enable us to reach our goals more quickly and equitably. Nowhere in the interim plan or the updated presentation is there a mention of the cost of not taking swift and wide-reaching action. We are already experiencing the impacts of climate change and there are documented, associated costs of these impacts along with projections of impacts and costs that could be included in the introduction to the plan. We understand in a plan of this nature, it is difficult, if not impossible, to include calculations of costs of inaction, but it bears a mention as we consider future actions.

We agree with comments made at the 4/29/22 IAC meeting that the recommendations of the Climate Justice working group should be prominent and specific in the plan. For instance, if we are calling for electrification of buses, buses that serve EJ communities should be electrified first so those communities that have borne and continue to bear disproportionate burdens are first in line for benefits from the transition to a clean energy economy.

We were pleased to hear at the IAC meeting that EEA is working closely with MassDOT on ways to best use state capital dollars and federal dollars to help us achieve our GHG reduction targets. It is critical that both the formula dollars and those being made available through competitive grant programs for transportation projects be used to move us closer to our climate commitments. More broadly, we would urge that no state dollars be invested in projects that will set us back as we work to meet our climate mandates.

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Transportation Sector

We appreciate EEA responding to comments on the interim plan that there were insufficient actions related to transit and to removing existing barriers to EV adoption. In particular, the point-of-sale EV rebate is an important addition as are programs to electrify school bus fleets.

We fully supported the Housing Choice provisions passed last session and appreciate the administration tying state funding to implementation of the zoning requirements for multifamily zones near transit. We also are pleased to see the emphasis on EV charging infrastructure in the updated plan. What remains missing is any mention of transit expansion. We note that the MBTA just announced a significant increase in service across the bus network including new bus routes and more frequent service on existing routes. This is welcome news; however, additional transit expansion is necessary to encourage mode shift. We understand that in the time frame for the plan, it is unlikely that we will see significant new expansions, but this plan is also meant to set us up for meeting our 2050 targets and so the omission of transit expansion or electrification of transit is of concern.

We also note the absence of smart roadway pricing that can both encourage mode shift and non-peak hour travel as well as raise revenue to support transit expansion or other policies to reduce emissions from the transportation sector. This is a proven approach to reducing congestion and commute times and can be more quickly instituted than many other transportation policies. We encourage its inclusion in the plan.

Finally, we note the inclusion in the interim plan of a VMT reduction goal related to "Massachusetts Rideshare Regulation (310 CMR 7.16), which requires certain facilities to implement and maintain measures designed to achieve a non-binding goal of reducing single-occupancy vehicle (SOV) commutes by 25% and annual reports detailing steps taken to achieve that goal." ELM recommends setting a broader VMT reduction goal that would complement the emphasis on EVs and electrification and help us measure progress. In a similar vein, we recommend the CECP include more specific recommendations for promoting active transportation such as biking and walking. While the GHG reduction benefits might not be as significant as EV adoption, the co-benefits in terms of improved health and reduced congestion are important. A recent survey conducted for MassDOT, indicated that 61% of car trips are three miles or less. A goal for expansion of safe biking and walking in the plan would promote these options.

Building Sector

We look forward to the recommendations from the Clean Heat Commission and hope they will be incorporated into the plan. We strongly support a declining cap on building heat emissions included in the update along with a Clean Heat Standard by 2024.

In past years, ELM has been the primary proponent of legislation that would establish a home energy rating system so homebuyers would have information about the energy efficiency of a home prior to purchase. We continue to support giving homebuyers that information so they can make informed decisions and because we believe it could drive sellers to make efficiency investments prior to putting a home on the market. In addition, we would urge a specific recommendation about making existing and new school buildings all electric. From a "leading

by example" and public health perspective, and given the millions of dollars the Commonwealth makes available to municipalities through the Mass School Building Authority every year, a focus on school buildings can help us reduce emissions and serve as pilots throughout the state showcasing the benefits of building electrification. Additionally, school building siting is important. The MSBA should incentivize building schools in locations that promote walking to school rather than driving. Finally, as you have heard in response to the draft net zero stretch code, we would strongly urge a ban on fossil fuel hook-ups as part of the plan and in the final version of the code.

Electricity Sector

ELM has been a leading proponent for responsibly developed Offshore Wind and we support the increased procurement target included in the Senate's recently passed climate bill. We would recommend a more ambitious Clean Energy Standard and solar development target and inclusion of a clean storage mandate of 5000 MWH by 2024.

While the slide for the electricity sector includes mention of equity in siting, we have not seen specific CECP language. This is an opportunity for the plan to explicitly acknowledge that siting new electric infrastructure cannot further burden Environmental Justice (EJ) communities and the need for Energy Facilities Siting Board reforms both in process and substance. These reforms should include consideration of cumulative impacts, inclusion on the board of a representative of an EJ community, and expanded and earlier community outreach.

Natural and Working Lands

We fully support the additions to the interim CECP for natural and working lands. That said, we would urge the final plan to include more robust land protection targets per the letter submitted by The Nature Conservancy. We agree with TNC that NWL policies should be on a par with other policy approaches included in the CECP and there should be specific sequestration and emissions reductions goals set for this sector. Land protection can be a relatively cost-effective approach to achieving carbon emission reductions with very significant co-benefits. These include wildlife habitat, flood and coastal protection, ameliorating heat island effect in urban areas, protecting local food production, etc. In addition, protected lands contribute to our tourism and recreation economy and as we have seen during the pandemic, provided invaluable and safe places for residents to visit – with both physical and mental health benefits.

Again, thank you for the opportunity to comment. We look forward to the release of the final plan.

Sincerely,

Nancy Goodman
VP for Policy

EVERSOURCE ENERGY

Comments on Draft Clean Energy & Climate Plan 2025 and 2030
Draft Limits, Sublimits and Policies

April 30, 2022

Submitted by:

William Akley, President, Gas Business

Craig Hallstrom, President, Regional Electric Operations (MA and CT)

EXECUTIVE SUMMARY

With the release of the April 2022 draft proposal for Clean Energy & Climate Plan for 2025 and 2030, the Commonwealth continues to demonstrate leadership in charting a path to a net zero carbon future. Eversource applauds the Baker Administration's efforts to work across all sectors to ensure access to safe, reliable energy at a reasonable cost. Energy remains a fundamental public necessity, critical to all facets of society and the economy, as well as health and security. Robust stakeholder engagement and a focus on equity remains critically important.

Eversource Energy is enabling the clean energy transition and is taking measures across many sectors of the economy to achieve the comprehensive carbon reductions laid out in this new draft plan, as well as in the previously published 2050 Roadmap. In particular, Eversource joins other stakeholders in supporting the higher level of focus on equity issues in the revised draft plan. As the Commonwealth works to transform the energy model for a clean energy future, ensuring that all affected stakeholders are included is paramount. The interests of all constituencies must be considered, including businesses, residential customers, low-income customers, and environmental justice communities.

Investment in energy infrastructure is also critical to delivering energy to homes and businesses in the Commonwealth, and enabling new sources of clean energy that are critical to achieving these short- and long-term targets. As the region's largest energy provider, Eversource has the responsibility for ensuring safety and reliability as the Commonwealth transitions to a cleaner energy future. Gas and electric system planning and coordination must be carefully considered as transportation and building heating sectors become increasingly electrified to achieve these goals.

In alignment with Eversource's 2021 comment letter, the transition to net-zero should be grounded in three principles:

> Transparency. Robust stakeholder engagement must continue, and competing interests must be balanced, to achieve the expected result. Critical choices will have impact on customer costs and convenience; the general public -- and utility customers -- should have a line of sight into the changes that will affect them and the associated costs benefits and how they have access to and can participate in the process.
>
> Feasibility. Adopted strategies should be feasible, meaning that the strategies, methods, and approach are reasonably achievable from a technical, financial, and logistical perspective, and reasonably affordable given the important goals at hand.
>
> Prioritization. The strategies, methods and approach should be prioritized so that the transformation of the energy delivery platform is accomplished without resulting in damaging disruption of the economy. An orderly, transparent transition is more likely to achieve the Commonwealth's climate goals with the greatest amount of public support for the adoption of changes.

COMMENTS OF EVERSOURCE ENERGY

Eversource provides the following specific comments on the April 2022 draft 2025 & 2030 CECP proposal:

Buildings Sector

Since the release of the last draft CECP and 2050 Roadmap, Eversource has made considerable progress working with stakeholders and Massachusetts LDCs to develop specific plans to decarbonize the heating sector. In particular, on March 18, 2022, Eversource submitted a near-term Operating Plan in D.P.U. 20-80 that includes recommendations and plans for assisting the Commonwealth in achieving its 2050 climate goals through the gas sector.

Decarbonization of Heating Sector

The Eversource Operating Plan submitted in D.P.U.20-80 directly supports many of the new draft 2025 and 2030 CECP proposed policies and targets.

Eversource supports the Administration's main tenets that describe metrics and performance reporting, enhanced customer outreach, workforce development and long-term utility planning, aligned with decarbonization while also balancing and mitigating consumer costs. As stated in Eversource's Operating Plan, coordinated gas and electric planning is key to furthering decarbonized solutions for customers that manage successful cost mitigation and execution deployment. This effort will allow the appropriate non-wires or non-pipeline analyses to be performed holistically based on critical factors such as existing building stock, customer mix and ability of the electric grid to handle additional load specific locations.

In alignment with the proposed 2025 and 2030 plan, Eversource is pursuing a hybrid electrification option, which moves customers to an air-source heat pump for primary thermal use while utilizing gas as a backup source for customers. Eversource is also actively pursuing targeted electrification, by providing customers with a natural gas alternative. In particular, Eversource is in the advanced stages of a networked geothermal project in Framingham, MA. Finally, for those customers or buildings that are difficult to electrify, Eversource supports decarbonized gas (e.g., renewable natural gas) as a way to efficiently and cost effectively decarbonize.

Eversource's networked geothermal pilot in Framingham, MA, has demonstrated that clear guidance and repeated customer outreach is necessary for customers and other stakeholders such as the community to understand and adopt decarbonized technologies. The pilot has also identified workforce development needs in order to offer this service to customers at the scale and speed required.

As stated in the Eversource Operations Plan, the most effective way to decarbonize the building sector is to offer customers choice to encourage adoption and minimize costs without sacrificing reliability or environmental benefits. Eversource continues to support a technology- agnostic approach that leverages its coordinated gas and electric planning to expeditiously achieve the Commonwealth's emissions reductions in the building sector.

In addition to these electrification efforts, Eversource has long experience working with residential, commercial, and industrial customers in reducing energy consumption and associated greenhouse gas emissions through the energy-efficiency programs administered by Eversource operating affiliates. Eversource operating affiliates in Massachusetts offer a wide array of energy-efficiency solutions for customers and has been a pioneer in developing innovative offerings such

as Passive House and Net Zero initiatives. In addition, through its 2022-2024 Energy Efficiency Plan recently approved by the Department, Eversource is offering unprecedented incentives for air-source heat pumps in an effort to remove financial barriers for this important electrification technology. Eversource expects to support significant heat pump installations from 2022-2024 and beyond. A key component of this success is the emphasis on finding the right solution for each customer.

Eversource supports the expanded definition of electric space heating in the new draft of the 2030 CECP to explicitly include hybrid heating solutions. The acceleration of the market for electric heating is likely to begin with customers transitioning a portion of their heating or cooling load to high efficiency heat pumps. Positive experience with initial installations can then lead customers to choose to complete electrification in future years.

Support of residential and commercial building electrification includes not only energy efficiency program incentives for customers, but also extensive work with manufacturers and distributors to ensure efficient products are available in the marketplace. Eversource is working with installers and HVAC companies to build out their capacity and ensure they have the skills needed to provide information and options to customers. We support the Commonwealth's focus on this area to ensure decarbonization targets can be met.

Weatherization

Weatherization remains a fundamental opportunity for reduction of greenhouse gas emissions. Eversource has helped weatherize more than 40,000 homes in the Commonwealth in just the last three years. Key focus areas moving forward include efforts to reach customer segments that have historically lower participation rates in weatherization, including renters, moderate income

customers and customers in environmental justice communities. Through enhanced incentives, streamlined processes and focused education and outreach, the energy efficiency program will reach greater numbers of customers over the next 3-year plan term. However, these customers often experience barriers that go beyond the realm of energy efficiency programming and to that end, the CECP should contemplate strategies such as making additional funding available for stricter code compliance/enforcement, additional funding for the remediation of pre-weatherization health and safety barriers such as asbestos or knob and tube wiring, and legislation that encourages landlords to undertake more energy efficiency upgrades in rental units.

The Commercial sector represents an incredibly diverse building stock and set of end uses. Traditional weatherization opportunities may or may not apply for commercial customers and buildings. It is critically important that programming and policy directives allow for customized review and solutions so commercial customers can learn about and identify the GHG reduction solutions that will best work for their business and their space.

Eversource recognizes the importance of partnering weatherization opportunities with heating electrification to optimize energy use in a home or building. Enhanced incentives and continued focus on both customer and contractor education will drive customers to undertake both weatherization and electrification. It is important to note, however, that customers may have immediate needs that impact their ability to plan for future projects. Eversource will offer opportunities to identify projects of interest that are feasible for each customer and be ready to support their continued engagement.

As with any multi-faceted effort, partners and stakeholders must work together to minimize duplication of efforts and guard against generating customer confusion that may impede achieving

the goals of the CECP and the Commonwealth. For example, though they do not in and of themselves result in claimable energy savings, Eversource has participated in a multi-year review of home energy scorecard offerings and has included a scorecard for residential customers as part of the 2022-2024 Plan. Build out of scorecard offerings in municipalities as proposed in the CECP should be coordinated in order to ensure consistency, and funding should be identified for additional efforts.

The MassSave® programs currently focus on reduction of MMBtu from all fuel types in order to maximize GHG reductions. The CECP recommendation to develop an "Energy Transition approach to enhance MassSave®" needs to be further defined. Eversource would value any opportunity to participate in discussions with policy makers and regulators regarding potential changes to the overall approach or goals of the MassSave® programs. Program delivery and marketplace transition benefit from stable policy and advanced planning in order to ensure the contractor capacity and customer education and awareness needed to achieve goals.

Eversource is supportive of the daft 2025 and 2030 CECP's building envelope improvement targets. Although these targets are ambitious, the market for these services has been well established through the efforts of MassSave® Program Administrators over the last decade. Ensuring that the existing building stock is as efficient, safe, and comfortable as possible is an absolute priority for Eversource. Eversource is confident that the substantial experience it has gained to date can be leveraged to expand these efforts and accelerate the pace of weatherization over the next decade.

Transportation Sector

The Commonwealth has laid out robust and aggressive transportation goals in the 2025 and

2030 CECP proposal, particularly in relation to accelerated electrification of light, medium and heavy-duty vehicles in order to achieve the aggressive reductions needed in this sector short and long term. These new draft goals and strategies continue to align with Eversource's mission to be a catalyst for clean energy by promoting EV adoption, investing in EV infrastructure, and developing solutions to deliver an increased electric load. Many of the specific proposals in the draft CECP are reflected in Eversource's proposed expansion of incentives to support electric vehicle infrastructure and EV adoption in D.P.U. 21-90, which prioritizes the continued deployment of public light duty charging infrastructure, development of a residential charging program, the introduction of a medium and heavy-duty charging program, and pilot programs focused on e-mobility solutions for hard-to-reach customer segments.

Through successful implementation of its EV infrastructure and EV adoption programs, Eversource has demonstrated the ability to enable many of the transportation electrification solutions. The 2025 and 2030 CECP strategies establish a framework to pursue further opportunities and execute programs to expand public charging networks for light duty vehicles, while also acknowledging the significance of an increased focus on residential charging infrastructure programs as laid out in the new draft plan, including load-shifting solutions.

Eversource recognizes that the 2025 and 2030 CECP develops specific strategies and goals for medium and heavy-duty fleets with practical challenges in mind. As Eversource works with customers on these deployments, significant load increases in the medium- to longer-term will require load-shifting, resiliency, and redundancy strategies. Long-term system planning for transit and other large fleet deployment will become critical as fleet

electrification accelerates.

Eversource is supportive of these transportation electrification strategies in the 2025 and 2030 CECP, including encouraging development of a rate that supports initially low load factor DC Fast Charger installations, as proposed in D.P.U. 21-90; the further development and expansion of load-shifting solutions (including managed charging); and development of fleet advisory engagement services and pilots for medium and heavy-duty fleets.

Eversource applauds the continued emphasis on equity in achieving these goals and will continue to work with stakeholders to find solutions to meet the needs of all customers.

Finally, Eversource appreciates the inclusion of specific new targets for charging infrastructure required to support the level of EV adoption necessary to meet the Commonwealth's goals, and the quantification of the goal for the number of medium and heavy-duty vehicles on the road by 2030 outlined in the recent draft plan.

Electricity Sector

Eversource is committed to helping meet the electric sector targets for 2025 and 2030 proposed in the draft plan, but close collaboration and coordination between Eversource and key Commonwealth, regional and federal stakeholders, as well as interconnecting customers, will be required. Eversource is prepared to actively engage in the 2024 comprehensive planning process.

Eversource recently demonstrated successful design and commercial arrangements to enable interconnection of Vineyard Wind 1 and Vineyard Wind 2 (Park City Wind). The latter project, in particular, required an innovative co-optimized design that ensured achievement of multiple benefits to customers. Eversource is now preparing for the next tranche of Off-Shore Wind interconnections on the Cape (Cluster 1). Completion of such investments in an expedited manner

will enable 2,800 MWs of Off-Shore Wind off the coast of Cape Cod, in addition to over 2,200 MW of interconnection at other locations in MA and RI.

Beyond these, Eversource is prepared to further support cost-effective offshore wind projects needed to meet CECP targets. Successful execution is reliant on the support of key stakeholders and close collaboration from interconnection developers.

In addition to supporting further offshore wind development, Eversource is committed to enabling the interconnection of clean resources while maintaining system reliability and resiliency. To that end, Eversource is actively participating in the DPU's investigation in D.P.U. 20-75, which is exploring ways to reform system planning for distributed generation interconnection, and new methods of cost allocation to build out the distribution and transmission system more proactively while accommodating significant growth of solar in the near term. Successfully following through on the comprehensive policies to address system investments will be critical to meet the 2030 CECP goal of facilitating a path for an additional 2 GW of new distributed generation between 2025 and 2030. To better inform and facilitate comprehensive system planning for future distributed generation, the CECP should consider more granular annual deployment targets within the five-year 2 GW target.

Regarding clean energy supply, Eversource agrees that offshore wind and solar will play a key role in transforming the supply mix and Eversource is committed to supporting procurements as needed, in particular to ensure that the resources being procured are fully deliverable, provide all needed attributes, and will result in safe and reliable interconnections. Eversource also believes that in addition to intermittent renewable resources, there must be greater focus given to dispatchable clean energy resources including hydropower.

There are two additional factors that Eversource believes will determine success in achieving emission targets during this clean energy transition. In the near term, without a sizable alternative and clean technology that is available on demand for a sustained period of time, the region relies on carbon intense fossil fuels for electric reliability. Geopolitical developments put further pressure on competitive markets' ability to procure the necessary fuel thereby requiring regional and federal cooperation in supporting clean energy development. Until cleaner and controllable alternative electricity sources are developed in New England, regional power sector emissions will continue to spike during winter cold snaps. Growing demand for electricity from economic growth and demographic trends, in addition to electrification of transportation and building energy use, increases the need to develop cleaner alternatives.

Finally, while committed to meeting the CECP targets, stakeholders need to consider the overall costs to Massachusetts' customers and businesses to ensure that affordability is part of the equation.

The Commonwealth's transportation and heating electrification commitments will be challenging to meet if clean energy policies continue to be funded through electric ratepayer bills. Eversource encourages the administration to explore alternative mechanisms for funding renewable energy in the Commonwealth that do not raise electric and gas rates such as customer access fees, state grants, tax credits and bond financing.

Non-Energy & Industrial Sector

Eversource maintains that the Gas System Enhancement Plans remain critical to gas distribution system safety and reliability for customers. In addition, Eversource and the other gas utilities must maintain compliance with federal regulations, and the Gas System Enhancement Plans facilitate this compliance.

Eversource agrees with the maintenance and use of the anaerobic digestors and sees potential with any biogas or renewable natural gas produced for use specifically for hard to electrify customers on the gas distribution system. This philosophy aligns with the Eversource Operating Plan submitted in the D.P.U. 20-80 docket this past March.

Natural and Working Lands

Eversource values its role as an environmental steward, including in our Rights of Way as well as tens of thousands of acres of land we manage and preserve. To ensure a safe and reliable electric system for our customers, especially in the face of severe weather created by climate change, our Vegetation Management Program focuses on reducing the number of tree-fall risks and creates a sustainable environment comprised of vegetation that can safely coexist with our transmission infrastructure. This requires a balance between the environmental benefit that trees provide with the responsibility to deliver safe and reliable power. For energy infrastructure projects, the balance of clean energy benefits should be carefully considered with loss of carbon sequestration. In addition, to achieve the aggressive decarbonization targets laid out in the draft CECP and 2050 roadmap, supportive energy infrastructure is needed. We encourage the Commonwealth to consider these factors when evaluating MEPA thresholds.

Equity Considerations

The Commonwealth's 2050 Decarbonization Roadmap recognizes the possibility of negative equity-related effects as the system transitions, with customers migrating to electricity, and the resulting fairness implications for residual cost recovery. Without good program designs, and a balance of programs (providing multiple options for customers to participate in), it is possible that

residual gas system costs will rise, and that these costs become concentrated within residential rate classes. Equity concerns also involve matters of program participation, program outreach efforts (such as disseminating program information as part of program marketing and awareness), to address local community impacts that may arise due to the transition, and workforce development. Eversource shares the Commonwealth's goal to ensure that environmental justice principles are properly incorporated in decision making. The Company supports substantially increasing protections for environmental justice communities across Massachusetts. We see a bright future for the clean energy transition, and we know that our commitment to embracing that transition in a way that serves the interests of our communities is crucial. Eversource remains committed to continuously adapting and enhancing the effectiveness of our communications with underserved and environmental justice communities. Eversource has formed a Pro-Equity Advisory Team ("PEAT") to help drive additional innovation into its EJ and equity planning and implementation. The Company fully appreciates the importance and role that open and responsive channels of communication play to ensure all customers and communities feel informed, educated on our efforts and projects, and know how to engage in the process. As part of this vision, our obligation to provide safe, reliable electric service to all residents in the Commonwealth will become extraordinarily important as customers shift to even greater reliance on clean energy and the electric grid.

Meeting Equity and Environmental Justice priorities will also require close focus on the way programs are structured and paid for. Attention is needed in how decarbonization costs flow thru customer rates, particularly as customers depart the gas system as they opt for electric service options. Addressing these concerns will require that programs are balanced in their consideration around both economic efficiency and fairness (i.e., equity). For example, multi-tenant customers

should have the same levels of access as other Eversource customers to climate programs. This is one reason Eversource is proposing many types of available decarbonization programs, improving the range of options for all its customers.

Conclusion

Eversource is prepared to innovate and actively advance the effort to achieve a net zero energy delivery platform in the Commonwealth, and has committed to continued collaboration with stakeholders to develop plans to achieve the Commonwealth's short- and long- term goals. The comments and recommendations put forth herein are intended to enable progress and to assure that the interests of all constituencies, including individual customers, are diligently considered throughout in terms of transparency, feasibility, and priority.

Clean Energy and Climate Plan for 2025 and 2030
Comments

April 29, 2022

Ms. Kathleen Theoharides, Secretary
Mass. Executive Office of Energy and
Environmental Affairs
Commonwealth of Massachusetts

Secretary Theoharides and the Roadmap Team,

After attending numerous Roadmap meetings and submitting comments over the past 3 years, I would like to add this final observation. I believe most sections of the Climate Plan for 2025 and 2030 are thoughtful and well conceived but the approach in the Natural and Working Lands chapter is completely off base and, I believe, has been derailed by outside interests. As you know, we are in a climate emergency with little time left to address it. Forests are one of the most important tools available as they sequester up to 20% of our carbon emissions (despite claims in the plan that it is much lower). The first priority of the Roadmap plan should be to strictly protect our state's public, carbon-dense forests but this has not been done. In fact, if the Plan wanted to be bold and a national leader on climate, it would designate our public state forests as a carbon sink where no logging would be allowed. Now that would really start bringing down emissions.

The following three areas in the Natural and Working Lands section are particularly troubling when evaluating a long term climate policy.

A. Solar Array Siting – As many of us know, the ongoing construction of large commercial solar arrays has been devastating the forests of Central Massachusetts. Based on this, the Roadmap should be making strong provisions against the use of forested lands for this purpose. Instead, though, under the heading of "Forest Protection", the authors presented a "solar screening tool" that helps identify categories of land but offers no

means of protection for wooded areas. When I asked how the tool would protect forests, I was told that the decision of where to site the arrays would be made by a board whose makeup was unknown. My fear is that the screening tool would only make it easier for developers to identify wooded lands.

B. Forest Management on Public Lands – Including this practice in a long term climate policy is damaging and short sighted. It is well known in the scientific community that the most carbon storage can be achieved by leaving forests unmanaged. Disturbances from logging and its associated machinery reduces sequestration and disrupts ecosystems. As New England has a low incidence of forest fires due to a relatively moist climate, forest management cannot be justified on this account, either. At this point in the climate crisis, we should not be interfering with the maximization of carbon storage. I realize that this is a tough, contentious issue with the logging industry but <u>public</u> forests need to be set aside for sequestration, water protection, soil retention, wildlife habitat and recreation. Private lands can be available for timber harvesting.

C. Wood Products – Given that forests need maximum protection in any effective climate plan, why is the topic of wood products even mentioned in the Roadmap plan? Our society's use of wood products needs to be reduced rather than promoted as in the Roadmap! The Plan's concept of advocating the construction of 12+ story all-wood buildings using cross laminated timber (CLT) is irresponsible when faced with our current climate crisis. What will people think in 20 years when they hear, we cut down our carbon sink to build 12 story wood buildings – it is madness.

   When I asked at a public hearing why wood products were in the Plan, I was told it was a way to store carbon. The science says about 17% of carbon from the original tree is stored in a wood product. When a standing tree stores 100% and continues storing carbon over a long period, why would you go with 17% and eliminate future sequestration? I have observed over

time the slow infiltration of the CLT industry (the New England Forestry Foundation probably) into the Roadmap plan. Each new draft seemed to highlight this technology more and more. Clearly, there was some unseen influence here. The promotion of wood products has no place in the Clean Energy and Climate Plan.

In conclusion, most of the Climate Plan has vision and appropriate measures for future climate action but not the section on Natural and Working Lands. This section falls far short of where we need to be in protecting our public forests for the all important job of carbon sequestration. The Plan lacks protections for forests against solar array siting, as well as forest "management" practices which degrade forest health and reduces carbon storage. Finally, the Plan actually promotes the significantly increased use of wood products and CLT at exactly the moment when we need to reduce wood usage in order to save trees for carbon sequestration. This section of the plan does not reduce emissions or address climate change as it should. I hope the Natural and Working Lands section of the Roadmap will be reworked so it stipulates strong, scientifically proven means of protecting Massachusetts' carbon sink for future generations. Anything else sells this Plan short.

Respectfully,
Susan Purser
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susanbythesea6696@hotmail.com

cc: Maura Healey, Attorney General
Sonia Chang-Diaz, State Senator
Adam Hines, State Senator
Eric Lesser, State Senator
Smitty Pignatelli, State Representative
Elizabeth Warren, US Senator
Edward Markey, US Senator
Richard Neal, US Representative

April 29, 2022

FirstLight Power Comments in Response to Massachusetts Draft Clean Energy and Climate Plan for 2030

Company Overview

FirstLight Power is a leading clean power producer, developer and energy storage company serving North America. The company is also a steward of more than 14,000 acres and hundreds of miles of shoreline along some of our most beautiful rivers and lakes.

For decades, our renewable assets have been delivering clean, safe, reliable electricity to serve our communities. To meet the demand for clean energy as states and provinces transition away from fossil fuels, FirstLight has advanced our mission and swiftly expanded our portfolio to include solar, battery storage and investments in offshore wind – in addition to our legacy pumped-hydro and hydroelectric assets. Building upon our industry-leading experience in operating large-scale renewable energy and storage assets, FirstLight's vision and commitment to leading the energy industry transformation makes us uniquely positioned to navigate rapidly evolving market conditions and grow our portfolio in New England and other US markets in the years ahead.

FirstLight's hydropower facilities in New England produce over 690,000 MWh of emissions-free generation, reducing the region's carbon footprint by more than 780,000 tons annually. In addition to our conventional and run-of-river hydro facilities, we also own and operate the 1168 MW Northfield Mountain pumped hydro storage station and 29 MW Rocky River pumped hydro storage station, respectively the largest and third largest energy storage facilities in New England, 2 MW of solar PV, and 1.5 MW of behind-the-meter battery storage in Massachusetts. Our facilities represent over a billion dollars of private investment in the region, employ 130 people, and support our communities in Massachusetts with more than $15 million in local property taxes every year.

General comments on the Draft Clean Energy and Climate Plan (CECP) for 2030

We appreciate the Executive Office of Energy and Environmental Affairs (EEA) efforts to continue this process to craft an ambitious vision to accelerate the transition to a clean energy future in the Commonwealth. FirstLight supports the proposed emissions reduction target of 50% reduction below the 1990 emissions level in 2030 and the longer-term goal of net zero emission by 2050. The urgency and scale of the changes needed to achieve those targets requires a continued aggressive push for clean energy generation and energy storage and that Massachusetts must be aggressive in pushing the full range of solutions, including clean energy supply, demand-side reductions, flexible storage options and grid infrastructure to deliver reliable, clean power. FirstLight believes that energy storage and existing clean energy resources will play a crucial role in achieving this goal.

FirstLight also supports the EEA's interest in addressing carbon emissions in other sectors outside of the electricity sector. We believe that to fully decarbonize the economy it is critical to implement strategies to electrify these sectors, particularly the transportation and building sectors. This will necessitate additional strategies in the electric sector to compensate for the inevitable increase in electric demand; however, it is not possible to fully decarbonize without mitigating emissions across all sectors.

Energy storage provides a number of benefits to the electric grid, including moving clean energy to meet peak demand, mitigating greenhouse gas emissions, improving reliability, addressing system resiliency. The need for energy storage in a decarbonized system is widely recognized throughout New England, and Massachusetts will benefit in terms of jobs and infrastructure in developing programs to develop storage projects throughout the state. While these benefits are generally reflected in the CECP, FirstLight offers the following comments to suggest further refinements to Massachusetts' efforts to accelerate clean energy progress by better leveraging the contributions of multiple types of clean generation and storage resources.

Optimizing the use of existing in-state resources can accelerate carbon reductions in the short-term.

Policies that accelerate near-term carbon reduction are an important part of the overall strategy to fully decarbonize in the long-term. What happens in the next 10 years is critical to our eventual success. One way to achieve this is by utilizing existing clean energy resources differently than they currently deployed.

Existing storage resources, such as FirstLight's Northfield Mountain (an 1168-megawatt zero-emissions, fast-dispatch, nearly 8-hour duration energy storage asset) provide significant additional benefits that could be unlocked with a time-differentiated compensation signal. While existing pumped hydro currently provides substantial contributions in the wholesale energy market, they can do much more. For example, Northfield Mountain, New England's largest energy storage facility operates at approximately 25% of its overall throughput capability on an annual basis. The simplest explanation for this underutilization is that the ISO-NE energy market was never designed to reflect the carbon reduction opportunities that can be

achieved by moving clean energy at the time of renewable generation to a later time when it can have even greater success in curbing emissions.

The potential additional value that can be unlocked by better leveraging this large-scale facility is compelling. In a study published by Energyzt, LLC in June 2020, the firm concluded that operating just two of Northfield Mountain's four units more frequently would produce over $410 million in consumer savings between 2022 and 2030.[1] Additionally the same regimen would reduce carbon emissions by an average of 180,000 metric tonnes annually.[2] These values do not account for an increased use of the other pumped hydro facilities located in New England. Absent a well-designed market structure (e.g., FCEM with delivery time-differentiated value), the existing large-scale pumped hydro facilities will remain underutilized and the value opportunities they present will not be realized[3].

Increased dispatch of pumped-hydro storage is a key strategy to realizing the goals of the Roadmap The Commonwealth has these clean energy resources now, ready to meet its 2030 goals – over 1800 MW of carbon-free grid-connected energy storage that is underutilized in the current market.

Enable and incentivize the pairing offshore wind procurements with at-scale storage procurements

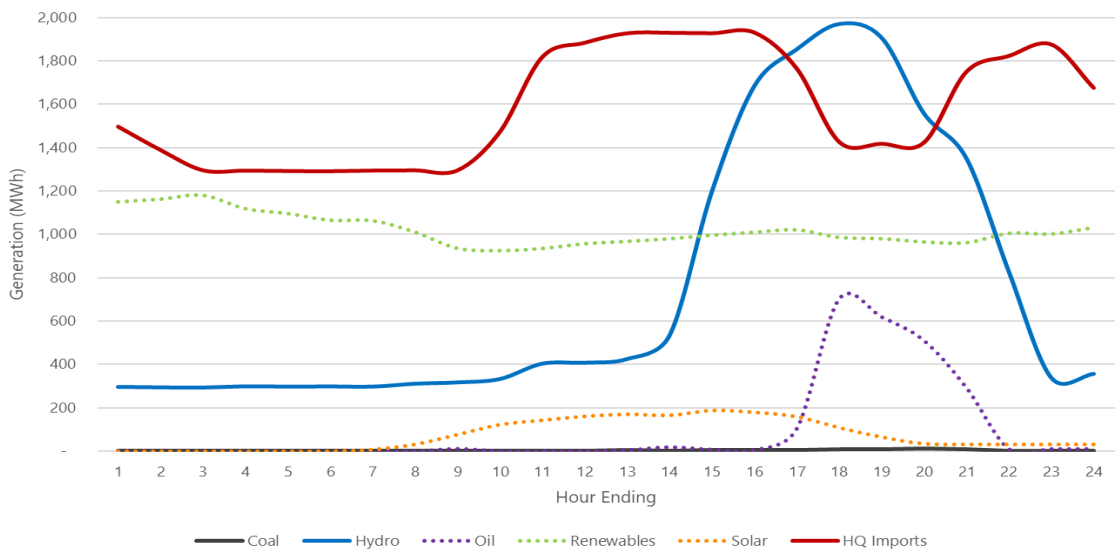
FirstLight applauds the Baker-Polito Administration's ambition to develop a mature offshore wind industry in Massachusetts. However, in order to maximize the value of every clean electron, we recommend that Massachusetts use existing grid-connected energy storage, enabling the Commonwealth to deliver offshore wind when the system needs it, not just when the wind is blowing. The scale of New England's offshore wind programs demands similarly sized flexible storage solutions.

The Massachusetts 2050 Decarbonization Roadmap notes, *"to affordably and reliably operate an electricity grid based on variable renewable generation, a balanced portfolio of clean generation technologies shared across a broad geographical region is need. Together with offshore wind power, the Commonwealth needs a similarly large volume of solar generation….additional energy storage, and several new high-voltage transmission lines…"* [4]

[1] Energyzt, LLC, *Northfield Mountain Pumped Storage: Assessment of Contract Benefits in an Increasingly Renewable Region* (June 2020), 35.
[2] Ibid. 34.
[3] Recently filed legislation by Massachusetts Representative Thomas Golden (HD. 3292) and Senator Julian Cyr (SD 1687) would establish a process by which the Commonwealth would leverage bilateral contracts to develop new large-scale energy storage and ensure that existing large-scale energy storage will be dispatched in coordination with large-scale renewable resources to capture environmental and economic value. These bills may serve as a model strategy to capture the States goals in the near-term while market reforms are under construction.
[4] *Massachusetts 2050 Decarbonization Roadmap, p. 23*

Without specific requirements or pricing incentives to maximize on-peak production, offshore wind generators will simply dispatch as their wind resource allows, bypassing a unique opportunity for efficient hybrid operation of wind generation and improved use of existing storage solutions to optimize delivery of that generation. As noted above, the Commonwealth has these resources now, ready to meet its 2030 goals – over 1800 MW of carbon-free grid-connected energy storage that is underutilized in the current market.

Example: Pumped storage can provide zero-emissions peaking: On July 27, 2020, imports from Hydro-Quebec dropped due to a heat wave, and pumped storage in Massachusetts was able to serve as many as 797,000 homes over the period while attenuating the impact of high emission peakers such as oil. Intermittent resources were unavailable during this period.



On this day, Northfield Mountain generated ~5,500MWhs, and averaged an additional ~3,400MWhs of generation per day throughout the weeklong heat wave.

Local based, existing clean energy resources like conventional hydropower must also be part of the solution.

Locally based hydropower resources, particularly those located Massachusetts, should be as much a part of the solution as imported resources like Canadian hydro. In addition to providing zero-emissions generation, local conventional hydropower assets offset peak demand, provide ramping, regulation, and other ancillary services within Massachusetts load zones, and help to improve summer and winter peak reliability. Pairing energy storage with flexible generation such as hydropower will substantially contribute to additional system reliability, particularly during summer and winter peaks.

While imported hydro resources are important additions to the system, supporting and maintaining locally sourced resources provides a number of additional benefits to Massachusetts that are not often considered, including local jobs and taxes. Critically locally based hydropower is not restricted by contractual limitations to other governments and offers substantially lower risk of transmission interruptions, like those referenced in the example above.

We recommend that DOER consider policies that would enable the Commonwealth to capture the additional value that storage paired with local hydropower resources can provide. In particular, the current limit on eligibility for clean peak credits to Tier 1 resources, rather than technologies like existing hydro that are recognized in the CES-E tier, reduces the incentive for clean power resources to deliver at times when they could contribute substantially to reduce state-wide and regional emissions.

The CES program should be expanded to allow the participation of all in-state clean energy resources regardless of vintage or historical participation in other state programs.

FirstLight recommends the expansion of the CES program, particularly the expansion of the CES-E program. The program wisely acknowledges the value that existing clean energy resources bring to the region, a critical component left out of the original Clean Energy Standard program. Ideally, the CES should create an environment that fosters the continued success of new and existing clean energy resources, both of which are necessary to attain Massachusetts' carbon reduction goals. Given Massachusetts' ambitious statutory goals, the Commonwealth will need as many clean energy resources as it can develop and maintain.

Unfortunately, the program unnecessarily limited the participation of numerous existing resources, including those that are physically located in Massachusetts but have previously participated in other jurisdictions programs out of necessity. Massachusetts has historically excluded existing clean energy resources from participating in the RPS and other renewable programs through vintage requirements. In past years, other states have captured the environmental attributes of Massachusetts-based clean energy resources simply because asset operators have had no recourse within the Commonwealth.

From a practical standpoint the current program maintains this dynamic, which serves to slow the attainment of the Commonwealth's environmental goals and leads to higher costs to Massachusetts ratepayers than is necessary. If the CES program allowed existing clean energy resources to participate regardless of historical participation in other jurisdictions' programs, it would appropriately realize the opportunity to claim these resources' environmental attributes and limit the need for an equal amount of newly built renewable resources, which far exceed the cost of existing resources. Historical benefits do not necessarily equate to future value.

Alternatively, in-region resources may be forced to look outside New England to find markets that fairly compensate these resources. New York in particular is moving aggressively to meet near-term electric-sector renewable goals (70% renewable energy by 2030 is required under New York law) and existing hydro, wind and solar resources in New England may very likely seek to export to the NY market if they are left out of clean energy compensation programs. Whether by retirement, deactivation, or exporting, Massachusetts is not well served to erode the baseline of existing zero-emissions resources, which only increases the challenge of meeting the ambitious goals of the Commonwealth.[5]

Massachusetts should consider eliminating the proposed restriction on Massachusetts based assets, as those resources represent a significant amount of greenhouse gas emission (GHG) free generation that provide additional ancillary benefits to Massachusetts residents in the form of jobs and tax revenue. Maintaining these resources should be an additional priority of the CES program.

The state's current RPS is comprised of a complex list of technology-specific incentives that date back to a time when renewable resources were limited and there were very few available commercial technologies. The Commonwealth should consider revising the RPS to harmonize with the CES' technology-neutral approach, an approach that is also being adopted successfully in other states, to create opportunities for the most cost-efficient and innovative resources to be deployed.

Market structure changes as part of a regional decarbonization strategy will accelerate progress most cost-effectively.

Beyond the CECP, we congratulate the Baker-Polito Administration for its leadership role in the New England Energy Vision effort to reform regional energy markets to find least-cost way to accommodate regional decarbonization goals. Several regional solutions are key to this effort.

The New England States have each approached resource planning by leveraging reports that not only detail decarbonizing the generation sector but also critically how best to move decarbonized electricity to where the supply is needed most. Transmission is a critical component to grid resiliency and reliability, but it is not the only solution available. As we have

[55] This pattern has already been observed in states (including Connecticut in New England) that were forced to support existing nuclear facilities with long-term contracts to maintain their zero-emissions generation. The New York experience illustrates the progression directly—first New York sought to support nuclear facilities with zero emissions credit contracts, and then more recently has issued an RFP for existing wind and hydro resources to participation to avoid risk that those resources would export to PJM or NE ISO. See https://www.governor.ny.gov/news/governor-cuomo-announces-new-competitive-program-retain-new-yorks-existing-renewable-energy. Now New England will face a similar risk if existing renewables are left out of the solution.

seen throughout New England, it can be incredibly difficult to site and build new transmission anywhere in the region. It is also costly to do so, necessitating a more holistic approach to grid planning and buildout. Energy storage, particularly targeted grid scale storage, can serve as a less costly and more easily sited alternative to some transmission buildout.

Storage offers fewer siting challenges than miles-long transmission corridors and can be situated in critical areas for resiliency and reliability purposes. Its flexibility offers a range of value to the localized grid; including reducing peak demand, congestion management, renewable integration, curtailment management, resiliency improvements, and decreasing carbon emissions. We recommend the Commonwealth consider leveraging grid-scale energy storage as an alternative to some transmission development.

The retirement of obsolete fossil resources needs to be addressed.

While it is important that the New England states continue to focus on the necessary buildout of transmission and storage alternatives, the region must also consider the value that may be obtained from retiring obsolete resources currently occupying critical locations on the grid. Ideally, the retirement of resources that operate infrequently yet maintain valuable interconnections on the grid will free those locations up to be redeveloped by renewable resources and energy storage.

With the New England states appropriately focused on achieving market-based clean energy entry to meet their goals, it is also important to assure that the ISO-NE market has efficient retirement signals. Improving market entry without assuring efficient market exit will ultimately prove unhelpful to the fleet of clean energy resources (because prices will remain depressed and undercompensate clean energy resources) as well as undermine the needed backstop and balancing fleet of other resources.

This concern is not hypothetical—the existing wholesale capacity markets actually discourage rarely used resources to retire once they reach that point of obsolescence. Absent an effective retirement signal, such obsolete resources are encouraged to remain in the Forward Capacity Market (FCM) to collect capacity payments in exchange for providing very little system value, which is the current state of affairs. Most of these older units run on residual oil, and their technology is so inefficient and costly to operate that they run infrequently. These units receive revenue streams through the ISO-NE capacity market. There does not seem to be evidence that the Pay for Performance (PFP) program instituted by ISO-NE is affecting the retirement decisions of resources, as the region has seen minimal retirements since PFP has been in place. A review of the regional data reveals a similar story. For example, despite oil generators receiving 20% of capacity revenues in ISO-NE, they only supply 0.52% of energy on average. Coal's declining capacity is also reflected in generation declines to less than 0.1% of generation

in 2020, though it still receives 1.5% of the capacity revenues.2 By contrast, while renewables such as hydropower received up to 16% of capacity revenues, they provide 18.7% of energy on average.

The reality is that many obsolete resources are paid the same capacity payment as resources that are more actively employed, yet they may never be called on to provide any real value to the system or do any of the "work" to keep the system running. The current FCM design promotes this inefficiency, as the obsolete resources require little maintenance (due to little, if any, work required of them), pushing capacity prices below levels sustainable in the end by the marginal resources actively supporting the system. FirstLight recognizes that capacity payments and payments for energy production compensate different values. Nonetheless, it is undeniable that the mismatch in capacity payments and production noted above are not effectively channeling scarce electric ratepayer funds to the resources we need and instead channeling funds to the least desired resources.

Restoring a meaningful retirement signal is fundamental to efficiently achieving state policy goals, including properly planning, siting, and developing transmission infrastructure. Encouraging obsolete resource retirement will free valuable, underutilized, interconnection space for new clean energy and energy storage projects. Making this existing infrastructure available to clean energy resources will minimize the amount of new investment in transmission and other grid upgrades, saving consumers money by more efficiently utilizing the existing system infrastructure.

In addition to helping reduce the need for some additional transmission resources, restoring meaningful retirement signals will also provide the following benefits:

- Encouraging resources presenting the highest cost energy options, which often correspond with the highest greenhouse gas emissions rates per megawatt-hour, to cease operation. Even if the capacity sale obligation does not lead too much, if any, economic dispatch of that high emissions rate power, the capacity supply obligation requires the resource to run at least two times per year to meet capacity market audit requirements.
- Many of New England's biggest sources of greenhouse gas emissions were sited close to environmental justice communities, disproportionately affecting those communities through their emissions. Replacing these resources with renewable assets and electric storage can provide economic benefits to communities in the form of new investment and property taxes.
- Market rules encouraging efficient retirements will support the market outcomes that attract and retain the full set of resources needed to meet state policy, both the new

and existing clean energy resources and the back-up/balancing resources needed to integrate them.

Summary

The Roadmap highlights a number of pathways toward decarbonization, focusing primarily on new development required to achieve emissions reductions. Massachusetts should also consider the role that existing resources, deployed differently in the service of decarbonization, can play. As a leading provider of carbon-free generation in Massachusetts, FirstLight has a strong interest in developing energy storage projects here in the Commonwealth, particularly those that leverage our existing fleet of zero-carbon hydropower. FirstLight believes that both existing and new resources are needed to effectively mitigate the impacts of climate change. Existing storage and conventional hydro resources can be deployed in the service of new renewable integration and to help Massachusetts meet the its goals. Maintaining these existing resources and strategically deploying them to capture the additional value that they are capable of providing should be a priority of the Commonwealth.

FirstLight also encourages EEA to explore and implement strategies to decarbonize other sectors outside of the electricity sector.

Lastly, FirstLight recommends that Massachusetts adopt policies to assure efficient market exit for fossil generation, especially those situated a critical locations along the grid that could potentially offset the need for some transmission buildout.

Thank you for your consideration.

Sincerely,

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April 29, 2022

Dear Undersecretary Chang;

Thank you for this opportunity to provide comments on the 2025 and 2030 Clean Energy and Climate Plans (CECPs). Green Energy Consumers Alliance greatly appreciated the updates you gave to the public April 14 and 15, 2022, and the care EEA has taken to revise the 2030 and write a new CECP for 2025. Green Energy Consumers submitted comments on the draft 2030 CECP in February 2021 in addition to feedback on completing the 2025 and 2030 CECPs in October of last year. We stand by the recommendations we made then and, after receiving the updates from EEA earlier this month, respectfully submit the following comments for the transportation, buildings, and electricity sectors.

Cross-Cutting Issues

For all sectors, we request that EEA publish the modeling details of how it arrived at the emissions reductions estimates for each of the sectors and the impact of each of the suggested interventions. This information is key to assessing the feasibility and reach of each potential strategy. Secondly, while we support large-scale investments in clean energy, we suggest that it's time to increase the "R2" rate on electricity to reduce the energy burden that lower-income consumers are paying for energy.

Transportation

In our original comments on the first draft of the 2030 CECP released in December 2021, we urged the Commonwealth to think about transportation more comprehensively and incorporate expanded walking, biking, and public transit in the 2030 CECP with a specific focus on reducing vehicle miles traveled (VMT). We are heartened to see the new draft of the 2030 CECP include an explicit target of reducing VMT 7% by 2030. In addition, we called for a swifter transition to electric vehicles of all sizes and more supporting policies to support the acceleration of that transition. We appreciate the progress made on that front in this latest draft of the CECP and offer the following comments and recommendations.

A. **The 2025 transportation goals are achievable, but we need more specificity on the charging infrastructure goals.**

We believe the goal of having 200,000 EVs registered in Massachusetts by 2025 is doable with the supporting policies outlined. The combination of a global shift towards electric vehicles in manufacturers' model line-ups for the rest of this decade, the $100 million allocated for consumer EV incentives in the recently passed Senate climate bill (S.2819), and the influx of federal funding for the build-out of electric vehicle charging stations should help the Commonwealth meet a 2025 target of 200,000 EVs.

Notwithstanding our optimism about EV adoption, it must be acknowledged that there is significant uncertainty. For example, even if S.2819 is passed into law this year and $100 million is made available for EV purchase incentives, that sum would provide rebates for fewer than 30,000 light-duty, medium-duty, and heavy-duty vehicles.

On the charging infrastructure front, we think the goal of installing 15,000 ports for public and workplace Level II charging and DC Fast Charging stations is appropriate and feasible. It is important to note that the investor-owned utilities currently have dockets before the Department of Public Utilities (DPU) that would greatly expand the scope of the utilities' Make Ready programs. The DPU will likely issue orders on these dockets before the CECP is completed. National Grid and Eversource proposals together would support the installation of roughly 14,000 charging ports through 2025 by our calculations. Therefore, in finalizing the 2025 CECP, we recommend that EEA:

1. Incorporate projections of EVSE installations supported by utilities' Make Ready programs following the DPU's order.
2. Separate out targets for Level II installations from those of DCFC installations.
3. On DCFC, prioritize the deployment of future-proofed high-power stations of at least 150 kW. 50 kW stations are cheaper to install, but EV drivers increasingly expect high-powered fast-charging and as vehicle batteries get larger, 50 kW stations will be too slow.

B. The 2030 transportation goals are appropriately ambitious to meet the 50% greenhouse gas emissions reduction requirement, but the outlined policies are not sufficient to meet these targets.

We commend EEA for increasing the target number of EVs for 2030 from 750,000 in the first draft to 900,000. However, we do not think the listed policy interventions are sufficient to reach this level of EV adoption. Funding 900,000 EV purchase incentives is not possible and we are concerned that the other main policy tool – the adoption of California's Advanced Clean Cars II (ACCII) regulation – may result in fewer EVs than expected, as its predecessor, the Zero Emission Vehicle (ZEV) mandate, did. (The ZEV mandate was supposed to result in 300,000 EVs in Massachusetts by 2025. We are unlikely to meet that goal, as evidenced by the 2025 CECP itself setting a goal of just 200,000.) As a result, we suggest that EEA:

1. Set a more aggressive target to phase out the sale of new gas-powered cars by 2030 to align and catalyze state policy.

Many countries around the world are setting deadlines by which they will phase out the sale of new gas-powered cars. Massachusetts should follow the lead of Washington state, which recently set a non-binding target for 2030 in which all newly registered cars would be electric. Setting a similar goal would actually *support* the Commonwealth's adoption of ACCII by setting in motion the planning, policies, evaluation, and accountability required to increase EV adoption at the needed pace. Particularly, we see a great need for an inter-agency council responsible for coordinating EV policy, such as the one proposed in the recently passed Senate climate bill. Five agencies have significant roles to play as we shift away from the internal combustion engine: the Department of Energy Resources, Department of Environmental Protection, Department of Transportation, Massachusetts Clean Energy Center, and DPU all need to be aligned and working together if we are to reach our 2030 goal.

2. Weigh in on the value of an accurately-calculated off-peak rebate at the DPU and the legislature.

In our previously submitted comments, we commented on the power of a correctly-calculated off-peak charging rebate to incentivize EV adoption without subsidy and better balance demand and supply on our electric grid. We are glad to see "revised rate structures and time-varying rates" on the list of policy interventions. However, more specificity is in order. We recently asked the Applied Economics Clinic to calculate the benefits associated with off-peak charging and they produced a document, which we are submitting for the record, indicating that benefits add up to 10-14 cents per kilowatt-hour. An off-peak charging rebate of this size would make for a strong selling point to consumers and help to shift the load away from peak hours. Furthermore, tying the off-peak rebate to avoided costs ensures that the policy would be not be a cross-subsidy from non-participants.

The proposals submitted by the utilities in the aforementioned dockets at the DPU do not fully account for the benefits. We urge EEA to (a) recommend that the DPU approve time-varying rates that fully account for (i) avoided energy and capacity costs; (ii) avoided transmission costs; (iii) avoided distribution costs; (iv) improved grid reliability; (v) capacity benefits in the form of demand-induced price reduction effects; (vi) avoided greenhouse gas emissions; and (vii) public health benefits, and (b) communicate support for Amendment #85 to the Senate climate bill S.2819, which calls for time-varying rates with these elements as well.

3. Consider VMT reduction and the electrification of medium- and heavy-duty vehicles as core pillars of the plan.

As mentioned above, we are pleased to see an explicit goal of a 7% reduction in VMT by 2030 in the new version of the CECP as well as a recognition of the important of electrifying public transit and school buses in particular, especially given their outsized public health impacts. However, we are not confident that the policies proposed in the new plan for public transit, school buses, and VMT will be sufficiently funded to reduce transportation emissions enough by 2030. The lower cost of ownership over the lifetime of the vehicles justifies issuing bonds to fund electric vehicle procurement.

4. Identify sustainable and equitable revenue sources.

Across the board, transitioning vehicles of all kinds to EVs swiftly enough to meet our 2030 emissions reductions requirement will require targeted investments. In the absence of the Transportation & Climate Initiative (TCI), the 2030 CECP leaves this question of funding unanswered. We encourage EEA to identify sustainable and equitable revenue sources. At Green Energy Consumers Alliance, we support a modest fee on all new high-MSRP car registrations to fund incentives targeted to EVs selling for less than $50,000.

Buildings

We note that the new CECP 2030 proposes smaller emission reductions than contemplated in the interim CECP. While there will be difficulty in reducing building sector emissions, we recommend two "macro" interventions that would be necessary to achieving any significant target.

First, the CECP refers to a reporting methodology that would be completed by December 2023. That by itself is not enough. We need a statewide building performance standard (BPS) that starts with large buildings. Over time, it would reach down to medium and smaller buildings. One key point is that a BPS would achieve results whether buildings are owner-occupied or leased out. The voluntary Mass Save program is clear not sufficient to produce the emission reductions we need.

Second, we endorse the Heating Fuels Emissions Cap and/or Clean Heat Standard. However, details in the CECP are still lacking and we reserve the right to comment further when details are available, perhaps in the form of the Clean Heat Commission final report. Assuming that the policy would be a form of carbon pricing, it is important from the start to allocate any revenue from the HFEC towards reducing the energy burden of low-and moderate-income people and to make public buildings greener as well. If the final CECP proposes an HFEC, it must simultaneously propose how the revenue would be allocated so that we can evaluate whether it makes sense and is equitable.

Electricity

Compared to transportation and buildings, reducing emissions from the electricity sector is simpler. According to the CECP, the consumers of Massachusetts will have to make over two million important decisions regarding EVs, heat pumps, where they live, etc. By comparison, emissions in the electricity sector can be reduced by the governor with authority given to him or her by the GWSA and Roadmap laws. Unfortunately, what we read in the new CECP does not give us the confidence to believe in the emission reduction figures shown for transportation and buildings. For that reason, we encourage a more aggressive approach with electricity. The sooner emission reductions in the electricity sector are made, the more certain policymakers will be that the 2025 target will be achieved.

To put it bluntly, the executive branch has the authority to achieve deep reductions in the electricity sector and should use that authority given the great uncertainty about whether two million EVs and

heat pumps will be purchased by consumers by 2030. Furthermore, reductions in power sector emissions will magnify reductions from the heat pumps and EVs.

A. Clean Energy Standard

The draft CECP stated that the Clean Energy Standard ought to be increased from 40% to at least 60% by 2030. We suggest that the CES be raised to 100% by 2030 and 60% by 2025 to coincide with Vineyard Wind and Mayflower Wind. When those projects come on-line, Massachusetts will likely have more REC supply than required to meet the RPS/CES as it is currently scheduled. The sooner the CES is increased the better so that the annual increments will be known to market participants with as much advance notice as possible.

B. Green Municipal Aggregation

Aggregation in Massachusetts has been a resounding success from both perspectives – lower cost for consumers and adding Class I renewable energy to the grid. Green Energy Consumers estimates that by 2023, aggregation will be responsible for about **1 million megawatt hours** of clean energy above and beyond that required by the Renewable Portfolio Standard. There are approximately 100 cities and towns with aggregations including more Class I RECs than required by the RPS.

This is a tremendous amount of renewable energy brought about through the voluntary market, meaning **it requires no subsidy** from the Commonwealth. Furthermore, Green Energy Consumers has calculated that a large sample of aggregations with content that includes **5-11% more Class I renewables** have paid an average of **1.3 cents per kilowatt hour less** than Basic Service rates over the terms of their supply contracts.

Green Energy Consumers took the data from our large sample of aggregations with 5-11% more Class I renewables and extrapolated to all residential consumers of investor-owned utilities. If every residential customer was in such an aggregation, the state-wide results would be **1.6 million** more megawatt hours of renewable energy than mandated by the Renewable Portfolio Standard and over **$200 million** in annual savings compared to Basic Service.

Despite the proven success of aggregation and its remaining potential, the Department of Public Utilities has been a barrier to success rather than a support. The full potential of aggregation to contribute to the 2030 GHG reduction goal will not be fulfilled until there is a major overhaul of the DPU.

C. Retiring Off-Shore Wind RECs for State & Local Government Usage & Municipal Aggregation

Green Energy Consumers has found that when Vineyard Wind and Mayflower Wind come on-line, the investor-owned distribution companies will have far more (over 3000 GWh) Class I RECs than necessary to comply with the Renewable Portfolio Standard. The “surplus” RECs should be retained

in order to contribute to the CECP's overall target of 50% GHG reduction by 2030. One way would be to retire them in proportion to state and local electricity load. Another way would be to require the distribution companies to resell the RECs to municipal aggregations. It's better for Massachusetts to retain those Class I RECs than to sell them off, only to purchase out-of-state RECs to meet the demand.

D. Municipal Greenhouse Emission Standards

The proposed regulations for the GHG emissions standards for municipal utilities are simply too lenient. This is a matter of fundamental fairness. The standards would not require most municipal utilities to retire a significant number of Class I RECs for many years. Accordingly, consumers of investor-owned utilities (IOUs) will be paying far more each month for electricity than customers of municipal utilities due to the policies listed in the CECP having to do with Mass Save, the CES, and more. The final CECP should require municipal utilities to "catch up" to and stay in step with the IOUs on requirements to reduce GHG by 2030.

Thank you again for the work you have done to strengthen the 2025 and 2030 CECPs and for calling for comments such as these.

Sincerely,

Larry F Chretien

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April 29, 2022

Dear Undersecretary Chang;

The following document is expert testimony submitted by Elizabeth A. Stanton and Joshua R. Castigliego of Applied Economics Clinic on behalf of Green Energy Consumers Alliance. The testimony was submitted in D.P.U. 21-91 as evidence to analyze National Grid's proposal to expand its electric vehicle programs. Green Energy Consumers Alliance filed similar testimony in D.P.U. 21-90 regarding Eversource's EV program filing as well.

The document includes an overview of National Grid's current off-peak charging rebate program, an analysis of omitted benefits, and a calculation of what the full value of the off-peak charging rebate might be if all benefits were accounted for. I hope it will clarify the full value of off-peak charging, both to the electric system and as a tool to incentivize EV adoption by lowering fuel costs.

Thank you for the opportunity to provide input.

Sincerely,

Larry Chretien
Executive Director

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

Petition of Massachusetts Electric Company	**)**	
and Nantucket Electric Company each	**)**	**D.P.U. 21-91**
d/b/a National Grid for Approval of	**)**	
Phase III Electric Vehicle Market Development Program	**)**	

TRACK 1

DIRECT PANEL TESTIMONY OF

ELIZABETH A. STANTON

AND

JOSHUA R. CASTIGLIEGO

ON BEHALF OF

INTERVENOR GREEN ENERGY CONSUMERS ALLIANCE

D.P.U. 21-91 EXHIBIT GECA-ESJC-1

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I. INTRODUCTION

Q. Dr. Stanton, please state your full name, business name and address.

A. My name is Elizabeth A. Stanton. I am the Director and a Senior Economist at the Applied Economics Clinic. Our offices are located at 1012 Massachusetts Avenue, Arlington MA, 02476.

Q. What is your educational background?

A. I received a PhD in Economics from the University of Massachusetts-Amherst. Prior to that, I received my Master of Arts in Economics from New Mexico State University and a Bachelor of International Studies at the School for International Training in Brattleboro, Vermont.

Q. Please describe your professional experience.

A. I am the founder and Director of the Applied Economics Clinic ("AEC"), a non-profit consulting group. AEC provides expert testimony, analysis, modeling, policy briefs, and reports for municipalities and other public interest groups on the topics of energy, environment, consumer protection, and equity. AEC also provides training to the next generation of expert technical witnesses and analysts through applied, on-the-job experience for graduate students in related fields and works proactively to enhance diversity among the people who do our jobs today and in the future. As a researcher and analyst with two decades of professional experience as a political and environmental economist, I have authored more than 155 reports, policy studies, white papers, journal articles, and book chapters as well as more than 45 expert comments and oral and written testimony in public proceedings on topics related to energy, the economy, the environment,

and equity. My articles have been published in Ecological Economics, Climatic Change, Environmental and Resource Economics, Environmental Science & Technology, and other journals. I have also published books, including Climate Change and Global Equity (Anthem Press, 2014) and Climate Economics: The State of the Art (Routledge, 2013), which I co-wrote with Frank Ackerman. I am also co-author of Environment for the People (Political Economy Research Institute, 2005, with James K. Boyce) and co-editor of Reclaiming Nature: Worldwide Strategies for Building Natural Assets (Anthem Press, 2007, with Boyce and Sunita Narain).

My recent work includes review and analysis of electric planning in several states, Integrated Resource Plan (IRP) and Demand-Side Management (DSM) planning review, analysis and testimony of state climate laws as they relate to proposed capacity additions, and other issues related to consumer and environmental protection in the electric sector. In my previous position as a Principal Economist at Synapse Energy Economics, I provided expert testimony in electric and gas sector dockets, and led studies examining environmental regulation, cost-benefit analyses, and the economics of energy efficiency and renewable energy. Prior to joining Synapse, I was a Senior Economist with the Stockholm Environment Institute's (SEI) Climate Economics Group, where I was responsible for leading the organization's work on the Consumption-Based Emissions Inventory (CBEI) model and on water issues and climate change in the western United States. While at SEI, I led domestic and international studies commissioned by the United Nations Development Programme, Friends of the Earth-U.K., and Environmental Defense

Fund, among others. My Curriculum Vitae is attached as D.P.U. 21-91 Exhibit GECA-ESJC-2.

Q. Have you ever testified before the Massachusetts Department of Public Utilities (DPU)?

A. Yes. I provided testimony in D.P.U. 14-86 (2014), D.P.U. 15-181 (2016), D.P.U. 16-05 (2016), D.P.U. 17-145 (2018), D.P.U. 17-172 (2018), D.P.U. 17-174 (2018), D.P.U. 17-175 (2018), D.P.U. 18-110 through D.P.U. 18-119 (2018), D.P.U. 18-150 (2019), D.P.U. 19-132 (2020) as well as in OADR 2011-025 & 026 before the Department of Environmental Protection.

Q. Have you testified in other jurisdictions?

A. Yes. I have submitted expert testimony and comments in public utility and other related dockets in District of Columbia, Florida, Illinois, Indiana, Louisiana, Michigan, Minnesota, New Hampshire, New York, Pennsylvania, Puerto Rico, South Carolina, and Vermont as well as several federal dockets, including in front of the U.S. EPA.

Q. Mr. Castigliego, please state your full name, business name and address.

A. My name is Joshua R. Castigliego. I am a Researcher at the Applied Economics Clinic. Our offices are located at 1012 Massachusetts Avenue, Arlington MA, 02476.

Q. What is your educational background?

A. I received a Master of Arts in Energy & Environment from Boston University and a Bachelor of Science in both Mathematics and Physics from Roger Williams University.

Q. Please describe your professional experience.

A. I have more than four years of professional experience in energy and climate research and analysis, with a focus on decarbonization and pollution mitigation. I have authored more than 15 reports, and have been published in *Waste Management*. Prior to joining the Applied Economics Clinic, I worked as a Research Fellow at Boston University's Institute for Sustainable Energy, where I led the analysis on the emissions impacts associated with Boston's waste management system to inform the City's decarbonization efforts as it works to achieve carbon neutrality by 2050 in the Carbon Free Boston report.

My recent work includes investigating the value of winter grid reliability, examining the net emissions savings benefit of a battery storage facility, and critiquing the over-procurement of PJM's capacity market. My Curriculum Vitae is attached as D.P.U. 21-91 Exhibit GECA-ESJC-3.

Q. Have you ever testified before the Massachusetts DPU?

A. No.

Q. On whose behalf are you submitting this testimony?

A. We are submitting this testimony on behalf of the Green Energy Consumers Alliance.

Q. Are you sponsoring any exhibits?

A. Yes. We are sponsoring the following exhibits:

- D.P.U. 21-91 GECA-ESJC-2 – Curriculum Vitae of Dr. Elizabeth A. Stanton
- D.P.U. 21-91 GECA-ESJC-3 – Curriculum Vitae of Mr. Joshua R. Castigliego
- D.P.U. 21-91 GECA-ESJC-4 – Workpaper A
- D.P.U. 21-91 GECA-ESJC-5 – Workpaper B

Q. What materials did you review in preparing this testimony?

A. Any document upon which we relied directly is cited in our testimony.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your joint testimony?

A. The purpose of our joint testimony is to review and critique National Grid's methods and assumptions in setting a 3 to 5 cent per kilowatt-hour (kWh) rebate for its Off-Peak Charging Program.

Q. Can you summarize your conclusions?

A. We find that National Grid's methodology and resulting rebate values omit important benefits of off-peak charging including avoided transmission and distribution costs, avoided emissions and emission costs, avoided reliability costs, avoided costs due to induced price effects, and non-energy benefits. We provide evidence that including these benefits in a value for off-peak charging could raise the rebate by 10 cents per kWh from 3 to 5 cents per kWh to 13 to 15 cents per kWh. We recommend that the DPU require National Grid (the "Company") to reexamine its methodology for setting these rebates, include a more complete set of benefits from this program, and raise rebate values accordingly.

III. OVERVIEW OF NATIONAL GRID'S OFF-PEAK CHARGING PROGRAM

Q. Please describe National Grid's Off-Peak Charging Program.

A. National Grid's Phase II Off-Peak Charging Program ("Program") was approved by the Massachusetts DPU in D.P.U. 18-150 for residential electric vehicles (EV) customers. The Program provides an incentive—in the form of per kWh charging rebates—to encourage

customers to charge their EVs during off-peak hours. National Grid offers off-peak charging rebates of $0.03 per kWh for EV charging occurring during off-peak hours (9:00pm to 1:00pm) in Winter (October through May) and $0.05 per kWh for off-peak charging in Summer (June through September).

In its proposal for D.P.U. 18-150, National Grid noted that "residential customers receiving a rebate for a Level 2 charger in the EV Charging Program will be automatically enrolled in the Off-Peak Charging Rebate Program…"[1] with the option to opt out. Customers with existing Level 2 chargers can sign up to participate in the Program. National Grid stated that the Program's administrator will be in charge of "enrolling customers in the program, receiving and collecting charging session data from the charging and monitoring technology eligible for the program, managing a web portal for customers to view their activity and rebate amounts, both current and historical, and generating the rebate payments to customers. The Company anticipates offering customers payment options, which may include gift cards or credits on their electric bills."[2]

In D.P.U. 18-150, the Company stated that the Off-Peak Charging Program would be offered to a maximum of 11,000 participants.[3] National Grid launched the Program in October 2020[4] with an enrollment of over 500 residential customers.[5]

[1] D.P.U. 18-150, Exhibit NG-RS-1 at 25, lines 19-20.
[2] D.P.U. 18-150, Exhibit NG-RS-1 at 28, lines 1-5.
[3] D.P.U. 18-150, Exhibit NG-RS-1 at 28, lines 19-20.
[4] D.P.U. 21-91, National Grid's Response to Information Request GECA-NG-2-2(b)
[5] D.P.U. 21-91, Exhibit NG-EVPP-1 at 86, line 2.

Q. Has National Grid proposed changes to its Off-Peak Charging Program?

A. Yes. In its initial D.P.U. 21-91 filing, National Grid is seeking approval from DPU to expand the scope of its Off-Peak Charging Program by (1) extending the Program through 2025 and (2) expanding the Program to include up to 1,000 additional fleet EVs.[6] The Company also proposes to revise the Program to include automated, flexible scheduling with the goal of shifting more charging off-peak while avoiding the occurrence of timer peaks (i.e., spikes in demand at the beginning or end of off-peak hours).[7]

Q. Has National Grid revised its rebate amounts for the Off-Peak Charging Program since its 2018 DPU filing?

A. No. In its direct pre-filed testimony of the electric vehicle program panel, National Grid states that "The Company does not recommend any changes in how it offers off-peak rebates at this time as the off-peak rebate amounts, three or five-cents per kWh depending on the season, were based upon an analysis of ISO New England supply and capacity costs."[8]

Q. Does National Grid provide any justification for not revising its rebate amounts?

A. Yes. In its direct pre-filed testimony of the electric vehicle program panel, National Grid states that "Given the absence of evidence thus far on the impact of the approved rebate design, the Company does not see a need to conduct another version of this analysis at this time."[9] National Grid does plan to conduct a detailed analysis of the Program once a year

[6] D.P.U. 21-91, Exhibit NG-EVPP-1 at 87, lines 1-6.
[7] D.P.U. 21-91, Exhibit NG-EVPP-1 at 86, lines 15-19.
[8] D.P.U. 21-91, Exhibit NG-EVPP-1 at 92, lines 10-12.
[9] D.P.U. 21-91, National Grid's Response to Information Request GECA-NG-1-2(c)

with the next evaluation memo to be filed by May 15, 2022 as part of the 2021 Phase II EV Program cost recovery filing.[10] National Grid has confirmed that "[t]he Company will propose changes in the future as it gains experience in this area and as new evidence becomes available. The Company will use evidence available at the time to propose changes to the off-peak charging rebate design."[11]

IV. REVIEW OF NATIONAL GRID'S CURRENT OFF-PEAK CHARGING REBATES

Q. How did National Grid develop its off-peak charging rebates?

A. National Grid estimates its off-peak charging rebates as the difference between cost savings associated with charging off-peak versus on-peak (that is, on-peak costs less off-peak costs). Energy and capacity cost savings are summed together to calculate National Grid's off-peak rebates of $0.03 and $0.05 per kWh for Winter and Summer, respectively.[12] Importantly, for the purposes of calculating its off-peak charging rebate National Grid uses the assumption that in the absence of its Off-Peak Charging Program customers will charge their EVs on peak, and that with the Charging Program customers will charge their EVs off peak.

Q. Does National Grid consider any other costs or benefits of off-peak charging in setting its rebate values?

A. No. National Grid only includes energy and capacity cost savings in its off-peak charging rebates.

[10] D.P.U. 21-91, National Grid's Response to Information Request GECA-NG-2-2(c)
[11] D.P.U. 21-91, National Grid's Response to Information Request GECA-NG-2-2(e)
[12] D.P.U. 21-91, Exhibit NG-EVPP-1 at 92, line 11.

Q. How does National Grid estimate the energy cost savings component of its off-peak rebate?

A. To estimate the value of energy cost savings from off-peak charging, National Grid uses ISO-New England's hourly load and cost data[13] from January 1, 2016 through December 31, 2017 by load zone for Massachusetts (i.e., Northeast, Southeast, West/Central). National Grid calculates the weighted average across Massachusetts' load zones based on the Company's zonal load shares in 2017 (i.e., 32 percent for Northeast, 31 percent for Southeast, and 38 percent for West/Central).[14] The Company performs these calculations twice: once for real-time and once for day-ahead markets.

Using these weighted-averages for load and energy costs, National Grid calculates total energy demand and energy costs in the on-peak and off-peak periods, combining 2016-2017 data for each season. National Grid estimates the average energy price ($ per kWh) for each season and on-peak/off-peak period by dividing the total energy cost ($) by the total demand (MWh) and adjusted these values by a line loss factor of 1.7 percent.[15] As a final step, the Company averages together its real-time and day-ahead results to arrive at final on-peak and off-peak energy prices.

National Grid estimates the energy cost savings component of its off-peak charging rebate by calculating the difference between the on-peak and off-peak energy prices. These

[13] ISO-New England. "Energy, Load, and Demand Reports." *SMD Hourly Data [Excel]*. Available at: https://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/zone-info
[14] D.P.U. 21-91, National Grid's Response to Information Request, Attachment GECA-NG-1-2 [Excel]
[15] D.P.U. 21-91, National Grid's Response to Information Request, Attachment GECA-NG-1-2 [Excel]

differences (or "deltas") are $0.006 and $0.019 per kWh for Winter and Summer, respectively (see Table 1).[16]

Table 1. Replicated Energy Cost Results

Energy Cost Savings ($ per kWh)				
Season	**Peak/Off-Peak**	**Real Time**	**Day Ahead**	**Average**
Winter	On-Peak	$0.042	$0.040	$0.041
	Off-Peak	$0.035	$0.035	$0.035
	DELTA	**$0.007**	**$0.006**	**$0.006**
Summer	On-Peak	$0.047	$0.043	$0.045
	Off-Peak	$0.025	$0.026	$0.025
	DELTA	**$0.022**	**$0.017**	**$0.019**

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Q. What does National Grid assume about annual EV electric usage and avoided EV demand from charging off-peak?

A. National Grid assumes that the average EV customer uses 3,000 kWh per year to charge their vehicle and that charging an EV off-peak versus on-peak results in an average avoided peak demand of 0.825 kW per vehicle.[17]

Q. How does National Grid estimate the capacity cost savings component of its off-peak rebate?

A. To estimate the value of capacity cost savings from off-peak charging, National Grid uses ISO-New England's 10th Forward Capacity Auction (FCA #10) clearing price for the 2019/2020 delivery years: $7.03 per kW-month.[18] National Grid first estimates the annual

[16] See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.
[17] D.P.U. 21-91, National Grid's Response to Information Request, Attachment GECA-NG-1-2 [Excel]
[18] ISO-New England. February 2016. "Finalized Capacity Auction Results Confirm 10th FCA Procured Sufficient Resources at a Lower Prices, for 2019-2020." Available at: https://www.iso-ne.com/static-assets/documents/2016/02/20160229_fca10_finalresults.pdf

capacity payment ($ per kW-year) by multiplying the FCA #10 clearing price ($7.03 per kW-month) by 12 months (adjusting to account for a loss factor of 8 percent and a reserve margin of 19 percent) to yield $108 per kW-year.[19]

National Grid estimates annual avoided capacity costs by multiplying the annual capacity payment of $108 per kW-year by its assumed average avoided demand of 0.825 kW to yield $89 per year per vehicle. The annual avoided capacity cost is estimated on a per-kWh basis by dividing the $89 per year by 3,000 kWh—National Grid's assumed average annual usage for an electric vehicle—resulting in an avoided capacity cost of $0.030 per kWh.[20]

National Grid calculates its avoided capacity costs for the Winter and Summer periods using two different methodologies: (1) ratio of on-peak to off-peak hours in each period; and (2) the ratio of on-peak to off-peak energy costs in each period. These ratios are used as scaling factors to translate the annual avoided capacity cost of $0.030 per kWh into the average Winter and Summer values of $0.028 and $0.035 per kWh, respectively (see Table 2).[21]

[19] See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.
[20] See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.
[21] See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Table 2. Replicated Capacity Cost Results

Capacity Cost Savings ($ per kWh)				
Season	**Weight Metric**	**Real Time**	**Day Ahead**	**Average**
Winter	Cost-Weighted	$0.026	$0.026	$0.026
	Hour-Weighted	$0.030	$0.030	$0.030
	AVERAGE	**$0.028**	**$0.028**	**$0.028**
Summer	Cost-Weighted	$0.040	$0.038	$0.039
	Hour-Weighted	$0.030	$0.030	$0.030
	AVERAGE	**$0.035**	**$0.034**	**$0.035**

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Q. In your review of National Grid's off-peak charging rebates, did you find any calculation errors?

A. Yes. National Grid's off-peak charging rebates calculations appear to include two errors: (1) incorrect calculation of a weighted average line loss factor of 1.7 percent (the correct value is 5.0 percent),[22] and (2) the erroneous use of real-time demand data in day-ahead demand calculations.

Q. Would correcting the loss factor error in National Grid's calculations change the rebate?

A. Yes. National Grid incorrectly calculates the weighted average across Massachusetts' load zones by weighting and then averaging their components rather than, correctly, weighting and then summing them together. As a result, National Grid uses a loss factor of 1.7 percent instead of the correct weighted average of 5.0 percent (see Table 3).[23] Correcting this error would result in a slight increase in the rebate amounts.

[22] See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.
[23] See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Table 3. Line Loss Factors by Load Zone

Massachusetts Load Zone	Weights	Line Loss Factors
Northeast (NEMA)	31.8%	5.4%
Southeast (SEMA)	30.6%	5.1%
West Central (WCMA)	37.6%	4.5%
National Grid's Weighted Average		1.7%
Corrected Calculation		5.0%

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Q. Would correcting the demand totals error in National Grid's calculations change the rebate?

A. Yes. National Grid incorrectly used real-time demand totals in its day-ahead calculations (see Table 4). Correcting this error would result in a slight increase in the rebate amounts.

Table 4. Real-Time and Day-Ahead Electric Demand

Peak/Off-Peak	Real-Time Demand (MWh)	Day-Ahead Demand (MWh)
On-Peak	11,004,511	10,864,213
Off-Peak	25,712,954	26,243,516
Total	36,717,465	37,107,729

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Q. What rebates did you estimate by correcting these errors?

A. By correcting National Grid's calculations, we were able to identify minor differences in the Company's off-peak rebate amounts. Our corrections increased National Grid's off-peak charging rebates ($0.034 and $0.054 per kWh) by $0.001 per kWh, resulting in corrected rebates of $0.035 and $0.055 per kWh for Winter and Summer, respectively (see Table 5).[24]

[24] See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Table 5. Replicated and Corrected Off-Peak Rebates by Season

Season	National Grid's Off-Peak Rebates ($ per kWh)	Corrected Off-Peak Rebates ($ per kWh)	DELTA ($ per kWh)
Winter	$0.034	$0.035	**$0.001**
Summer	$0.054	$0.055	**$0.001**

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A calculations.

Q. Aside from the mathematical errors associated with energy and capacity, do you agree with National Grid's method for calculating its off-peak charging rebates?

A. No. In our professional opinion, National Grid is underestimating its rebate by excluding important benefits of off-peak charging such as avoided transmission and distribution costs, avoided emissions and emission costs, avoided reliability costs, avoided costs due to induced price effects, and non-energy benefits.

V. OMITTED BENEFITS IN NATIONAL GRID'S OFF-PEAK CHARGING REBATES

Q. What are the benefits of off-peak charging?

A. Off-peak charging provides benefits that include, but are not limited to:

- **Avoided energy costs:** The difference between peak and off-peak energy costs.
- **Avoided capacity costs:** Charging EVs during off-peak hours reduces peak demand, which provides cost savings to the grid due to the reduced need to build and operate plants that serve peak load.
- **Avoided transmission and distribution costs:** The need for additional transmission and distribution investment is reduced as demand is shifted from peak to off-peak hours.
- **Avoided reliability costs:** Related to the avoided capacity benefit, shifting schedules to charge EVs during off-peak hours can improve grid reliability as more capacity will be made available when fewer EVs are charging during the peak. New England utilities estimate reliability using the value of non-energy

benefits of avoided outages to residences and businesses—i.e., the value of lost load, (VOLL)—as a proxy for the cost of system-wide outages (see AESC 2021).[25]

- **Avoided costs due to induced price effects or "Capacity DRIPE":** Avoided demand reduction induced price effects (DRIPE) is a measure of the value of efficiency in terms of a reduction in wholesale prices seen by all customers in a given timeframe.
- **Avoided emissions and emission costs:** As fewer EV charge during peak hours, less generation from high-emitting peaker plants is required—which results in reduced greenhouse gas emissions and air pollution, and reduced costs of emission abatement.
- **Non-energy benefits**: Additional non-energy benefits of charging off-peak include: avoided power outages and less land used for power plants as the need for peaker plants is reduced.

Q. Does National Grid include these benefits in its off-peak charging rebates?

A. National Grid only includes avoided energy and capacity costs in its off-peak charging rebates. It does not include avoided transmission and distribution costs, avoided reliability costs, avoided capacity DRIPE, avoided emissions and emission costs, or non-energy benefits.

Q. Is it possible to estimate the avoided transmission and distribution costs associated with off-peak EV charging?

A. Yes. In its proposed 2022-2024 Three-Year Energy Efficiency Plan, National Grid applies an avoided transmission cost of $99 per kW-year and an avoided distribution cost of $110

[25] AESC Study Group. May 2021. "Avoided Energy Supply Costs in New England 2021." Synapse Energy Economics. Available at: https://www.synapse-energy.com/sites/default/files/AESC%202021_20-068.pdf

per kW-year to measures that reduce peak load.[26] (Note that we relied on the data contained in the "AESC" tab of National Grid's draft BCA workbook submitted to the Massachusetts Energy Efficiency Advisory Council in April 2021, which in turn relies upon values from the *2021 Avoided Energy Supply Cost* (AESC) study and therefore would not have changed in the Company's final 2022-2024 Three-Year Plan calculations as submitted in D.P.U. 21-128.)

Charging EVs during off-peak hours also reduces peak load, and the inclusion of these avoided costs would increase National Grid's off-peak charging rebates. Following National Grid's methodology for calculating its avoided capacity benefit, we estimate an avoided transmission benefit of $0.027 per kWh and an avoided distribution benefit of $0.030 per kWh for a total transmission and distribution cost savings of $0.058 per kWh (see Table 6).

Table 6. Avoided Transmission and Distribution Costs

	Avoided Cost ($ per kW)	Cost Savings ($ per kWh)
Transmission	$99	$0.027
Distribution	$110	$0.030
TOTAL	**$209**	**$0.058**

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

[26] National Grid. April 30, 2021. "Statewide Draft Energy Efficiency Plan." *2022-24 National Grid BC Model Electric [Excel].* Available at: https://ma-eeac.org/wp-content/uploads/2022-24-National-Grid-BC-Model-Electric-April.xlsb

Q. Is it possible to estimate the avoided reliability costs associated with off-peak EV charging?

A. Yes. In its draft 2022-2024 Three-Year Energy Efficiency Plan, National Grid applies a total avoided reliability cost of $31 per kW-year in 2022 to measures that reduce peak load.[27] Charging EVs during off-peak hours also reduces peak load, and the inclusion of this avoided cost would increase National Grid's off-peak charging rebates. Following National Grid's methodology for calculating its avoided capacity benefit, we estimate a reliability benefit of $0.008 per kWh (see Table 7).

Table 7. Avoided Reliability Costs

	Avoided Cost ($ per kW)	Cost Savings ($ per kWh)
Reliability	$31	$0.008

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Q. Is it possible to estimate the avoided capacity DRIPE costs associated with off-peak EV charging?

A. Yes. In its draft 2022-2024 Three-Year Energy Efficiency Plan, National Grid utilizes a total avoided capacity DRIPE cost of $50 per kW-year in 2022 for measures that reduce peak load.[28] Charging EVs during off-peak hours also reduces peak load, and the inclusion of this avoided cost would increase National Grid's off-peak charging rebates. Following National Grid's methodology for calculating its avoided capacity benefit, we estimate a capacity DRIPE benefit of $0.014 per kWh (see Table 8).

[27] National Grid. April 30, 2021. "Statewide Draft Energy Efficiency Plan." *2022-24 National Grid BC Model Electric [Excel].* Available at: https://ma-eeac.org/wp-content/uploads/2022-24-National-Grid-BC-Model-Electric-April.xlsb
[28] National Grid. April 30, 2021. "Statewide Draft Energy Efficiency Plan." *2022-24 National Grid BC Model Electric [Excel].* Available at: https://ma-eeac.org/wp-content/uploads/2022-24-National-Grid-BC-Model-Electric-April.xlsb

Table 8. Avoided Capacity DRIPE Costs

	Avoided Cost ($ per kW)	Cost Savings ($ per kWh)
Capacity DRIPE	$50	$0.014

Note: See D.P.U. 21-91 GECA-ESJC-4 Workpaper A for calculations.

Q. How does off-peak EV charging provide an emissions reduction and related cost benefit?

A. Off-peak EV charging shifts energy use from peak to off-peak times. Off-peak charging times have a lower grid emissions rate than on-peak charging rates per ISO-New England.[29] Shifting energy use from peak to off-peak times both lowers Massachusetts emissions and lowers the marginal abatement costs associated with those emissions.[30]

Q. Is it possible to estimate the emission reduction from off-peak EV charging?

A. Yes. Both ISO-New England[31] and AESC[32] provide estimates of peak and off-peak grid emissions. The on- and off-peak periods used by ISO-New England and AESC do not, however, align perfectly with expected EV charging or the rebate program as designed by National Grid. For this reason, we apply a different methodology—developed by AEC for use in battery storage permitting applications with the DPU—that allows for emission rate estimation for specific periods (e.g., charging and discharging, peak and off-peak, etc.).

[29] ISO-New England. March 2021. "2019 ISO New England Electric Generator Air Emissions Report." *System Planning.* Available at: https://www.iso-ne.com/static-assets/documents/2021/03/2019_air_emissions_report.pdf, Table 5-3
[30] AESC Study Group. May 2021. "Avoided Energy Supply Costs in New England 2021." Synapse Energy Economics. Available at: https://www.synapse-energy.com/sites/default/files/AESC%202021_20-068.pdf, Chapter 8
[31] ISO-New England. March 2021. "2019 ISO New England Electric Generator Air Emissions Report." *System Planning.* Available at: https://www.iso-ne.com/static-assets/documents/2021/03/2019_air_emissions_report.pdf
[32] AESC Study Group. May 2021. "Avoided Energy Supply Costs in New England 2021." Synapse Energy Economics. Available at: https://www.synapse-energy.com/sites/default/files/AESC%202021_20-068.pdf

In essence, our method estimates a difference in the emission rates associated with EV charging under two different scenarios:

(1) **No planning**: In this counterfactual, National Grid does not plan for EV charging and charging occurs on peak (per National Grid's own assumption). In this scenario, the addition to peak load from charging is served by marginal generating resources (that is, the next least expensive resource available to run in the event of higher load) and the relevant emissions rate is the on-peak marginal emissions rate.

(2) **Planning**: In this scenario, National Grid plans for EV charging by means of its Off-Peak Charging Program. EV load is expected and National Grid is ready to meet that load with generation that is compliant with Massachusetts climate regulations (e.g., Renewable Portfolio Standard, Clean Energy Standard, Clean Peak Standard). The relevant emissions rate is the off-peak average emissions rate.

Thus, charging during on-peak hours adds unplanned marginal generation and emissions, while charging during off-peak hours adds planned average generation and emissions. We estimate the difference in emissions rates using hourly generation data by resource type from ISO-New England's *Operations Reports for Dispatch Fuel Mix*[33] for the 2020 calendar year to estimate marginal and average emission rates for specific time periods and seasons.

[33] ISO-New England. 2020. *Operations Reports: Dispatch Fuel Mix*. Available at: https://www.isone.com/isoexpress/web/reports/operations/-/tree/gen-fuel-mix

Using this period-specific method we find a difference in on-peak versus off-peak emission rates of 89.7 and 83.8 kg CO_2 per MWh for Winter and Summer, respectively (see Table 9).[34]

Table 9. On- and Off-Peak Emissions Rates and Avoided Emissions Values by Season

Season	On-Peak Emissions Rate (kg CO_2 per MWh)	Off-Peak Emissions Rate (kg CO_2 per MWh)	Emission Savings (kg CO_2 per MWh)
Winter	404.2	314.5	89.7
Summer	423.4	339.6	83.8
Average	**413.8**	**327.1**	**86.7**

Note: See D.P.U. 21-91 GECA-ESJC-5 Workpaper B for calculations.

Q. Is it possible to estimate the avoided costs associated with the emissions reduction from off-peak EV charging?

A. Yes. AESC 2021 develops avoided greenhouse gas emission values that are applied in the Massachusetts energy efficiency program administrators draft 2022-2024 plan. Table 10 below shows the 2021 Winter and Summer peak and off-peak avoided greenhouse gas emission values used in the draft 2022-2024 plan,[35] the emission rates assumed in AESC 2021,[36] and the inferred $184 per short ton CO_2 (or $203 per metric ton CO_2).[37] (This value, when calculated using AESC's illustrative 15-year levelized average emission cost is $125 per short ton.)

[34] See D.P.U. 21-91 GECA-ESJC-5 Workpaper B for calculations.
[35] National Grid. April 30, 2021. "Statewide Draft Energy Efficiency Plan." *2022-24 National Grid BC Model Electric [Excel].* Available at: https://ma-eeac.org/wp-content/uploads/2022-24-National-Grid-BC-Model-Electric-April.xlsb
[36] AESC Study Group. May 2021. "Avoided Energy Supply Costs in New England 2021." Synapse Energy Economics. Available at: https://www.synapse-energy.com/sites/default/files/AESC%202021_20-068.pdf, Table 80
[37] See D.P.U. 21-91 GECA-ESJC-5 Workpaper B for calculations.

Table 10. Avoided CO_2 Emissions Costs by Season

	Winter		Summer	
	On-Peak	Off-Peak	On-Peak	Off-Peak
Non-Embedded CO_2 Costs (2021$ per kWh)	$0.0695	$0.0728	$0.0717	$0.0735
CO_2 Marginal Emissions Rates (lb per MWh)	756	791	779	799
Avoided CO_2 Emissions Cost ($ per short ton)	$184	$184	$184	$184
Avoided CO_2 Emissions Cost ($ per metric ton)	$203	$203	$203	$203

Note: See D.P.U. 21-91 GECA-ESJC-5 Workpaper B for calculations.

Multiplied by the average emission reduction of 86.7 kg CO_2 per MWh as calculated above, the result is an average avoided greenhouse gas emissions cost savings of $0.018 per kWh (see Table 11).[38]

Table 11. Avoided Emissions Costs

Season	Emission Savings (kg CO_2 per MWh)	Avoided Emissions Cost ($ per metric ton CO_2)	Cost Savings ($ per kWh)
Winter	89.7	$203	$0.018
Summer	83.8	$203	$0.017
Average	86.7	$203	$0.018

Note: See D.P.U. 21-91 GECA-ESJC-5 Workpaper B for calculations

Q. How would including these omitted benefits change National Grid's off-peak charging rebate?

A. National Grid includes energy and capacity cost reductions in its valuation of its Off-Peak Charging Program rebate:

[38] See D.P.U. 21-91 GECA-ESJC-5 Workpaper B for calculations.

- **Energy cost reduction:** 0.6 and 1.9 cents per kWh for Winter and Summer, respectively
- **Capacity cost reduction:** 2.8 and 3.5 cents per kWh for Winter and Summer, respectively

Our testimony identifies several additional benefits of off-peak charging omitted by National Grid and provides preliminary valuations as a demonstration that it is possible to assign values to these benefits:

- **Transmission cost reduction:** 2.7 cents per kWh
- **Distribution cost reduction:** 3.0 cents per kWh
- **Reliability cost reduction:** 0.8 cents per kWh
- **Capacity DRIPE cost reduction:** 1.4 cents per kWh
- **Emissions cost reduction:** 1.8 cents per kWh

Summing these estimates together provides illustrative Winter and Summer rebate values of 13.1 and 15.1 cents per kWh, respectively.

VI. POTENTIAL REVENUE SOURCE FOR FUNDING CHARGING REBATES

Q. What potential revenue sources could National Grid leverage to fund its Off-Peak Charging Program?

A. All National Grid customers are charged a System Benefit Charge, or energy efficiency fee, on their bills of $0.00250 per kWh[39] to fund the utility's energy efficiency programs. In addition, National Grid collects an energy efficiency reconciling factor (EERF) charge,

[39] National Grid. September 2021. "Summary of Electric Delivery Service Rates." *Residential R-1.* Available at: https://www.nationalgridus.com/media/pdfs/billing-payments/tariffs/mae/meco_delivery.pdf

which is designed to cover the estimated incremental costs of the Company's proposed energy efficiency programs for the year. The EERF charge is updated every year and varies by customer group. The current EERF charge for National Grid's residential customers is $0.01479 per kWh.[40] Together these two fees amount to $0.01729 per kWh. Charging of electric vehicles, therefore, contributes $0.01729 per kWh to fund energy efficiency programs in Massachusetts. At an average usage of 3,000 kWh per year, each electric car is generating $51.87 per year that may be one potential revenue source for funding charging rebates.

VII. RECOMMENDATIONS

Q. Are you recommending a specific off-peak charging rebate for National Grid?

A. No. The calculations we present in this testimony are illustrative and meant to demonstrate that (1) National Grid's off-peak charging rebates omit important benefits of off-peak charging, and (2) quantification of these omitted benefits is feasible.

Q. What is your recommendation with regard to National Grid's off-peak charging rebates?

A. National Grid should revisit its off-peak rebate calculations by rerunning its analysis to correct the errors that we have identified as well as to include the omitted benefits that we have described above. Our review indicates that doing so would result in much larger values than the off-peak charging rebates that National Grid is currently offering, which would more accurately compensate customers for the service that they provide by

[40] National Grid. September 2021. "Summary of Electric Delivery Service Rates." *Residential R-1.* Available at: https://www.nationalgridus.com/media/pdfs/billing-payments/tariffs/mae/meco_delivery.pdf

charging their EVs during off-peak hours. EV owners are currently being overcharged for the energy used to charge their vehicles; correcting the rebate value would eliminate a cross-subsidy from EV owners to non-EV owners while at the same time providing an incentive to adopt critical emission reductions in the transportation sector.

VIII. CONCLUSION

Q. Does this conclude your testimony?

A. Yes.

To: Massachusetts Office on Energy and Environmental Affairs

From: Eric Bachrach

Date: April 30, 2022

Subject: Comments on the 2025/2030 CECP

Thank you for considering my comments.

Just two days ago, a frightening report was published by Nature magazine. Global assessments reveal that, among tetrapods, 40.7% of amphibians, 25.4% of mammals and 13.6% of birds are threatened with extinction. The article provides a comprehensive extinction-risk assessment of reptiles and shows that at least 1,829 out of 10,196 species (21.1%) are threatened—representing 15.6 billion years of evolutionary phylogenetic diversity. Reptiles are threatened by the same major factors that threaten other tetrapods—agriculture, logging, urban development and invasive species—although the threat posed by climate change remains uncertain. **Reptiles inhabiting forests, where these threats are strongest, are more threatened than those in arid habitats, contrary to our prediction**.

This report corresponds with pleas, not recommendations, from the CAP 26, imploring the world to stop the deforestation of the planet.

I feel strongly that as we embark on a cleaner energy future, that we refrain form destroying forests and farmland to install large scale solar. I am calling on your office, along with the Department of Energy Resources, to end subsidies, including in the SMART program, for solar projects over five acres and solar projects on land.

Protections must also include:

- Biodiversity, including plants and animals listed under the Massachusetts Endangered Species Act.
- Protected open space or agricultural land.
- Priority Habitat or BioMap 2 Critical Natural Landscape Core Habitat areas or Important Habitat.
- Outstanding Resource Waters, wetlands or rivers.
- Indigenous cultural sites.

Massachusetts must **redirect state solar subsidies** away from large ground mounted electric generating and battery storage systems and towards solar on buildings, over parking lots, and to small systems where the electricity is used for a residence or business.

Eric Bachrach
Amherst, MA

Clean Fuels
ALLIANCE AMERICA

Comments from Clean Fuels Alliance America
on the
Massachusetts Clean Energy and Climate Plan for 2025 and 2030
Submitted to
The Massachusetts Executive Office of Energy and Environmental Affairs

Please accept these comments regarding the Clean Energy and Climate Plan for 2025 and 2030. These comments are submitted on behalf of Clean Fuels Alliance America, formerly the National Biodiesel Board. Our name change was official just recently, reflecting our embrace of all the products our members and the U.S. industry are producing, which include biodiesel, renewable diesel, sustainable aviation fuel, Bioheat ® fuel for thermal space heating and maritime and railroad fuels.

We serve as the clean fuel industry's primary organization for technical, environmental, and quality assurance programs and are the strongest voice for its advocacy, communications, and market development. Clean Fuels members play an important role in state and national programs aimed at reducing carbon emissions, displacing petroleum, improving public health, and protecting the environment. Many Clean Fuels members are members of environmental organizations and are supportive of state and local initiatives to achieve a sustainable energy future.

Made from an increasingly diverse mix of resources such as recycled cooking oil, soybean oil and animal fats, biodiesel and renewable diesel are better, cleaner fuels that are available now for use in existing diesel engines and heating furnaces and boilers without modification. Nationwide, some 3 billion gallons was consumed last year, and we project use will exceed six billion gallons by 2030, eliminating over 35 million metric tons of CO2 equivalent greenhouse gas emissions annually. With advancements in feedstock, use will reach 15 billion gallons by 2050.

These comments will focus primarily on the need to establish biodiesel as a viable carbon reduction strategy in the thermal heat sector. We oppose efforts to eliminate all liquid fuel incentives and infrastructure since such moves would preclude the use of biodiesel as a cost-effective pathway to immediate, near-term carbon reductions. We particularly support the proposed "declining emissions cap" on heating fuels by 2023 and the ongoing work that the Commission on Clean Heat is doing to develop cost-effective and practical carbon reduction strategies in the building sector.

We understand electrification is a viable and important pathway to achieve greenhouse gas reductions, but it cannot realistically be the only pathway, particularly given timeframe which it will take to convert the large number of liquid fuel-fired heating systems currently in use, and

particularly when the heating fuel industry is moving to ever-more higher blends of biodiesel - a comparatively priced drop-in fuel that reduces greenhouse gases immediately. It makes no sense to exclude such fuels.

The liquid fuel heating industry has put their money where their mouths are: In September of 2019, the liquid fuels industry in the Northeast adopted the *Providence Resolution,* which incorporates the goal of using renewable liquid fuels for heating at a B20 blend level (15% life cycle carbon reduction) by the year 2023, the B50 level (40 percent life cycle carbon reduction) by 2030, and net carbon neutrality by 2050.

Unlike the purchase of a new vehicle, when owners usually have time to consider what type of vehicle they want to purchase, the decision to replace a heating system is usually done when the system breaks down and is unrepairable. It usually happens in the winter, when customers do not have the luxury of time to decide to completely refurbish their system, resulting in customers more likely replacing their existing system with a similar but more efficient system making the changeover to a more expensive heat pump system unlikely. This is true for not only individual homeowners, but for owners of facilities (e.g., schools, apartments, hospitals, etc.) who currently use fossil-fuel fired systems.

Heat Pumps vs Liquid Fuel Use

The claim by some that inclusion of a biodiesel pathway in the 2025/2030 plan will result in heat pump installation and weatherization efforts taking a back seat to liquid fuels is false. This claim presents a false dichotomy of needing to choose between weatherization/energy efficiency and fuel switching. The fact is that addressing climate change effectively requires a comprehensive "all-of-the-above" strategy.

With that said, fuel switching can be clearly superior to weatherization and energy-efficiency improvements, both from a GHG and cost standpoint:

- Average CO2 reduction is 41-49% for retrofitting homes in cold climates through weatherization and energy-efficiency improvements; most of those reductions come from envelope upgrades (insulation)[1].
- CO2 reduction from switching to B100 (soy) is up to 76% without considering indirect land use change (ILUC), 66-72% reduction when various ILUC cases are considered[2].
- The cost to convert a home to an air source heat pump is over $20,000, according to the Massachusetts Clean Energy Center (not including the cost of weatherization and other

[1] • (Amann, J., R. Srivastava, and N. Henner. 2021. Pathways for Deep Energy Use Reductions and Decarbonization in Homes. Washington, DC: American Council for an Energy-Efficient Economy. aceee.org/research-report/b2103, at 23, accessed March 29, 2022).

[2] • (Chen et al., Life Cycle Energy and Greenhouse Gas Emission Effects of Biodiesel in The United States with Induced Land Use Change Impacts, https://www.sciencedirect.com/science/article/pii/S0960852417321648, accessed March 29, 2022).

envelope upgrades). By contrast, switching to Bioheat imposes little to no extra costs on consumers.

- And fuel switching can achieve that 76% GHG reduction immediately, as opposed to the many years it would take for deep deployment of envelope upgrades, which is critical for addressing climate change due to the "time value of carbon" reductions.

Time Value of Carbon Reductions

We all know we must act now. The IPCC's 6th assessment released last summer provided us with a stark warning: "It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred." Furthermore, the report states, "From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO_2 emissions, reaching at least net zero CO_2 emissions, along with strong reductions in other greenhouse gas emissions."

Simply put, reducing carbon emissions now, is more valuable than reducing the same amount of emissions later. It's the same principle we learned in high school: a dollar invested now is worth more than a dollar invested 20 years from now. This is because earlier reductions limit the long-term climate impact caused by the accumulation of greenhouse gases. This significant and often overlooked principal is frequently absent from policy discussions, which, for example treat a reduction of CO_2 in 2022 with the same weight as a reduction in 2050. This is simply not accurate and skews the market to seek low-technology readiness options which may not be deployed for years or decades, if ever at all.

A Declining Emissions Cap Should Follow Universally Accepted Lifecycle Analysis Accounting Practices

As required by both federal and state statutes such as the federal Renewable Fuel Standard[3] and California's Low Carbon Fuel Standard[4] biofuel's greenhouse gas impact and reduction benefits are measured on a life cycle basis including direct and *significant* indirect emissions, such as those from potential indirect land use change. This allows any carbon reduction program to have confidence that the biofuels delivered into the state generate real, meaningful climate benefits compared to petroleum-based fuels.

Federally, the Renewable Fuel Standard requires that biodiesel and renewable diesel achieve *at least* a 50% life cycle greenhouse gas reduction. If a fuel is unable to meet this threshold, it does not qualify the federal Renewable Fuel Standard RIN credit, nor does it qualify for the federal blenders tax credit. Without these incentives, the fuel would not be competitive in the U.S. marketplace. In short, this should provide a high degree of certainty to the state that any biodiesel or renewable diesel that is used in Massachusetts meets these stringent standards.

[3] Energy Independence and Security Act, Sec 201 (1)(H)
[4] Section 95481 (a)(88)

Both federal and state programs rely on the expertise of Argonne National Lab, a federally funded Department of Energy lab, to estimate the carbon intensity, or emissions intensity of various types of energy, including biofuels, petroleum, and other non-carbon energy sources such as electricity or hydrogen. This concentrated expertise in a single, so-called "GREET" model, helps ensure that the estimates of the carbon intensity of all energy sources are done in a highly consistent manner. In many circles, GREET is considered the state-of-the-art model for energy and environmental analysis of transportation fuels and vehicle technologies, both emerging and conventional. GREET is widely used for biofuel life cycle analyses, including those by regulatory agencies. It is the fundamental basis for fuel lifecycle assessment underpinning the low carbon fuel programs in California, Oregon, and Washington state. GREET was also used by the U.S. EPA in its development of the Renewable Fuel Standard (RFS) regulation in 2010.

The most recent publication from Argonne National Lab found that biodiesel, even when produced from crops such as soybean oil, a byproduct of producing animal feed, can reduce emissions approximately 76%[5]. This finding was updated in 2021 and demonstrated an increased savings for all raw material used to produce biodiesel. In fact, these findings aligned with EPA's original estimates which demonstrated that biofuels produced from residue feedstocks such as animal fats and inedible distillers corn oil can reduce emissions by up to 86%[6]. As more renewable electricity comes online and production practices and processes get ever more efficient, it is expected that figure will continue to rise. It is critical to recognize that these deep reductions have a dramatic effect on our climate trajectory as carbon reductions now are worth more than carbon reductions later.

Additionally, from a greenhouse gas inventory perspective, national and state programs such as the Federal Greenhouse Gas Reporting Requirement[7] and the California Mandatory Greenhouse Gas Reporting Requirement[8] require that biobased products report their combustion emissions in a manner that is consistent with the 2006 IPCC framework[9]. In short this means CO_2 emissions generated during the combustion of biofuels are reported as biogenic emissions, separately and distinctly from CO_2 emissions which originate from the combustion of fossil fuels. Additionally, non-CO_2 greenhouse gases that are emitted during the combustion of the fuel are reported as a fossil emission, since those emissions contribute to radiative forcing before degrading into CO_2.

The emissions that are generated during the production of these biofuels are captured elsewhere in the national, state, and international inventories. In fact, if one where to add up all the components of the inventory associated with the production of a biofuel, they would come to a very similar estimate to the life cycle carbon intensity generated by Argonne National

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[5] Life cycle energy and greenhouse gas emission effects of biodiesel in the United States with induced land use change impacts - PubMed (nih.gov)
[6] https://greet.es.anl.gov/
[7] eCFR :: 40 CFR Part 98 -- Mandatory Greenhouse Gas Reporting
[8] Mandatory Greenhouse Gas Emissions Reporting | California Air Resources Board
[9] Microsoft Word - V2_Ch3_Mobile_Combustion_Final.doc (iges.or.jp), section 3.17

Lab's GREET model. Simply put, inventory methods and life cycle assessments are aligned and compatible, both demonstrating that biofuels, like biodiesel, can dramatically reduce the CO_2 emissions generated from the combustion of petroleum. This can clearly be seen in states like California which report both inventory emissions[10] and life cycle carbon intensity[11] figures.

Biofuel Does Not Pit Food Against Fuel

This claim by some of "devastating consequences" as a result of biofuel production is utterly without merit and is made without any supporting evidence. In fact, replacing domestic petroleum diesel consumption with domestically produced biodiesel for heating applications not only reduces GHG emissions by up to 76%, but doing so is one of one the most sustainable actions available to Massachusetts and other states concerned with addressing climate change effectively.

- Biodiesel is the most diverse fuel available, made from a wide variety of waste and by-product feedstocks such as used cooking oil, rendered animal tallow, recycled grease, and agricultural byproducts from canola, soybean, and other plant oils.
- Biodiesel is nontoxic and biodegradable, and its production reduces wastewater by 79% and hazardous waste by 96%
- Biodiesel decreases soybean meal prices by $20-$40 per ton, saving livestock producers $5 billion in reduced soymeal cost and reducing food costs for consumers.
- The U.S. biodiesel industry supports more than 60,000 jobs, generates $11 billion for the U.S. economy (rather than on foreign oil), and recycles atmospheric CO2 into valuable fuel that enables progressive states to keep climate-worsening crude oil (the burning of which produces new, not recycled sources of carbon) in the ground.
- The "devastating consequences" claim appears to conflate palm oil production with soybean oil production. Palm oil production, conducted in tropical countries outside the U.S., often involves destructive practices, but those practices do not occur in domestic production of soybean and biodiesel. If the state wants to preclude the use of palm oil, it can easily do so via a prescriptive or performance standard without excluding the environmentally and economically beneficial domestic biodiesel industry.
- Indeed, biodiesel use in climate progressive states like California and Oregon has increased many-fold under their innovative low carbon fuel programs. For example, because of their positive attributes, biodiesel and renewable diesel have grown 61-fold in California since the start of its Low Carbon Fuel Standard program in 2011 to comprise over a quarter (27%) of the total on-road diesel fuel pool in the state.
- Such rapid growth has taken place due to substantial increases in agricultural yield, efficiency gains in the processing and production of biodiesel, and other improvements that have enabled the increase biodiesel production without the adverse land and soil carbon impacts noted by some environmental groups. It is inconceivable that California and Oregon would allow the use of such biofuels, much less the

[10] ca_ghg_inventory_trends_2000-2019.pdf – page 11
[11] LCFS Pathway Certified Carbon Intensities | California Air Resources Board

phenomenal growth these fuels have had, if the types of "devastating consequences" were actually being caused by these fuels.

- The U.S. biodiesel and renewable diesel production capacity is currently 3 billion gallons, with 6 billion gallons projected by 2030 (and probably years before then) and, with further innovations in feedstocks, up to 15 billion gallons by 2050. There are ample domestically sourced feedstocks for biodiesel production to meet all the region's needs.

Other States Have Already Taken Action

New York has already recognized the important of Bioheat ® fuel in passing a mandate bill last year. And other states and cities like Connecticut, Rhode Island, New York City and, in fact, Massachusetts (through its APS program and Executive Order No. 594) have established biodiesel pathways for reducing carbon emissions. Biodiesel and renewable diesel have been recognized by California regulators as a major factor in the success of that state's low carbon fuel standard. About a quarter of all on-road diesel fuel in California is now renewable diesel or biodiesel.

Disadvantaged Communities Benefit from Biodiesel Use

We understand equity and affordability are important aspects of the Clean Energy and Climate Plan. To better characterize the health benefits biodiesel can generate in local communities who switch from petroleum-based diesel, Clean Fuels commissioned a study by Trinity Consultants, a globally renowned air quality modeling firm, who specializes in air dispersion modeling. Their work, which is published online, characterizes the benefits of these fuels much more granularly, allowing decision makers to understand where the benefits of reduced particulate matter and improved health outcomes, would occur and to whom. The results demonstrate that the use of B100 as a heating oil replacement reduces carcinogenic, diesel particulate matter emissions by 86%. These dramatic reductions can lead to significant health benefits in the form of reduced asthma attacks, avoided work loss days, and reduced cancer risk. This is of particular value to EJ communities which bear a disproportionate burden from the adverse health effects of petroleum-based heating fuel. And, perhaps most importantly, these health benefits can occur with NO additional consumer investments.

In conclusion, Clean Fuels believes that biodiesel should be identified as a viable pathway in the state's Clean Energy and Climate Plan. We look forward to working with EOEEA staff in the development and implementation of this pathway.

Sincerely,

Stephen C. Dodge

Stephen C. Dodge
Director of State Regulatory Affairs
Clean Fuels Alliance America
sdodge@cleanfuels.org

MAPC
METROPOLITAN AREA PLANNING COUNCIL

SMART GROWTH AND REGIONAL COLLABORATION

April 29, 2022

Honorable Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Secretary Theoharides and Undersecretary Chang:

The Metropolitan Area Planning Council (MAPC) appreciates the opportunity to submit additional comments on the updates provided to the Interim Clean Energy and Climate Plan for 2030 (CECP) released by the Administration for public comment on April 14, 2022. As you know, MAPC is the regional planning agency serving the people who live and work in the 101 cities and towns of Greater Boston, which comprises roughly half of the state's population and two-thirds of the state's jobs. We are committed to smart growth, sustainability, regional collaboration, and advancing equity. MAPC has long recognized that making our Commonwealth more resilient to climate change for residents of all income levels will lead to healthier and stronger communities, and we have focused much of our work toward climate mitigation, preparedness, and adaptation.

Our work is guided by our new regional plan, MetroCommon2050.[1] The plan serves as a blueprint for making our region one that is energy efficient and climate-smart, is prepared for the extremes of a changing climate, and provides clean air and water for all. Climate change mitigation and resilience cut across the range of policy areas within MAPC's purview, including clean energy, transportation, land use, housing production, public health, and more. Through our membership on the Global Warming Solutions Act Implementation Advisory Committee (GWSA IAC) since its inception and involvement on each of the sector-based GWSA IAC work groups, MAPC is deeply involved in the implementation of the Global Warming Solutions Act and in forming the policy recommendations made to EEA for consideration in the Clean Energy and Climate Plan (CECP) update for 2030.

MAPC would like to first commend the Administration for making many of the necessary commitments to decarbonize our homes and businesses, connect our communities to renewable and clean sources of energy, and accelerate the adoption of carbon-free modes of transportation across the Commonwealth. We would like to underscore our particularly strong support for the following strategies:

- Requiring 100% Zero Emission Vehicle sales for light duty vehicles by 2035.
- Reducing the upfront cost burden of Zero Emission Vehicle purchases.
- Optimizing the MBTA Communities multifamily zoning mandate and MassDEP rideshare regulation as GHG emissions strategies.
- Advancing a statewide heating fuel emissions cap and performance standard for buildings by 2023.
- Leveraging municipal leadership and state grant programs to drive clean heating opportunities.
- Raising the Clean Energy Standard requirements for 2030.
- Improving the approach to the Gas Safety Enhancement Plans.

[1] https://metrocommon.mapc.org/

- Incentivizing urban tree planting and retention, healthy soils, and climate-smart forestry.

We must establish and accelerate a strong system of incentives and requirements so the state can meet our 2030 and 2050 commitments and our cities and towns can achieve their local climate goals. In these comments, we highlight the gaps and areas that should be strengthened within the updated CECP to ensure we can achieve an equitable and inclusive net zero future. In the final version of the CECP, MAPC strongly urges the Administration to:

- **Make equity and environmental justice central in each of the proposed strategies**. The effects of climate change systemically impact Environmental Justice (EJ) communities and communities of color inequitably. A holistic consideration of the benefits and impacts on EJ communities should underpin all that is put forth in the CECP.
- **Accelerate the pace and scale of GHG reductions by 2025.** While it is understandable that many actions may take time to operationalize, and therefore that more reductions will occur between 2025 and 2030, numerous actions can be initiated, scaled, or expanded immediately to reap more reductions sooner. The longer we wait to take no-regrets actions, the more expensive and challenging they become. An accelerated pace will enable the Commonwealth to take advantage of federal funding opportunities and may help to avoid unnecessary costs down the line.
- **Enhance the role of public transportation and land use planning in achieving net zero.** Increases in vehicle miles traveled (VMT) across the state will increase GHG emissions. While we appreciate the greater attention paid to public transportation and strategic land use planning decisions in the CECP updates, tactics and strategies will need to be rigorous and measurable to improve public transit infrastructure, increase the use of transit, bicycles, and walking, and encourage land use that is transit-oriented and lessens the demand for personal vehicular trips.
- **Include a comprehensive approach to build a green and equitable workforce**. Explicit policy actions that ensure a rapid and equitable expansion of the green workforce in Massachusetts are even more essential in the coming years as our state and national economies recover from the devastating impacts of the COVID-19 pandemic.
- **Restructure decision-making and accounting processes economy-wide to align with climate requirements**. "Cost-effectiveness" and "least-cost" remain common terms in the proposed strategies. We instead need to transform our economic framework to fully align with our statutory requirements to reduce GHG emissions across all state decision-making and funding allocations.
- **Create a State Climate Bank to supercharge climate mitigation efforts across the state.** Successful and just implementation of the CECP requires the identification and centralized coordination of substantial new sources of funding and financing to optimize federal dollars and leverage other public and private resources to meet the needs now and into the future.

The following comments specify MAPC's recommendations within each sector as well as our recommendations regarding equity, workforce development, and funding, connecting the dots to these six overarching areas for improvement.

Transforming Our Transportation Systems

MAPC appreciates that the limits and sublimits for 2025 and 2030 and updated transportation sector strategies demonstrate a concerted effort to promote more equitable pathways to reducing transportation emissions. These updates highlight the ways that the Commonwealth intends to be strategic with federal funding that is newly available to expand vehicle electrification investments across transportation services, including school buses, ride for hire vehicles, and delivery services. We were also glad to see that the suggested changes to the MOR-EV program were included, which will help ensure that the program

provides assistance to low-income, high mileage drivers with few transportation alternatives. Importantly, strategies to reduce emissions via investments in public transit, particularly bus infrastructure, and the successful implementation of the new MBTA Communities multifamily zoning mandate and MassDEP rideshare regulation are referenced in concrete terms as well.

These changes reflect a step in the right direction. MAPC's comment letter on the Interim CECP, authored in March 2021 and included as an appendix here, offers additional recommendations to enable more compact development near transit, expand resources available for municipalities to invest in more robust walking and biking infrastructure, increase the role of employers in reducing employee VMT, and more. We appreciate EEA's openness to considering these strategies and engaging with related agencies in deeper discussions about them. We encourage EEA to continue to use our recommendations, and MAPC more broadly, as a resource to operationalize the goals for achieving the 2025 and 2030 proposed sublimits.

We feel that it is very important to note that in the months since EEA released the Interim CECP, major shifts have occurred in the transportation funding landscape. The Transportation and Climate Initiative has been put on an indefinite pause, leaving the Commonwealth without a critical funding option for investments in transportation emissions reduction projects. President Biden has signed into law the Infrastructure Investment and Jobs Act (IIJA), which is estimated to provide Massachusetts over nine billion dollars in capital funding for a wide range of infrastructure projects over five years. IIJA gives the Commonwealth an opportunity to make a down payment on the 21st century low-carbon transportation system it deserves. However, IIJA alone will not address the MBTA's long standing capital and operating deficit. Working together with the Legislature, the Administration must put forward a complementary strategy to advance a range of transportation revenue raising options to fill the void created by the dissolution of TCI and ensure that Massachusetts has the resources available to invest in a robust, accessible, equitable, and climate-forward transportation system. MAPC compiled many of these funding opportunities in our 2019 report,[2] and we discuss funding more broadly toward the end of this letter.

Land Use, Transit, and Mode Shift

We encourage EEA to review MAPC's March 2021 letter for comments on additional strategies to enable mode shift, promote smart growth, and leverage local land use decision making as a decarbonization tool. Below are comments on some of the specific new policies proposed within this portfolio.

MBTA Communities and Housing Choice: MAPC was pleased to see the new Section 3A of M.G.L. Chapter 40A named as a transportation decarbonization strategy. This new zoning provision will not only enable the production of more housing near transit, but also empower more residents to live a less car-dependent lifestyle. We strongly encourage EEA and MassDOT to work closely with DHCD as draft guidelines are finalized. MAPC has provided extensive comments on how to ensure the final program guidelines can center equity.[3] Our comments highlight ways to structure zoning requirements in a manner that does not inadvertently direct the largest share of new zoning capacity to transit-poor areas, which would undermine the emissions reduction benefits of the program.

Public transit investments: A safe, reliable, and accessible public transit system is essential for smart growth to be a successful mode shift, VMT reduction, and ultimately, transportation GHG emissions reduction strategy. Investments in more robust public transit service connects residents to economic opportunities without having to rely on a personal vehicle, minimizing the pressure to achieve rapid personal vehicle electrification. MAPC is deeply supportive of the new strategy to fully fund the MBTA's bus modernization

[2] https://www.mapc.org/resource-library/transportation-finance-recommendations/
[3] https://www.mapc.org/resource-library/mbta-multifamily-zoning/

program. This will not only prepare the MBTA to make the shift to an all-electric fleet, but also ensure the MBTA has the maintenance capacity to support expanded bus service. Throughout the pandemic, bus service proved to be the most utilized, especially by transit-dependent and low-income essential workers. To accommodate sustained demand for frequent and reliable bus services, we also encourage EEA to support increased investments in transit operations.

Complete and Shared Streets and Spaces: MAPC has long been supportive of the Complete Streets program, helping communities draft Complete Streets policies and prioritization plans. The Shared Streets and Spaces program has provided critical support to cities and towns during the pandemic, allowing them to make more active use of their streets in business districts and downtowns. We are very glad to see the urgency around more resources for these programs. Building out a more connected network of safe walking and cycling infrastructure will help promote mode shift while providing additional first- and last-mile connections to transit. We encourage EEA also to include additional funding for the MassTrails program, as it is regularly oversubscribed, and municipalities are eager to integrate trail, greenway, and shared path infrastructure into their larger walking and biking landscapes.

Transportation Electrification

MAPC strongly supports the Administration's commitment to adopting the Advanced Clean Cars (ACC) II regulations upon finalization by California that would commit the Commonwealth to ramp up ZEV sales to 100% of new light duty vehicle sales by 2035. As we transition to electrification of light-, medium-, and heavy-duty vehicles, it is vital that the Commonwealth's strategies also make this transition accessible to low- and moderate-income residents across the Commonwealth and also ensure that electric vehicles are available to residents in urban, suburban, or rural communities.

Equitable Access to Transportation Electrification and TNCs: MAPC is pleased to see the Administration strengthen the commitment to a low- and moderate-income (LMI) consumer program. This was one of the primary recommendations from the Ride for Hire Electrification Working Group that MAPC convened at the request of EEA.[4] The Working Group members learned from Uber and Lyft that many drivers are from low-income communities and that the majority of rides start or end in low-income communities. In addition to expanding ZEV incentives for low- and moderate-income drivers, making rebates available at the point of sale will make these incentives more accessible. We encourage EEA to consider additional opportunities to expand access to ZEV incentive programs for LMI drivers, including establishing a dedicated funding source for LMI consumer programs, creating a statewide program for low- or zero-interest vehicle loans, and incorporating an option to purchase used ZEVs. Until robust incentives are implemented along with community outreach and education, the transition to electrify the light-duty vehicle fleet in Massachusetts will remain available only to those with means.

As trips taken by transportation network company (TNC) drivers represent a growing segment of VMT in Massachusetts, it is increasingly important that we electrify these miles to achieve our net zero commitment. MAPC is glad to see the Administration consider an incentive structure that provides additional incentives for the replacement of high-mileage internal combustion engine vehicles with ZEVs. In parallel, EEA will want to consider how best to ensure workforce protections for TNC drivers. MAPC's March 2021 CECP comment letter, included here as an appendix, offers additional recommendations to help state and local governments meet pollution and emissions reduction goals and increase use of ZEVs equitably.

Mechanisms to Deploy Charging Broadly: MAPC would like to underscore the Administration's acknowledgement of the need for revisions to our utility rate structures. These revisions are crucial to

[4] https://www.mapc.org/resource-library/ride4hireelectric

support the full-scale deployment of direct current fast-charging (DCFC) infrastructure and accelerate electrification of vehicles across the state. MAPC strongly urges the state to require the Commonwealth's electric distribution companies to enact a rate structure for DCFC infrastructure by the end of 2022 that includes both climate-smart time-varying rates and the removal of punitive demand charges.

MAPC supports the Administration's commitment to explore a utility-based residential charging incentive program. A particular challenge for more densely urban communities is the lack of access to off-street parking. MAPC is glad to see reference to a residential charging infrastructure program in the CECP update and recommends that any residential charging incentive program include mechanisms to support the deployment of on-street charging in partnership with municipal governments.

Strategic and Equitable Consumer Awareness: Ongoing efforts of MassEVolves and Drive Green highlighted in the CECP have been foundational in promoting greater consumer awareness of EVs. As the Administration devises specific strategies to increase support for outreach and education, MAPC encourages the Administration to target consumer awareness toward dealership education and outreach and to educational initiatives tied to the LMI program proposed in the CECP.

Transforming Our Buildings

Decarbonizing the buildings sector is essential to achieving the Commonwealth's emissions limits for 2025, 2030, and beyond. The transition to better buildings presents tremendous opportunities beyond GHG emissions reductions alone, from improving public health, strengthening local economies, and increasing resilience to extreme weather to redressing environmental injustices. Thousands of well-paying jobs and expanded workforce opportunities, lives saved through reduced pollution, and better housing developments will result from constructing and retrofitting our buildings to be green, healthy, efficient, and affordable. The goals of mitigating climate change and addressing our housing crisis are not mutually exclusive.

The Commonwealth must move much more quickly to facilitate this transition by massively scaling up its investments in climate-forward policies, programs, and incentives, setting wheels in motion in the next six to twelve months, rather than waiting for planning effort results, new structures in place, or a clean electric grid to initiate our next steps.

Clean Heating

MAPC commends EEA for launching the Clean Heat Commission and Interagency Building Decarbonization Task Force since the Interim CECP's release. We have appreciated participating on the Commission and are hopeful that the recommendations set forth to date will improve the CECP. We moreover look forward to the Commission's work expanding and deepening these recommendations over the next six months to lay the groundwork for the heating fuel emissions cap and related performance standards as well as the financing and funding mechanisms to come. While acknowledging that the Commission's timeframe for action was truncated, we must also acknowledge that the climate crisis is not patient with our delays. We urge EEA accordingly to reinstate the timeline from the Interim CECP for the cap so that it is designed and implemented by the end of 2023. We recommend that the cap design be completed by Q2 2023 and the regulations in effect by no later than Q1 2024. These should be designed to meet aggressive 2025 sublimits and with sufficient declining cap levels in subsequent years to achieve or exceed the updated 2030 subsector emissions limits.

In addition to these declining caps, we must also utilize the revenue collected through alternative compliance payments or fees once the caps are in effect to equitably protect low- and -moderate income people and EJ communities. Rebates, incentives, and technical assistance must be made available to support both owners and renters in making their buildings more energy efficient and in converting heating to non-

fossil fuel systems, especially in rental properties. To this end, the cap must be structured to drive fossil fuel customers toward carbon-free renewables and to phase out fossil fuel combustion in buildings.

We urge EEA to eliminate the addition of hybrid heating solutions as part of a 2030 expanded definition for electric space heating. MassCEC's whole home pilot, in addition to many other studies and real-world examples, demonstrated that "whole-home heat pump systems offer a high-performance solution today and that the market is ready for significant expansion going forward" without having to maintain two heating systems.[5] For nearly all applications, hybrid systems that extend fossil fuel use in buildings, even blended fuels, risk extending the life of fuel oil and propane infrastructure and the gas distribution system, leading to billions of dollars in stranded assets funded by ratepayers and endangering public health and equity in addition to climate.

Performance Standards, Benchmarks, and Scorecards

As the majority of the 2.5 million buildings in Massachusetts will still be standing in 2050, the need to decarbonize existing buildings is critical. To meet our 2030 commitments, according to the Interim CECP, and reflected in the updated metrics, "20% of building stock [will require] a deep energy retrofit, representing about three-quarters of all replacement points for windows, roofs, etc." The scale of the challenge at the pace required means that we must initiate and advance a significant suite of policy, financing, and workforce development tools immediately.

Current incentives and program structures are not sufficient. Nor will they be this decade unless the Commonwealth establishes a strong building emissions benchmarking requirement and performance standard statewide. This action would enable buildings to meet a declining heating fuel cap while accelerating the shift from fossil fuels to energy efficiency, electrification, and renewables. Rather than exempting certain building types, uses, or populations, the state should provide ample funding, financing, and technical assistance. These resources should support all community members, especially LMI and EJ communities, to reap the benefits of better, more resilient, healthier buildings as soon as possible, looking to the models of Energiesprong and RetrofitNY.

While benchmarking can be the first step, as proposed in the CECP updates, it cannot be the only step. We recommend that a state benchmarking policy be followed – with a predictable and escalating timeframe – by a statewide building emissions performance standard (BEPS). Strong models exist in Washington DC, Washington State, and New York City, among others. The following schedule should be established in the CECP so that industry, building owners, and residents can adjust and prepare accordingly:

- The benchmarking policy for buildings over 50,000 square feet goes into effect no later than July 2023.
- The benchmarking policy for buildings over 20,000 square feet goes into effect no later than January 2025, and buildings over 10,000 square feet no later than January 2027.
- The BEPS for buildings over 50,000 square feet goes into effect no later than January 2024, phasing in buildings over 35,000 square feet by January 2026, buildings over 20,000 square feet by January 2028, and over 10,000 square feet by January 2030.

A municipality's existing standards should be grandfathered if comparable to the state's requirements. Violations for noncompliance should be enforced starting no more than one year after the effective date of each regulation. As we advance these building standards, we must also adopt complementary policies to preserve and produce affordable housing, especially where housing prices continue to skyrocket and more residents are priced out of our region.

[5] https://www.masscec.com/blog/2021/09/13/masscec-pilot-showcases-success-whole-home-heat-pumps

To support the declining BEPS and cap mechanisms, energy scorecards can be a helpful tool. MAPC recommends these be a requirement of a Green Communities 2.0 program in addition to an option for other municipalities. A building energy scorecard should be required at the time of listing, rather than sale or lease, as proposed in the CECP updates. Examples for this earlier transaction point exist in Portland, OR; Minneapolis, MN; Montpelier, VT; and Chicago, IL.[6,7] Sale or lease is likely too late in the process to influence those looking to buy or rent a home or commercial building space, thereby having a diminished effect in persuading those listing the property to achieve a better score. If choosing to phase in time of listing labeling later in the program, the Administration should consider mandatory compliance with the time of sale or lease scorecard, as in the states of Maine and New York.[8] Protections and support for low-income residents, seniors, and people on a fixed income should be incorporated into any scorecard policy.

Mass Save

The Mass Save program is currently one of the most important tools available to reduce emissions from buildings, new or existing. The 2022-2024 Energy Efficiency Plan is a strong step forward and will hopefully result in a large number of weatherization jobs and heat pump installations, as well as more equitable program design that reaches many more of our underserved residents. As the Energy Efficiency Advisory Council (EEAC) member representing Commonwealth cities and towns, MAPC urges the update to the 2030 CECP to retain the boldness of the interim plan in regard to Mass Save and input specific policies for how we get there. The full sea change called for in the Interim CECP to eliminate fossil fuel incentives no later than the end of 2024 must be reiterated here and include a complete elimination of incentives for new fossil fuel equipment, service, training, and other investments within the 2025-2027 Plan. This will require not just DOER, but also leadership, support, and guidance from EEA and cooperation from DPU.

Building Code

MAPC was pleased to see the rigorous energy efficiency provisions proposed in the DOER straw proposal for updating the current Stretch Code this past February. Over 85% of municipalities have adopted this above-code appendix, and rigor here will have an outsized impact. Additional onsite solar and electric vehicle charging requirements and a lower HERS rating threshold for buildings heated with fossil fuels can strengthen the Stretch Code update further. As likewise shared in our comments to DOER,[9] the proposed specialized net zero code concept can be improved as well. We strongly recommend that it include a net zero definition that specifies a high-performance all-electric building powered by renewable energy and constructed to meet robust energy efficiency requirements on par with Passive House. This is the place to lead and to allow municipalities that are ready and willing to set the new bar to do so. MAPC will continue to encourage the affordable housing accommodations needed to avoid a slow-down in new development or increase in displacement while also enabling the residents to participate in the benefits of healthier net zero buildings, such as improved air quality, enhanced resilience to extreme temperatures, and reduced operational energy costs.

In the Interim CECP, EEA had proposed to consolidate the higher-performance opt-in code into the base building energy code by January 1, 2028. We remain highly supportive of integrating the opt-in high-performance net zero code pathway into the base code by this date and urge EEA to retain this in the updated CECP. We further recommend that, by 2025, the new specialized net zero opt-in code supplant

[6] https://www.mwalliance.org/sites/default/files/meea-research/energy-disclosure-fact_sheet.pdf
[7] https://www.naseo.org/issues/buildings/home-energy-labeling
[8] Ibid.
[9] https://www.mapc.org/wp-content/uploads/2022/03/MAPC_to-DOER_Comments-re-Stretch-Code-Proposals_3-15-22.pdf

the stretch code. This would return the state to two building energy code options: a base building code and a net zero stretch code that includes both the stretch code and the specialized net zero code municipalities. By 2028, this – or an updated version – would then become the base building energy code. Such code pathways and accelerated timelines are both feasible and necessary in order to reach high levels of energy efficiency, electrify buildings, and maximize renewable energy, either onsite as practical or offsite.

Cities and Towns as Incubators

As climate change in general, and building decarbonization in particular, require a multi-pronged approach, cities and towns present a powerful means through which to advance new and improved models for policy, program, and project deployment. MAPC agrees with EEA that existing statewide programs that interact with localities can serve as key drivers in this.

Green Communities: A new climate mitigation-focused tier of Green Communities, or Green Communities 2.0, should be launched by the end of 2022, to coincide with the promulgation of the new Specialized Net Zero Code. First-mover communities will be ready to start adopting the net zero code at that time. By including adoption as a requirement in a Green Communities 2.0 program, additional communities will be incentivized to pursue adoption, just as the original Green Communities program mobilized Stretch Code adoption and accelerated GHG emissions reductions. Green Communities 2.0 requirements should likewise incentivize home energy scorecards, net zero action planning with GHG inventory tracking, and grants for projects in municipal and community buildings and fleets that equitably reduce GHG emissions.

Massachusetts School Building Authority: Climate should be centered in all Commonwealth-directed funding and financing decisions, and the Massachusetts School Building Authority (MSBA) should be the next to institutionalize this practice. Schools are by far the most significant energy hogs of our municipal building stock. Yet one of the largest funding instruments, MSBA, does not require that these buildings meet any climate or energy reduction standards beyond building and safety codes. To access this funding, cities, towns, and regional school districts should be required to meet increasingly stringent energy and emissions thresholds for their school buildings. Many municipalities are leading the way, currently building their schools to passive house and net zero standards with solar and geothermal installations. Many others, however, are missing opportunities to create or retrofit school buildings to high performance standards that enable better health, equity, and learning outcomes, greater resilience to extreme temperatures, GHG reductions, and reduced operational savings.

Massachusetts Environmental Policy Act (MEPA): MAPC also appreciates the reference to the Massachusetts Environmental Policy Act (MEPA) GHG review threshold as an important lever in the CECP update, and we look forward to continuing to participate in the advisory process. We encourage the CECP to call out a few specific ways that MEPA can play a more representative and impactful role in building decarbonization. Most notably, there is the need for clearer and more rigorous standards that are applied earlier in the review process. During the scoping part of the process, in-depth requirements for demonstrating how the project will mitigate GHG emissions and will meet or exceed the building energy code of the location or the Stretch Code, whichever is more stringent, could be a useful strategy.

Transforming Our Energy Supply

MAPC strongly supports the Administration's commitment to increase the Clean Energy Standard (CES) requirements to at least 60 percent by 2030 and encourages greater and more rapid action. Deep decarbonization of our energy supply is the backbone to achieving near-term emissions reductions across sectors as we seek to electrify our transportation and heating and cooling systems. To more swiftly decrease electricity emissions, MAPC recommends that the Administration increase its commitment much more

rapidly, aiming to reach 100 percent by 2030 under the CES. Additionally, MAPC strongly recommends that the Administration address the IAC Electricity Work Group's recommendation to construct a strategy review and alignment of the RPS, APS, CES, and CPS regarding the participation of biomass, landfill gas, and municipal solid waste "waste-to-energy" generators.

Solar and Wind Development

The updated CECP commits to conducting a clean energy resource projection to keep resource development "on pace" to meet needs anticipated by 2050. MAPC recommends that EEA further define what "on pace" means for Massachusetts and make bold commitments to maximize the deployment of solar and accelerate offshore wind development by 2030. While we are deeply supportive of the state's existing commitments to accelerate the deployment of renewable energy resources, we must exceed these commitments to ensure our best chance of mitigating the worst impacts of climate change. The CECP should therefore set a goal of 10 GW of installed solar capacity by 2030. MAPC also encourages the inclusion of more specific policies to bolster solar development, similar to those outlined in the Interim CECP, such as minting RECs and removing utility interconnection barriers. Bold commitments to accelerate solar and wind deployment should be paired with appropriate siting practices that minimize the use of greenfields and eliminate barriers to building on brownfields and other multi-benefit co-uses. Program models and incentives should be designed and improved to allow more EJ communities to capture the benefits of solar.

Grid Modernization

Regional coordination on electricity system planning across the ISO New England states and collaboration across Massachusetts agencies and departments on grid modernization is fundamental to achieving a decarbonized and resilient energy supply. However, MAPC is concerned that the updated CECP, and consequently the projected emissions reductions for 2030, may be over-reliant on regional processes, like the New England States Committee on Electricity, to make substantive progress. We must act now to ensure grid resiliency and reliability and provide market-based incentives for energy supply decarbonization. In particular, MAPC would like to see a more aggressive commitment to incorporating GWSA compliance into distribution-level policy decisions in the near term. The proposed criteria of a least-cost approach for distribution system planning in the revised strategy should be replaced by a method that significantly values equity and the social cost of carbon. MAPC also recommends requiring substantive and accelerated implementation of grid modernization efforts by DPU, DOER, and EEA by 2025, and comprehensive electric and gas utility reform ideally by mid-decade and certainly no later than 2030, as referenced in other sections of this letter.

Mitigating Other Sources of Emissions

The CECP update proposes that the GHG emissions from "Natural Gas Distribution & Service" will decrease 0.1 MMT between 2020 and 2025 and stay constant at that level, which would equal an 82% decrease since 1990, through 2030. While MAPC has long been advocating with the nonprofit Home Energy Efficiency Team (HEET) for better coordination and communication between gas companies and municipalities, we have seen little evidence that this work is actually reducing the number of gas leaks, preventing gas explosions, or lowering greenhouse gas emissions. Moreover, there is mounting evidence that burning gas in our homes is bad for our health.[10] MassDEP must continue to improve its GHG accounting methodologies and update its methane accounting to properly account for the sizable contribution methane has and will continue to make.

[10] https://www.npr.org/2021/10/07/1015460605/gas-stove-emissions-climate-change-health-effects

MAPC shares the concerns of many municipalities and local advocates that methane emissions have been severely undercounted over the years;[11] that pipe replacement in the Gas System Enhancement Plans (GSEPs) has not reduced methane emissions, as demonstrated by Harvard University's top-down analysis;[12] and that the cost of GSEP implementation could be more than $20 billion.[13] While the updates on the limits and sublimits for 2025 and 2030 mention a change in approach to the GSEP to upgrade leaky pipes, they do not include detail about that change. The proposals put forward by the gas companies in the DPU 20-80 "Future of Gas" proceeding indicate that the gas companies intend to prioritize pipe replacement and expensive and untested solutions like hydrogen and "renewable natural gas" rather than transitioning to the climate-smart future that is required.

We are very supportive of shifting to alternatives such as electrification and retirement, as proposed for evaluation in the CECP updates. Overall, the CECP should acknowledge the importance of mapping a pathway away from all fossil fuels, including natural gas, as soon as possible and with minimal impact to ratepayers, residents, and businesses. A "Comprehensive Energy Transition Approach" cannot wait until December 2023 for a recommendation to the Legislature, and enactment at some indeterminate date after that. That future needs to be planned for now, with comprehensive recommendations to the Legislature no later than July 2023, and infrastructure expansion ceased by mid-decade.

Protecting Our Natural and Working Lands

Reducing fossil fuel emissions is the number one strategy in our fight to mitigate climate change. Preserving and increasing the capacity of land to sequester and store carbon is therefore critically important. Natural and working lands also provide important climate resilience and other co-benefits, including cooling and shade, clean air and water, flood protection, production of food and fiber, and recreation, scenery, and quality of life. The Commonwealth should accurately and effectively leverage natural and working lands as a part of the state's climate change strategy using best management practices aligned with international standards for carbon accounting and GHG inventories. MAPC also recommends that the Administration continue advancing the implementation of near-term policies and actions to protect, manage, and restore natural and working lands while improving its methodology for carbon accounting.

It is vital that the Commonwealth's climate change strategy include provisions to preserve, increase, and maintain the presence of healthy and mature street trees and the urban tree canopy overall. MAPC encourages EEA to institute a more aggressive target for the planting and preservation of urban and suburban trees by 2030, with a focus on EJ communities, along rivers, streams, and meadows. The current target of 16,100 acres of new tree cover may be only half of the opportunity available. To aid the expansion of the urban tree canopy, MAPC further encourages the state to identify priority locations in EJ communities to convert impervious surfaces to green spaces. The reduction of gas leaks from leak-prone pipe will further enhance the preservation of street trees, enabling them to support urban GHG reductions and improved air quality. State funding should also be allocated to ensure local planting programs and initiatives provide tree care and maintenance.

MAPC commends EEA for proposing that funds be allocated for projects that increase opportunities for carbon sequestration and reduce urban heat island, and ultimately help restore our lands. MAPC urges EEA to continue prioritizing funding for projects that significantly and directly improve public health benefits in EJ populations. Current formulas and pending legislation are based on property value instead of

[11] https://www.bostonglobe.com/2021/10/25/science/state-vastly-underestimates-emissions-natural-gas-study-finds
[12] Ibid.
[13] https://www.bostonglobe.com/2021/10/03/science/massachusetts-envisions-fossil-fuel-free-future-gas-companies-are-quietly-investing-billions-pipelines/

minimizing harm from extreme weather events, climate change, and air and water quality. The cost-benefit formula for adaptation measures should consider public health benefits, reduced heat island impacts, reduced flooding damage, and prioritization of EJ populations.

Equity and Workforce Development

As the Commonwealth transitions to a fully decarbonized future, our strategy needs to support both a just transition and equitable access to the benefits of this transition. The expansion of the clean energy industry offers tremendous opportunities for the creation of thousands of long-term, sustainable, good paying jobs installing and maintaining clean energy and climate technologies. Across all sectors, MAPC strongly encourages the Administration to continue to incorporate the recommendations from the IAC Climate Justice Working Group regarding accountability, transparency, and inclusion of EJ populations in the decision-making processes,[14] and to implement best practices from the White House's Justice40 Initiative.

Equitable Siting Practices

MAPC appreciates the inclusion of content to "Ensure Equity in Siting Decisions" as part of the Electricity Sector updates. We encourage the Administration to commit more specifically to developing a transparent process with robust community involvement to inform the siting of new transmission or energy-related infrastructure and distribution system changes. This, paired with climate-forward accounting in state decision-making processes, should aid in protecting against disproportionate siting of facilities in EJ communities and ensuring that related cost savings and health benefits result for those residents. MAPC also recommends that the Administration include strategies to expand the deployment of microgrids and renewable energy cooperatives that serve EJ populations.

Equitable Clean Energy Workforce Development

Key demographics, including people of color and women, are underrepresented in the current clean energy workforce, and minority, women, and disadvantaged business enterprises (MWDBEs) are consistently excluded by the structures in place. As the Commonwealth executes a large-scale expansion of good green jobs, there is a fundamental opportunity to increase representation from MWDBEs. Our transition will also displace workers from fossil fuel-related jobs, and the Commonwealth must plan for retraining these workers to participate in the clean energy economy. We support the development of a Clean Energy and Climate "Workforce Needs Assessment and Investment," and recommend it be applied across all sectors. We also encourage the Administration to define more fully how the design of workforce programs will develop equitable procurement and supply chain practices and bolster workforce and market development resources to greatly expand the participation of MWDBEs in the clean energy economy.

Funding Options to Advance Climate Mitigation and Resiliency

The Commonwealth will need to utilize a suite of funding and financing mechanisms to ensure a swift and equitable transition to net zero emissions. In the wake of both the Transportation Climate Initiative and the New England Clean Energy Connect transmission lines plans collapsing, at least temporarily, the Commonwealth must now scramble for other resources, funds, investments, and tools to grow our clean energy efforts. This includes sector-wide carbon pricing, building off the TCI-P framework. One proposal currently before the Legislature is *An Act providing for climate change adaptation infrastructure and affordable housing investments in the Commonwealth*, filed by Representative Nika Elugardo (H.2890) and Senator Jamie Eldridge (S.1853). This legislation, also known as the Housing and Environment Revenue Opportunities

[14] The IAC Climate Justice Work Group's memo providing recommendations to improve the IAC's 2019 list of recommended policies can be accessed at https://www.mass.gov/doc/climate-justice-working-group-policy-recommendations/download.

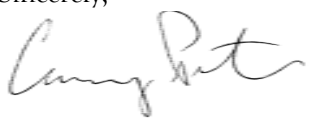
(HERO) bill, was originally modeled after the Administration's S.10 proposal. It would increase the real estate excise tax to fund climate and housing needs, and likewise deserves the Administration's support.

An additional mechanism to undertake is the creation of a Climate Bank, which could provide capital for several of the necessary infrastructure investments, upgrades, and systems. The City of Boston has begun to explore how to establish a Boston Climate Bank in order to help the city and its residents meet their ambitious climate goals. Such an entity would be even more effective statewide. The statewide Climate Bank could be initially capitalized by the Commonwealth or through federal recovery funds. This mechanism could include debt financing, where appropriate paybacks exist, for measures related to renewable energy, non-combustion clean heating and cooling, transit, and water infrastructure and technology investments, and institute a revolving loan fund and other financing tools where paybacks can be more challenging. Substantial funding and financing, from the state directly and indirectly, will be required quickly and at scale to advance deep energy retrofits, long-duration battery storage, district heating and cooling, and other large-scale decarbonization and resiliency measures.

The Climate Bank should prioritize funding innovative, emerging, and transformative climate and energy technologies and programs as well as regional or multi-municipal resilience infrastructure, both green and grey, especially in EJ communities. We urge EEA to consider specific inclusion of a Climate Bank within the CECP, and to call out other promising concepts as well, such as restructuring the economic accounting and allocations to prioritize the metric tons of carbon reduced or avoided and developing a climate-forward tax credit strategy. Regardless of the funding mechanisms pursued, we encourage the Administration to structure them in a way that minimizes the impact on low-income individuals and maximizes investments that prioritize historically underserved and overburdened communities, following the Justice40 model.

Thank you for the opportunity to provide comments and for the Administration's consideration of our recommendations. MAPC looks forward to continued collaboration with the Administration on its efforts to achieve a 50% emissions reduction by 2030 and net zero emissions by 2050. Please contact me at cpeterson@mapc.org with any questions or for further discussion regarding MAPC's comments.

Sincerely,



Cammy Peterson
Director of Clean Energy
Metropolitan Area Planning Council

Appendix:

MAPC Comment Letter on the Interim CECP, March 22, 2021

March 22, 2021

Honorable Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Secretary Theoharides, Undersecretary Chang, and the 2030 Clean Energy and Climate Plan Team:

The Metropolitan Area Planning Council (MAPC) appreciates the opportunity to submit the following comments on the draft Interim Clean Energy and Climate Plan for 2030 (CECP) released by the Administration for public comment on December 30, 2020. MAPC would like to thank the Administration for the opportunity to provide input at this critical juncture in the planning process.

As you know, MAPC is the regional planning agency serving the people who live and work in the 101 cities and towns of Greater Boston, which comprises roughly half of the state's population and two-thirds of the state's jobs. We are committed to smart growth, sustainability, regional collaboration, and advancing equity. MAPC has long recognized that making our Commonwealth more resilient to climate change for residents of all income levels will lead to healthier and stronger communities, and we have focused much of our work toward climate preparedness, adaptation, and mitigation.

Through our membership on the Global Warming Solutions Act Implementation Advisory Committee (GWSA IAC) since its inception and involvement on each of the sector-based GWSA IAC work groups (energy, buildings, transportation, and land use), MAPC is deeply involved in the implementation of the Global Warming Solutions Act and in forming the policy recommendations made to EEA for consideration in the Clean Energy and Climate Plan (CECP) update for 2030.

MAPC would like to first commend the Administration for making many of the necessary commitments to decarbonize our homes and businesses, connect our communities to renewable and clean sources of energy, and accelerate the adoption of carbon-free modes of transportation across the Commonwealth. MAPC would like to underscore our particularly strong support for the Administration's inclusion of the following strategies:

- Implementing the Transportation and Climate Initiative Program (Strategy T1).
- Requiring 100% Zero Emission Vehicle sales for light duty vehicles by 2035 (Strategy T2).
- Establishing a GWSA-compliant base building code by 2028 (Strategy B1).
- Imposing a statewide heating fuel emissions cap for buildings by 2023 (Strategy B3).
- Raising the Clean Energy Standard requirements for 2030 (Strategy E3).

The state's leadership on establishing a robust policy system of incentives and requirements to work toward net zero is essential to support both the state in attaining our 2030 and 2050 commitments and our cities and towns in achieving their local climate goals. In these comments, we wish to highlight the gaps and areas that merit strengthening within the draft CECP to ensure we can accelerate the Commonwealth's path to an equitable and inclusive net zero future. In the final version of the CECP, MAPC strongly urges the Administration to:

- **Make equity and environmental justice central in each of the proposed strategies**. The effects of climate change systemically impact Environmental Justice communities and communities of color inequitably. While the CECP's overview articulates a commitment to apply an equity and justice

lens to programs and policies, the draft CECP lacks rigorous and measurable tactics and strategies to ensure an equitable and just transition to a net zero future. The Administration took a critical first step in this regard by including "climate change" within the state's definition of environmental burden for Environmental Justice populations in Governor Baker's proposed amendments to S.9, which have been retained in the final bill. This holistic consideration of the benefits and impacts on Environmental Justice communities should underpin all that is put forth in the CECP.

- **Enhance the role of public transportation and land use planning in achieving net zero**. Increases in vehicle miles traveled (VMT) across the state will increase greenhouse gas (GHG) emissions, and as those miles are electrified, increase demand for electricity. As such, improvements to public transportation and strategic land use planning decisions will play an important role in mitigating substantial increases to VMT and supporting the Commonwealth in achieving its net zero target. As with environmental justice, the plan should therefore include rigorous and measurable tactics and strategies to improve public transit infrastructure, increase the use of transit, bicycles, and walking, and encourage land use that is transit-oriented and lessens the demand for personal vehicular trips.
- **Include a comprehensive approach to build a green and equitable workforce**. Explicit policy actions that ensure a rapid and equitable expansion of the green workforce in Massachusetts are even more essential in the coming years as our state and national economies recover from the devastating impacts of the COVID-19 pandemic. The Commonwealth is poised to reshape the clean energy and climate industries, where women and people of color are currently underrepresented, through targeted measures to support economic advancement and access.
- **Advance policy to account for the social cost of carbon economy-wide**. Cost-effectiveness and least-cost solutions are underscored throughout the strategies proposed by the Administration. We instead need to shift our economic framework to appropriately account for the true cost of GHG emissions and assess the co-benefits of climate mitigation across all state decision-making processes.
- **Create a dedicated funding source to support climate mitigation efforts across the state**. Aside from the Transportation Climate Initiative Program, the draft CECP makes no mention of new funding sources or mechanisms to support agencies in moving forward with the policies and programs specified. Successful and just implementation of the CECP requires the identification of additional new sources of funding sufficient to meet the need.
- **Incorporate contingency plans to address the inherent uncertainties around the potential GHG impacts of each strategy**. There is consensus on the urgency of achieving the state's targets for 2030. The sooner we act to dramatically reduce emissions, the more able we will be to avoid the worst impacts of climate change and provide the benefits of better air quality, better buildings, and less traffic congestion to all, and particularly those most vulnerable. Accordingly, the final CECP should reckon with how the Administration intends to be nimble and overcome unanticipated changes in the next ten years that may diminish the scale of emissions reductions.

The following comments specify MAPC's recommendations within each chapter of the CECP and highlight areas that connect with these six overarching areas for improvement. We provide recommendations in the final section on potential funding sources for greater consideration.

Transforming Our Transportation Systems

Role of Land Use and Transit

Both the draft CECP and Decarbonization Roadmap ("Roadmap") contain bold strategies for achieving ambitious goals for mitigating climate change through emissions reductions. Centerpieces of the plans include rapid electrification of the vehicle fleet, massive increases in renewable energy production, electric

grid improvements, stronger energy efficiency standards, and deep building retrofits. With the emphasis on equity, robust scenario analysis, and stronger targets, there is much to admire about the Roadmap and CECP documents. However, MAPC strongly urges the Administrative to take a more comprehensive approach to transportation sector emissions reductions that appropriately addresses the role of land use and transit in mitigating climate change.

MAPC recently released a research brief entitled *The Impacts of Land Use and Pricing in Reducing Vehicle Miles Traveled and Transport Emissions in Massachusetts.*[15] The report describes our analysis of forecasted household VMT in the MAPC region out to the year 2030 under a baseline scenario, two alternative land use scenarios (sprawl and smart growth), and multiple roadway pricing scenarios. To conduct the analysis, we used our detailed land use allocation model, UrbanSim, to prepare census block-level household and employment forecasts, and another Vision Eval modeling tool called RSPM, which operates at a much more detailed level than the EERPAT model used by the EEA consultants.

Based on the results of our analysis and our other research on VMT reduction policies, we find the treatment of VMT in the Roadmap and CECP to be inadequate. The following sections detail MAPC's primary concerns with the analysis and recommendations for comprehensively addressing VMT in the final CECP. EEA should revisit its analysis in the Roadmap and develop more robust VMT reduction strategies for the CECP.

Dismissal of the Role of VMT in Reducing Emissions: The Commonwealth's plans are predicated on rapid electrification of the vehicle fleet, which will reduce the per-mile energy demand due to the greater efficiency of electric vehicles, and production of sufficient renewable energy to power those vehicles with no net carbon emissions. This rapid fleet turnover will not be easy, or cheap — billions of dollars in subsidies may be needed. Notably, the CECP and Roadmap assume that this reduction in energy demand and GHG emissions can be achieved while still experiencing substantial growth in VMT from light-duty vehicles, 22.6% statewide and 25% in the MAPC region between 2015 and 2050.[16]

The Roadmap expressly dismisses efforts that seek to reduce transportation energy demand by reducing growth in VMT, choosing to rely solely on electrification of the fleet. Using the modeling tool EERPAT, EEA and its consultants evaluated the effects of density, improved transit, and roadway pricing. The results suggest that land use policies promoting greater density could reduce the growth in VMT by only 0.5 percentage points over 2015 VMT, and that a 10-cent VMT fee would reduce VMT growth by 7.6 percentage points over 2015. Ultimately, the Roadmap report concluded that VMT reduction was "limited in opportunity;" that land use policies would have only a "modest potential impact;" and that pricing policies or transit improvements "would have to be substantial" in order to have an impact.[17] The Roadmap report concludes these strategies do not merit inclusion, even as complementary strategies.

The draft 2030 CECP takes a somewhat less dismissive approach regarding land use, retaining the "Smart Growth Policy Package" which has been a part of each CECP since 2010, and assuming a 25% reduction in single-occupancy vehicle commuting. The Smart Growth Policy Package (SGPP) consists of a range of activities, including technical assistance, infrastructure programs, and other unspecified "new,

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[15] *The Impacts of Land Use and Pricing in Reducing Vehicle Miles Traveled and Transport Emissions in Massachusetts*," MAPC, January 2021, https://www.mapc.org/resource-library/vehicle-miles-traveled-emissions/

[16] "Transportation Sector Report: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study," December 2020, page 41, https://www.mass.gov/doc/transportation-sector-technical-report/download

[17] Ibid, page 5.

complementary policies." To achieve a 25% reduction in commuter VMT, the CECP proposes "broadening the scope of [existing] regulation[s] or utilizing a complementary policy approach," without further detail. Together, these policies are posited to "stabilize" light-duty VMT at about 56 billion miles per year, approximately 3% higher than the annualized figure for 2015 VMT reported in table 14 of the Roadmap Report. The CECP posits that implementation of the SGPP will reduce GHG emissions by 0.1 MMTCO2e by the year 2030, or 0.5% of the total light-duty vehicle GHG emissions in 2015. A reduction in single-occupancy commuting is projected to reduce light-duty emissions by 0.6 MMCO2e over the same period, or 3.5% of 2015 emissions. In other words, these two policies are together asserted to reduce VMT growth by 4 percentage points. The precise rationale or technical justification for the reduction attributed to the SGPP and commuter VMT reduction is not explained.

Underestimation of Future Growth in VMT: While VMT growth is uncertain, it is almost certainly underestimated by the EEA analysis. EEA's consultants estimated 25% growth in the Boston MPO region over the 35-year period from 2015 and 2050. MAPC's analysis using more detailed land use forecasts and a more detailed version of the VisionEval modeling tool suggests much more rapid rates of VMT increase: a 21% increase in Boston MPO-region VMT over a 20-year period. This would roughly equate to a 42% in VMT for that same 35-year period. Our projections are much more consistent with historical trends, which show a roughly 25% increase in on-road VMT since 2000 (Transportation Sector Report, Figure 10.)

There are also many reasons to believe that future availability of autonomous vehicles will further accelerate VMT growth as they reduce the "time cost" associated with driving. While the COVID-19 pandemic has dramatically suppressed commuting for those who can work from home, and may have ushered in a new age of remote work, continued teleworking is by no means a foregone conclusion, and it is highly likely that the changes in commute VMT will be marginal or negligible, especially if flexible work schedules encourage workers to live in outlying areas with longer commutes. Furthermore, the CECP provides no clear policy mechanisms to achieve the targeted reduction in commuter VMT.

If VMT does increase more rapidly than forecasted by EEA, then the proposed rate of EV adoption and grid decarbonization will be insufficient to meet the transportation sector emissions reduction targets without additional, and costly, investments in EV subsidies and renewable production. While the number of additional EVs needed to close the gap may be relatively small, as the adoption rate target climbs, the marginal cost of each additional EV increases, reaching $12,000 per EV.[18]

Underestimation of the Effects and Benefits of Compact Land Use Patterns: EEA's consultants estimated that compact land use patterns could reduce VMT growth between 2015 and 2050 by only 0.5 percentage points. MAPC's analysis, conducted using more detailed land use forecasts and EERPAT analysis, indicates this is a substantial underestimate, especially when compared to a potential 'sprawl' scenario in which land uses become substantially more dispersed.

In the Metro Boston region, MAPC found that the VMT growth in a Sprawl scenario, in which suburbs see the majority of new growth, is over five percentage points higher than in a Smart Growth scenario, in which growth is more focused in the region's Inner Core: 24.2% versus 19% growth over a 20-year period. Moreover, our modeling should be considered a conservative estimate of the effects of smart growth, since it does not target growth to specific transit-rich municipalities or transportation-efficient locations.

[18] "Transportation Sector Report: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study," December 2020, Table 9, https://www.mass.gov/doc/transportation-sector-technical-report/download

Compact growth can reduce VMT and emissions and can "eliminate the need for a trip altogether or by shifting the mode of travel from a personal vehicle to a shared vehicle or non-motorized mode such as walking or biking."[19] Yet, other pathways through which compact growth can reduce emissions are not modeled or addressed in the Roadmap. Even if people do drive on occasion, compact growth can make trip lengths shorter. Amenity- and transit-rich locations can also enable more residents to live without owning and leasing a car, thereby averting all the energy and carbon embedded in a vehicle, especially one with a massive battery. As noted in the Roadmap report, septic systems are more emissions-intensive than modern wastewater treatment facilities are, and so locating more growth in sewered areas also reduces emissions. Sprawling land use has permanent impacts on the carbon sequestration potential of the affected land, impacts that last well beyond the 2050 horizon. Compact growth can also reduce building energy demand, a topic not addressed in the Roadmap or CECP. Multifamily housing has a more efficient building envelope and shared systems, enabling more cost-effective implementation of high-efficiency technologies during construction.

It is clear that the Administration understands the benefits of compact growth. Only two weeks after the Roadmap was released, Governor Baker signed the Economic Development Bond Bill into law, which included the Housing Choices legislation and a provision that requires all MBTA-served communities to provide zoning for multifamily housing by-right near transit. MAPC urges the Administration to include in the CECP not only the likely impacts of this newly enacted legislation, but also additional land use and transit-oriented development (TOD) policies that will reduce auto-ownership, boost transit ridership, and slow growth in VMT while also opening up new housing opportunities.

Plan for Complementary and Multi-Benefit Pathways to Net Zero: While the Roadmap and CECP define pathways to meet the state's emissions reduction targets, those pathways are dependent on many assumptions about technology and consumer behavior. Any deviation from the target EV adoption rates or availability of zero carbon electricity could cause the state to fall short. The analysis makes rather optimistic assumptions about when EVs will reach cost parity with internal combustion engine (ICE) vehicles. For example, battery electric vehicles are assumed to reach cost parity with ICE vehicles in 2023, fully 12 years before anticipated by the MA3T model. Failure of the auto industry to meet these vehicle costs may either suppress adoption or require even more subsidies to achieve target adoption rates. Only a small decline in ZEV adoption would likely cause Massachusetts to exceed its population-weighted share of imported bioenergy fuels.[20]

Given this uncertainty, the importance of VMT reduction is even more important. VMT reduction strategies can be effective at reducing emissions even when EV shares are still low.[21] VMT reduction also lowers the demand for clean electricity, helping to moderate prices and reduce the amount of generation needed. As noted in the Transportation Sector report, "reducing VMT supports ambitious decarbonization targets by easing some requirements in the electricity sector and by reducing emissions in interim years." The CECP cites "Guiding Principles for policy development and implementation;" robust VMT reduction strategies fulfill all of these principles. **No matter the strategy, VMT reduction yields less congestion, fewer crashes and injuries, less polluted roadway runoff, less land for parking, and less demand for energy.** Strategies to achieve those reductions can have other co-benefits.

[19] Ibid, Page 39.
[20] Ibid, Page 13.
[21] Ibid, Page 46.

For instance, compact growth, especially near transit, not only reduces VMT, but also it enables more affordable housing and reduced transportation costs, improves efficiency of delivery services, and fosters active transportation. Roadway pricing reduces congestion and associated wasted hours, improves worker efficiency, and improves quality of life. Improved transit yields greater ridership, resulting in a virtuous cycle in which higher ridership prompts improved service benefitting transit-dependent populations. These are no-regrets strategies. Notably, they also can be implemented with public expenditures that are a fraction of the proposed investment in EV subsidies. They can also be designed equitably so that low-income and Environmental Justice residents are benefitted and not harmed by changes in land use, pricing, and transit.

Invest in the State's Public Transit System: Using pricing signals and developing more housing and job centers near transit will only be an effective pathway forward if we also have long-term investments in a robust, reliable, and affordable public transportation system. There is only one mention in the CECP of "maintenance and expansion of the Commonwealth's public transit system." **We strongly urge EEA to elevate the importance of investing in a robust, reliable, and affordable public transportation system in the final CECP.** In addition to electrifying the system, we must also increase frequency, ensure fares are affordable, and expand routes of our trains, buses, and ferries. The Governor's own Commission on the Future of Transportation, in which MAPC was pleased to participate, noted that the "transportation system needs to move more people in fewer vehicles."[22] The primary way to achieve this is to move more trips from single-occupant vehicles to public transit. By eliminating the need to take certain trips by car, investments in transit would not only reduce emissions, but also alleviate some of the pressure to rapidly electrify personal vehicles and lessen the strain on our grid.

Smart Growth Incentives and Policies

The draft CECP's goal of a 15% reduction in commuter VMT is an important first step. However, commute trips only represent about 25% of all trips taken in our region.[23] While we are eager to work with the Administration on a range of strategies to exceed this goal, we also urge EEA to think beyond telecommuting to achieve this reduction. The rapid and prolonged shift in our commuting patterns will likely have some level of permanent impact—some percentage of employees will almost certainly continue to work from home on a regular basis once we enter a new normal. Instead of focusing mainly on policy interventions that support more white-collar employees continuing to telecommute, efforts to achieve a reduction in VMT must also focus on employees who do not have the option to work from home.

Adjustments to the way we work are not the only economy-wide shifts impacting VMT and GHG emissions across the state. A report recently released by MAPC, *Hidden and In Plain Sight: Impacts of E-commerce in Massachusetts*, found that the rapid rise of e-commerce is having an impact on both VMT and vehicle GHG emissions. As of 2018, approximately five percent of e-commerce was same-day delivery. Same-day delivery is forecast to increase to 15 percent within five years. A study by the World Economic Forum concluded that without policy intervention, the number of delivery vehicles will increase 36 percent from 2019 to 2030, along with a 32 percent increase in carbon dioxide emissions.[24,25]

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22 https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download.
23 https://www.ctps.org/data/pdf/studies/other/Exploring_2011_Travel_Survey.pdf.
24 Miguel Jaller, Anmol Pahwa, Seth Karten, "Keeping e-Commerce Environmentally Friendly—What Consumers Can Do," Blog post on U.C. Davis Institute of Transportation Studies, December 1, 2020.
25 World Economic Forum, "The Future of the Last-Mile Ecosystem," January 2020.

In addition to impacting GHG emissions and transportation networks with increased vehicle traffic, the dramatic increase of e-commerce is also having major effects on land use. The pressure to maintain dependable and quicker delivery times has resulted in e-commerce companies adding smaller warehouse and distribution centers closer to consumers as part of their regional networks, a trend that shows no signs of changing.[26] The following sections identify a range of policy solutions the Administration can pursue to incentivize smart growth development and reduce VMT.

Strengthen Existing State Programs to Increase Smart Growth Development: The Commonwealth already has programs in place to foster smart growth development, most significantly the Chapter 40R Smart Growth Overlay District program. Over the life of the program more than 50 districts have been created and approximately 3,800 residential units permitted/built. The Commonwealth should build upon this success by improving the program to increase its utilization and the quality of development. Some possible changes to 40R include:

- Simplify the program's requirements and application process, reducing the cost and bureaucracy of establishing these districts.
- Clarify that the mission of 40R districts is not just housing production, but also to facilitate a broader range of smart growth principles, such as increased walkability and a sense of place.
- Enact a series of incentives to encourage the designation of larger 40R districts covering multiple parcels and the fuller build-out of these districts once designated. Many 40R districts are presently "one-offs," created to facilitate only a single development.
- Increase funding for the program as well as 40S, the companion program, to account for increased costs associated with growth in the school-age population.

Provide Municipal Resources to Prioritize Walkability and Affordability: Land use decisions largely fall to local governments. Through programs like the Housing Choice Initiative, the Administration has already created important incentives to encourage housing production aligned with smart growth principles. The Administration should build upon this effort by providing additional resources and incentives for municipalities to advance further improvements, including:

- **Reduce or eliminate minimum parking requirements for multifamily housing**: MAPC's Perfect Fit Parking research found that the more off-street parking provided at multifamily developments, the greater likelihood the site will attract car-owning households.[27] Excessive off-street parking provisions undermine the goals of equitable transit-oriented development, spurring more driving and less transit use. They also drive up the cost of housing, create excess impervious surfaces, and reduce space available for other amenities like open space. The Commonwealth should take a more active role in helping cities and towns to reduce parking requirements within zoning.

- **Require that local zoning allow for mixed-used development in transit centers**: Equitable TOD is about creating complete communities near transit that allow for a mix of residential and commercial uses near transit, with an emphasis on creation and preservation of affordable housing. Local zoning should be updated to allow mixed-use development, including vertical mixed-use development (a mix of uses in the same building) and horizontal mixed-use development (a mix of uses across multiple buildings in a parcel). Site plan approval should

[26] Deloitte Real Estate, "The Shed of the Future. E-commerce: Its Impact on Warehouses," 2014.
[27] https://perfectfitparking.mapc.org/.

incorporate principles that allow for walkability and foster a sense of place, such as sidewalks, safe pedestrian crossings, and roadway design that discourages high-speed vehicle travel.

Expand the Role of Employers in Reducing Commuter VMT: MAPC was pleased to see the reference to broadening the scope of DEP's Rideshare Regulations in the draft CECP. The Administration could employ a number of strategies to strengthen this program, expand its reach, and help ensure measurable reductions in commuter VMT. Potential changes include:

- Reduce threshold to 500 applicable employees/students.
- Locate facilities within one mile of transit and pay for transit passes up to a certain dollar amount for employees, rather than just offering passes for purchase on-site. At a minimum, offer pre-tax transit benefits.
- Require membership in a Transportation Management Association (TMA) if in a TMA service area.
- Require employers to measure VMT, not just number of drive-alone commute trips.
- Replace the goal of reducing drive-alone trips with either a mode-shift or a VMT reduction goal.
- Require DEP to post reporting information online, with at least a summary of data gathered

Allow Municipalities to Create Regional Mitigation Funds: A regional mitigation fund (RMF) is a mechanism used to levy and pool mitigation payments from multiple developments over time and sometimes across municipal boundaries. In Massachusetts, RMFs could serve as a mitigation requirement triggered by MEPA review or through local permitting processes. Funds should be prioritized for projects that will expand walking, biking, and public transit infrastructure in the Commonwealth. Mitigation payments from new development could then be used in high-priority development areas to ensure expanded bus service and other transit modernization without placing the financial burden of providing increased transit service on the MBTA or Regional Transit Authorities (RTAs). Similarly, RMFs could improve pedestrian and cyclist mobility by expanding trail networks.

Require New Development Sites to Measure VMT Impacts and Use Local Data: MAPC recommends that the Administration require new development sites that trigger MEPA to measure transportation impacts based on VMT rather than level of service (LOS). Current development review practices characterize transportation impacts using inherently auto-centric LOS metrics, which describe vehicular flow and driver delay. Replacing LOS with a metric that measures the impact of driving will better align transportation impact analysis and mitigation outcomes with goals to reduce GHG emissions, encourage infill development, and improve public health through more active transportation.

MAPC also recommends requiring developers use local data to more accurately estimate trip generation and avoid overestimating impacts. To forecast trip generation as part of local and state permitting, developers most frequently cite models established through the Institute of Transportation Engineers (ITE), which provides vehicular trip estimations based on a development's size and land use. However, the bulk of ITE's data is from suburban auto-oriented locations across the country with relatively unconstrained parking availability and primarily single land uses. As a result, ITE routinely overestimates trips generated by new development in Greater Boston by 25% to 35% or more. MassDOT should develop a database composed of local post-development trip counts to better forecast future trip generation rates and more accurately account for walking, biking, and public transit.

Transportation and Climate Initiative

MAPC is deeply appreciative of the leadership that the Administration has demonstrated to advance the Transportation and Climate Initiative (TCI) among participating jurisdictions. We remain committed to continuing to partner with the Administration and to work with both fellow regional councils across the TCI region and our cities and towns to support robust and equitable implementation. TCI is one of several transportation revenue-raising efforts that the Commonwealth needs to pursue in order to build a robust, reliable, and resilient transportation system.

Now that Massachusetts has signed onto the final Memorandum of Understanding (MOU), there are several steps we can take to ensure TCI investments maximize carbon reduction benefits while serving residents who have historically been most burdened by transportation inequities. These include:

- **Increase the investment in underserved and overburdened communities**: The TCI MOU indicates that not less than 35% of TCI investments must benefit underserved and overburdened communities. We strongly urge the Commonwealth far exceed this threshold, with a majority of investments benefiting underserved and overburdened communities. Furthermore, we urge clarity about what it means for an investment to benefit these communities. We encourage the Administration to work with the Equity Advisory Boards to guide this distinction.
- **Empower Equity Advisory Boards (EABs) to guide program implementation and make investment decisions**: MAPC supports the creation of the EABs and endowing them with sufficient power to bring in voices from communities most impacted by TCI. The Administration should give the EABs decision-making authority regarding how the dollars are invested, whether investments benefit underserved and overburdened communities, and what interventions are needed should the program fall short of its equitable investment goals. EAB membership should represent all regions of the Commonwealth, and members should be residents of underserved and overburdened communities.
- **Program results and progress toward goals must be transparent**: MAPC strongly encourages the participating jurisdictions to publicly post the annual report and all metrics and goals devised in concert with the Equity Advisory Boards. Should the goals not be achieved, the annual reports should lay out steps that will be taken the following year to get back on track.

Finally, we encourage the Administration to continue its strong partnership with regional councils to guide successful implementation of the program. Regional councils conduct long-term transportation modeling that can help guide future investment decisions. We also serve as conveners and facilitators for our cities and towns, helping municipal officials work through challenges together. MAPC and our fellow RPAs are committed to work with you to advance robust and equitable implementation of the program.

Transportation Electrification

MAPC strongly supports the Administration's commitment to adopting the Advanced Clean Cars (ACC) II regulations upon finalization by California that would commit the Commonwealth to ramp up Zero Emission Vehicle (ZEV) sales to 100% of new light duty vehicle sales by 2035. As we transition to electrify light-, medium-, and heavy-duty vehicles, it is vital that the Commonwealth's strategies simultaneously make this transition accessible to low- and moderate-income residents across the Commonwealth and a viable alternative for residents across all community types, whether urban, suburban, or rural.

Equitable Access to Transportation Electrification: MAPC would like to see the Administration strengthen the commitment to a low- and moderate-income (LMI) consumer program for ZEVs to surpass investigation and commit to program development. This program should be designed in consultation with

community partners by the end of 2022 (Strategy T3). At the request of EEA, MAPC has been convening a Ride for Hire Electrification Working Group to develop recommendations on how to support ride for hire drivers in electrifying their vehicles. The importance of developing complementary incentives to make electric vehicles an accessible option for LMI consumers has surfaced during the working group conversations with industry and advocacy stakeholders.

Recommendations to reach this goal include establishing a dedicated funding source for LMI consumer programs, creating a statewide program for low- or zero-interest vehicle loans, developing a program with auto dealerships to issue rebates at point of sale, and incorporating an option to purchase used ZEVs. Until robust incentives are implemented along with community outreach and education, the transition to electrify the light duty vehicle fleet in Massachusetts will continue to remain available only to those with means. There is overlap between LMI residents in the Commonwealth and drivers participating in the ride for hire industry (e.g., Uber, Lyft, and taxi and livery companies). As trips taken by transportation network company (TNC) drivers represent a growing segment of VMT in Massachusetts, it is increasingly important that we electrify these miles to achieve the state's net zero commitment. As such, MAPC recommends that the Administration consider an incentive structure that provides additional incentives for the replacement of high-mileage ICE vehicles with ZEVs.

Accelerate Mechanisms to Deploy Charging Broadly: MAPC would like to underscore the Administration's acknowledgement of the need for revisions to our utility rate structures; these revisions are crucial to support the full-scale deployment of direct current fast-charging (DCFC) infrastructure and accelerate electrification of vehicles across the state. MAPC strongly urges the state to enact policy that would require the Commonwealth's Electric Distribution Companies to develop and put in place a rate structure for DCFC infrastructure by the end of 2022 that includes both time-varying rates and removal of punitive demand charges (Strategy T4).

MAPC supports the Administration's commitment to explore a utility-based residential charging incentive program. A particular challenge for more densely urban communities is the lack of access to off-street parking. MAPC recommends that any residential charging incentive program include mechanisms to support the deployment of on-street charging in partnership with municipal governments.

Strategic and Equitable Consumer Awareness: Ongoing efforts of MassEVolves and Drive Green highlighted in the CECP have been foundational in promoting greater consumer awareness of EVs. MAPC would like to encourage the Administration to target consumer awareness toward dealership education and outreach and to education initiatives tied to the LMI program proposed in the CECP.

Transportation Network Companies

Trips taken in rideshare companies, such as Uber and Lyft, are steadily increasing and significantly impacting our transportation system. In 2019, rideshare companies provided 91.1 million rides in Massachusetts, approximately 12% more than in 2018 and 40.6% more than in 2017.[28] This increase has taken place statewide and in towns and cities of all sizes and types. A Fehr & Peers study[29] commissioned by Uber and Lyft estimated that additional miles driven while a driver waits for a ride request or is driving to pick up a passenger account for an estimated 40% of TNC vehicle miles in the Boston metro region.

However, TNCs are well positioned to help state and local governments meet pollution and emission reduction goals and increase use of ZEVs. Since ride-hailing vehicles travel more miles than personal vehicles do, a study by the University of California – Davis determined that replacing a gas-powered ride-

[28] Department of Public Utilities, 2018 Data Report – Rideshare in Massachusetts. https://tnc.sites.digital.mass.gov/
[29] Estimated TNC Share of VMT in Six US Metropolitan Regions (Revision 1), Fehr and Peers, August 6, 2019.

hailing vehicle with an electric vehicle can deliver three times the carbon benefits of a personally owned electric vehicle. [30] MAPC encourages the Administration to implement regulations that discourage inefficient mileage, encourage EV usage, and require TNCs to establish climate-smart goals and targets. Such regulations are in effect in other cities and states. In San Francisco, for example, TNCs are required to pay a 3.25 percent tax on an individual ride, and the tax drops to 1.5 percent for a shared ride or a ride in a ZEV.[31] In California, with the enactment of the Clean Miles Standard and Incentive Program in 2018 (SB1014), GHG emissions-per-passenger-mile reduction targets for TNC providers will be set. Targets will include increasing passenger miles traveled using ZEVs, and TNCs must create plans on how they will meet these goals. Similarly, a proposed bill in Washington State would mandate reduction targets for TNCs.[32]

Transforming Our Buildings

As the CECP notes, decarbonizing buildings is essential to complying with the Commonwealth's emissions limits for 2030 and 2050. The transition to better buildings presents tremendous opportunities beyond GHG emissions reductions alone, from improving public health, strengthening local economies, and increasing resilience to extreme weather to redressing environmental injustices. Thousands of well-paying jobs and expanded workforce opportunities, lives saved through reduced pollution, and better housing developments will result from constructing and retrofitting our buildings to be green, healthy, efficient, and affordable. MAPC's experience working to expand access both to clean energy and affordable housing across the Greater Boston region has shown us that the goals of mitigating climate change and addressing the housing crisis are not mutually exclusive. The Commonwealth must move quickly to facilitate this transition by massively scaling up its investments in the policies, programs, and incentives necessary in the near term to decarbonize the Massachusetts buildings sector by 2050.

Building Code

MAPC applauds EEA for committing to a new high-performance stretch code with passive-house level efficiency for Green Communities by 2022 (Strategy B1). Yet, this does not reflect the full need from cities and towns. Massachusetts communities seek both a higher-performance stretch code for the existing stretch code, which over 80% of municipalities have adopted, and a code that they can opt into now, if they choose, that enables new construction to be built to net zero. In this, the net zero definition should be inclusive of high-performance buildings, which are constructed to meet robust energy efficiency requirements likely on par with Passive House standards, while also including the needed shift to electrification and renewable energy. Since many of the 288 cities and towns on the current stretch code may not opt into the new net zero code for several years, the new opt-in net zero stretch code pathway for all new construction should be available in addition to an updated existing stretch code in 2022.

MAPC further commends EEA for proposing to consolidate the higher-performance opt-in code into the base building energy code by January 1, 2028 (Strategy B1). We are supportive of integrating the opt-in high-performance net zero code pathway into the base code by this date. As noted, MAPC contends that the existing stretch code should also improve between 2022 and 2028. This progress would send the needed market signals and enable a smoother transition to the base code update by 2028. Moreover, it would address the demand by stretch code cities and towns for the stretch energy code to be updated at the same

[30] Ride-Hailing Electric Vehicles Offer Triple the Emissions Benefits, University of California – Davis, June 2020
[31] Traffic Congestion Mitigation Tax (San Francisco Business Tax and Regulations Code - Article 32) https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_business/0-0-0-48642
[32] Uber, Lyft would Need to Cut Emissions under WA State Plan, Crosscut.com, February 1, 2021.

rate that the base building code as well as the International Energy Conservation Code are. MAPC therefore recommends that, by 2025, the updated stretch code should be consolidated with the new net zero opt-in code pathway into one net zero stretch code that replaces the basic stretch code and does not require an existing stretch code or net zero code municipality to re-adopt it. By 2028, we recommend that this - or an updated version - become the base building code, thereby aligning with the timing put forward in the draft CECP. Such code pathways and accelerated timelines are both feasible and necessary in order to reach high levels of energy efficiency, electrify buildings, and maximize renewable energy, either onsite as practical or offsite.

Benchmarking and Building Performance Standard

As the majority of the 2.5 million buildings in Massachusetts will still be standing in 2050, the need to decarbonize existing buildings is critical (Strategy B2). The Building Sector technical report asserts that heat pumps must be adopted in at least one million households and 300 to 400 million square feet of commercial buildings by 2030.[33] Current incentives and program structures are not sufficient to achieve the deep energy savings called for in the CECP, and existing buildings are by far the greatest challenge in decarbonizing the sector that we will confront. MAPC recommends establishing a strong building energy and emissions benchmarking requirement and building performance standard statewide. This action will enable buildings to meet a declining heating fuel cap while accelerating the shift from fossil fuels to energy efficiency, electrification, and renewables. Rather than exempting certain building types, uses, or populations, the state should provide ample funding, financing, resources, and technical assistance to support all community members, especially low-and-moderate income and Environmental Justice communities, to reap the benefits of better, more resilient, healthier buildings as soon as possible, looking to the models of Energiesprong and RetrofitNY as starting points.

Energy Efficiency Programs

Reducing building emissions by at least 45% by 2030 and to net zero by 2050 will require a major transformation of markets (Strategies B1 and B2). Reaching our climate goals and avoiding the worst of climate change necessitates a paradigm shift from our fossil fuel-driven present to a clean energy future. The Mass Save program is one of the most important tools available to reduce emissions from buildings, new or existing, and it is cited throughout past and current CECPs. However, the current statutory and regulatory frameworks in which the Mass Save program is administered create barriers to alignment with GWSA goals. We know this firsthand from our appointment on the Energy Efficiency Advisory Council representing Commonwealth cities and towns. We were pleased to see and fully support the strategy to limit fossil fuel incentives in the 2022-2024 Three-Year Energy Efficiency Plan and eliminating them completely in the 2025-2027 plan (Strategy B1). This will require not just DOER, but also leadership, support, and guidance from EEA and cooperation from DPU.

To reach this objective, the CECP wisely relies heavily on heat pumps to achieve its goals, referencing the need to install at least 100,000 per year on average in residential dwellings plus a large number in commercial spaces. The current Three-Year Energy Efficiency Plan for 2019-2021 aims for roughly 15,000 heat pump installations per year. The gap is notable. We recommend that the final CECP and subsequent policies demonstrate how the state will achieve the annual level of heat pump installations needed. The plan put forth should be clear, begin early, and transparently chart out progress with benchmarks and

[33] "Building Sector Report: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study," December 2020, https://www.mass.gov/doc/building-sector-technical-report/download

milestones for success, and alternate pathways if installation levels lag. Additionally, we urge EEA to institute sufficient training, education, and incentives to enable whole-home conversions that do not retain back-up systems.

To support clean heating and cooling, and many other benefits, our buildings must have robust and deeply energy efficient envelopes and enclosures. During the pandemic, the Mass Save Program Administrators initially offered no-cost weatherization, an offer that continues for moderate-income customers and renters. In addition to preserving this offer in future plans, we recommend that Mass Save additionally offer the 100% incentive for weatherization to buildings that agree also to electrify their space heating or water heating equipment. Moreover, we urge full funding for pre-weatherization and pre-electrification barrier mitigation for low-and-moderate income customers and Environmental Justice communities.

Cap on Heating Fuel Emissions

MAPC applauds EEA for proposing the heating fuel emissions cap (HFEC); it is essential to reaching the 9.4 $MMTCO_2e$ reduction in emissions from buildings by 2030 contained in the draft CECP, the largest cut by sector (Strategy B3). In order to ensure that the critical role that the HFEC will play is effective and expedient, DOER should convene the Commission on Clean Heat and Task Force on Clean Heat by June 2021 in order to meet the CECP's timeline of recommendations on the "structure and levels for long-term emissions caps on heating fuels consistent with the findings of the 2050 Roadmap, the 2030 emissions limit, and this plan" by the end of 2021 and the "statutory, regulatory, and financing mechanisms needed" by end of 2022 (CECP, page 33). Moreover, the two bodies must be endowed with a strong mandate that enables them to implement the cap beginning in 2023, with declining cap levels over time.

With these declining caps, we must not miss the opportunity to utilize the likely revenue collected through alternative compliance payments or fees once the caps are in effect to equitably protect low- and -moderate income people and Environmental Justice communities. For both owners and renters, rebates, incentives, and technical assistance must be made available to support them in making their buildings more energy efficient and in converting their heating to non-fossil fuel systems, particularly in rental properties. To this end, the cap must be structured to drive fossil fuel customers toward no- or low-carbon renewables and to phase out fossil fuel combustion in buildings. Fossil fuel use in buildings, even blended fuels, risks extending the life of fuel oil and propane infrastructure and the gas distribution system, leading to billions of dollars of leak and age repair and resulting in stranded assets funded by ratepayers.

The Commission must likewise be empowered to design the complementary policies, incentives, and regulations that are needed to decarbonize existing buildings, including development of a statewide building performance standard, benchmarking and disclosure requirements, and significant funding and technical assistance for low-and-moderate income building owners and Environmental Justice communities. While we have witnessed firsthand the interest in advancing policies such as these at the municipal level, we strongly encourage the state to leverage the impactful scale and reduced barriers that result from coordinated statewide policy.

Workforce Development and Upskills Training

Transitioning the buildings sector to a decarbonized future requires training workers in deep energy efficiency measures and climate-smart building technologies, especially related to HVAC, onsite solar, building operations, and heat pumps. The expansion of this industry offers tremendous opportunities for the creation of thousands of long-term, sustainable, good paying jobs installing and maintaining new

technologies. However, Massachusetts' current workforce is ill-equipped for this challenge, both in terms of numbers and diverse representation.

Key demographics, including people of color and women, are underrepresented in the current workforce, and minority, women, and disadvantaged business enterprises (MWDBEs) are consistently excluded – unintentionally or not – by the structures presently in place. Our transition to a decarbonized building sector will also likely displace workers from fossil fuel-related jobs-, and the Commonwealth must plan for retraining these workers to participate in the clean energy economy. MAPC agrees with the Administration's acknowledgement of workforce availability as a potential barrier to adoption of the clean energy solutions necessary to decarbonize our economy, and we encourage the Commonwealth to seize the opportunity to address workforce shortages while also redressing current inequities in workforce representation and access to economic opportunity in the clean energy sector (Strategy B2).

Embodied Carbon

The manufacturing of many construction materials is inherently carbon-intensive, including many foam products used in high-performance buildings. Too many carbon-intensive decisions can create a building with a multi-year carbon debt that delays the project's contribution to our net zero carbon goals. MAPC recommends that considerations for embodied carbon for new buildings be integrated within the net zero code pathway, relevant Mass Save initiatives, and other pertinent utility and state programs, and that appropriate regulations to this effect be promulgated by mid-decade (Strategies B1 and B2).

Transforming Our Energy Supply

MAPC strongly supports the Administration's commitment to increase the Clean Energy Standard (CES) requirements to at least 60 percent by 2030 (Strategy E3). Deep decarbonization of our energy supply is the backbone to achieving near-term emissions reductions across sectors as we seek to electrify our transportation and heating and cooling systems. As such, MAPC would like to recommend that the Administration increase its commitment of 60 percent by 2023, and 100 percent by 2030 under the CES. Additionally, MAPC strongly recommends that the Administration address the IAC Electricity Work Group's recommendation to construct a strategy review and alignment of the RPS, APS, CES, and CPS regarding the participation of biomass, landfill gas, and municipal solid waste "waste-to-energy" generators.

Equity and Clean Energy Workforce Development

As the Commonwealth transitions to a fully decarbonized energy supply, our strategy needs to support both a just transition and equitable access to the benefits of this transition. Across all six strategies included in the draft CECP for the energy sector, MAPC strongly encourages the Administration to incorporate the recommendations from the IAC Climate Justice Working Group regarding accountability, transparency, and inclusion of EJ populations in the decision-making processes.[34] In particular, MAPC recommends that the Administration include tactics within its efforts to deploy solar in Massachusetts in order to expand the deployment of microgrids and renewable energy cooperatives that serve EJ populations.

Ensure Equitable Siting Practices: MAPC encourages the Administration to commit to develop a transparent process with robust community involvement to inform the siting of new transmission or energy-

[34] The IAC Climate Justice Work Group's memo providing recommendations to improve the IAC's 2019 list of recommended policies can be accessed at https://www.mass.gov/doc/climate-justice-working-group-policy-recommendations/download.

related infrastructure (Strategy E5) and distribution system changes (Strategy E6). This, paired with the incorporation of the social cost of carbon into state decision-making processes, should aid in protecting against disproportionate siting of facilities in EJ communities and ensuring that related cost savings and health benefits result for EJ communities.

Grow an Equitable Clean Energy Workforce: The expansion of the clean energy industry in Massachusetts will continue to offer expanding economic opportunities for a growing green workforce. As the Commonwealth executes large-scale procurements (Strategy E1) and expands the solar and wind markets (Strategies E4 and E5), MAPC sees this as a fundamental opportunity to connect MWDBEs with these growing economic opportunities and increase representation within the clean energy industry. MAPC strongly encourages the Administration to include provisions within the final CECP that commit to developing equitable procurement practices and bolstering workforce and market development resources to greatly expand the participation of MWDBEs in the clean energy economy.

Solar and Wind Development

The draft CECP commits to executing existing solar programs and wind procurements and supporting "on pace" deployment of clean energy. MAPC recommends that the Administration further define what "on pace" means for Massachusetts and make bold commitments to maximize the deployment of solar and accelerate offshore wind development by 2030. While we are deeply supportive of the state's existing commitments to accelerate the deployment of renewable energy resources, we strongly urge the Administration to exceed these commitments to ensure our best chance of mitigating the worst impacts of climate change and commit to a goal of 10 GW of installed solar capacity by 2030.

Bold commitments to accelerate solar and wind deployment should be paired with appropriate siting practices that minimize the use of greenfields. MAPC recommends the development of a statewide geospatial plan for siting solar, determining what is feasible on specific sites, and eliminating barriers to building on brownfields and other multi-benefit co-uses.

Grid Modernization

Regional coordination on electricity system planning across the ISO New England states and collaboration across Massachusetts agencies and departments on grid modernization is fundamental to achieving a decarbonized and resilient energy supply. However, MAPC is concerned that the draft CECP, and consequently the projected emissions reductions for 2030, may be over-reliant on regional processes, like the New England States Committee on Electricity, to make substantive progress. MAPC encourages the Administration to identify tactics now to ensure grid resiliency and reliability and provide market-based incentives for energy supply decarbonization. In particular, MAPC would like to see a more aggressive commitment to incorporating GWSA compliance into distribution-level policy decisions (Strategy E6) in the near term. MAPC recommends requiring substantive implementation of grid modernization efforts by DPU, DOER, and EEA by 2025, and comprehensive electric and gas utility reform ideally by mid-decade and by no later than 2030.

Mitigating Other Sources of Emissions

The CECP acknowledges the importance of reducing emissions from methane leaks from the natural gas distribution network and suggests that existing policies such as MassDEP's Reducing Methane Emissions from Natural Gas Distribution Mains and Services regulation will be sufficient. While DEP and the gas distribution companies deserve credit for the strides that they are making to replace leak-prone pipes,

calling for emissions to remain steady misses a critical opportunity to accelerate this progress. The pace of pipe replacement under the utilities' Gas System Enhancement Plans (GSEPs) should be accelerated, and the utilities should be required to prioritize "super-emitting leaks" – the 8% of leaks which make up nearly 50% of total emissions –to improve the safety of the system while significantly reducing emissions from leaks by 2030.

Just as the CECP acknowledges the current DPU investigation of the future of the natural gas industry within the buildings section, so too should the plan reflect the inherent tension between our transition to clean heating fuels and the infrastructure and systems in place that support the current energy economy. Continued investments in natural gas infrastructure, like those called for in the utilities' GSEPs, may reduce emissions in the short-term. However, they may also lead to unnecessary expenditures of ratepayer funds for pipes that become stranded assets in the near future. The CECP should acknowledge the importance of mapping a pathway away from all fossil fuels, including natural gas, as soon as possible and with minimal impact to ratepayers, residents, and businesses.

Protecting Our Natural and Working Lands

Reducing fossil fuel emissions is the number one strategy in our fight to mitigate climate change. Preserving and increasing the capacity of land to sequester and store carbon is therefore critically important. Natural and working lands also provide important climate resilience and other co-benefits, including cooling and shade, clean air and water, flood protection, production of food and fiber, and recreation, scenery and quality of life. The Commonwealth should accurately and effectively leverage natural and working lands as a part of the state's climate change strategy using best management practices aligned with international standards for carbon accounting and GHG inventories.

It is vital that the Commonwealth's climate change strategy include provisions to preserve and increase the presence of healthy and mature street trees and the urban tree canopy overall. MAPC urges the Administration to establish a goal for the planting and preservation of a specific number of urban and suburban trees by a certain date, with a focus on EJ communities, along rivers, streams and meadows (Strategy L1). To aid the expansion of the urban tree canopy, MAPC further encourages the state to identify priority locations in EJ communities to convert impervious surfaces to green spaces. The reduction of gas leaks from leak-prone pipe will further enhance the preservation of street trees, enabling them to support urban GHG reductions and improved air quality.

MAPC also recommends that the Administration allocate a set amount of funds for climate adaptation projects that create public health benefits in EJ populations (Strategy L2). Current formulas and pending legislation are based on property value instead of minimizing harm from extreme weather events, climate change, and air and water quality. The cost-benefit formula of adaptation measures should consider public health benefits, reduced heat island impacts, reduced flooding damage, and prioritization of EJ populations.

Funding Options to Advance Climate Mitigation and Resiliency

The Commonwealth will need to utilize a suite of funding mechanisms to ensure a swift and equitable transition to net zero emissions. While the draft CECP importantly identifies TCI-P as a funding source for some of the investments we will need in the future, a range of other tools must be deployed and at the ready. This includes sector-wide carbon pricing, building off the TCI-P framework.

One proposal currently before the Legislature is *An Act providing for climate change adaptation infrastructure and affordable housing investments in the Commonwealth*, filed by Representative Nika Elugardo (HD.1252) and

Senator Jamie Eldridge (SD.611). This legislation, also known as the Housing and Environment Revenue Opportunities (HERO) bill, is modeled after the Administration's S.10 proposal. It would increase the real estate excise tax to fund climate and housing needs, and likewise deserves the Administration's support.

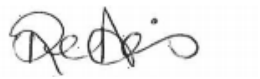
An additional mechanism to undertake is the creation of a Climate Bank, which could provide capital for several of the infrastructure investments, upgrades, and systems identified as necessary in the draft CECP. The Climate Bank could be established and initially capitalized by the Commonwealth or through federal recovery funds. This mechanism could include debt financing, where appropriate paybacks exist, for measures related to clean energy, transit, and water infrastructure and technology investments, and institute a revolving loan fund and other financing tools where paybacks can be more challenging. Substantial funding and financing, from the state directly and indirectly, will be required quickly and at scale to advance deep energy retrofits, long-duration battery storage, district heating and cooling, and other large-scale decarbonization and resiliency measures. The Climate Bank should prioritize funding innovative, emerging, and transformative climate and energy technologies and programs as well as regional or multi-municipal resilience infrastructure, both green and grey, especially in Environmental Justice communities.

Regardless of the funding options pursued, we encourage the Administration to structure these mechanisms in a way that minimizes the impact on low-income individuals and maximizes investments that prioritize underserved and overburdened communities.

Thank you for the opportunity to provide comments and for the Administration's consideration of our recommendations. MAPC looks forward to continued collaboration with the Administration on its efforts to achieve net zero emissions by 2050 and to make great progress toward this commitment by 2030. We would be particularly interested and well suited to continue our leadership on building decarbonization and resilience as a member of the Commission on Clean Heat. Please contact Rebecca Davis, Deputy Director (rdavis@mapc.org), or Cammy Peterson, Director of Clean Energy (cpeterson@mapc.org), with any questions or for further discussion regarding MAPC's comments.

Sincerely,

Marc Draisen
Executive Director



Rebecca Davis
Deputy Director

Mass Audubon
Policy & Advocacy Team

April 30, 2022

Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Via Email gwsa@mass.gov

Re: **Clean Energy and Climate Plan for 2030**

Dear Secretary Theoharides, Undersecretaries Card and Chang, and the Clean Energy and Climate Plan Team:

On behalf of Mass Audubon, I'm pleased to submit comments on the draft Clean Energy and Climate Plan ("interim CECP") for 2030. We strongly support the economy-wide approach to the planning effort, and we applaud the work of the EEA team and other state agency staff to conduct and complete the technical analysis necessary to develop the proposed Clean Energy and Climate Plan for 2030. We support many of the individual policy proposals as is, or with some refinements; for many, we suggest scaling up the size and pace of implementation. And, we provide some cautionary guidance on a few other policy strategies.

Mass Audubon strongly supports the Commonwealth's overall approach and initiatives to address climate change. The latest IPCC report confirms that our time window to mitigate and prepare for the impacts of climate is very short, and narrowing quickly.[1] As one of the few jurisdictions in the world to set legally binding limits on GHG emissions from all sectors of the economy, we are proud to see Massachusetts continuing to be a world leader on climate policy. Setting of sectoral emissions limits for 2025 and 2030 is also unique – it requires us to begin 'bending the emissions curve' immediately and is thus invaluable for signaling to utilities, investors, and businesses that their most profitable path forward is to plan for and invest in low-carbon options now, especially for long-lived assets like buildings and energy generation and distribution infrastructure, rather than incur costs of stranding assets decades from now. Ultimately, setting near-term limits that encourage making these shifts now, rather than delaying for later decades, is the least-cost decarbonization path forward for our state and our economy.

We have no doubt that the climate ambition embodied in the Next Gen Climate Roadmap will bolster our economic competitiveness, by drawing in private sector investors who are growing increasingly skeptical of voluntary climate programs, and accelerating market transformation of critical low-carbon

[1] Available at: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf

technologies. We are already growing leading clean economy innovators and companies that will rival our prominence in biotech, healthcare, and education. And our proven approach to incubating clean energy innovation is already being exported, with Houston now hosting the next location of Somerville's Greentown Labs.

Because of Massachusetts' leadership on clean energy and climate policy, Mass Audubon's recommendations for many of these policies is shaped as much by the precedent they set for other jurisdictions to adopt and build from, in addition to their impact on GHG emissions in in absolute terms.

In particular, Mass Audubon appreciates that the CECP formally recognizes the **role of nature as an essential climate solution**. Nature's importance as both a carbon removal strategy and for building resilience cannot be overstated. Natural climate solutions are a top-tier priority for Mass Audubon: with our five-year Action Agenda, we are making major direct investments in natural climate solutions, both at our sanctuaries and also via partnerships with state agencies (e.g., DCR, DER), other land owners, and community-based organizations. A critical goal of these investments is to rectify longstanding inequities in access to nature by low-income and under-resourced communities and citizens. We are also ramping up our advocacy efforts to broaden public support for the net-zero goals of the Next Generation Climate Roadmap and expanding the Commonwealth's precedent-setting programs for city and town climate resilience like the Municipal Vulnerability Preparedness program.

Below, we first provide high-level recommendations and considerations for the draft CECP for 2030. Then we provide comments on specific policy proposals included in the draft plan.

1. **Front-loading significant investments in NWL strategies in the next decade will deliver the highest possible returns on investment and public benefits.**

Now is the optimal time to deploy NWL solutions at scale—they are broadly available, and have lower marginal costs than many mitigation strategies in the energy sectors. Given that we currently lack cost-effective low-carbon technologies for many "hard-to-abate" energy end-uses including like heavy-duty transport, shipping, aviation and industry, a significant scale-up deployment of NWL strategies over the next decade is an insurance policy against spending more capital than needed in later decades.

In addition to enabling a much more cost-effective path to achieving net-zero, what separates investments in NWL strategies are their co-benefits beyond carbon storage and sequestration. Natural and working lands provide critical ecosystem services including clean air and water, critical wildlife habitat, food and wood products, and opportunities to improve human health and quality of life. NWL support the state's outdoor recreation industry which contributes over $10.5 billion annually to the state's GDP.

Finally, we need to make more investments in NWL strategies as a means to address historical inequalities in access to nature. The ongoing pandemic has highlighted our collective need for and appreciation of nature – visitation at many of our sanctuaries as well as many DCR parks more than doubled in the last two years. But the pandemic also laid bare the stark inequities between those who currently enjoy access to nature, abundant tree canopies and their resultant public health benefits, and those who do not. We must do significantly more to rectify these inequities.

2. **Meeting the climate challenge requires a major ramp-up of public funding for nature and open space from current levels. To do so, we need higher investment in nature on an ongoing, sustained basis.**

In order to achieve higher levels of carbon storage and sequestration and well as the broad base of public benefits to our economy, public health, and climate resilience, a sustained level of public funding that is commensurate to the size of the opportunity is needed. After reaching annual expenditures on open space and parks in the mid-2000s of nearly $40 million per year, state expenditures on open space have fallen dramatically. As noted in the DCR Special Commission report, currently Massachusetts is 50th out of 50 states – i.e., dead last in the U.S.-- in levels of investment in parks and open space, on both a per capita and income basis, and spends only 58 percent of the national average.[2]

Cross-Sector Policy Integration

Clean energy siting and NWL: Concerted efforts will be needed to ensure that the policies for each sector work together to achieve the goals. In particular, future land use trends intersect with the preservation and stewardship of NWL and their capacity to sequester and store carbon as well as provide other ecosystem services. We appreciate the fact that the Department of Energy Resources (DOER) is undertaking a Technical Potential Solar Study. However, we feel that the study completion date in summer 2023 is too late to support effective near-term decision-making on solar incentives, given the state of the solar market as well as the pressing need to deploy more clean energy resources. Well before that study is completed, there is urgency to identify any opportunities to increase solar deployment within the 1 million acres of already developed lands. We note that the limited scope of the study on solar infrastructure only, without including the needs for new transmission infrastructure and distributed energy systems, may limit its usefulness to future CECP planning efforts. Mass Audubon looks forward to working with the Commonwealth, solar industry, and stakeholders to plan for the next phase of solar deployment with "smarter solar siting."

Community Planning – Housing, Economic Development, Transportation: A transition to more compact development, redevelopment and infill focused around existing infrastructure is a necessary cross-sectoral topic needing careful policy alignment. Walkable communities, multi-use development with multiple energy efficient modes of transportation access, net zero buildings, distributed energy systems, and green design (minimize imperviousness and maximize trees and green spaces) are some of the important components. Since most land use decisions are made at the local level, state programs need to support and incentivize communities to adopt best practices. The proposed policy in the NWL sector to encourage broader adoption of Natural Resource Protection Zoning is one example of a mechanism to support this cross-sector objective. The Commonwealth should also review its community grant programs and other initiatives to ensure that they systematically support compact, energy efficient, accessible and green designs. The proposed MEPA regulatory updates to include review of forest clearing and tree removal is a step in that direction, although the policy and regulatory reforms should be broader to align all state programs and actions with the CECP goals for NWL and other sectors.

We also recommend the following refinements to sector-specific strategies for the final CECP: emphasis on strategies that have "no regrets," (e.g. protecting lands of high conservation, resilience, and carbon storage value and smart, compact, energy efficient development close to existing transit and other infrastructure).

Natural and Working Lands

We recommend that the CECP set a quantifiable 2030 goal for NWL of at least 1 million metric tons of CO_2-equivalent improvement in net GHG flux.

[2] https://www.mass.gov/doc/umdi-dcr-special-commission-report/download

Forests and trees across Massachusetts currently sequester 4.6 million metric tons of greenhouse gas emissions in the state every year, and have the potential to store millions more using available practices.[3] Deploying cost-effective mitigation policies like those described below can significantly improve upon current levels of net carbon removal, but only if done at an ambitious pace and scale.

Policies in the CECP need to accelerate the current pace of land protection and the current pace of restoration for maximum resilience to climate. We also need to deploy energy- and land-efficient forms of development to meet our affordable housing challenges, and we can do so in ways that minimize losses of NWL.

L1 – Protect NWL

Expand Landscape and Watershed-Scale Conservation

Accelerate Land Protection: Mass Audubon strongly supports increased funding and accelerating the protection for forests and other carbon-rich lands. The goal of reaching 30% of land in the state protected by 2030 should be increased. Mass Audubon's land use analysis in *Losing Ground: Nature's Value in a Changing Climate* (2020)[4] found that 27 percent of the state was protected as of 2019, and the rate of conservation was about 20,000 acres per year. About 150,000 acres of additional land protection is needed to reach 30%, so achieving that by 2030 would require only about 15,000 acres per year. This actually represents a *decrease* in the pace of conservation. Instead, we recommend a goal that represents an actual increase over the pace of recent conservation progress.

Specific measures to support the land conservation goals should include increasing state capital expenditures for land protection programs and grants, tapping federal sources such as ARPA funds, and increasing the annual cap on the Conservation Land Tax Credit Incentive program which has an extensive backlog of projects. Additional operating funds are also needed to enable agencies to effectively manage these programs and to support municipalities, especially EJ communities with limited capacity to plan and manage projects. The state should also expand the eligibility of nonprofits to partner with municipalities and lead land protection projects funded by state programs. This change was recently approved for MVP projects funded through ARPA. We recommend the state consider other opportunities to pursue these kinds of partnership approaches, which also increase opportunities to leverage private funding for land conservation.

In addition to prioritizing lands that are at relatively higher risk of development, land protection programs should also prioritize lands that are of high value for preserving biodiversity and supporting climate resilience for people and nature. Protecting interconnected areas at the landscape scale is particularly important for biodiversity and resilience. We also agree that areas immediately upstream of wetlands are particularly important, and recommend broadening this to include lands bordering rivers and the coast, as well as inland and coastal floodplains as priorities. Mass Audubon's *Losing Ground* analysis includes a map of the undeveloped, unprotected lands with these priority biodiversity and resiliency characteristics, forming a statewide "Green Infrastructure Network. In urban areas, remaining wooded parcels should be targeted for protection, especially in EJ neighborhoods and areas that already are impacted by heat islands and flooding. Vacant lots adjacent to wetlands and waterways should be prioritized for protection and

[3]Annual carbon sequestration, 2010: Methods taken from Gu et al. 2019 and applied to Massachusetts. MA annual emissions, 2017: Appendix C: Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017 https://www.mass.gov/lists/massdep-emissionsinventories; Nature4Climate, 2020. https://nature4climate.org/u-s-carbon-mapper

[4] www.massaudubon.org/losingground

restoration with tree planting and creation of parks to ensure that all residents have access to natural settings and the other co-benefits associated with urban green spaces.

Protect Farmlands: We support permanent protection of additional farmland including lands that do not currently meet the requirements for an Agricultural Preservation Restriction. Maintaining and increasing the capacity of lands to produce food locally is important for many reasons, including maximizing carbon in farm soils and minimizing transportation emissions by reducing reliance on food from distant sources. Dual solar/agricultural projects need to be carefully designed and managed to support the production of locally produced food while keeping farms economically viable. Solar incentive policies should avoid converting high productivity farm fields such as row crops to lower productivity uses like livestock grazing, and these project must be carefully designed to protect soil health including carbon in farm soils.

Limit Conversion and Loss

Reducing the rate of loss of NWL to development is essential. In order to maintain or increase carbon storage overall across the landscape, the rate of loss must be no higher than the rate of restoration (and this is not a guarantee of carbon levels – which individual lands are affected matters tremendously). This is a challenging goal to meet and requires aligning state programs for economic development, housing, and infrastructure with the CECP NWL goals. It also requires extensive support for and coordination with municipalities to assist them in aligning their land use plans and regulations with these goals.

Local Land Use Regulations: We support the proposed policy of increasing funding to municipalities to update their local land use rules to increase the use of tools like Natural Resource Protection Zoning and Tree Retention bylaws and ordinances. In addition to the EEA Planning Assistance Grants program, the Municipal Vulnerability Preparedness (MVP) provides grants for local planning and land use regulatory updates. These programs and other incentives should continue to be expanded to incentivize compact, energy efficient development that preserves important lands including forested areas adjacent to wetlands, rivers, and the coast. Many smaller and mid-sized communities where development pressures are highest have limited capacity to undertake local planning and regulatory review processes, so state assistance is vital in funding those efforts. Communities need assistance meeting their local needs for jobs, housing and infrastructure in way that support the role of NWL in addressing climate change.

MEPA Thresholds for Forest Conversion: Mass Audubon is actively participating in the Massachusetts Environmental Policy Act (MEPA) Advisory Committee, providing input on updates to the regulations. We support revisions to the MEPA review thresholds to require review of projects that will result in significant losses of forests and trees. Because the MEPA statute jurisdiction is limited to state agency actions, the ability to review projects and require designs that avoid, minimize, and mitigate loss of forest cover is limited to that nexus with state agency action. For projects undertaken directly by an agency or receiving state financial support, MEPA jurisdiction is broad and can include avoiding and minimizing impacts to forests and trees. Conversion of forests to development by private entities often does not have a direct nexus to state funding or a state permit. While the greenhouse gas (GHG) emissions analysis required by MEPA may document the carbon losses associated with those private developments, there often is no permitting nexus to require a design that reduces or compensates for those losses. There are, however, opportunities to address this at a higher level through review and refinement of state programs to fund or incentivize development projects. For example, if DOER's SMART solar incentive program had been reviewed by MEPA before it was implemented, the program could have been refined to reduce the amount of forest loss. To date, this program has supported projects resulting in the conversion of 8,000 acres of land, including 4,000 acres of forest[5]. Other state programs such as the school building

[5] DOER Solar Siting Analysis, https://www.mass.gov/service-details/annual-compliance-reports-and-other-publications

assistance program could also be reviewed to require green designs that retain forest and trees as much as possible. Trees and green spaces should be required within all school projects funded by the state.

The MEPA regulatory changes should include requirements for agencies to avoid minimize forest/tree loss in all projects and programs. This could be accomplished through programmatic reviews and establishment of green design standards for projects undertaken or funded by the state.

Solar Siting: Rapid, responsible deployment of solar photovoltaic systems is essential in order to meet the Commonwealth's clean energy and decarbonization goals. At the same time, this needs to be done in a way that aligns with goals for NWL. Mass Audubon and other environmental NGOs have developed a joint statement on solar siting that identifies goals for solar siting.

> 1. Maximize deployment of solar power within the more than 1 million acres of land that are already developed or degraded, including rooftops, parking lots, and other low-impact areas with minimal ecosystem service values;
> 2. If further analysis shows that additional capacity is needed outside those areas, determine which natural or working lands and waters are most and least appropriate for solar energy using spatial analysis and stakeholder input; and
> 3. Avoid, minimize and mitigate impacts to natural and working lands and waters and the valuable benefits they provide including biodiversity and climate resilience.

This statement contains additional details on guiding principles for achieving these goals. We are grateful that DOER is undertaking the Technical Potential Solar Study. Mass Audubon also supports Section 61 of *S.2842 An Act Driving Climate Policy Forward* recently passed by the Senate. That bill would require DOER to make recommendations to the successor of the SMART Program, including avoiding and minimizing impacts to NWL as well as other important considerations including cost, reliability, the role of distributed systems, and EJ and equity considerations. We encourage EEA to incorporate these concepts for solar planning and policy refinements into the CECP.

Strengthen Wetland Protections:

Expedited Permitting in the Outer Buffer Zone: We support the concept of regulatory changes to reduce loss of forest and other natural vegetation close to wetlands and waterways. However, it is unclear whether this proposal is actually feasible and would achieve the desired benefits. The 100-foot buffer zone under the Massachusetts Wetlands Protection Act regulations is not a resource area with specific standards, but rather a zone of review intended to ensure that projects do not alter the adjoining wetland resource area. Extensive scientific literature on buffer zones indicates that, depending on soils, slopes and other factors, more than 100 feet of undisturbed, naturally vegetated buffer is often required to avoid degradation of water quality, alterations in hydrology, and other adverse effects[6]. More than 200 communities have adopted local bylaws or ordinances and accompanying local regulations that treat the buffer zone as an actual resource area and/or require no-disturb setbacks (with exceptions for unavoidable impacts). In those communities, any streamlining in the outer 50 feet would not typically result in increased protection in the inner 50 feet, where work is already prohibited or strictly limited. In addition, most projects in the outer 50 feet that create new impervious surfaces will need to comply with the Massachusetts Stormwater Management Standards. This requires submission and review of technical information and is not readily streamlined beyond the process already in place. For projects not requiring stormwater management and that have minimal impacts in the outer 50 feet, streamlining has already been accomplished through the "minor project" exemption provisions of the wetlands regulations, or

[6] MACC Wetlands Buffer Zone Guide Book https://www.maccweb.org/store/viewproduct.aspx?id=13390302

through the use of a Request for Determination of Applicability, which can be reviewed and issued with minimal cost and time. The concept of further regulatory streamlining in the outer buffer zone was previously reviewed by the Department of Environmental Protection (MassDEP) with substantial stakeholder input and we do not believe it would be fruitful to revisit that.

Instead, we recommend that the CECP policies call for review of the wetlands regulations and other related regulations (401 Water Quality Certification, Chapter 91 Tidelands), to strengthen protection of wetlands and adjoining forested wetland buffers, and to improve wetlands replication standards and follow up documentation.

The policies should also call for increasing incentives for municipalities and developers to adopt greener "low impact development" designs, which are cost-effective and have multiple benefits including retention of trees and other natural vegetation, protection of water quality, and reduced flood risks[7].

L2 Manage NWL

Incentivize healthy soil practices and climate-smart forestry that balance ecosystem resilience and carbon sequestration

Establish New Forest Resilience Program: Mass Audubon supports this initiative, including the creation of a new provision in Chapter 61 to provide incentives to municipalities and landowners to keep forest in forest use rather than developed for 20 years or more, provided they are managed using practices that increase forest carbon and improve resilience to climate impacts[8]. Mass Audubon has worked with the Department of Conservation and Recreation (DCR), The Nature Conservancy and others to develop a list of these practices, which are being piloted in the Mohawk Trail Woodland Partnership region.

Healthy Soils: We look forward to seeing the Healthy Soils Action Plan (HSAP) released soon, and support implementations of programs and policies in that document that will support the protection and stewardship of forests and farmlands, including maximizing carbon storage in soils. The draft HSAP also includes recommendations to improve soils and retain vegetation within developed sites and on managed landscapes. These policies intersect with increasing support for municipalities to update their land use regulations, as referenced above under the land protection and wetlands protection sections above. We also support the proposal to develop a new incentive program for healthy soil practices pursuant to the Healthy Soils Amendment in the Chapter 358 of the Act of 2020.

L3 – Restore NWL

Increase Urban and Riparian Vegetation

Increase Funding for Urban Tree Planting and Launch New Planting Program along Rivers and Streams: Mass Audubon strongly supports this proposed policy. We recommend that the successful Greening the Gateway Cities program be expanded to additional communities. Tree planting and riparian restoration should be prioritized in EJ communities and other neighborhoods with urban heat islands and degraded stream corridors.

[7] www.massaudubonorg/lidcost

[8] https://malegislature.gov/Bills/192/S1880 S.1880 *An Act to create a forest carbon incentive program to enhance carbon storage on private timber lands* (Sen. Hinds)

Allocate a Portion of MVP Grants for Greening Projects: This is already occurring. We support a significant expansion of the amount of grant funding allocated to greening projects that have multiple benefits including carbon sequestration, reduction in urban heat islands, reduction of flood risks, and access to nature for all.

Improve Wetland Replication and Expand Wetland Restoration

Wetlands sequester and store carbon at higher levels than terrestrial ecosystems. Massachusetts was the first state to adopt a Wetlands Protection Act, and is a national leader in wetland restoration, supported by the Division of Ecological Restoration. We strongly support further advancement of this leadership. There are many opportunities to scale up wetlands restoration, including on thousand of acres of cranberry bogs that are no longer economically viable, in salt marshes that were historically altered by ditching and other activities, and on rivers where dam removals can create new vegetated wetlands in former impoundments.

Require No Net Loss of Stored Carbon in Replicated Wetlands and 2:1 Ratio of Replacement to Loss for Variances: We support these proposed policies and updating of the wetlands regulations at 310 CMR 10.00 by 2024, while noting that it is challenging to achieve No Net Loss of carbon in replication. High rates of failure of wetlands replication projects have been documented in Massachusetts. In the most recent sampling, 64% of the replication areas did not meet the basic regulatory requirements, let alone fully replace the functions lost[9]. Strengthening replication regulatory standards and oversight would be helpful, but not sufficient to reach the goal of No Net Loss of carbon. Wetland soils have developed over thousands of years, and it is difficult to replicate these carbon-rich soils in constructed wetlands. One way to achieve this goal would be to require projects that destroy wetlands to make payments into a fund for wetlands restoration projects, while still replacing locally important functions such as flood control and interconnected wetland habitat on-site. Restoration projects usually offer greater opportunities to provide carbon-rich wetland soils and native wetlands plant communities than replication projects.

Variance projects are, by definition, projects that exceed regulatory limits on the amount of wetland alteration and otherwise are not able to meet general regulatory performance standards. Variances are only allowed in cases where there is an overriding public interest, and most frequently are used for infrastructure projects. MassDEP has a longstanding practice of requiring a minimum of 2:1 replacement ratio for variance projects. Mass Audubon supports codifying this policy in the regulations. Restoration should be prioritized over replication for these projects as well, but also including on-site replication for locally important functions impacted by a project.

Streamline Permitting for Tidal and Salt Marsh Restoration: We support this policy and offer the expertise of our Coastal Resilience Program in support MassDEP's work to update the regulations in partnership with other state and federal agencies, NGOs, municipalities, and universities. The policy initiative should be expanded to include review and update of other applicable regulations including MEPA, Chapter 91 Tidelands, and 401 Water Quality Certification.

Salt marshes and other coastal wetlands are among the most productive ecosystems globally, sequestering carbon at rates up to 10 times higher than terrestrial forests. They also provide critically important habitat for fish and wildlife and protect communities from the impacts of increasingly intense storms. Salt marshes are also among our most endangered ecosystems. Historic impacts including ditching and agricultural berms are accelerating the rate of loss. Innovative restoration techniques including ditch

[9] https://www.nawm.org/pdf_lib/member_webinar/assessment_of_wetland_mitigation_success_rhodes_jackson_042915.pdf

remediation, runneling, and micro-topography are being applied successfully at sites in Massachusetts and other states. There is a narrow window of opportunity over the next 5 to 10 years to scale up these restoration projects across thousands of acres of salt marsh. If that restoration work is delayed beyond that timeframe, the impacts of sea level rise will require other more expensive and intrusive methods such as sediment deposition. The wetlands regulations include provisions streamlining several other types of restoration projects, and we support expanding those provisions to include the new salt marsh restoration techniques.

We also recommend that this regulatory streamlining update address other categories of wetland restoration including cranberry bog restoration and management of invasive species.

Incentivizing Durable Wood Products

Massachusetts is fortunate to have more than 60% of its land in forest. Most of the privately-owned forestlands are in parcels smaller than 50 acres, owned by thousands of individuals, who face a variety of financial pressures in deciding how to manage their land and whether to keep it in forest or convert it to development. Massachusetts also imports the majority of wood it uses in construction. In general, we support opportunities to utilize more of our home-grown agricultural and timber products generated by sustainable agricultural and forestry practices here in Massachusetts. These revenue streams help private land owners keep forests and farms intact rather than needing to sell them for conversion to another use, which ensures that we retain our carbon storage capabilities.

Cement and steel are relatively high-carbon building materials, and we currently lack low-carbon methods for producing them, so the prospects of using cross-laminated timber (CLT) to replace these materials in new buildings is an exciting idea that can bring real benefits to local rural economies. However, CLT has some real challenges: it will need to be limited in scale to be climate-positive, and as such it will always be a relatively minor mitigation strategy.

First, any mitigation strategy that involves changing the supply or demand of a commodity that is traded beyond our state borders – and timber and other wood products (e.g., pellets) certainly are – can create shifts in dynamic markets that may increase (or in some cases decrease) land use and GHG emissions in other geographies. Second, these market-mediated shifts are very difficult to track, and nearly impossible to measure with accuracy. For example, we've seen that jurisdictions that have set strong policy incentives for bioenergy, including California (Low Carbon Fuel Standard) and the U.S. EPA (Renewable Fuel Standard), have had to develop complex models to measure the magnitude of 'indirect land use change (iLUC)', i.e., an attempt to account for GHG emissions resulting from changes in commodity markets that indirectly change land use in other parts of the world. However, estimates from these models have never been validated, both because of their complexity and impossibility of collecting enough empirical data to validate results. These models are also very resource-intensive to maintain and run.

Lessons from the impact of bioenergy incentives on land use changes also gives us pause about the likely benefits of this as a GHG mitigation strategy. We do support a study to better understand the end use of trees harvested in Massachusetts, and opportunities to utilize more of that wood here with benefits to local landowners and economies. However, for the reasons described above, we have concerns about this strategy taking significant resources and focus –the magnitude of GHG emissions from existing buildings will always be the largest part of the building sector GHG footprint, we feel that this strategy should be limited in scope because of market effects, and thus is unlikely to contribute more than marginal GHG benefits.

Track Timber Flows to Better Understand End Use of Massachusetts Timber

Require Reporting of Sawmills Where Tree Removals Are Processed: We support creation of a tracking system to document the end use of trees removed by state agencies, state-contracted vendors, developers, and forest landowners. Trees removed for development, utility and roadside maintenance, hazard trees around buildings, and other reasons are not subject to the Forest Cutting Practices Act and will not be captured in that data. The state should develop mechanisms to obtain information about these other categories of tree removals. The MEPA regulatory updates could be one such opportunity, at least for development projects. We recommend that the state also consider ways to obtain information about tree removals by MassDOT, airports, railroads, and local department of public works, utilities, and arborists. Many of the trees removed for these other reasons are not sent to sawmills for processing. The state should develop data to track or at least estimate other end uses like chipping for biomass or mulch, drop and leave etc.

L5 –Explore Additional Carbon Sequestration

Develop Accounting and Market Frameworks by 2025 for Achieving Net Zero with Sequestration Beyond Our NWL

Collaborate with Other States on Carbon Accounting Methodology, Policy, and Credit Accounting: Climate change is a global problem affecting our atmospheric commons. As such, the best approach to addressing this market failure is to set policies at the national level. Despite the Biden Administration's actions to establish national climate goals for 2030 and 2050 that align with climate science for 1.5-2C°, however, many of the most ambitious climate policies and incentives are still being done at the subnational level, i.e., states, provinces, and regions. The durability of the Regional Greenhouse Gas Initiative (RGGI) is a great proof of how well-designed, flexible climate programs can both reduce GHG emissions but also set precedents for how other jurisdictions can develop rigorous climate policy on a regional basis.

We will have much more to say about this strategy as more details become known. Our top-line recommendation for a regional approach is to ensure that other states involved commit to taking on binding GHG emissions limits. Setting a regional rule for GHG reductions that each state must adopt on a legal basis, and be committed to enforcing, is the reason that RGGI's emissions market has credibility. We also advise EEA to increase transparency about the regional process, goals, and discussions with other states. Building public support for regional climate strategies can be politically challenging, so the public support of Mass Audubon and others in our broad coalition of conservation and environmental justice advocates will be essential to landing a successful program.

Electricity Sector

Transmission Systems Planning**:** The Commonwealth is entering into regional planning for transmission system improvements. This should include offshore wind transmission. In addition to cost and reliability, the state should evaluate the relative land impacts of different approaches. Failure to plan for a shared offshore wind transmission system to bring that new source of power to demand markets is likely to result in significant impacts to land, which should be avoided to the extent possible.

Incorporate Wildlife Protections into Offshore Wind: Commitments to avoid, minimize, and mitigate impacts to fish, invertebrates, marine mammals, birds and bats should be included in all procurements and agreements with wind developers.

Thank you for close review and consideration of these comments. Please do not hesitate to reach out to me if you have any questions or need clarification.

Sincerely,

Michelle Manion
Vice President for Policy and Advocacy
mmanion@massaudubon.org

M A S S A C H U S E T T S F O R E S T A L L I A N C E

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April 8, 2022

Judy Chang, Undersecretary of Energy and Climate Solutions
Executive Office of Energy and Environmental Affairs
100 Cambridge St, Suite 900
Boston, MA 02114

Undersecretary Chang:

The Massachusetts Forest Alliance represents forest landowners, foresters, timber harvesters, and forest products companies in Massachusetts.

I'm writing in response to the recent forest-related public meetings around the 2025 and 2030 CECP, but also on other topics as well. I apologize for the delayed feedback, but we wanted to investigate some issues more closely with our membership before providing feedback. Thank you for continuing to keep the comment period open.

Our comments gradually expanded as we gathered more thoughts and feedback from our members. For simplicity, I'm dividing our comments into large sections, with page numbers below in case you want to skip ahead to a particular topic. Topics have subsections within them.

I'm always available (as are our knowledgeable board members) to discuss any of these topics and our feedback with you. I can be reached at cegan@massforestalliance.org or (617) 645-1191.

Thank you for your consideration of our comments.

Sincerely,

Christopher Egan
Executive Director

Forest Management and Carbon

First, we wanted to applaud EEA for holding these meetings and gathering input. We were pleased by the selection of speakers and the breadth of the material presented. We hope that EEA will come down on the side of mainstream climate science, aligning with the Intergovernmental Panel on Climate Change (IPCC) and major environmental organizations rather than the strident voices that have dominated the public discourse around forest management in Massachusetts, whose talking points misinterpret or ignore the body of peer-reviewed research that has accumulated over the past decades.

The science behind sustainable forest management is clear and well-established. This science is why the IPCC said in their 2019 Special Report on Climate Change and Land:

> *"In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit."*

and:

> *"Sustainable forest management can reduce the extent of forest conversion to non-forest uses. Sustainable forest management aimed at providing timber, fiber, biomass, non-timber resources, and other ecosystem functions and services, can lower greenhouse gas emissions and can contribute to adaptation. (high confidence)."*

Looking at data from the US Forest Service's Forest Inventory and Analysis (FIA) program, we can see that in 2019 (most recent data available), new annual growth of trees that year was 206 million cubic feet – that amount of wood was added to our forests in 2019. That same year, harvesting was just 25 million cubic feet. Growth outweighed harvesting by ***724%*** - **we harvested only 12% of new growth**. Our forests continue to accumulate more and more carbon each year because our harvesting is clearly sustainable. Through harvesting, we're able to get the timber we need for the forest products we all use every single day, as we live in our wood-framed houses with hardwood floors and wooden furniture, use toilet paper and tissues, read books and magazines, and have cardboard boxes delivered to our doorstep with the goods we need inside.

The bad news is that tree mortality has been rising in our forests for years, and in 2019 approached nearly four times the amount of wood removed in harvesting. That is a huge loss in forest carbon and may explain why carbon sequestration has plateaued in the last five years. Looking at other New England states, it appears that mortality and harvesting are inversely related to some degree. If this theory is correct, we have the highest mortality in New England because we harvest the least of any New England states, resulting in lower net sequestration rates compared to other states.

We urge EEA to follow the IPCC and other major environmental groups, and not forest activists who insist that not cutting any trees is the be the best thing for carbon sequestration. Forests that are degraded or dying (often single-species plantations planted during the Great Depression) will sequester little carbon if left untouched, and likely become carbon sources in the short term. Invasive insects and diseases (which Massachusetts unfortunately has plenty of) can severely degrade forests.

In fact, Harvard Forest discovered that their hemlocks had become a carbon source, not a carbon sink – emitting more carbon than they were sequestering – thanks to the hemlock woolly adelgid. Another recent study found that forests affected by invasive insects sequestered 69% less carbon and those affected by invasive plants sequestered 28% less. We clearly need to address these invasives with additional funding to protect the carbon sequestration capacity in our forests.

As was detailed by Dr. Todd Ontl from NIACS in your public meetings, science shows that forests with a diversity of tree species and ages are not only more resilient to climate change-caused weather events, but also sequester more carbon annually in aggregate than a forest with low age class diversity. Diversity of species, size classes, and ages across the landscape, beyond just better carbon sequestration, is also the surest pathway to statewide biodiversity protection. Having DCR gradually convert dying monoculture plantations into more diverse forests will unquestionably benefit carbon sequestration and storage in future years, and preventing all cutting on state lands would prevent these benefits from being realized.

Two of our board members who are timber harvesters have been informally working with DCR to decide how best to track the carbon emissions and storage of harvested wood products from state land (more information on that below). As part of their efforts, they looked at a CFI data analysis that showed that DCR forestland that had been previously harvested had accumulated more forest carbon than unmanaged land over the last 60 years, even after accounting for the carbon emitted from harvesting and short-lived forest products.

At a time when EEA has been under attack for forest management on state lands, the decision to keep this analysis under wraps is truly puzzling, as it offers pushback against forest activists trumpeting a handful of modeling studies that conflict not only with decades of peer-reviewed research, but also with the position of the IPCC and major environmental groups. We encourage you to release this data analysis, based on decades of careful measurement, to help the public understand the actual effects of forest management on forest carbon on state-owned lands.

Forest management would benefit forest carbon on private lands as well. Currently, an estimated 75% of Massachusetts forest volume is low-value timber. Just 25% of the timber (the higher-value timber) produces more than 75% of the timber value during a harvest. By conducting proper sustainable forest management in a practice we call “timber stand improvement,” or “TSI,” these numbers can be dramatically improved, and Massachusetts forestland could grow much more valuable sawtimber that can be turned into long-lasting durable wood products that continue to store carbon for decades or even a century or

longer into the future. The issue is that TSI generally **costs** a landowner money – it isn't profitable or even break-even in the short-term. The reason for this is that there are few markets for low-value timber, in part because paper production has dramatically declined in our region. As a result, few landowners are able to engage in timber stand improvement.

Strategically investing some state funds into carefully chosen TSI opportunities would have many long-term benefits – increased annual carbon sequestration, increased carbon storage in harvested wood products, increased resilience and adaptation to climate change, increased biodiversity, increased rural economic growth, and increased timber values for forest landowners, making them less likely to sell their land for development.

We think there may also be management opportunities for forests in suburban areas that are in smaller acreage ownership. There is plenty of this forest but it's a challenge to manage and too often it is in poor health and choked with invasives. We own land in Plainville and we're working on a demonstration project that will involve harvesting timber with small, specialized mechanized equipment that could be a model used elsewhere. We'll be happy to keep you in the loop on this as it moves forward.

In fact, the single best thing we can do for forest carbon is to keep forests as forests, as forest lost to development means permanent deforestation, with not only immediate loss of carbon, but also loss of future sequestration, which adds up quickly. Sustainable forest management as a practice is meaningless **unless it also includes the sustained viability of forest ownership.** This means not only continuing to offer current use taxation on forestland through the Chapter 61 program, but also ensuring that forest landowners can earn income from their forest – from the sustainable harvesting of forest products and from compensation for ecosystem services such as carbon sequestration.

We're glad to see that you're apparently interested in moving towards this goal – encouraging forest landowners to undertake improved, climate-smart forest management through incentive programs. We support this effort, so long as it includes sustainable forest management rather than simply locking up forests in the name of forest carbon, which we believe would be a mistake that is not supported by science.

Old Growth Forests

A century of silvicultural science has said that old growth forests are very high in carbon storage (carbon stocks accumulated over many years) but have rates of annual carbon sequestration that are relatively low compared to younger forests, resulting in a forest that approaches carbon neutrality, with a lower level of sequestration balancing carbon emissions from dead trees. Some anti-forestry activists believe that old growth forests instead sequester much **more** carbon than younger forests on an annual basis, pointing to studies that show that a large older tree sequesters as much carbon in a single year as is fully contained in two or three younger trees.

Although it may seem counterintuitive, it is true that an older tree sequesters more carbon than a younger tree ***and*** that younger forests sequester more carbon annually than older forests. How to explain this seeming contradiction? A younger forest contains many more trees than an older forest. Packing in those young, fast-growing trees results in more

carbon sequestered annually than in an older forest, which has far fewer, but significantly larger trees. It's simply a matter of overall numbers, and taking studies of individual trees and trying to apply them to a forest is a literal case of missing the forest for the trees.

Some studies that have tried to project the future of forests over the next 400 years have indicated that older forests sequester more carbon than younger forests, but they have used simplistic models that in some cases actually ignored tree mortality. If you pretend that trees never die, it's easy to say that older forests will sequester more carbon.

A study that examined actual carbon measurements from actual old growth forests in the Pacific Northwest (where there is still a substantial amount of old growth) revealed that on average, old growth forests there are just a slight carbon sink, aligned with a century of silvicultural science. Climate is an influencer – the study found that during El Niño events, the forests were a slight carbon source (emitting more carbon than they sequestered), and during La Niña years, they were a carbon sink. We believe that studies based on actual forest carbon measurements should outweigh models that attempt to predict Mother Nature for hundreds of years in all her complexity, which is a terribly difficult task.

Forest Carbon Management vs Other Ecosystem Services

Finally, as we consider forest carbon, it's important to realize there are tradeoffs being made if we favor forest carbon over other ecosystem services. Watershed protection involves keeping younger trees on slopes facing into the wind to help reduce blowdown events that can quickly silt up reservoirs. This type of management is supported by a century of silvicultural science.

Perhaps the biggest tradeoff is in wildlife management. Many of the threatened and endangered species in Massachusetts are those that rely on early successional forest habitat, which was formerly abundant here but has vanished as our forests matured. Creating that young forest habitat requires cutting a lot of trees but is necessary to protect species such as the New England cottontail, whip-poor-will, and migratory songbirds. We can let those species disappear in the name of trying to maximize forest carbon, but that is a choice most residents of the Commonwealth don't want to make. A research paper that explores the tradeoffs between forest carbon and wildlife habitat was recently published.

"High-grading" is the practice of removing all the high-value timber from a property, leaving only low-value trees behind, which we frown upon. We hope that the Commonwealth won't steer towards forest management solely for forest carbon, which could end up potentially damaging other ecosystem services in what would in effect be "high-grading" for carbon.

Forest Industry Support

It is also important to recognize the need for a viable forest products industry, which creates markets that compensate forest landowners for the timber they grow. Without timber harvesters and sawmills, forest landowners would have no market, their timber would be much less valuable, and they would be more tempted to sell for development.

We are encouraged that you are interested in this issue and are searching for ways to protect the industry. Local sawmills have dwindled in number for a variety of reasons. They face out-of-state and Canadian competitors that have significant cost advantages from lower electric prices (generally the largest expense for a sawmill), lower taxes, cheaper employee healthcare (particularly in Canada, with single-payer health insurance), and less regulation and time-consuming paperwork and permitting.

We've polled some of our sawmill members for ideas that might help preserve their businesses and potentially allow them to scale up. Suggestions include encouraging/incentivizing municipal and state agencies to build with local wood; offering grants and/or zero-interest loans to purchase new, more efficient equipment that maximizes yield of durable wood products from raw timber while reducing energy consumption at the same time; and offering either lower commercial electric prices or grants to install renewable energy systems to lower net electric prices.

Ultimately, we will never mill all the wood grown in Massachusetts within the state, and we don't think that's a major problem. There are mills located just over the state borders in Connecticut, New Hampshire and Vermont that work closely with Massachusetts harvesters – many of them are members of our organization. Looking at things in a more regional view, rather than a state-only view, should be acceptable.

Other states in the region have also tried to support the forest products industry outside of just sawmills. Maine uses funds from their revolving Clean Water Fund to help timber harvesters buy new tracked equipment that has less ground pressure, resulting in less soil disturbance that can run off into water supplies, for example. You could look to other states for ideas here.

Workforce development is also an important issue. There are few industries that are facing as much of a workforce succession crisis as forestry. While there are plenty of foresters graduating from university programs each year, timber harvesters and log truckers are reaching retirement age with few newcomers to replace them. Other states have invested in educational programs to attract a new workforce. John Deere has introduced a new simulator that is being used in vocational training elsewhere. This is something that EEA could give a grant to a vocational school to buy at relatively low cost.

We are happy to speak with you further about these options and help develop policies and grant programs that would best support this important link in the forest economy. Please take advantage of our expertise and work with us to make sure that forest management isn't foreclosed as an option for forest landowners in Massachusetts.

Tracking Carbon in Harvested Wood Products

You've also inquired about tracking the end use of timber harvested in the state. Logistically, this is tricky and might not yield the quality and quantity of information that you hope. While a harvester may sell the wood to a mill or other large buyer, determining the fate of that wood isn't easy, depending on how precise you need to get. Logs are typically graded at the mills and that grading determines whether that wood will end up as

veneer, flooring, furniture, lumber, railroad ties, or pallets, all of which have different average lifespans.

Timber harvesters view their business relationships with wood buyers as trade secrets, and mandating they reveal this information is something they would strongly oppose. Our suggestion is to collect basic information on volumes of major product categories such as sawtimber, pulpwood, firewood, biomass chips, etc. This information could be collected from harvesters as part of the Chapter 132 process (without requiring harvesters to detail exactly who it was sold to – perhaps just collecting basic information about sawmill destinations (in-state, out-of-state, and export) would be enough). You could then use available formulae to make carbon calculations based on this information.

Other states are also working on this issue, and examining their approaches has some value. We mentioned above that two of our harvester board members have been working with DCR to figure out how to accomplish these goals on state-owned land. This working group could be expanded or their conclusions could be applied to privately-owned lands as well. We are happy to work with you in the design of a system that is workable, relatively simple, and likely to yield useful information.

Chapter 61 Issue

As a final aside, there is one issue we wanted to make sure you knew about – we had notified Bob O'Connor about this in the past, but never got a reply. The Chapter 61 current use program is a critical tool in protecting forests, acting as a temporary conservation restriction in exchange for significantly lowered tax rates that help keep forest as forest and help landowners afford the services of a consulting forester to develop a forest management plan.

But the way it works is that a lien is placed on the property during the 10-year period. This has caused issues for forest landowners whose forestland in Chapter 61 is in the same legal parcel as their home. As those landowners have tried to refinance their mortgages, some banks are refusing to refinance until the lien is removed. The landowner than must either not refinance, or withdraw the property from Chapter 61, pay penalties, refinance, and then rejoin the program – an expensive proposition.

Other states have dealt with this issue. In Vermont, landowners could pay a fee and get a subordination agreement from their state revenue department to take to their bank. Eventually, Vermont tired of this and passed a law declaring that all existing and prospective current use liens were converted to contingent liens that would only become an actual lien if the land was developed. A similar approach might be possible here.

We're not sure how to best deal with this, and wondered how effective it would be talking to DOR and the Joint Committee on Revenue on our own versus with EEA's involvement. Please let us know how we should proceed on this. We're concerned that if this problem is left unaddressed, it could result in fewer landowners putting their land in Chapter 61, and existing landowners withdrawing their land at the end of their 10-year agreement as more and more banks refuse refinancing of mortgages on chapterlands.

Resilient Lands Initiative and Healthy Soils Action Plan

You mentioned in previous public meetings that the Resilient Lands Initiative (RLI) and the Healthy Soils Action Plan (HSAP) would be incorporated into your planning. We have some concerns about each of these.

Resilient Lands Initiative

We generally support the RLI. We have a few caveats – we're concerned about potentially preventing forest landowners from carving out a house lot or two for their children on their land, which may be the result through NRPZ or no net loss provisions. We would favor an exemption for family forest landowners for this specific use. We're also concerned that NRPZ and no net loss provisions could significantly reduce the value of forestland. This could become a major problem if forest landowners attempt to borrow against the property in a financial emergency, and potentially could prevent refinancing a mortgage.

Healthy Soils Action Plan

We also have some issues with the HSAP, and we believe some of the potential policies outlined in it are not supported by science.

The first issue with the science of soil carbon is that there is disagreement on the definition of the word "soil." Many research studies lump in the litter or duff layer into the category of soil carbon, even though they are very different things. The litter layer is disturbed during harvest – in fact, it's disturbed merely by walking through it, resulting in carbon emissions – but it is only a small, single-digit percentage of forest carbon.

Even if they don't include the litter layer, many soil carbon studies classify "soil" as just 6-12 inches down from the surface – clearly not even close to root depth of the trees. Why do they make this choice? It's likely because accurately measuring soil carbon is extremely difficult and time-consuming. To do it properly involves hand-digging a pit up to six feet in depth and then taking very careful measurements. An entire team of grad students might be able to dig and measure 4-6 pits per summer. As a result, some studies get around this by limiting depth, which could result in skewed and incomplete measurements.

Places that have done full soil carbon analysis using deep pits – such as Harvard Forest and at Hubbard Brook Research Forest – have found little to no change at all in their soil carbon across a number of decades. This is true of both areas harvested and areas left undisturbed. Even when declines of soil carbon *are* found, the declines are small and seem to rebound quickly (watch beginning at 11:30 in this linked webinar as a forest ecology professor from Cornell University discusses their results). Given that the science on soil carbon is in some dispute, we believe those studies that do full-depth excavations and take detailed measurements should be viewed as more accurate than studies that measure down only a few inches.

In the HSAP, one suggestion is to allow harvesting only when the leaves are off the trees, which would absolutely wipe out timber harvesters in Massachusetts by allowing them to work only half the year. Assuming that **all** the leaves are lost from **all** the harvested trees in their entirety is simply wrong. Traditional logging and cut-to-length mechanized logging

both process the trees in the forest, leaving the leaves and branches behind (in compliance with state regulations around this material, which we call "slash"). Even in whole tree mechanized harvesting (where trees are processed at the landing), a portion of the tops and branches (with leaves) are typically towed back into the forest. But even if we pretend that **all** the leaves are lost from those trees, the idea that losing *some* of the leaves (since not all trees are harvested) for a single year would make a substantial difference in long-term soil carbon is clearly incorrect. Any soil carbon gains would be marginal at best at massive cost to both forest landowners and timber harvesters.

HSAP also includes a potential recommendation to vastly expand the use of timber mats. These are expensive (generally $1 per single mat per day, plus transportation, placement, and removal), which can quickly make forest management uneconomic. Additionally, placing the mats requires significant experience and knowledge, and incorrect placement can often result in **more** damage to the soil. DCR has been exploring having the state provide mats for free to harvesters, but that doesn't address the issue of proper placement, which would require serious training of harvesters over time – not to mention the trucking and placement costs. We are concerned that jumping to a much larger timber mat requirement without much consideration could be a death knell for forest management in Massachusetts.

Because the science on soil carbon is complex and far less robust than that of aboveground carbon pools, we urge EEA to be very cautious in adopting wide-reaching policies intended to protect soil carbon during harvesting. These policies could have the unintended consequence of making forest management economically infeasible and make impossible the forest resilience work and other programs you are considering.

Biogenic Combustion and Modern Wood Heat

You mentioned during the recent IAC meeting that no one complained about the state using gross numbers in climate change planning. In fact, we are concerned about the numbers you are using for biogenic combustion (the pink line on your charts). The breakdown of this guide, which we first saw in the slides for your March 28 stakeholder meeting, indicates that wood is only a small part of this figure – perhaps a third or less.

We wonder what the sources of that data are, and whether they represent actual data or assumptions and estimates from secondary sources. During the webinar in January, EEA indicated that it was from DEP using "federal data sources." We're not sure what that data source is. If it is EPA's National Emissions Inventory (NEI), we have some concerns about that, as it is not based on actual emissions measurements, but rather mostly estimates from census data. This can be an issue. For example, these estimates include fireplaces. Estimating the number of fireplaces from census data should be relatively accurate. But determining emissions from them requires knowing how often they are used, and how long they are used each time. Surveying residents – how many times did you use your fireplace last year, and how long on average did you use it each time? – may not return accurate results.

In 2017, an anti-wood energy group used the NEI to claim that Worcester County had a massive wood smoke problem – 8th worst in the country for PM 2.5 pollution. When the Worcester Telegram & Gazette investigated, they found no such problem. In fact, Worcester County has been listed as one of the cleanest counties in the country for PM 2.5 in the American Lung Association's *State of the Air* report. When challenged by the Telegram reporter, the EPA publicly conceded that relying on the gross tonnage number from the NEI would produce misleading results for larger counties (which we have plenty of in Massachusetts). We are concerned about the potential reliance on the NEI to establish emissions, if in fact that is your data source, especially with the EPA's public admission on the danger of using gross numbers from the NEI.

Since wood appears to be only a small component of biogenic combustion, it would make sense to address the larger components as the most effective way to drive down combustion emissions. As people switch from gasoline-powered vehicles to electric vehicles, ethanol use will naturally decline. Other components, such as trash-burning, aren't as easy to eliminate. But they should be our first target.

For the percentage of that figure that comes from the combustion of wood, relying on a gross figure is an issue for us, beyond simply the potential data source. Switching from oil heat to wood heat is a significant decarbonizer, as confirmed by the Commonwealth's own research in the *Manomet* study, as displayed on the Massachusetts Clean Energy Center's GoClean website, and in other peer-reviewed published research. To ignore these net carbon emission savings by relying on a gross figure would be a serious policy error and will make it much more difficult for the Commonwealth to reach its climate goals.

What naturally comes from using a gross figure that ignores net decarbonization is a push to reduce the combustion of wood. Doing this would require banning wood stoves and

other wood-burning devices. New York's Climate Action Council recently hinted at doing this, and it caused a media firestorm. Politicians, state officials, and the Climate Action Council itself then made a frantic, panicked retreat as they discovered that banning wood stoves managed to unite voters across the entire political spectrum in opposition and is one of the least popular policies ever proposed. We saw this exact same pattern play out in the past in some western Massachusetts towns, and we wouldn't want EEA to make this same disastrous mistake (or allow the perception to take hold that you plan to do so).

One easy and inexpensive way to reduce carbon emissions from wood stoves without banning them is to engage in a wood stove changeout program. DEP partnered with MassCEC on this program for a number of years, with a very small amount of funding each year that was quickly exhausted by overwhelming demand. Eliminating this funding in recent years was an inexplicable mistake.

Replacing a wood stove from the 1980s with one that meets the latest EPA standards is a huge win. Not only are PM 2.5 emissions reduced by 90 percent or more, but the stoves are so much more efficient that they use 30 percent less wood to generate the same amount of heat – saving the consumer a significant amount on fuel expenses, but also reducing gross carbon emissions by 30 percent. The program was easy for the consumer, as the stove shop handled all the paperwork, and it especially benefited the rural poor, who often rely on wood heat because it is the least expensive heating fuel (if cut from their own property, it is effectively free, with only the cost of their own labor and time). Under the changeout program, low-income residents could replace their wood stove with a new model at virtually no cost at all and cut their heating costs by 30 percent, making it an extremely effective anti-poverty program that also offered significant environmental benefits. We urge EEA to reinstate and expand this program, and we would be happy to help – promoting the program to our members or even taking some responsibility for it as a contractor.

Modern wood heat – the use of pellet and chip boilers, rather than wood stoves – has an even more compelling case. These ultra-modern furnace/boiler replacements reduce PM 2.5 emissions by more than 99 percent compared to a wood stove from the 1980s per unit of heat generated, and they are extremely efficient.

These are the only wood heating systems incentivized by the Commonwealth through the APS program, and it makes sense to do so. These systems are wood heat done right, with very low emissions, very high efficiency, ease of use for the homeowner, and strong decarbonization value. This is exactly what we ***should*** be incentivizing.

We're concerned about widespread misinformation about modern wood heat and carbon and the conflation with utility-scale biomass power, when in fact they are very different. This misunderstanding likely drove the inclusion of language removing wood from the RPS and APS in the Senate Climate bill, as referenced by Senator Creem's claim that it was needed to prevent the Springfield biomass power plant from being built. In fact, that plant is dead, and the RPS regulations – both current and prospective – prevent new utility-scale biomass power plants from qualifying for the RPS.

The fuel for modern wood heating systems in the APS is almost entirely made from sawmill residues – sawdust is used to make pellets, and the chips are made from "slabs" – the rounded edges of the log left over when it is made into square lumber. Slabs used to go into paper production, but that market has gradually disappeared, and sawmills are looking for other markets for their residues.

Using sawmill residues improves the decarbonization even further, as using residues from trees that were already cut means that no additional trees were harvested to create the fuel. Even opponents of wood energy concede that using sawmill residues for modern wood heat is unobjectionable from a climate perspective.

As the Commonwealth transitions to electric heat and transportation, massive grid upgrades will be necessary as electric demand is expected to at least double. This issue is particularly acute in rural towns, where three-phase power is rare. The cost to upgrade these power lines is roughly $1 million per mile. Utilities are very happy to do this, because they are paid the entire cost, plus a guaranteed profit margin on top. But with already sky-high electric rates, these upgrades will drive the price of electricity even higher. Already, annual operating costs tend to <u>increase</u> for those who switch from newer natural gas furnaces to whole-house heat pumps, which disincentivizes switching. By incentivizing modern wood heat instead in these rural areas (which tend to be at higher elevations with colder temperatures), some upgrades should become unnecessary, saving ratepayers money.

Modern wood heat is especially valuable for larger businesses like farms or factories in rural areas. Heat pumps tend to be slightly cheaper for a residential installation than a modern wood heat pellet boiler, but that situation reverses as scale increases, and a large wood chip system at a large business is substantially cheaper than a heat pump system to install, and the ongoing fuel costs – wood chips instead of electricity – is <u>also</u> substantially cheaper. This helps businesses thrive in rural communities where every job is precious.

<u>RPS Regulations</u>

We've also been deeply concerned about DOER's decision to insert a five-mile environmental setback for all wood systems in the RPS. This appears on its face to be an error with unforeseen consequences. DOER was reacting to concerns about the Springfield biomass plant – a project we did not support and one which was clearly poorly sited – and overcorrected.

DOER apparently did not understand the impact of this regulation when proposed. To be fair, we also failed to grasp the impact. That's because no maps of EJ communities were available at the time, and it turned out that the Commonwealth's current definition of an EJ community is so overbroad that wealthy suburbs such as Lexington, where the average home price is $1.5 million, somehow were classified as EJ communities. This meant the five-mile limit reached nearly 90% of the state.

As an example of this confusion, DOER was working with one of our members on an exciting new ultra-efficient wood chip combined-heat-and-power (CHP) system. This

containerized system was to be imported from Europe, and it was to be the first one installed in North America (Senator Pacheco heavily praised these systems during a hearing on the RPS regulations). The US Forest Service helped support this demonstration project with a grant, and DOER staff were working on how the system would be regulated ***well after*** the EJ setbacks were proposed – even through those setbacks would prevent the system from eligibility because of a trailer park within the five-mile limit. The idea that a tiny CHP system that fits on the back of a truck would somehow represent a threat to the health of trailer park residents some distance away (a trailer park which incidentally has a number of fire pits) is obviously false.

DOER's intention was to prevent utility-scale biomass power plants like the 42-megawatt Springfield plant from being built in urban areas. But the result was the banning of **tiny** *CHP* systems in **rural** areas.

We suggested to DOER that they place a size limit on the regulation, having it only apply to systems of 5 megawatts of electricity generation or larger, or even well below that number – perhaps even 1 megawatt. Their refusal to do so, especially when given a second chance at the regulation, is puzzling. Instead, they grandfathered in the two existing CHP facilities which produce a small amount of power – both of which have operated for years with no issues and would have lost eligibility under the proposed regulations. To us, this approach makes no sense, and we urge you to reconsider.

Biochar Regulation

Finally, we have concerns about the regulation of new technologies. Biochar involves heating wood in a low- or zero-oxygen environment, in which the wood does not combust, but becomes an almost pure-carbon charcoal. The vast majority of the carbon contained in the wood remains in the biochar. When added to agricultural soils, biochar improves productivity and also retains water in the soil, reducing the need for irrigation and chemical fertilizers that can run off into water supplies, causing algae blooms and other deleterious effects. Even better, when mixed into soils, biochar does not run off and decays extremely slowly – with a projected lifespan of 700 – 4,000 years! Using sawmill residues to make this material comes close to being a net carbon negative product.

Because these systems do not combust wood, they have very different emission profiles – both carbon and PM 2.5. These systems generate electricity by fueling generators using a biogas that is another product of the process. This is similar to anaerobic digesters or natural gas furnaces in terms of emissions, and as a result we believe they should not be regulated as biomass combustion systems (because they do not combust wood). The EJ setback regulation is related to air impacts, and so it makes little sense to apply it to biochar facilities with virtually identical air impacts to anaerobic digesters (which are exempt from the EJ requirements) merely because the fuel stock is different. We hope you'll carefully examine how to regulate these systems as they are introduced to the Commonwealth.

Representation in Climate Change Planning Groups

We have previously expressed a strong concern to you that the state has little to no representation from those in the forest economy in any climate change planning. As the state aligns behind potential strategies such as the use of cross-laminated timber instead of high-carbon concrete and steel and engaging in climate-smart forest management to increase resilience, the value of timber harvesters, foresters, and forest landowners becomes even more important. The Commonwealth simply cannot accurately understand the impact of policies on these folks unless we have a seat at the table to tell you.

You have repeatedly acknowledged during public meetings that we desired more engagement with state planners, but there has been little actual action in that regard until very recently. We appreciated being at the table at the March 28 stakeholder meeting on carbon accounting for natural and working lands, and we are looking forward to a direct meeting with EEA staff next week. Nevertheless, this is only a start, and we encourage you to bring us to the table as you continue to finalize plans for natural and working lands.

Implementation Advisory Committee

We were dismayed by the makeup of the Implementation Advisory Committee. We're unsure why the Conservation Law Foundation has multiple representatives, including multiple working group chairs, while groups like ours have no representation at all. We believe this has led to decisions that are not science-based, since IAC members had little opportunity to hear perspectives from outside their own echo chamber, and there is a serious lack of knowledge about forest management, forest products, and the forest economy.

We were particularly puzzled by the IAC's call to remove wood from the RPS and APS, which didn't come from the Natural and Working Lands group. The Electricity group explained that they were inserting this call into their own recommendations at the request of the Environmental Justice group, which is bizarre. We understand the opposition to the proposed Springfield biomass power plant, but banning modern wood heat from eligibility in the APS makes little sense, as the Commonwealth's own research conclusively proves it is an effective decarbonizer and also found that air impacts were small and generally less than existing oil boilers (and there are mountains of peer-reviewed research demonstrating that oil emissions are much more toxic to human health than wood emissions).

We were also concerned about the IAC's call to impose MEPA EIR requirements on natural and working lands beyond what is already required. Removing the current exemptions for approved forest cutting plans could cut DCR out of their authority over these projects – the regulators that truly understand the land impact of these projects.

Forest management in Massachusetts is already heavily regulated. In fact, as the fiscal sponsor of the Tree Farm certification program in Massachusetts, out-of-state inspectors who double-check adherence to the Tree Farm program have told us that just obeying state regulations gets you well on the way to Tree Farm certification – far different from other states. DCR service foresters are hard-working and on top of any issues that arise – they've

proven over and over that they have a tight grip on enforcement of state regulations. Taking oversight out of their hands to any degree would be a mistake.

Adding EIR requirements to harvesting would throw up time-consuming roadblocks to forest management projects and potentially cripple your efforts in the Forest Resilience Program if applied to private lands. Foresters simply don't have the sophistication or understanding to write these reports, and so the addition of this requirement would typically require hiring a consultant to write them. As a result, this new requirement could potentially make forest management uneconomic, as paying a consultant to write such a report could be very expensive. Ironically, it would likely encourage high-grading of timber to afford the additional cost, setting back forest carbon sequestration in Massachusetts over the long term.

Again, we believe that the absence of anyone on the IAC who understands forest management and the forest economy resulted in poor recommendations that don't align with climate science. We urge you not to take this unnecessary step.

Clean Heat Commission

Finally, we're concerned about the Clean Heat Commission. The Commission meetings are secret and exactly how their process will work has not been fully explained, even during the public meetings you held this past month. We're not certain if the Commission will consider modern wood heat at all, and if it does, if there will be someone there to explain the science to the Commission. If the Commission ignores modern wood heat in favor of electric heat only, or if it actively argues against modern wood heating, it will be acting in contravention of the science. We fear that lack of representation will result in missed opportunities that will slow the Commonwealth's decarbonization efforts.

April 30, 2022
Undersecretary of Energy and Climate Solutions Judy Chang
Massachusetts Executive Office of Energy and Environmental Affairs
Boston, MA 02114

Re: Public Comments on the Massachusetts Clean Energy and Climate Plan for 2025 and 2030

Dear Undersecretary Chang and GWSA team:

Thank you for the opportunity to provide suggestions for the 2025/2030 plan, and the excellent briefings this month of proposed emissions limits, goals, and policies. We are all appreciative that your plan intends to fully meet, in a desirable, effective, and cost-efficient manner, the Commonwealth's goals as defined by the 2021 Next Generation Climate Roadmap Law, as well as our ongoing laudable decarbonization and energy efficiency goals in place since 2008.

These comments reflect my MIT faculty teaching and research, including a Systems Dynamics Project that you and your team are aware of, intended to inform the transition to clean heat at scale. And as well, these reflect my long-time practice in the energy efficiency field, including leadership roles in Xenergy (1980's/90's), Nexus/Aclara (2000's), as Board member of Conservation Services Group, and as member of the Wayland Town Climate Committee. In that role, we are implementing a Spring 2021 Town Meeting resolution to achieve carbon neutrality goals here in Wayland in a creative, equitable, effective, and timely manner.

Forthcoming research and papers will go into further depth, but for this purpose, we'd like to offer a few items for your team's consideration in drafting the final plan.

<u>The size of the air source heat pump opportunity</u>

Building electrification, especially for space heat, holds great potential for building sector decarbonization. The paradigms typically expressed on air source heat pumps don't fully match the dynamics of the technology and industry; and when we look that the dynamics there is reason for optimism that greater decarbonization is possible, in a manner that is economically sound and desirable for our consumers and power grid.

Today, in a supply-chain-constrained economy, high quality variable speed cold weather heat pump equipment is typically available at $1200 - $1500 per ton for the equipment, although the most typical examples are $4000 or more per ton installed. This installation cost can and should come down, and likely will as delivery services get beyond the learning curve, become more available and competitive, and tools become available to efficiently comparison shop or participate in group-buy agreements. These were the types of drivers for home solar that has helped make the complexity of such a purchase more manageable, less costly, and lower in risk for the consumer.

With the new Mass Save incentives, and hopefully initiatives to create a better ecosystem for delivering heat pumps, we can anticipate strong demand. But most of the demand, as it is now, will be driven not

by heating purchase decisions, but air conditioning decisions. The 2022 New England ISO heating load forecast, released last week, anticipates 21,100 heat pump installs this year, although only 13% are expected to be "full heating". This is projected to increase smoothly to 100,000 per year by 2030, and 43% "full heating".

Anecdotally, the data may be somewhat misleading, partly for semantic reasons. Maine, with one-fifth the population, reports more heat pump installs than Massachusetts in 2022. It seems likely that over 30,000 homes are adding at least one ductless mini-split a year today.

Hybrid vs. Full Heating.

The description of hybrid vs. full heating might be misleading. What is most likely the case for hybrid systems is that they are being installed to meet the air conditioning needs of the home, and are sized for that purpose only, or for an addition, or in a cold corner of the house.

We should encourage these air conditioning system buyers to become optimized users of the heat pumps for heat. This requires that we have initiatives to help these people use them properly, benefiting themselves financially, while reducing the site carbon use over 50%, even without integrated controls.

The working definition for full heating is a double-sized cold weather variable speed system, which is ideal for climate and heat economics, especially with the benefit of the incentives. However, in the great majority of homes, these double sized systems also still don't provide all the heat, and have some backup or auxiliary heat.

We should encourage these double-sized systems more strongly. Our systems dynamics model shows that the full heating approach, *if we avoid peak congestion*, reduces the cost of electricity for everyone by increasing the utilization ratio of the power grid, without adding any costs for additional generation, transmission, or distribution. And even in the worst case, where fossil fuel provides all heat below 15F, we still produce 85% decarbonization.

We should avoid resistance backup. Fully electric systems rely on electric resistance auxiliary in most cases, so while fully electric, they are not fully heat pump. As described in the DOER stretch code proposal, these heat pumps can provide 100% of heat in a new home with a HERS 50 rating, and potentially in homes rated as high as 75, even though such homes need 50% more heat per square foot. HERS 75 is often the target for deep retrofitted older homes. But our state average HERS rating is 140, and even if the average home adds thermal measures to improve thermal efficiency by 1/3, the limit of what we can do with the standard Mass Save measures, we can only target a HERS 100 rating, typical of new homes built in 2006. These systems will usually need backup heat below 15 degrees F.

If provided by resistance, the 6KW demand for a typical home heat pump system (4 ton) will require resistance auxiliary heat of at least 4KW at zero degrees F, for a total heating peak demand of 10 KW. Each 100,000 such systems will add a full GW to our winter peak, and as few as 250,000 (10% of our homes) will use up our available surplus winter power capacity of about 2.5GW.

However, the same 100,000 systems, using a legacy fossil system for supplemental auxiliary heat below 15F, will add only .6 GW to the winter peak, if the heat pumps remain on and the systems work in tandem. And these systems could add 0 KW to winter peak, if a demand management program

encouraged consumers to turn the heat pumps off during the extreme weather and use their legacy fossil backup instead.

Smart Building Features

We should be requiring more "smart" building features that can adjust use of electricity on short notice in response to grid congestion. A concern with *Net Zero* terminology is that it suggests that what happens moment-to-moment is of less concern than the annual net zero balance, but this is certainly not the case when considering the need for grid stabilization. To mitigate the costs associated with grid upgrades in support of electrification, we need our homes and buildings to provide a form of *virtual peak power;* some combination of batteries, controlled water heaters and car chargers, and demand-responsive thermostats, as examples. Over time, we will be able to orchestrate these to accommodate periods of grid congestion, without interfering with comfort or activities in the home or building.

We see potentially even more impactful opportunities emerging that increase the potential for virtual peak power, such as vehicle-to-home devices that permit emergency power to be drawn from the EV battery during outages. And another promising opportunity is to unify the control of ductless mini-split heat pumps and backup heating systems. With these things, we should be able to fully avoid the need to expand our electric transmission and distribution systems to accommodate growing winter electric heat load. And as well, such systems will provide value to consumers, and resilience to the building.

Pipeline gas to Propane Conversion

When full double-sized whole home heat pumps are installed, and the legacy fossil system is used as backup, carbon emissions are minimized as power plant emissions to support resistance backup are higher than emissions from onsite fossil backup, during peak winter weather.

While oil or propane are stored onsite and serve the purpose well, pipeline gas use for the 50-200 coldest hours only is a problem. Our systems dynamics model shows that the gas network utilization drops markedly at scale, resulting in an increased cost of gas per unit for everyone. As heat pump scale is inevitable, pipeline gas will be increasing in price relative to all other fuels, as our transition to heat pumps at scale makes gas demand *peakier*.

Perhaps a better alternative for such gas consumers is to retrofit to *propane heat in a tank* for the small supplement needed for heat pump use. Although higher in cost per unit for heat now compared with pipeline gas, the cost difference will likely shrink over time. And as well, there are more likely paths towards increasingly carbon-neutral substitutions for tanked propane or heating oil than for pipeline natural gas. Especially if most of the winter is heated by heat pumps, which is both likely and what we need for climate, the size of fuel tanks needed should be modest.

If designed well, our climate programs will benefit our consumers, and the Commonwealth, by creating long term value, promoting equity, and protecting our environment. We would be happy to discuss any of these suggestions with you. Thank you for moving the Commonwealth forward towards a model climate solution.

Respectfully submitted,

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March 22, 2021

Kathleen Theoharides
Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs
100 Cambridge St., Suite 900
Boston, MA 02114

RE: Joint Comments from Municipalities regarding the Interim Clean Energy and Climate Plan for 2030

Dear Secretary Theoharides,

The Cities of Framingham, Melrose and Newton and the Towns of Arlington, Ashland, Chelmsford, Concord, Holliston, Lexington, Natick, Northborough, Sherborn, Sudbury, Swampscott, Wellesley, Westborough and Weston ("Communities") are pleased to respond to the Interim Clean Energy and Climate Plan for 2030 ("2030 CECP").

Our Communities have grave concerns regarding the impact climate change will have on the Commonwealth, the United States, and the world, and we have each made strong commitments to reducing greenhouse gas emissions. We appreciate the thoughtful analysis the Executive Office of Energy and Environmental Affairs (EEA) has conducted to understand the complex scientific, technological and economic impact for various roadmaps.

As we work with you to advance our shared focus on climate mitigation, our Communities are struggling to answer the same question the EEA posed in the 2050 Decarbonization Roadmap Study:

How can we achieve Net Zero while maintaining a healthy, equitable, and thriving economy?

The release of the 2050 Decarbonization Roadmap Study and the 2030 CECP, which provides a rich and diverse collection of strategic state actions cities and towns can use to build local implementation plans, is an important first step, and we agree with the plan's overall approach to reducing emissions. Specifically, we agree with the bold actions, such as pressing BBRS to quickly implement a 2050-compliant building code, establishing 2035 as the end of sales of fossil fuel vehicles and taking actions that would change the goals and priorities of Mass Save and the Department of Public Utilities so as to align with our climate goals.
To further enhance the Commonwealth's plan, we provide the following specific requests from the viewpoint of municipalities who are endeavoring to do our part in achieving Massachusetts' climate goals and to model leading municipal actions within the state and nationally:

1. Establish a Municipal Version of the GWSA Implementation Advisory Committee

The Interim CEC Plan states that, "It will take action at all levels of government…" and "…continued action by local government across the Commonwealth is required." The Communities agree with this statement and encourage the Commonwealth to formally engage municipalities in the Plan's implementation. We recommend establishing a Municipal version of the GWSA Implementation Advisory Committee to provide an ongoing bridge for communications between state and local government. The Committee should be designed to reflect the diverse nature and needs of municipalities based on size, location and economic structure.

2. Increase Funding for Municipal Climate Action

The Communities encourage the Commonwealth to realize that, because work is needed at all levels of government, so too are new funds needed at all levels. Without this local support, which the 2030 CECP describes as "required", local actions will be delayed, sporadic or in too many cases not available at all.

Local funding should be prioritized for regional collaboration which leads to greater efficiency and uniformity among neighboring municipalities. These resources are needed at three levels. First, the Commonwealth should provide support at the community level such as funding for sustainability coordinators for program administration as well as funding for community-wide coaching to guide an equitable transition to 2050-compliant technology for all stakeholders. Second, municipalities need experts who can serve as resources in clean energy and sustainability technologies who can be available regionally to define and share best practices among cities and towns and ultimately to negotiate better deals with vendors. Third, it is crucial that municipalities are included in the improvements and expansions made to grant, rebate, and incentive programs (including renewable energy incentive programs) that will help them lead by example. Funding to facilitate, implement, maintain, and operate clean energy and electrification technologies such as EV charging station networks and clean heating equipment will be crucial to accelerating municipalities' progress to net zero.

3. Update the Building Code with a High-Performance Stretch Energy Code

The 2030 CECP correctly identifies the importance of moving quickly to a "new, high-performance stretch energy code requiring passive-house level building envelope efficiency." In doing so, the 2030 CECP outlines a plan to "present a new high-performance stretch energy code to the Board of Building Regulations and Standards (BBRS) in 2021 that allows for Green Communities to opt in starting in 2022 and that it will become mandatory and effective statewide no later than January 1, 2028."

The Communities – all of which have been designated as Green Communities – support the development of a new high-performance stretch energy code and the rapid, orderly transition to this code. To encourage early adoption by Green Communities, we recommend a pool of grant money be made available exclusively to Green Communities who adopt the high performance energy stretch code prior to 2028. This

would accelerate adoption of 2050-compliant technology statewide, and this incentive would provide motivation for existing Green Communities to move quickly toward the goal we share.

The Communities also seek to remind DOER how challenging it can be to adopt a new code as a general ordinance via City Council or as a bylaw through a vote of Town Meeting. Creating a mechanism for Green Communities to avoid this local legislative burden as part of the opt in process would further increase the speed of widespread code adoption. Indeed, in debating and voting to support the existing stretch energy code, Green Communities have already agreed to adopt "any future editions, amendments or modifications thereto" established through the BBRS update process. As such, the Communities ask the Commonwealth to update the 2030 CECP to clarify the process Green Communities must take to adopt the proposed high-performance stretch code, and request a provision that gives the chief municipal executive in a Green Community the authority to opt in.

The Communities welcome partnering with the DOER to further discuss these requests.

4. Align Funding for Public Buildings with Net Zero Goals

The 2030 CECP acknowledges the importance of "avoiding new infrastructure or construction that is based on fossil-fuels for heating which would not be 2050 compliant, as well as ensuring that new equipment and products within buildings are on the path towards 2050 compliance." However, one of the largest funders of new public buildings, the Massachusetts School Building Authority (MSBA), does not currently require districts to seriously consider 2050 goals in the design and construction of new or renovated school buildings.

At present, the MSBA provides two additional reimbursement points to projects that exceed the Massachusetts Energy base code by 20%. While this is a step in the right direction, it does not go far enough. School districts across the state, including Acton-Boxborough, Arlington, Belmont, Brookline, Cambridge, Lexington, Watertown, Wellesley, and Westborough are demonstrating that fully electric, net zero ready schools – and other building types – are possible and that they do not present a significant financial burden to taxpayers. The Communities urge the EEA to require all new public buildings that are funded by the Commonwealth to be net zero ready starting in 2022 and to direct additional funding through such avenues to support the implementation of innovative clean energy and sustainability solutions in their construction.

5. Prioritize Public Transit in Transportation Emission Reduction Strategies

While the Communities applaud the plan's focus on the "near-term, widespread electrification of the majority of the Commonwealth's vehicles", the absence of a clear strategy to improve and expand public transit is worrisome.

The only mention of public transit in the 2030 CECP is in relation to the Transportation and Climate Initiative Program (TCI-P), which "will also help support investments that will make it easier to get around without a car, such as improved public transportation". This singular reference to public transit reflects an inadequate level of attention to a resource that is critical to maximizing the effectiveness of smart growth policies in our Communities and across the Commonwealth and is equally necessary in advancing equity in the transition to net zero. The Communities ask the EEA to re-evaluate the role of public transit in achieving the state's 2030 emissions reduction goal and, at a minimum, to provide further detail on how TCI-P funding will be used to improve public transportation.

6. Provide Resources to Accelerate Electrification Locally

While municipal governments have limited expertise in emerging technologies like electric vehicles and heat pumps, we have unique insight into our communities and the concerns of local property owners who will be making decisions on the adoption of carbon-free technologies. As municipalities, we are eager to support early adopters and normalize these technologies, similar to the experience many communities have had participating in the Massachusetts Clean Energy Center's Solarize and HeatSmart programs.

As MassCEC transitions from supporting community-level technology campaigns, we ask the state to provide municipalities with training, engineering services, technical support, web-based resources, procurement tools, implementation services and more to educate and engage with our residents and business owners about electrification opportunities.

7. Increase Access to Emissions Data

Local data supports local decisions, and provides feedback on progress. At present, state agencies and public utilities capture data about emissions-related activities occurring in local communities, but do not maintain or share the data in a timely manner that allows communities to assess needs, affirm actions or allow for adjustments.

The Communities ask the Commonwealth for increased access to emissions-related data that impact our cities and towns. This includes the number of electric and battery electric vehicles registered in our communities, the number of kilowatt-hours generated by solar panels located in our communities, the number of heat pumps installed in our communities, the number of properties that have participated in MassSave by Census blocks and the types of energy efficiency improvements taken, and more.

A step in the right direction is the Metropolitan Area Planning Council's (MAPC) new tool for measuring community-wide greenhouse gas emissions, which was funded by an EEA grant. This tool allows any Massachusetts community to estimate its community-wide emissions without the added cost of hiring a consultant. It is a tremendously valuable start, but even it is handicapped by stale data – most notably the 2014 Massachusetts vehicle census, which – more than five years later, remains the most recent valid vehicle census available from the state.

The Communities also believe the Massachusetts Legislature plays an essential role in conveying the voice of citizens as well as providing funding and legal mandate to the goals and path forward for the Commonwealth. There are many valuable elements of the climate legislation currently being considered in the Statehouse, and the Communities urge the Baker Administration to act quickly on this and to seek a compromise to ensure a climate bill is passed early in 2021, which will ensure the 2030 CECP has the full support of the state government.

We are proud to be part of Massachusetts's effort to achieve net zero by 2050 and look forward to collaborating with you to realize our shared goal.

Thank you for your commitment to the climate.

Sincerely,

CITY OF FRAMINGHAM
Yvonne M. Spicer
Dr. Yvonne Spicer
Mayor

CITY OF MELROSE
Paul Brodeur
Paul Brodeur
Mayor

CITY OF NEWTON
Ruthanne Fuller
Ruthanne Fuller
Mayor

TOWN OF ARLINGTON
Adam Chapdelaine
Adam Chapdelaine
Town Manager

TOWN OF ASHLAND
Michael Herbert
Michael D. Herbert
Town Manager

TOWN OF CHELMSFORD
Paul E. Cohen
Paul E. Cohen
Town Manager

TOWN OF CONCORD

Stephen Crane
Town Manager

TOWN OF HOLLISTON

Travis Ahern
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Douglas M. Lucente
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Janie Dretler
Chair, Select Board

TOWN OF SWAMPSCOTT

Sean Fitzgerald
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TOWN OF WESTBOROUGH

Kristi Williams
Town Manager

TOWN OF WESTON

Leon Gaumond
Town Manager

NORTH AMERICAN MEGADAM RESISTANCE ALLIANCE

Protecting rivers & communities by resisting
megadams & transmission corridors

www.northeastmegadamsresistance.org

April 28, 2022

Executive Office of Energy and Environmental Affairs
Commonwealth of Massachusetts
100 Cambridge Street, Suite 900
Boston, MA 02114

By email only to: gwsa@mass.gov

Re: Massachusetts Interim Clean Energy and Climate Plan for 2025 & 2030: Comments

The North American Megadam Resistance Alliance ("NAMRA") submits the following comments on Massachusetts's interim Clean Energy and Climate Plan for 2025 and 2030 ("CECP"). The 2025 and 2030 CECP provides details on the actions the Commonwealth proposes to take through the 2020s to ensure that statewide greenhouse gas ("GHG") emission limits are 45% below the reported 1990 level. The 2025 & 2030 CECP is prepared in coordination with the development of the 2050 Decarbonization Roadmap such that the strategies, policies, actions outlined in the plan aims to help the Commonwealth achieve net zero GHG emissions by 2050.

As detailed below, the CECP for 2025 and 2030 are flawed because Massachusetts fails to account for GHG emissions from electricity used in Massachusetts and generated elsewhere -- specifically by Canadian hydroelectricity -- in its 2030 CECP reduction strategies. Canadian hydropower imports account for about 19% of New England's electricity usage as of 2019 according to the Independent Services Operators of New England ("ISO-NE"). Neither Massachusetts nor ISO-NE account for the greenhouse gas emissions from electricity generated by Canadian hydropower and used in New England. These emissions are also not accounted for in Canada. This is a GHG accounting loophole at a time of climate crisis. Massachusetts cannot claim to be reducing emissions through importing hydroelectricity if there is not proper accounting for greenhouse gases by megadams and reservoirs. Perpetuating this loophole under the CECP contravenes the Global Warming Solutions Act by undercounting GHG emissions both in the 1990 baseline inventory and every year after that. As a result, Massachusetts electricity usage actually emits more GHG than reported. This makes Massachusetts's GHG reporting inaccurate and paints a false picture of the state's actual GHG emissions.

I. Factual Background

From 2000-2008, Massachusetts imported about 4,748,725 megawatt hours of electricity from Quebec Province in Canada.[1] Massachusetts has developed climate policies over the past decade to help drive emission reductions, particularly within the electricity sector. The 2050 Decarbonization Roadmap calls for a continued transition away from carbon intensive electricity sources and toward imported Canadian hydropower and high-voltage interstate transmission lines.[2] The roadmap falsely describes hydropower as "a clean energy generation resource" that is "highly controllable and effectively dispatchable."[3] In an effort to shift the state from a fossil fuel-dependent grid to a renewable energy grid, Massachusetts passed *An Act to Promote Energy Diversity* in 2016. In part the Act requires utilities to solicit 9.45 terawatt hours per year of "clean energy generation."[4] In response, utilities contracted with Central Maine Power ("CMP") for the delivery of hydropower via high-voltage transmission lines through the New England Clean

Energy Connect ("NECEC") project.[5] The contract was approved by the Department of Public Utilities; however, the NECEC project is currently on hold due to a successful citizens' referendum rejecting the project in Maine. If built, NECEC would tear through miles of biodiverse and carbon-sequestering forests acting as an extension cord from Canada to Massachusetts. A majority of Maine residents oppose this project.

If built, the NECEC project is slated to deliver Canadian hydropower generated by 63 hydroelectric generation stations in Eastern Canada, including 1/6 of which is generated at the Upper Churchill Falls facility in Labrador/Newfoundland Province. The Canadian hydropower industry is owned by the individual provinces making them state-run monopolies. The Canadian Government and the hydropower monopolies market this hydroelectricity as "clean."[6] However, peer reviewed science shows that the emissions from Canadian hydropower can be on par with fossil fuels. This electricity destroys rivers, and biodiversity which are vital to mitigating the worst impacts of the climate and biodiversity crises and is resulting in ongoing environmental racism according to Indigenous communities from whose land most of this electricity is taken without compensation and without consent. [7] Massachusetts cannot care to claim about climate and environmental justice while procuring energy that is directly linked to environmental racism including forced displacement, disruption of traditions, impoverishment, food source disruption, and cultural genocide.

[1] *See* MASS. EXEC. OFF. OF ENERGY AND ENV'T AFF, STATEWIDE GREENHOUSE GAS (GHG) EMISSIONS BASELINE AND PROJECTION UPDATE (2020) (table depicting data from 2000-2008 on Massachusetts's share of Quebec net electricity exports).

MASS. EXEC. OFF. OF ENERGY AND ENV'T AFF., MASSACHUSETTS 2050 DECARBONIZATION ROADMAP at 55 (2020)
[3] *Id.* at 63.
[4] MASS. EXEC. OFF. OF ENERGY AND ENV'T AFF., INTERIM 2030 CECP 35 (2020).
[5] *Id.* at 8, 35.
[6] *Hydro-Quebec Has Left Quebec's First Nations Behind*, BANGOR DAILY NEWS (Feb. 7, 2021), https://bangordailynews.com/2021/02/07/opinion/contributors/hydro-quebec-has-left-quebecs-first-nations-behind/.
[7] See, www.quebechydroclash.com and www.50yearspastdue.ca for positions of the Atikawekw, Pessamit Innu and Anishnabe Coalition and the Innu Nation of Labrador opposing the export of Hydro-Quebec electricity to the U.S. without compensation.

Hydro Québec's electricity generation has been negatively impacting Indigenous communities since the 1970s and the new dams built for export to Massachusetts via NECEC perpetuate what they describe as cultural genocide. Flooding lowlands to create hydropower storage reservoirs has led to the release of methylmercury from plants and soil which poisons wild caught foods including fish, duck, and seals relied on for physical and spiritual survival by groups such as the Pessamit Innu First Nation and the Innu and Inuit.[8] The dams and associated related infrastructure such as transmission corridors have shifted migratory patterns for fish and key game animals hunted by Indigenous peoples, further disrupting their food sources and ways of life.[9]

Construction and operation of hydroelectric continues to erode, flood, and destroy ancestral lands, sacred sites, and traditional cultures and livelihoods of Indigenous people in Eastern Canada, including communities in Labrador impacted by Hydro-Quebec's production and export of one-sixth of its electricity supply generated at the Upper Churchill facility. The Phase 1 Lower Churchill project, the Muskrat Falls dam, was built without the consent of all Indigenous community members and over the opposition of the Grand Riverkeeper of Labrador, Inc. and a wide network of social justice, environmental and Indigenous groups. Massachusetts' refusal to acknowledge the climate injustices and environmental racism perpetuated by Hydro-Quebec' electricity imports is deeply concerning at odds with the professed "climate justice" and "environmental justice" pronouncements of the CECP and Governor Baker's own policies. Importing more hydropower via NECEC so Hydro Quebec, a state-owned monopoly, can grow its profits by selling to U.S. consumers is not acceptable.[10]

Instead of importing this power, Massachusetts should invest in community-based clean energy solutions that do not perpetuate environmental racism and injustices and will provide local jobs for residents.

[8] *Id.*; *see also Hydro-Quebec and the Mercury Issue*, HYDRO-QUEBEC, https://www.hydroquebec.com/sustainable-development/specialized-documentation/mercury.html (last visited March 12, 2021) (HydroQuebec conducted a study and acknowledged the increase of mercury levels in its reservoirs, but nonetheless concluded that "the health benefits of eating fish far outweigh the mercury-related risks").
[9] *Hydro-Quebec Has Left Quebec's First Nations Behind, supra* note 3.
[10] *See id.* (discussing how HydroQuebec makes billions of dollars each year by profiting off its illegitimate occupation of indigenous land).

The NECEC Canadian hydropower import proposal faces strong public opposition and has divided government officials.[11] The Corridor is currently on hold in Maine after 59% of Maine voters cast their ballot to reject the corridor in November 2021 and adopt a process to require legislative approval for any electrical power line exceeding 50 miles.[12] The NECEC project would require 53 miles of new corridor and will cut through treasured mountain areas of Northern Maine.[13] Much of the controversy surrounds the concern that NECEC will precipitate irreparable environmental damage to Maine's prized landscapes with little return for Maine residents.[14] The issue of the CMP Corridor is currently in front of Maine's Supreme Court after Avangrid, the project's developer filed a lawsuit challenging the citizens' initiative, a democratic and community-led effort. The Court is expected to hear the case in May 2022. [15]

II. Legal Background

Massachusetts passed the Global Warming Solutions Act in 2008 to establish a comprehensive regulatory program that would address climate change through ambitious GHG reduction targets.[16] The overarching goal of the GWSA is to reduce emissions 10-25% below statewide 1990 levels by

2020 and at least 80% below by 2050.

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[11] *See PUC's Decision on CMP Corridor Deeply Flawed,* NAT. RES. COUNCIL OF MAINE (Apr. 11, 2019), https://www.nrcm.org/maine-environmental-news/pucs-decision-cmp-corridor-deeply-flawed/ (state-wide poll found that 65% of Mainers oppose the project).

[12] See how every Maine town voted in the CMP Corridor Referendum (November 3, 2021) https://bangordailynews.com/2021/11/03/politics/see-how-every-maine-town-voted-in-the-cmp-corridor-referendum/

[13] *Id.*

[14] *Id.*

[15] State Supreme Court may hear CMP corridor referendum case in May (March 31, 2022) https://spectrumlocalnews.com/me/maine/news/2022/03/31/law-court-may-hear-cmp-corridor-referendum-case-in-may

[16] *See* Global Warming Solutions Act Background, Exec. Office of Energy and Envt'l Affairs, https://www.mass.gov/service-details/global-warming-solutions-act-background

EEA has also adopted a statewide target of Net Zero GHG emissions by 2050 which Governor Baker announced in January 2020.[17] To help achieve these goals, the GWSA provides a framework for Massachusetts to promulgate reporting mandates for large GHG-emitting facilities and establish a baseline assessment of statewide GHG emissions.[18]

Under Section 3(a) of the GWSA, EEA is required to adopt "an interim 2030 emissions limit accompanied by plans to achieve this limit in accordance with said section 4; provided, however, that the 2030 interim emissions limits shall maximize the ability of the commonwealth to meet the 2050 emissions limits."[19] Section 4 outlines several factors to be considered by the Secretary in developing the targets, such as the feasibility of the measures to comply with the emissions limit, the potential economic and noneconomic benefits of reduction measures, and the relative contribution of each source to statewide GHG emission levels.[20] As implied by the language of Section 3(a), the priority of the provision is to ensure that the 2030 CECP sets Massachusetts on track to achieve its 2050 emission targets.

Section 2(5) of the GWSA states that Massachusetts's Department of Environmental Protection ("DEP") shall establish reporting requirements for GHG emissions from all consumed electricity sources.[21] This includes "transmission and distribution of line losses from electricity generated within the commonwealth or imported from outside the commonwealth."[22]

[17] MASS. EXEC. OFF. OF ENERGY AND ENV'T AFF., INTERIM 2030 CECP 4 (2020).
[18] *See* Global Warming Solutions Act Background, Exec. Office of Energy and Envt'l Affairs, https://www.mass.gov/service-details/global-warming-solutions-act-background.
[19] GWSA, § 3(b)(2) (2008).
[20] *Id.* §§ 4(b), (d), (e).
[21] *Id.* § 2(5).
[22] *Id.*

Thus, GHG emissions from facilities other than those located in Massachusetts should be reported since those sources contribute to the total consumption of electricity in the state. Further, the statute does not distinguish between national and international sources of electricity. The NECEC contract, approved by the Department of Public Utilities with the support of the Department of Energy Resources ("DOER") but over the opposition of the Attorney General of Massachusetts for the delivery of Canadian hydropower falls under this reporting mandate. However, neither Massachusetts nor ISO-NE have a reporting mechanism or system to account for GHGs from Hydro Quebec's hydropower that is currently imported to and used in Massachusetts or what will be used in the future – meaning these emissions omitted from the Commonwealth's GHG emissions inventory. **According to sworn testimony in proceedings before the U.S. International Trade Commission in 2020, NECEC's 20-year contract "roughly equates to about 17 percent of [Massachusetts] total electric demand."[23] Thus, 17% of the electricity will be counted as having zero emissions when this is not the case.**

III. Greenhouse Gas Emissions From Hydropower

Hydropower is often referred to as a "low-carbon" and "renewable" source of electricity.[24] This myth has been challenged for decades. Over the last 15 years, scientists have increasingly acknowledged the significant amounts of carbon dioxide ("CO2") and methane that can be released by hydropower facilities.[25] Mounting evidence reveals elevated CO2 and methane levels following the creation of a hydroelectric reservoir.[26] This initial uptick in GHG emissions can be attributed primarily to the decay of submerged trees and disturbed sediments after flooding.[27]

[23] Transcript, U.S. International Trade Commission, Investigation No. 332-574: 68:2-18: Testimony of Patrick Woodcock, MA DOER, July 29, 2020.
[24] Cuihong Song et al., *Cradle-to-Grave Greenhouse Gas Emissions from Dams in the United States of America*, 90 RENEWABLE AND SUSTAINABLE ENERGY REVIEWS 5 (2018).
[25] Brad Hager Dec. at 3.
[26] Cristian Teodoru et al., *The Net Carbon Footprint of a Newly Created Boreal Hydroelectric Reservoir*, GLOBAL BIOGEOCHEMICAL CYCLES, May 2012, at 1.

[27] Brad Hager Dec. at 7; Andreas Maeck et al., *Sediment Trapping by Dams Creates Methane Emission Hot Spots*, ENVT'L SCI. & TECH. 8130, 8130 (2013).

CO2 and methane emissions that result from organic matter decomposition can decline following the initial flooding, as revealed by a study on the Eastmain reservoir in Quebec, Canada, but levels stabilize at values that are still higher than those from the surrounding landscape.[28] The release of GHG emissions due to biomass decomposition from flooding is the largest source of direct GHG emission for hydropower.[29] Sources of indirect emissions from hydropower include construction work on the facility itself, transportation of materials and workers, and waste disposal.[30]

GHG emissions from reservoirs are highly dynamic and can vary greatly depending on location, age, and climate.[31] An ideal reservoir is one sited in narrow mountain valleys above the treeline.[32] Since these areas have less vegetation, they do not emit as many GHGs as the shallow, lowland areas with forests once they are flooded. Unfortunately, "many of Hydro Quebec's reservoirs flood vast tracts of low-lying woodlands, resulting in massive deforestation" and thus produce higher emission levels.[33] Peer-reviewed scientific literature ranks the carbon footprint of Hydro Quebec amongst the dirtiest hydropower generators in the world.[34] One particular study revealed that GHG emissions from six of Hydro Quebec's reservoirs range from about that of a natural gas power plant to over twice that of coal-fired power plants.[35] Another study of a 485 MW reservoir in Northern Quebec found that net CO2 equivalent emissions rate of a new hydroelectric dam in a boreal forest landscape could exceed the emissions of a new natural gas facility over the first few years of the asset's life.[36]

[28] Teodoru et al., *supra* note 21, at 12.
[29] William Steinhurst et al., *Hydropower Greenhouse Gas Emissions*, SYNAPSE ENERGY ECON. 12 (2012)
[30] *Id.* at 11.
[31] Teodoru et al., *supra* note 21, at 1.
[32] Brad Hager Dec. at 6–7.
[33] *Id.*
[34] *Id.* at 8.

[35] *See id.* at 3 (emissions from natural gas power plants are approximately 400g CO2e per kilowatt hour and approximately 1,000g CO2e per kilowatt hours from coal power plants).
[36] *See* Teodoru et al., *supra* note 21.

Studies suggest that hydropower production could release more GHG emissions than fossil fuel energy when taking into account the entire life cycle of the emissions.[37] A comprehensive understanding of life cycle GHG emissions from hydroelectric dams requires the application of a life cycle assessment ("LCA").[38] An LCA is a method used to evaluate the totality of environmental impacts of a product or service from "cradle to grave."[39] As part of an LCA for a hydroelectric dam, GHG emissions are calculated beginning with the construction of the facility all the way through the decommissioning phase.[40] Failing to account for emissions at the "end-of-life stage" could lead to an underestimation of a dams' total GHG contribution.[41] It is important to factor in the impacts of decommissioning hydroelectric facilities at the end of their life cycle when considering this particular energy source and its implications for climate change.[42] In addition, one study concluded that newly flooded boreal reservoirs (such as Hydro Quebec's) "have life cycle emissions that likely exceed those of other renewable sources."[43]

A GHG such as CO2 does not remain localized once emitted.[44] Rather, CO2 disperses evenly throughout the atmosphere and transcends the borders of any state or country.[45] This is known as the "spillover effect" which recognizes that the costs and benefits of GHG regulations may not be fully internalized within a state.[46] Addressing climate change requires the consideration of global emissions rather than just local emissions.[47]

[37] Song et al., *supra* note 19.
[38] Sergio Pacca, *Impacts From Decommissioning of Hydroelectric Dams: A Life Cycle Perspective*, 84 CLIMATIC CHANGE 281, 282 (2007).
[39] *Id.*
[40] *See id.*
[41] Song et al., *supra* note 19, at 14.
[42] *See* Pacca, *supra* note 31, at 291–92.
[43] William Steinhurst et al., *supra* note 26, at 20.
[44] Raymond B. Ludwiszewski & Charles H. Haake, *Cars, Carbon, and Climate Change*, 102 NW. U. L. REV. 665, 679 (2008).
[45] *Id.*
[46] *Id.* at 680.
[47] Brad Hager Dec. at 2.

This is especially pertinent in the context of hydropower, an energy source that has been found to emit a global average of 173 kg of CO2 and 2.95 kg of methane per megawatt hour of electricity produced.[48]

IV. The 2030 CECP Fails to Account For Hydropower Emissions

Hydropower emissions exceed that of all other renewable energies and are far greater than previously assumed.[49] The uncertainties that persist in measuring emissions from hydroelectricity generation underscores the need for more extensive monitoring and investigation. Underlying these uncertainties is the idea that hydropower is not as universally beneficial to climate needs as previously claimed.[50] Collecting more data on emissions and minimizing climate impacts must be a priority in the design and construction of new hydropower facilities.[51] A comprehensive evaluation of hydropower is vital for Massachusetts to determine the feasibility of this energy source for its emission reduction goals. However, EEA has neglected to account for emissions from hydroelectric dams in its interim 2025 & 2030 CECP.

As DOER testified, over a 20-year period 17% of Massachusetts electricity consumption will be coming from NECEC hydropower imports (assuming the transmission corridor is ever built). Massachusetts must account for the emissions from existing and future Canadian hydropower imports. Otherwise, it is playing a dangerous shell game with GHG accounting during a climate crisis – the very crisis the CECP and Roadmap purport to address.

[51] *Id.*

[48] *See* Laura Scherer & Stephan Pfister, *Hydropower's Biogenic Carbon Footprint*, PLOS ONE, Sept. 2016, at 7 (table depicting global estimates of carbon and methane emissions from a study of ~1,500 hydropower plants).
[49] *Id.* at 1.
[50] Ilissa B. Ocko & Steven P. Hamburg, *Climate Impacts of Hydropower: Enormous Differences Among Facilities and Over Time*, ENV'T SCI. & TECH., at M (2019).

[51] *Id.*

The CECP and Massachusetts's GHG emission inventory are supposed to account for, at a minimum, direct GHG emissions.[52] Direct emissions are defined under the GWSA as "emissions from sources that are owned or operated, in whole or in part, by an entity or facility including, but not limited to, emissions from factory stacks, manufacturing processes and vents, and company owned or company-leased motor vehicles."[53] This definition broadly encompasses all energy sources that are owned or operated by an entity without qualification. Hydro Quebec's generating fleet comprises of 61 hydroelectric generating stations, 24 thermal plants, and 28 large reservoirs[54] which will be employed to supply the NECEC project, plus the Upper Churchill hydropower facility in Labrador that accounts for 1/6th of Hydro-Quebec's supply, for a total of 63 generating stations used to supply exports. Hydro-Quebec itself identified that its hydropower facilities release an estimated 17 kg of CO2 emissions per megawatt hour.[55] Even ignoring the scientific evidence that this estimate is far too low,[56] Massachusetts should have at least accounted for the acknowledged emissions from Hydro-Quebec's energy generation. Just as coal-fired power plants must report the emissions from their smokestacks, Hydro-Quebec must report the direct emissions of each kilowatt imported into Massachusetts. To date, the Canadian hydropower industry, including Hydro-Quebec, has failed to substantiate claims of "low carbon" or "zero carbon" emissions from its hydroelectricity generation. Massachusetts's GHG inventory does not include GHG reporting on a lifecycle basis.[57]

[52] Bram Claeys & Sharon Weber, Memo Re: GHG Emissions From Large Hydro in the Context of the CECP, Mass. DEP, (April 9, 2013) [hereinafter Mass. DEP GHG Memo].
[53] GWSA, § 1 (2008).
[54] *Power Generation*, HydroQuebec, https://www.hydroquebec.com/generation/ (last visited Mar. 18, 2021).
[55] Brad Hager Dec. at 3.
[56] *Id.*
[57] Mass. DEP GHG Memo, *supra* note 43.

In an internal memo from 2013, DEP officials recognized the existence of lifecycle GHG emissions from large-scale hydropower sources but stated that "taking these into account is not consistent with the current scope of the CECP and GHG inventory for any fuel."[58] Since lifecycle emissions are not considered for any other type of electric generation, Massachusetts officials apparently believed it to be inappropriate to consider them for hydropower. This stance is legally and scientifically wrong, and it enables EEA to ignore the GHG emissions associated with the creation, operation, and decommissioning of Hydro-Quebec facilities including the Upper Churchill generating station that produce electricity for export to Massachusetts.[59] If the goal of the 2025 & 2030 CECP is to set Massachusetts on a path towards decarbonization, the state must take into account hydropower emissions from "cradle to grave." Furthermore, LCA's for hydropower typically cover a minimum time-period of 100 years.[60] The time frame for adequately assessing GHG emissions does not align with Massachusetts's goal to reach net zero emissions by 2050.

The 2030 CECP itself only mentions hydropower a handful of times when describing the procurement of "clean energy" to achieve the goal of Net Zero emissions in 2050.[61] Characterizing hydropower as "clean" is a glaring misrepresentation of the scientific evidence demonstrating that hydroelectricity production in fact emits significant amounts of CO2 and methane. In particular, it disregards the apparent discrepancies between Hydro-Quebec's allegedly minimal carbon footprint and the science showing significant emissions from its reservoirs.[62]

[58] *Id.*
[59] *See* Pacca, *supra* note 31, at 290.
[63] *Id.*

[60] *See, e.g.*, William Steinhurst et al., *supra* note 26, at 16.
[61] *See* MASS. EXEC. OFF. OF ENERGY AND ENV'T AFF., INTERIM 2030 CECP 38 (2020).
[62] *See* Brad Hager Dec. at 8.

Furthermore, the question of whether the NECEC project will result in the construction of new hydroelectric reservoirs in Quebec is not fully settled.[63] The possibility remains that Hydro Quebec will need to construct new reservoirs to meet the growing demand for energy, resulting in additional flooding and elevated GHG emission levels due to organic matter decomposition.[64]

[63] *Id.*

The Canadian government states that it plans to build more dams to supply electricity to the U.S. New dams are under construction on the Romaine River, the Lower Churchill Project (Muskrat Falls) was built for export, and Nalcor Energy is planning to build a third dam on the Churchill River at Gull Island for export out of the province via the Atlantic Loop. This means that Massachusetts is responsible for new dam construction in Canada-massive multi-billion-dollar dams that would never be allowed to be in New England where even the smallest dam removal is the subject of millions in state spending and self-congratulation for saving river ecology.

A study requested by the U.S. Department of Energy ("DOE") further highlights the uncertainty surrounding the GHG emission data and information for the NECEC project.[65] In 2019, DOE expended taxpayer dollars to contract for a review of CMP's analysis of purported climate benefits from Canadian hydropower delivered by the NECEC transmission lines.[66] The scope of the review included scientific reports that reflected a broad range of assumptions for the project.[67] Ultimately, these reports did not allow the reviewer to make any conclusive statements on the reasonableness of the GHG emissions data.[68] The information provided in the studies was "not sufficient . . . to perform a detailed assessment,"[69] reinforcing the need for Massachusetts to adequately evaluate hydropower emissions before relying upon this energy source to meet its emission reduction targets.

V. Conclusion

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[64] See *id.*; Teodoru et al., *supra* note 21, at 11. A recent study concluded that HydroQuebec would be unable to meet the export demand from the NECEC project, possibly necessitating the construction of new hydroelectric facilities. CANADIAN HYDROPOWER EXPORTS TO THE NORTHEAST U.S.: NEW TRANSMISSION CORRIDORS LINKED TO POTENTIAL NEW DAMS, NORTHBRIDGE ENERGY PARTNERS.
[65] Brad Hager Dec. at 3.
[66] *ICF's Review of Central Maine Power's Analysis of Climate Benefits Associated with the Proposed New England Clean Energy Connect (NECEC) Project*, DOE (Jan. 8, 2019).
[67] *Id.*
[68] *Id.*
[69] *Id.*

Stated bluntly, "[h]ydropower is dirty energy, and should be regarded just like fossil fuel."[70] There is documented scientific evidence that hydroelectric reservoirs emit substantial amounts of GHGs during the flooding stages of construction and throughout the entire life cycle of the facility. Multiple studies have concluded that these emission levels exceed those of traditional renewable energies and hover near those of fossil fuel plants. However, Massachusetts plans to increase reliance on imported hydroelectricity from Quebec without accounting for the related GHG emissions – even though NECEC will be supplying 17% of the state's electricity if the CMP corridor is built. The Commonwealth completely disregards these emissions as it attempts to decarbonize the state and achieve net zero emissions by 2050. Massachusetts must consider GHG emissions from hydropower as it pushes the state towards its clean energy goals and these considerations should be reflected in the 2025 & 2030 CECP.

Sincerely,
North American Megadam Resistance Alliance
NAMRA coordinator.namra@gmail.com

[70] Gary Wockner, *The False Promise of Hydropower*, WATERKEEPER ALLIANCE (2015) https://waterkeeper.org/magazines/summer-2015-3/the-false-promise-of-hydropower/.
Additional resources: https://www.dropbox.com/sh/qoob5nh5gak3n2y/AABUMcoMEnjoxAMzs2YMUkina?dl=0

April 29, 2022

Kathleen A. Theoharides
Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

By Electronic Mail: gwsa@mass.gov

Re: Massachusetts Clean Energy and Climate Plan for 2025 and 2030

Dear Secretary Theoharides:

On April 14 and 15, 2022, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) held hearings and requested stakeholder input on the Clean Energy and Climate Plan for 2025 and 2030. NextEra Energy Resources, LLC (NEER) appreciates the opportunity to provide comments and commends the Baker-Polito Administration for fashioning efficient and effective programs and policies to reduce greenhouse gas emissions equitably and cost-effectively.

NEER is a clean energy leader and is one of the largest wholesale generators of electric power in the United States, with approximately 24,600 megawatts of total net generating capacity; including approximately 24,070 megawatts of net generating capacity across 38 states and 520 megawatts of net generating capacity in 4 Canadian provinces. NEER, together with its affiliated entities, is the world's largest generator of renewable energy from the wind and sun and a world leader in battery storage. The business operates clean, emissions-free nuclear power generation facilities in New Hampshire and Wisconsin as part of the NextEra Energy nuclear fleet, which is one of the largest in the United States.

NEER's interest in the Clean Energy and Climate Plan principally arises from its majority ownership and operation of the Seabrook Station nuclear facility located in Seabrook, New Hampshire.[1] As one of the two remaining nuclear assets in New England, Seabrook Station safely and reliably generates electricity for the benefit of 1.2 million families and businesses in the region. The 1,250-megawatt unit generates approximately 10 million megawatt hours of baseload power 24 hours a day, 7 days a week. Its' operation prevents the emission of nearly 4 million tons of carbon dioxide annually, which is the equivalent of taking almost 700,000 cars off the road. The plant is operated in a highly responsible manner, and the Seabrook Station team is dedicated to protecting the environment while meeting the energy needs of the region.

[1] NextEra Energy Seabrook, LLC owns 88.23% of Seabrook Station. The other owners are Massachusetts Municipal Wholesale Electric Company (MMWEC) (11.59%) and two Massachusetts municipal utilities, the Taunton Municipal Lighting Plant (0.1%) and the Hudson Light & Power Department (0.08%)

To achieve its greenhouse gas emissions reduction mandates, NEER continues to urge Massachusetts -- either on its own or in coordination with its regional state partners -- to pursue technology-neutral solicitations for both existing and new emissions-free energy and attributes to take advantage of the most cost-effective solutions that exist today. Solicitations for both new and existing clean resources is the most efficient mechanism to preserve the continued operation of existing resources while bringing new emissions-free resources on line.

Additionally, NEER recommends changes to the Clean Energy Standard-Existing (CES-E) program to ensure the program delivers on its stated purpose to the Commonwealth and is not diluted to a point where it becomes inconsequential to those entities that participate.

To that end, NEER provides the following comments:

I. Technology-Neutral Solicitations

Technology-neutral solicitations give the Commonwealth the flexibility to procure a blend of resources to help achieve its goals of decarbonizing the Commonwealth's economy "equitably and affordably."[2] Technology-neutral procurements will allow the Commonwealth to secure cost-effective, emissions-free resources with the ability to deliver immediately, while incentivizing the development of new emissions-free resources. A procurement program designed to allow existing resources to compete will ensure Seabrook Station continues to contribute to meeting the Commonwealth's greenhouse gas reduction mandates.

This concept was successfully put into practice in Connecticut with its' Zero-Carbon Resources procurement in 2018. In addition to selecting a variety of new renewable projects -- including solar, storage, and offshore wind -- the Connecticut Department of Energy and Environmental Protection procured approximately 1.9 million megawatt hours annually for an 8-year term from Seabrook Station. Seabrook Station was selected because of its price of 3.3 cents per kilowatt hour levelized, which has already saved Connecticut ratepayers $37 million since the beginning of 2022. Relative to observable ISO-New England market prices, Connecticut ratepayers are projected to save an average of $60 million per year from 2023 through 2025, with additional savings through the term of the power purchase agreement through 2029.[3]

All six New England states and ISO-New England recognize the importance of the existing nuclear units as valuable sources of stable, emissions-free electricity necessary to maintaining grid stability and combatting climate change.[4] Based upon recent ISO-New England modeling, higher prices, higher emissions, more dispatch of gas fired generation, and even load shedding would occur in scenarios where Seabrook Station and the Millstone Nuclear plant are no longer

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[2] Draft Clean Energy and Climate Plan (Dec. 30, 2020) https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download

[3] Power purchase agreement price savings compared to April 2022 market forward prices

[4] New England Governors' Commitment to Regional Cooperation on Energy Issues (March 15, 2019) https://www.coneg.org/wp-content/uploads/2019/03/New-England-Governors-Statement-of-Cooperation-on-Regional-Energy-3-15-19.pdf

operating.[5] Specifically, ISO-New England's 2021 Economic Study on Future Grid Reliability showed that retiring the nuclear units in New England resulted in higher-cost generation having to run -- particularly natural gas units -- and higher Locational Marginal Prices (LMPs) through the majority of the year. Similar to LMPs, production costs increased under all model scenarios by approximately 53 percent. Additionally, on average nuclear retirements resulted in carbon emissions increasing by 46.4 percent. ISO-New England also demonstrated that under certain scenarios, there were 79 hours of unserved load seen during the winter months with a peak unserved load of 6,160 megawatts. Seabrook Station is a critical ISO-New England generating resource and it remains so under multiple future high renewable and high electrification scenarios.

NEER stands ready to submit a competitive offer to Massachusetts that would lock in cost-effective, emissions-free energy from Seabrook Station for the benefit of its citizens.

II. Clean Energy Standard-Existing Program Recommended Changes

While the programmatic review of 310 CMR 7.75 remains ongoing, NEER reiterates its recommendations to improve the CES-E, formerly submitted in response to the 310 CMR 7.75: Clean Energy Standard (CES) 2021 Program Review Stakeholder Discussion Document.

- NEER recommends EEA, in collaboration with the Massachusetts Department of Environmental Protection (MassDEP), consider an increase in the CES-E to "lock in" a larger contribution from pre-2010 clean generators to align the regulation with the mandates of the 2021 Climate Law.

  The CES 2021 Program Review Stakeholder Discussion Document suggested an increase from 20% to 25% of 2018 electricity sales to comprise the CES-E. NEER generally supports the concept of an increase but recommends EEA and MassDEP consider an increase beyond 25%, as maintaining existing clean generation remains the most cost-effective way for Massachusetts to meet its greenhouse gas reduction mandates.

- Additionally, NEER urges EEA and MassDEP to prohibit entities from reselling clean energy credits acquired in separate transactions into the CES-E. The CES-E is presently oversupplied and continuing to allow entities to resell clean energy credits into the CES-E exacerbates that problem and undermines the stated purpose of ensuring that new clean generators do not replace existing clean generators.

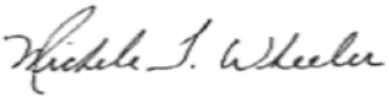
[5] ISO-New England: 2021 Economic Study: Future Grid Reliability Study Phase 1 (September 17, 2021) https://www.iso-ne.com/static-assets/documents/2021/09/a2_2021_economic_study_future_grid_reliability_study_phase_1_preliminary_production_cost_resuklts_part_3_rev1_clean.pdf

- In conjunction with an expansion of the CES-E and limiting the resale of clean energy credits, NEER recommends either increasing or eliminating the maximum annual cap of 2,500,000 megawatt hours per qualifying existing generation facility.

- Lastly, NEER supports a review of possible changes to the CES-E alternative compliance payment (ACP). The CES-E ACP should be specified by regulation as a dollar figure instead of a percentage of the RPS Class I ACP rate. NEER views this as particularly important given the recent decrease in the RPS Class I ACP.

NEER appreciates the work of the Baker-Polito Administration and the Executive Office of Energy and Environmental Affairs and looks forward to continued participation in the development of the Clean Energy and Climate Plan for 2025 and 2030.

Respectfully submitted,



Michele T. Wheeler
Vice President, Regulatory & Political Affairs
NextEra Energy Resources, LLC

NEW ENGLAND FORESTRY FOUNDATION

New England Forestry Foundation Comments on CECP for 2030

March 22, 2021

New England Forestry Foundation (NEFF) is grateful for the opportunity to submit comments on the Clean Energy and Climate Plan (CECP) for 2030. We commend the Executive Office of Energy and Environmental Affairs (EEA) for its leadership in developing this urgently needed plan to address the climate crisis.

For more than 75 years, NEFF has practiced and promoted exemplary forestry on its properties throughout New England, and has assisted other forest landowners to do the same. NEFF currently serves as the administrative agent for the Commonwealth in advancing the Mohawk Trail Woodlands Partnership, and supports New England's forests and communities in mitigating climate change through applied science and policy advocacy. Our staff of 21 includes leaders in progressive silviculture, policy experts, and climate scientists, and the comments below represent a collaborative effort among those disciplines.

Our comments below address three specific weaknesses in the CECP. By addressing these weaknesses, our calculations suggest the Commonwealth could help to seize a New England-wide climate opportunity to remove approximately an additional 650 million tons of CO2 equivalent from the atmosphere over the next thirty years through reduced forest conversion, improved forest management, and using advanced wood buildings to reduce emissions from high-embodied carbon materials such as steel and concrete. This would enable Massachusetts to complete its goals for carbon neutrality, with scientific rigor and direct impact on atmospheric CO2 levels. Action must begin in the next 10 years, and be scaled to the enormity of the challenge before us.

Our first area of comment addresses the importance of embodied carbon requirements for state-supported construction. We then discuss the need to consider the full scope of carbon flows when assessing forests' capacity to mitigate climate change. Finally, we provide an overview of how resilient, climate-smart forestry can ensure that Massachusetts forests withstand the stresses induced by climate change now and into the future. Before getting to these three specific recommendations, we want to offer a bit of context and framing.

For climate mitigation to succeed, in the long run we need not just renewable energy but also renewable materials. This idea underlies the idea of the circular economy promoted by Prince Charles and the World Economic Forum in their Sustainable Markets Initiative. Over the last 60 years, the world has gone in the opposite direction. Data from Dovetail Partners (https://dovetailinc.org/upload/tmp/1584361857.pdf) shows that while world population increased by 2.45-fold between 1961 and 2017, wood use increased by only 1.6-fold. This means per capita use of a renewable material compatible with a circular economy actually declined. Meanwhile use of the four horsemen of the climate apocalypse—steel, concrete, aluminum and plastic—soared by up to 10 ten times the rate of population growth. Massachusetts has 3 million acres of forests, capable of producing more renewable materials than they do, while simultaneously continuing to sequester carbon in

growing trees and maintaining carbon storage. New England Forestry Foundation commends the recommendations in the CECP as largely compatible with this vision for the Commonwealth's long-term success.

Embodied Carbon and Clean Procurement

NEFF commends EEA for including Strategy L3, "Incentivize Regional Manufacture and Use of Durable Wood Products", in the draft version of the CECP for 2030. We recommend bolstering this strategy by including a policy commitment to low-embodied carbon procurement standards for state-funded construction. One form this policy could take is a quantitative embodied carbon standard or benchmark. Requiring construction materials to meet an embodied carbon standard would help lower emissions from the buildings sector and immediately incentivize the use of local, sustainably harvested wood products, such as mass timber. Over time, as new materials with low embodied carbon levels become available, they would qualify without need for change in the underlying policy. EEA could refer to California's 2017 "Buy Clean California Act" for an example of such a policy.

EEA could alternatively include a procurement policy requiring state construction projects to utilize sustainably harvested, ideally local or regional wood products as the primary material. This policy would also encourage forestry practices for long-term, long-lived wood products in the state and wider region. This type of "wood first" policy has been implemented by the Canadian province of British Columbia, while France has implemented a similar policy requiring the primary material in public construction to be bio-based.

In addition to these strategies, EEA could also include a strategy to require the disclosure of embodied carbon data for state-funded construction projects. This informational policy can help to raise familiarity with embodied emissions among developers, builders, and sustainability managers and serve as a data resource for future reductions efforts. Public leadership in this area of embodied carbon data can dramatically facilitate greater changes in construction decisions, creating positive ripple effects throughout the Commonwealth's building sector.

California and other states that lead in climate action have begun to adopt embodied carbon standards and reporting measures and NEFF urges EEA to set Massachusetts on a path to do the same in the CECP for 2030.

Carbon Accounting and Leakage Effects

When timber harvesting is curtailed in Massachusetts, harvesting shifts to other regions to meet the demand for wood products. Carbon storage that occurs due to reduced harvest in Massachusetts is therefore offset by increased harvesting elsewhere; the atmosphere may see no net benefit particularly if the alternative to Massachusetts harvesting is harvest in a region with a less sustainable forestry regime or less resilient forests. This is the market phenomenon known as leakage, and NEFF would like to reinforce that forest carbon policymaking must take this process into account to be effective.

In light of these considerations, sweeping reductions in harvesting in Massachusetts could have perverse, negative effects for climate mitigation. As calls to ban harvesting in Massachusetts forests have increased from fringe actors, it is important to assess forest carbon fluxes in their entirety, which means including the effects of leakage and carbon stored in wood products in accounting analyses. Understanding the reality of leakage is crucial for effective decision-making about forest carbon. NEFF recommends including a statement to highlight leakage considerations in the CECP's discussion of Strategy L3, for example:

Recognizing that carbon stored in forests and wood products must be accurately counted in Massachusetts' climate accounting framework, EEA and its research partners will continue to incorporate the carbon consequences of leakage when studying in-state forest management scenarios. Failure to account for leakage impacts could lead to a perverse outcome for the atmosphere, whereby increased harvesting in forests outside of Massachusetts counteracts increased carbon sequestration within our forests. Moreover, EEA will incorporate the full scope of forest carbon flows into its policymaking, so as to arrive at a systemic and complete understanding of the carbon consequences of different forest management strategies.

Managing for Forest Resilience in a Changing Climate

NEFF would like to reinforce the importance of implementing resilient management in forests that are already being managed. We make this recommendation specifically for forests already under management to avoid suggesting that all forests in Massachusetts should be under management. NEFF believes appropriate creation of forest reserves are also a key part of the Commonwealth's climate strategy.

We are glad to see the understanding of resilient management articulated in the description of Strategy L2, "Manage for Ecosystem Health and Enhanced Carbon Sequestration". Climate change has induced new stressors that are expected to increase forest mortality, endangering carbon stocks and the sequestration potential of Massachusetts forests. According to the US Forest Service's Northern Institute of Applied Climate Science, these threats include more frequent drought and extreme weather events, more frequent pest and disease outbreaks, and greater prevalence of invasive species.

EEA and its partners must work with landowners to implement resilient forest management techniques to defend against these stressors. In light of the urgency of protecting forest carbon stocks, NEFF recommends that EEA incorporate the latest climate-smart, resilient forestry practices into ongoing management. The Commonwealth could see an increase in otherwise avoidable forest-related carbon emissions if it were to pass up the benefits of resilience-enhancing forestry practices.

Conclusion

NEFF's modelling shows that a strategy of ending forest conversion, implementing climate-smart management, and building with mass timber in place of carbon-intensive materials can provide approximately 30% of the emissions reductions New England as a region will need in order to reach net-

zero by 2050. This regional approach to forest-based mitigation can achieve truly significant emissions reductions, but cannot succeed without Massachusetts. NEFF is ready to work together with EEA, agencies, and other partners across the Commonwealth to act on the forest sector strategies outlined in the CECP for 2030. We are pleased to see the attention to detail in the plan's treatment of forest carbon dynamics and the mitigation potential of sustainably harvested, long-lived wood products. In placing emphasis on the need to incentivize low-embodied carbon construction, assess leakage impacts, and implement resilient forestry, these comments should help to refine and deepen the strategies that Massachusetts can take to leverage forests to mitigate climate change.

Thank you for considering these comments.

Sincerely,

Robert T. Perschel, Executive Director

Frank Lowenstein, Chief Operating Officer

New England Forestry Foundation
32 Foster St,
Littleton, MA 01460

Bob Perschel joined NEFF as Ex. Dir. in April 2012. In his 35 years as an environmental professional, he has worked on forestry, large landscape conservation, and wilderness issues. Previously Eastern region director for the Forest Stewards Guild, Bob worked for the forest industry before establishing his own forestry consulting business, including work in Connecticut, and founding the Land Ethic Institute. He is an original co-founder of the Forest Stewards Guild. Bob has a master's degree in forestry from the Yale School of Forestry and Environmental Studies and a psychology degree from Yale College.

Frank Lowenstein joined New England Forestry Foundation as Deputy Director in December 2013, and is now COO. He has played a critical role in overseeing and advancing NEFF's climate change mitigation and adaptation work, policy engagement and strategic planning. He also leads NEFF's Exemplary Forestry Center, which seeks to maximize the contributions of New England forests to mitigating damaging climate change. Prior to joining NEFF, Frank worked for more than 20 years for The Nature Conservancy, where he led programs ranging from community-based conservation in the Berkshires and Connecticut's Northwest Corner to leading the organization's global climate adaptation work. He is a Switzer Fellow, a former Senior Fellow in the U.S. Department of State's Energy and Climate Partnership

of the Americas, author of three books including Clothed in Bark, and adjunct faculty in Environmental Studies at Brandeis University and the Masters of Sustainability program at Harvard University Extension School.

NEPGA
NEW ENGLAND POWER GENERATORS ASSOCIATION, INC.

April 29, 2022

Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

By Electronic Mail: gwsa@mass.gov

Re: Comments on the Massachusetts Clean Energy and Climate Plan for 2025 and 2030

Secretary Theoharides:

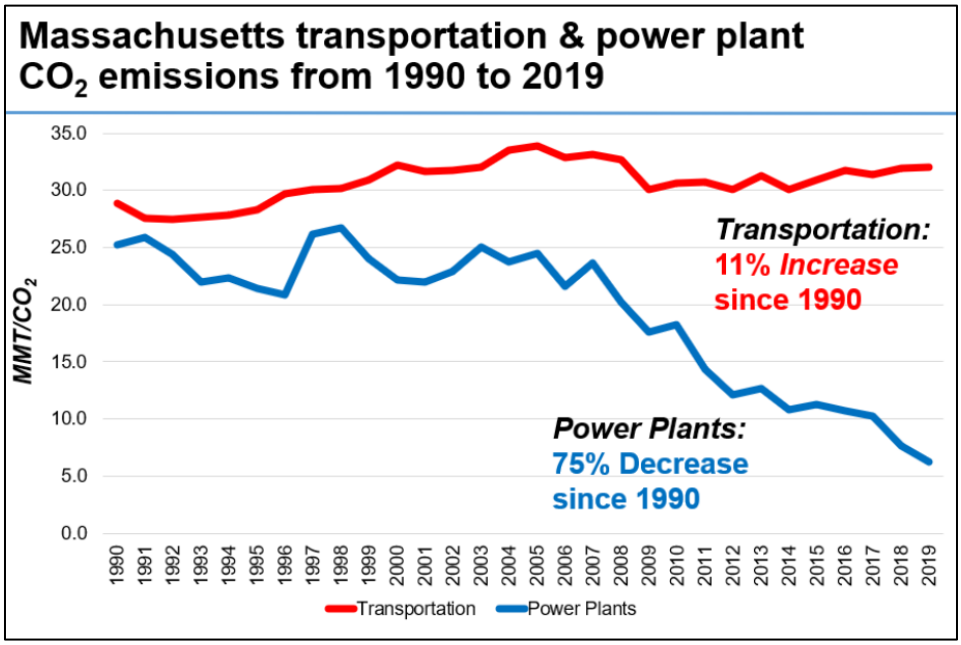
The New England Power Generators Association (NEPGA)[1] is committed to providing the power necessary to meet the Commonwealth's goal of net-zero carbon emissions by 2050 and appreciates the opportunity to offer the following comments on the emissions limits proposed for the Clean Energy and Climate Plan (CECP) for 2025 and 2030.

NEPGA's member companies account for more than 90% of all generating capacity throughout New England – with more 8,000 MW in Massachusetts alone. They also own and operate more than 7,500 MW of renewable and zero-carbon resources throughout the region. NEPGA companies provide well paid, highly skilled jobs to the Massachusetts workforce and pay millions of dollars in taxes to the Commonwealth and its cities and towns – and their employees pay millions more in income taxes. NEPGA's mission is to support competitive wholesale electricity markets in New England. We believe that open markets, guided by stable public policies, are the best means to provide reliable and competitively-priced electricity for consumers. A sensible, market-based approach furthers economic development, jobs, and environmental policy for the region. NEPGA therefore offers a unique perspective on how EEA establishes new emissions limits and develops plans to achieve them.

Because the Commonwealth's overall carbon reduction mandates cannot be realized through the electric power sector alone, NEPGA applauds the Commonwealth's proposed renewed focus on the significant GHG impacts from the transportation and buildings sectors. As EEA notes in its April presentation, the power sector has decarbonized significantly in the last decade and other sectors "need to carry the burden into 2030."[2]

[1] The comments expressed herein represent those of NEPGA as an organization, but not necessarily those of any particular member.
[2] https://www.mass.gov/doc/2025-2030-cecp-public-hearings-presentationenglish/download

On an economy-wide basis, New England's electric power sector has been responsible for *reducing* GHG emissions – by more than half since 1990 – where other sectors have stayed steady or even *increased*. As illustrated below, in Massachusetts, the emissions reductions have been even more dramatic, with CO_2 emissions from power plants cut by 75% from 1990 to 2019, while transportation's have increased by 11%.[3] According to the Energy Information Administration, transportation is not only the one sector to see its emissions rise over that time, but it today represents more than twice the emissions from any other sector in the Commonwealth's economy.



Source: http://www.eia.gov/environment/emissions/state/ (Released April 13, 2022)

NEPGA appreciates that EEA is considering the role of *all* economic sectors to meet new policy imperatives through the CECP 2025 and 2030. Massachusetts has long recognized that the largest sources of GHG emissions — transportation and building heating — have yet to make a meaningful contribution to the Commonwealth's energy and climate mandates. NEPGA therefore supports EEA's focus on meaningful reductions in those areas; namely, to achieve a 39% reduction below 1990 levels in the transportation sector and a 40% reduction below 1990 levels in the buildings sector. NEPGA also appreciates the specific metrics that EEA has identified in meeting its goals, such as the deployment by 2030 of 900,000 passenger EVs and of electric heating in approximately 500,000 homes.

NEPGA's membership is well positioned to be a partner as the Commonwealth continues to decarbonize its economy. As people increase their electricity use for necessities such as commuting and home heating, the reliability of the electric grid will become ever more important to the quality of life in, and economic strength of, the Commonwealth. The increased use of electricity will also likely result in even more sensitivity among businesses and families to the cost of electricity. For these reasons, we believe it is critical for the state to pursue options that

[3] State Carbon Dioxide Emissions Data - U.S. Energy Information Administration (EIA)

will ensure that generating resources are compensated through the most efficient and competitive ways possible.

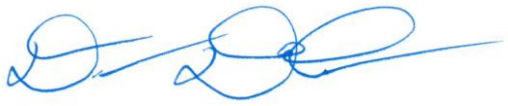
To drive additional reductions in electricity production, Massachusetts has also established declining hard caps via 310 CMR 7.74. These caps were specifically designed, with substantial stakeholder involvement, to meet Global Warming Solutions Act emissions mandates while maintaining power system reliability. The existing rule — combined with the development of offshore wind and other new clean energy resources that will displace energy generated from fossil units — will ensure that power sector emissions continue to decline.

The power sector has been preparing for the massive transition and eventual increased electricity demand for years. For example, ISO New England has begun its "Resource Capacity Accreditation in the Forward Capacity Market" project, which will create ways to more accurately reflect the contributions each resource makes to reliability.[4] The ISO and regional stakeholders have also begun working on the "Day-Ahead Ancillary Services Improvements" project,[5] which will create a market design for the new services that will be needed to reliably operate an electric grid increasingly dependent on intermittent resources.

With such efforts underway, NEPGA looks forward to continuing to work with EEA and other critical stakeholders within a regional process to better align the wholesale electricity markets with the collective goal of delivering a clean energy economy. Regional market structures will be the most efficient and competitive way to meet the necessary economy-wide emissions that Massachusetts law requires, and NEPGA urges the Commonwealth to maintain its leadership on this critical issue. If regional efforts are successful, they will pay dividends for the people of Massachusetts, who will therefore be able to more cost-effectively and efficiently decarbonize through electrification, while also protecting the reliability of the electric grid we all depend upon.

NEPGA appreciates this opportunity to provide comments on the Clean Energy and Climate Plan for 2025 and 2030 and appreciates your consideration of this important matter.

Sincerely,



Dan Dolan,
President

[4] https://www.iso-ne.com/committees/key-projects/resource-capacity-accreditation-in-the-fcm/
[5] https://www.iso-ne.com/committees/key-projects/day-ahead-ancillary-services-improvements

To: Honorable Kathleen Theoharides
Secretary Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900 Boston, MA 02114 gwsa@mass.gov
From: William R Moomaw william.moomaw@tufts.edu
Re: Scientists' comments on the Interim Clean Energy and Climate Plan for 2030
Date: April 30, 2022

Dear Secretary Theoharides, Undersecretary Chang, and the 2030 Clean Energy and Climate Plan Team:

Thank you for the opportunity to comment on proposed Clean Energy and Climate Plan for 2025 and 2030.

These comments are endorsed by climate change, forest and wetlands scientists, energy scientists and other experts from several universities and institutions. **We wish to help accelerate Massachusetts' transition to a climate-safe, thriving economy. We are offering to assist you and the Commonwealth in evaluating and developing climate strategies and policies.**

The accelerating pace of climate change, recent climate science, and new reports from the UN's Intergovernmental Panel on Climate Change (IPCC) make clear that we are running out of time to avoid dangerous and potentially irreversible damage to the climate and the natural world upon which we depend, and our economy and society. The IPCC Sixth Assessment Report emphasizes the urgent need to reduce emissions and increase removals of atmospheric carbon dioxide much faster than the timetable envisioned in the current milestones between now and 2030. We need bold actions – not pledges of goals – between now and 2025 and in every decade following it.

Unfortunately, the states' current goals have little chance of being met without more ambitious and urgent action. Now is the time to increase ambition and implementation. We urge the Commonwealth to do much more much sooner.

Massachusetts' climate goals must set a floor under our aspirations, but should not place a ceiling on accomplishments!

In addition to the specific recommendations we offer below, the current plan raises five overarching concerns:

1. **It relies on temporary reductions in transportation emissions due to the COVID pandemic lockdowns** to claim that we are on track;

2. **It postpones steep emissions cuts until after 2025**, counting on little more than pandemic-induced reductions (which are already rebounding) through 2025;

3. **It lacks clear commitment and metrics to ensure that equity goals are central** to the plan;

4. **It fails to utilize the potential for forest and wetland carbon accumulation to reduce atmospheric carbon dioxide;**

5. **Its mention of agriculture, does not utilize the full opportunities in that sector, and fisheries, and aquaculture are ignored. These three sectors represent significant potential for mitigation, and are currently facing direct threats from climate change.**

Transportation Sector

To compensate for Massachusetts withdrawal from the Transportation Climate Initiative (TCI), **we must accelerate efforts to expand public transport, walking and cycling, and must electrify vehicles**. Effective policies are already proposed - their timeline must be accelerated. **Public transit and EV incentives for low and moderate income residents must be prioritized to achieve equitable access to low-carbon transportation.**

Safe bike lanes and sidewalks should be expanded. Policies encouraging people to work from home, where possible, can reduce unneeded travel, congestion, and emissions. With less road use, there will be less road maintenance, or new construction and fewer associated emissions and financial costs. Incentives to speed deployment of EV charging infrastructure, especially in rural and disadvantaged communities, should be expanded.

Increasing sales of EVs does little to reduce the existing fleet of several million fossil-powered light duty vehicles. **The Commonwealth should consider a Cash-for-Clunkers (C4C) program**. Under C4C, those purchasing an EV would receive a cash payment if they choose to have their old fossil-powered vehicle decommissioned and recycled instead of trading it in, where it would remain on the road and continue to pollute. Research shows C4C can speed emissions reductions from the light duty fleet at costs commensurate with the social cost of carbon.

Building Sector

Energy efficiency is the cleanest, and most affordable way to deliver energy services and resilience to climate extremes and disruptions in energy supply. Efficiency cuts energy demand, emissions, and costs, while reducing peak loads for heating in winter and cooling in summer, and thus the costs of energy supply infrastructure. We urge the Commonwealth to accelerate and strengthen energy efficiency in the building sector by:

- **Including strong, immediate incentives for deep energy retrofits for residential and small commercial businesses in the Mass Save program**. Incentives should minimize up-front costs and enable homeowners and small business owners to reap cost-savings of energy efficiency within three years or less. Energy audits to assess potential savings should use integrated design principles and consider the whole-building and whole-system costs and benefits of efficiency measures.

- **Implementing a state-wide program for building energy scorecards for all point of sales in 2023**. Scorecards should show the total monthly carrying costs of homes and buildings including utility costs, not just the traditional PITI (Principle, Interest, Taxes, and Insurance). These programs should be mandatory, or use a state-wide 'opt-out' approach, rather than a municipal 'opt-in' approach.

- **Implementing state-wide required or opt-out installation of heat pumps** when any fossil fuel furnace or boiler, water heater, stove/oven, or other appliance is replaced. The program should require disclosure to building owners that opting out of replacement by a non-fossil fuel dependent alternative comes with a growing risk of losing access to fossil gas transmission or oil as they are phased out.

- **Ensuring that all new construction is energy efficient, fossil free energy efficient, and zero net energy by 2030.**

- **Leveraging our public universities and community colleges for workforce development and training programs** for builders, insulation professionals, HVAC professionals, solar installers, and building inspectors. These professionals must have the knowledge, skills, and training to be informed and trusted messengers for the public and to carry out the transition to an efficient and electrified building sector.

- Leveraging technology to **enable real-time feedback to ratepayers** about savings reaped through energy efficiency programs.
- **Establish a Green Bank** to reduce risk and blend private and public funding to underwrite the upfront costs of energy efficiency projects and small renewable energy installations, especially for economically disadvantaged communities.
- **Work with mortgage lenders and other financial institutions to provide loans at rates commensurate with the low risk of efficiency and renewable energy projects.** Projects including deep energy retrofits, heat pumps, and rooftop solar are investments that yield large returns with low risk because they lower the cost of ownership. The interest rate on mortgages, home equity, and other loans for such projects should be lower than conventional loans for other uses.
- **Achieve equity in participation in energy efficiency programs among environmental justice communities** that have faced barriers to participation, including renters and low-to-moderate-income households with limited English proficiency.

Electricity Sector

The current plan focuses on large-scale, centralized power sources, like off-shore wind and the now stalled long-distance hydro project. Off-shore wind installation should be accelerated in order to phase out gas-fired electrical generation more rapidly. Massachusetts is already benefitting from distributed solar installations that should be expanded by removing barriers. About two-thirds of the behind-the-meter solar installations in New England are located in Massachusetts. In New England, distributed solar already supplies more power than our two remaining nuclear power plants when the sun is shining and about one-fifth of nuclear power generation over an average 24-hour period.

- **Massachusetts should set priorities and provide graduated incentives for locating solar arrays**, with the following siting options from highest to lowest priority:

    1. Distributed solar on rooftops of homes, commercial buildings, parking structures, on private lands occupied by owners and in appropriate locations for small scale community solar owned by the partners;

2. On-Ground arrays on landfills and brownfields, abandoned gravel and other mining sites, abandoned shopping malls and strip malls, unused abandoned factory building sites;

3. Arrays placed along transmission powerline rights of way, highway rights of way, rail rights of way as is done in Europe;

4. Cleared degraded lands that no longer support agriculture or forests;

5. On-ground solar arrays should not require cutting of forests or disturbing of wetlands

- Massachusetts net metering rules limit the number of solar panels that can be installed by individuals in a given year. **These limits should be lifted so that distributed solar can expand much faster.** Personal solar is a means for individuals to invest directly and rapidly in bringing more solar to the grid instead of waiting for the slow pace of installing large-scale solar, wind and hydro.

- Utilities have withheld connections to the grid by individual, business and institutions like universities for more than one year after the panels are installed. **A clear time limit of no more than 2-3 months should be established.**

- **Subsidies for forest bioenergy heat and power from Massachusetts and out of state providers should end.** Per unit of primary energy, wood generates 25% more CO_2 than fuel oil, 75% more than natural gas, and 100% more than zero emission renewables. Burning wood for heat or power immediately increases CO_2 emissions, worsening climate change. Regrowth might eventually remove the extra CO_2 from the atmosphere, but regrowth is uncertain and takes decades to a century or more, time we do not have to meet our emissions targets. Worse, harvesting forests to supply wood reduces the removal of CO_2 from the atmosphere by our forests and lowers their resilience to a changing climate. **For any wood bioenergy in current use, its emissions should be counted in full at the point of combustion, and be phased out.**

- Municipal community choice aggregation (CCA) programs should be encouraged, but **transparency and clear rules on RECs for CCAs should be required**. For example, wood bioenergy should not be included in CCAs, nor should RECs from projects in other regions that do not require additional investment to move forward.

- **Guidance must be clear on how equity and environmental justice will be included** in siting board decisions.

Non-Energy and Industrial Sector

As the plan states, we must phase out natural gas within the next few decades. In many cases, the cost of repairing existing underground pipelines is higher than the cost of electrifying buildings that their service lines. Infrastructure currently used for gas pipelines may also be adapted to become networked geothermal or ground source heating and cooling ('geomicrodistrict') distribution systems. In all cases, gas leaks must be identified and addressed, but repairing them is a short-sighted fix that will ultimately delay the needed action to **phase out natural gas**. Equity goals should be integrated into phasing out natural gas by prioritizing low-income communities with appropriate substitutes for transitioning away from gas infrastructure.

We support the plan to phase out HFCs and encourage the state to make plans to carefully dispose of older CFCs and HCFCs in existing refrigeration and air conditioning systems as they are retired.

Natural and working lands

Forests and wetlands are the only systems of carbon accumulation and storage that operate at scale if allowed to continue growing. Today, less than one one-thousandth of New England's original forests survive. Rotation periods in the managed forests are too short, with only 3% managed so that they can grow old and continue to store large amounts of carbon. Less than 1.5% of Massachusetts forests are protected intact forests that meet the criteria envisioned by the IPCC. It is essential that they be protected and their ability to remove and store carbon be enhanced.

- **Massachusetts is far from meeting the goal of 30% and eventually 50% of conserved lands** that climate science indicates is necessary to maintain the resilience of biodiversity and ecosystem services (IPCC 2022 AR6 Working Group II).

- An interim plan to 'explore incentive programs designed to achieve no-net-loss of forest and farmland' is insufficient. We must do more to conserve existing forests and allow them to grow and store more carbon.

- The current plan aims to incentivize the use of durable wood products. Full, life-cycle accounting of carbon is essential including loss of stored carbon, foregone growth of harvested trees, emissions from fossil fuel-based

machinery that is used to harvest and produce wood products. Comparisons with net emissions from using wood instead and other materials must be full, life-cycle accounts. But wood-based building materials hold just 25-50% of the carbon in a harvested tree. The rest is released shortly after harvest. A study of the fate of harvested carbon between 1900 and 2015 from the western forests found that just 19% was in long lived wood products like buildings, 16% was decaying in landfill adding carbon dioxide and methane to the atmosphere, and 65% was in the atmosphere as CO_2. Therefore, increasing the use of durable wood products can worsen climate change and should not be incentivized unless it can be demonstrated with full accounting that there is a net reduction in emissions.

- The plan calls for developing 'measurement, accounting, and market frameworks necessary to support development of a regional carbon offset market by the end of 2025.' **Protecting forests, promoting their growth, and maximizing their carbon accumulation potential is critical for our climate. But an offset market that counts forest removals against fossil fuel emissions equates carbon flows and does not reduce the amount of carbon dioxide in the atmosphere.** To be legitimate, offsets must be AVID: Additional, Verifiable, Immediate, and Durable. Present forest offsets fail most or all these criteria. Applying fertilizer to managed forests to enhance tree growth (commonly done in tree plantations) emits nitrous oxide that substantially worsens climate change. How are biodiversity and other ecosystem services provided by forests such as water quality, flood mitigation, cooling, and biodiversity protected and accounted for by offset markets? How much of the natural carbon cycle should humans claim credit for? **Instead of offset markets, the state should pay landowners directly for the service of promoting forest growth**, similar to current incentives for rooftop solar arrays and EVs.

- **Allowing some of our existing forests to continue growing ('proforestation') will remove more carbon from the atmosphere than by planting new trees elsewhere ('afforestation') or replanting harvested forests ('reforestation').** Public forests, to serve the public interest should be conserved and allowed to mature. Private landowners should be compensated if they allow their forests to mature without harvest, and verification mechanisms implemented using on-the-ground and/or remote sensing methods.

- **Wetlands store disproportionately large amounts of carbon that has accumulated over centuries, but which is rapidly released when they are**

filled or degraded. Wetlands also increase climate resilience by withholding large amounts of water to prevent flooding, improve water quality, support biodiversity, and provide localized cooling and water supply during drought.

- **Protection of wetlands should be strengthened rather than weakened as is proposed in the climate plan.** The reduced protection of wetlands in the proposed climate plan will increase carbon dioxide and methane emissions to the atmosphere. When disturbed, wetlands rapidly release their carbon to the atmosphere, and **most created freshwater wetlands do not replicate lost carbon accumulation within the timeframe needed to address the current climate emergency. Coastal wetlands must be protected from further loss** because they continue to accumulate vast amounts of carbon and protect the lands behind them from storm surges and rising sea level**.**
- **The practice of "No Net Loss" is inadequate for carbon accumulation by freshwater wetlands on a time scale of multiple decades.**

We recognize that some of the above proposals may require new policy and budget priorities, but we urge those actions to ensure that Massachusetts achieves the goals defined in the 2021 Climate Law.

Affiliation is for informational purposes only and does not imply endorsement by the listed institutions.

Sincerely,

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April 30, 2022

Honorable Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Via Electronic Mail to gwsa@mass.gov

Sierra Club Massachusetts Chapter Comments on the 2025/2030 Clean Energy and Climate Plan presentation of April 2022

Dear Secretary Theoharides, Undersecretary Chang, and the 2025/2030 Clean Energy and Climate Plan Team:

On behalf of the 100,000 members and supporters of the Sierra Club's Massachusetts Chapter, we are grateful for the opportunity to provide recommendations to improve the 2025/2030 Clean Energy and Climate Plans (the "Plans"). We hope these comments will help EEA with the finalization of these Plans.

OVERALL COMMENTS

The finalized Plans must more quickly frontload the decarbonization of our economy so that we reduce our emissions sooner. They must also better define the actions, dates and resources needed to remove the barriers to achieve the state's 2030 emissions reductions mandates. Additionally, the Plans must better articulate measures and metrics for the protection of existing resources that sequester carbon in order to reach the 2050 netzero goal.

We encourage the EEA to strengthen the Plans by:

- *Defining the obligations of the state legislature and timeline for those actions*. A critical example: Funding and funding mechanisms for the transformation of the building and transportation sectors is imperative as are directives to halt destruction of natural landscapes.
- *Clarifying the assumed federal actions critical to achieving the Plans*.

- *Specifying necessary local and municipal actions, including timelines*. The Plans should provide a centralized statement of necessary municipal and/or local actions and timelines.
- *Identifying the resources necessary to implement the Plans*.
- *Making the strategy goals of the Plans measurable on an annual basis*.
- *Identifying contingency options in the face of possible setbacks*. If the EEA is not prepared to identify alternate plans, this could be expressed in the form of a risk analysis. What are the risks in each sector? For each risk, what is the consequence? Will a risk be mitigated, or will alternatives/backup plans be developed, or will the risk be accepted.

KEY CONSIDERATIONS FOR POLICY DEVELOPMENT (SLIDE 11)

The three "must meet" objectives listed under "Economy-Wide Decarbonization Pathway Analysis" are overly simplified. We note the following:

- Only #3, "Meet economy-wide GHG emissions limits", is a statutory "must".
- #1, "Least cost" scenarios depend on how you factor and value different parts of the equation. For decades, Massachusetts "least cost" power production scenarios have included large profits for utility executives and shareholders, and tremendous costs to environmental justice communities where emissions have imposed costly health impacts on generations of residents, as well as impacts on natural ecosystems. **In order to truly determine least cost scenarios, you need a larger table of stakeholders to work together to understand real costs and identify realistic and secure funding sources.** These stakeholders must include residents from environmental justice communities currently burdened by our energy economy, energy burdened residents (those who cannot afford the current energy system as implemented,) workers from industries that will be impacted by the transition off of fossil fuels; science based analysts who can represent the economic value of services provided by natural ecosystems; insurance industry analysts who value the cost to all residents from increasingly destructive climate events, and energy analysts who include all the current socialized costs of the operations of our current fossil fuel system - including current spending on incentives for new gas customers and the GSEP. **Understanding that those currently benefiting from the dirty energy system hold an immense amount of political power, the Governor's administration is fundamentally tasked with changing the power balance in the design of our future energy and environment policies. Instead of "Develop the least-cost approach," the requirement should be to "Develop an equitable and affordable approach."**
- #2, "Energy demands" are also in the eye of the beholder. In 2019 the U.S., which comprises 4% of the world's population, accounted for 17% of its energy consumption. On average, in the U.S. people emit 17.7 tons of CO2 per year. By comparison the European Union's average is 7.5 tons." Europeans enjoy a lifestyle like ours, but with significantly lower emissions that are still outsized

contributions to global climate emissions. Again, in this case, removing outsized influence of those who profit from higher emission production is a fundamental duty of the Governor's administration in the design and implementation of energy efficiency programs. **The 2025/2030 CECPs must mandate that the Governor's administration transparently bring a broader set of impacted stakeholders to the table to determine the most equitable, affordable and effective programs to lower our energy consumption.**

TRANSPORTATION (SLIDE 13)

1. **Strategies to reduce vehicle miles traveled and promote alternatives to personal vehicles.** It is disappointing that despite feedback, the 2025/2030 CECP pays limited attention to expanding and improving access to transit options statewide. Reducing vehicle miles traveled (VMT) and transportation emissions will be difficult without sufficient investments and targets for expanding transit and active transportation options.

    a. **Action to expand and modernize public transit options statewide remains inadequate.** Supporting mode shift from single occupancy vehicles is a stated goal of the transportation sector strategies in the 2025/2030 CECP. An expanded, reliable, and affordable transit system would support that mode shift. We are disappointed that the strategy actions planned for reducing transportation emissions, congestion, and vehicle miles traveled does little to expand and modernize our transit system. The only transit related element in the plan is the decision to fully fund the MBTA's bus modernization program including fleet electrification, garage modernization, and bus network redesign. While we welcome that decision, we strongly recommend that the Commonwealth expand transit service and increase destinations reachable by public transit across the state.

    The Commonwealth should lead by example and commit to an all-electric transit bus fleet at the Massachusetts Bay Transportation Authority (MBTA) and Regional Transit Authority' (RTAs) by 2030 and 2035 respectively; implement Regional Rail and electrify the commuter rail system by 2035, prioritizing electrification of environmental justice corridors.

    b. **Require and incentivize affordable housing in the implementation of MBTA Communities and Housing Choice.** Sierra Club supports the MBTA Communities and Housing Choice policy that would require municipalities served by the MBTA to zone for

denser housing near transit. Massachusetts is in the midst of a housing crisis and the supply of affordable housing units is especially limited. These zoning changes will help create new, multifamily housing near mass transit providing access to jobs in economic centers across the region. The Commonwealth should work with municipalities and housing developers to encourage adoption of the policy and support the production of more affordable housing units in these locations.

c. **Set 2025 and 2030 mode shift targets for walking, biking, and transit.** We support increased funding for the Shared Streets and Complete Streets Program that will help municipalities build streets that provide safe and accessible options for walking, biking, transit, and vehicles. However, the 2025/2030 CECP does not set any mode shift targets for non-car mobility options that are critical to supporting a mode shift from single occupancy vehicles. To track the success of strategies geared towards reducing vehicle miles traveled (VMT), we strongly recommend that the CECP set 2025 and 2030 mode shift targets for the percentage of commutes done using non-car modes of travel including walking, biking, and transit.

   On a related note, we welcome the proposed e- bike incentive program and urge the Commonwealth to launch the program in 2022.

2. **Implement policies that expand electric vehicle access for low-and moderate-income and high mileage drivers.** We are encouraged that the Massachusetts Department of Environmental Protection (MassDEP) is planning to adopt the Advanced Clean Cars II (ACC II) rule by the end of 2022, once the proposed regulations are adopted in the coming months by the California Air Resources Board (CARB). The 2025/2030 CECP calls for 900,000 passenger and 50,000 medium-and heavy-duty electric vehicles (EVs) on the road to get to 50% emission reductions in this decade. While we support this goal, with close to 36,000 electric passenger vehicles currently on our roads[1], we are far behind to meet that target. We urgently need additional policies that will encourage higher adoption levels in this decade and set the pathway for all light-duty vehicle sales to be electric by 2035, as required by ACC II. We strongly recommend that the Commonwealth:
   a. Offer the MOR-EV rebate at the point of sale and expand the program to include an additional tiered rebate level for low-and moderate income customers by fall of 2022[2]

[1] MOR-EV Cost-Effectiveness Study & Next Phase of Program. Massachusetts Department of Energy Resources, April 15, 2022
[2] Id

as indicated in the April meeting of the Zero Emission Vehicle (ZEV) Commission. California, Maine, Oregon, and Vermont already offer purchase incentives ranging between $4000 - $5,000 for low and moderate-income individuals.

b. Launch a MOR-EV rebate for used EVs by the end of 2022 instead of later in the decade. There is a strong demand and an increasing inventory for used EVs that can help expand electric vehicle access.
c. Commit to the implementation of a MOR-EV incentive targeted at high mileage drivers and fleet operators by the end of 2022.
d. Work with the legislature to identify a sustainable source of funding for the MOR-EV rebate programs, outreach, and education.

3. **Prioritize the electrification of state fleets, delivery trucks, school buses, and other high mileage medium-and heavy duty vehicles.** We thank the Commonwealth for the timely adoption of a suite of medium-and heavy-duty vehicle regulations including the Advanced Clean Trucks (ACT) rule earlier this year. The launch of the MOR-EV Trucks rebate and MassCEC's fleet electrification advisory services will help reduce upfront costs of electric trucks and provide fleet operators with the technical assistance needed to plan the transition to a zero emission fleet. We support the increased level of funding for trucks and fleets registered or operating in environmental justice communities and the emphasis in supporting under-represented and under-served businesses. By 2030, a minimum 30% of all trucks being manufactured will need to be zero-emission, as required by the ACT Rule. To prioritize and support the adoption of electric trucks and buses in this decade the Commonwealth should:
    a. Electrify state and municipal fleets by 2035, prioritizing the transition in pollution hot spots across the state.
    b. Expand MassCEC's medium-and heavy-duty fleet advisory service to provide fleet analysis and planning support for a range of different fleet types.
    c. In addition to the launch of the program to electrify school bus fleets in 2022, commit to electrifying all school buses in Massachusetts by 2035. Leverage federal funding opportunities, prioritizing deployment in environmental justice communities.
    d. Commit to launching a zero-emission program for delivery vehicles by the end of 2024. Short-haul trucks account for over 60% of all registered MDHD vehicles in the Commonwealth.[3] Most of these delivery trucks and vans travel less than 100 miles from their home base and often have predictable destinations, making them ideal candidates to be taken up for electrification first.

[3] Massachusetts 2050 Decarbonization Roadmap, Transportation Sector Report, December 2020, https://www.mass.gov/doc/transportation-sector-technical-report/download

e. Clarify plans and target program launch date for hard to electrify segments.
f. Identify funding sources that will be needed for the financial sustainability of programs that support electrification of medium-and heavy-duty fleets.
g. Facilitate the shifting of freight delivery from heavy duty trucks to rail freight.

4. **Establish policies to increase availability and ensure equitable distribution of charging infrastructure.** Easy access to charging stations at home, work, and along travel corridors is critical to the widespread adoption of electric vehicles. The CECP sets a target of installing 75,000 public, level 2, and DCFC EV chargers by 2030. The 2025/2030 CECP should clarify if the planned number of charging stations are sufficient to support the EV adoption goal of 900,000 light-duty and 50,000 medium-and heavy-duty EVs by 2030. The Commonwealth should:
    a. Coordinate with municipalities, state agencies, and utilities on development of a statewide charging infrastructure plan and the deployment of charging stations across the state.
    b. Maximize private-public partnerships and stretch federal funding available through the National Electric Vehicle Formula (NEVI) Program for Direct Current Fast Charging (DCFC) stations across more projects.
        i. Use NEVI funds to build charging stations that are networked and can support open communication standards like the OPen Charge Point Protocol. This will promote interoperability of equipment and ensure that charging stations continue to operate if a change in network provider is required.
        ii. Require that all charging stations funded through NEVI have credit and debit card readers to improve accessibility
    c. Ensure equitable distribution of charging infrastructure in urban, semi-urban, rural and underserved areas.
    d. Specify strategies under consideration for the residential charging infrastructure program, especially to adequately serve the needs of multi-family residences, and target date for launch of program..
    e. Work with utilities to establish off-peak charging rebates and time-varying-rates.

BUILDINGS (SLIDE 14)

Insufficient action and information. Based on the limited information provided we can't determine if the identified actions will achieve the Key Targets and Metrics. There is a glaring lack of information about the funding, incentives or the investments that will be needed. Where does the money come from to transform our existing building stock, to achieve high efficiency and weatherization and for heat pump conversions? Who is designing and overseeing these programs? How are we funding low and moderate income residents who currently do not have access to funding or credit to make this shift? For the more

affluent, for business owners and landlords, what policy(ies) makes them pay or what policy(ies) provide adequate incentives, and where does the incentive money come from?

We believe that the EEA should:

- Provide ballpark estimates for the aggregate weatherization/efficiency upgrades for residential and commercial property to achieve “Deep weatherization in 10% of stock by 2025” and “Deep weatherization in 20% of stock by 2030” as called for under Key Targets & Metrics
- Provide ballpark estimates for the cost of converting to eclectic heating and cooling for residential and commercial property as called for under Key Targets & Metrics
- Identify possible sources of funding, including how much is expected to be covered by building owners, and identify policies that will cause the building owners to proceed with the weatherization and eclectic heating upgrades.
- Call on the legislature to create a Green Bank to provide cash and financing for building owners - an important mechanism to enable action.
- Call on the legislature to provide the funding required for residents and businesses that can’t cover the cost on their own.

Green Bank. A large-scale statewide financing and investment program or green bank is needed to pay for the transition to:

a. Provide funding and financing support for, but not limited to, deep energy retrofits (building on models of Energiesprong and RetrofitNY), equitable workforce development, local and district-scale projects, renewable energy generation, and projects that advance both GHG reductions and climate adaptation or resilience.
b. Provide funding and financing support for renewable energy infrastructure and microgrid technologies built close to load to add resiliency to communities across the Commonwealth.
c. Remove barriers to building decarbonization in other state funding/financing programs, such as the Community Preservation Act (CPA) and Massachusetts School Building Authority (MSBA), as well as MassSave.

Get off gas. The Plans need to focus on the rapid elimination of fossil fuels in our energy systems, not new or altered ways of using them through incentives, enhancement of fossil fuel infrastructure or fuel blending. Continued or altered use of the gas infrastructure is:

- *Contrary to the net zero by 2050 goal.* We cannot combust our way to lower emissions. Renewable Natural Gas is just methane. A non-trivial portion of the methane in the distribution system leaks into the atmosphere rather than being burned and turned into carbon dioxide. Because methane is a much stronger greenhouse gas than carbon dioxide—with 28-36 times the

global warming potential over 100 years and 84-87 times the global warming potential over 20 years[4]—such leaks represent a significant level of GHG emissions that RNG will not and cannot reduce.

- *A safety and financial threat to the public.* A series of high profile natural gas accidents over the past decade (Merrimack Valley, San Bruno, New York City, various places in Pennsylvania) combined with an antiquated pipeline distribution network requires consideration of the potential financial and human consequences of another major pipeline accident. The cost of rebuilding the entire gas system would be astronomical. However, anything short of a complete rebuild of the system poses an unacceptably high accident risk. If San Bruno had happened in Massachusetts, the cost to ratepayers would have been severe. Pumped hydrogen into a pipeline system will further raise safety risks. Depending on the magnitude, a single gas pipeline gas accident could cost the Commonwealth more than a decade of sustained high levels of investment in clean energy.
- *An ever increasing cost problem*. In the pipeline gas pathway, average gas rates increased by 2-3 times due to a combination of biogas cost, operation of a large system with fewer customers, lower gas pipeline throughput, and impacts of the marginal cost to abate carbon emissions elsewhere in the economy required to allow the continued combustion of natural gas in buildings.

A major way of getting off gas is to change the rate structure by which the utilities earn their income. The DPU should eliminate in the rate structure incentives to provide gas (or its equivalent) in the first place, putting compensating rates and capacities into providing electricity, thus incentivizing the utilities to themselves push for the electricity transition. This should be a phased transition so as to allow the utilities to transition their stranded pipelines and related assets.

Focus on all-electric heating:

According to slide 14, the new 2025/2050 CECP plan expands the definition of electric space heating to include hybrid heating. This decision is short sighted and will force us to invest money unwisely, increase indoor air quality problems, and leave us unprepared for the technology of 2030.

Instead, the EEA should maintain an all-electric definition without gas backup. This will serve to:

- Direct money toward the transition: Already, the state has spent $22b in the past six years replacing gas infrastructure[5]. Allowing for gas backup heat systems will require us to maintain this infrastructure, locking us into even more expensive pipe infrastructure investments that will

[4] https://www.epa.gov/ghgemissions/understanding-global-warming-potentials
[5] https://www.gasleaksallies.org/gsep

be shouldered by ratepayers. Instead of forcing ratepayers to subsidize future stranded assets, we should be subsidizing retrofits and conversions over to all-electric heating systems.

- Avoid unintended air quality and health dangers: The CECP 2030 plan calls for 20% of homes to undergo deep retrofits. Already, children growing up in homes with gas stoves have a 42% higher chance of experiencing asthma.[6] As we tighten people's homes, we should be phasing out, not encouraging continued use of combustible appliances.
- Prepare us for the future: Today, all-electric heating systems, when coupled with retrofits, are reliable and effective. The efficiency of the technology will only improve between now and 2030. If we had set solar goals in 2008 based on existing technology and policy and not what was necessary to meet climate targets, widespread solar adoption would have seemed impossible. We should trust the market to continue to improve as we electrify at scale.

In summary, there does not seem to be nearly enough policy initiatives or legislative initiatives to cause electric heating in 1 million homes by 2030 with equivalent reduction in gas pipeline infrastructure.

ELECTRICITY SECTOR (SLIDE 15)

Hydro - which the Sierra Club sees as a false solution - is at risk for reasons outside of the Baker Administration's control. The Plans are counting on the New England Energy Connect project being completed (but no date for this is given). This is a substantial risk factor that should be addressed in the Plans.

Solar development is under represented. Massachusetts needs a major build out of solar to complement offshore wind. The Plans should require at least 500 MW of new solar next year, increasing by at least 100 MW per year every year after that through 2030. Of necessity, Massachusetts must meet its need for solar within its borders and not expect to import solar from Maine, New Hampshire or Vermont. There is no available transmission capacity from Maine, and New Hampshire is too small.

There must be improved permitting and interconnection processes to ease the installation of these projects, and there must be policies and incentives to remove barriers for renters and low and moderate income residents to be able to access solar on their homes, as well as a policy to scale up solar installations on commercial buildings and disturbed lands such as industrial sites and parking lots that are situated in proximity to areas with higher loads.

Nuclear. The Plans should state the expectations for the two nuclear plants Millstone and Seabrook, and a risk assessment.

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6 https://rmi.org/insight/gas-stoves-pollution-health/#:~:text=Gas%20stoves%2C%20particularly%20when%20unvented,exacerbating%20respiratory%20conditions%20like%20asthma

No Biomass incentives. The Plans need to explicitly state that incentives for biomass will be eliminated from the RPS. There is no justification for spending ratepayer dollars for energy generation that is more polluting than coal.

NON-ENERGY & INDUSTRIAL SECTOR (SLIDES 10 & 16)

Methane Emissions Reporting Slide 10 shows a reduction in emissions related to Natural Gas Distribution and Service of 82%. This highly misleading story has been propagated for years. The improvement from 1990 to 2014 is almost entirely the result of changing the emissions factors used in calculating methane emissions from gas pipes, not in replacing pipes or fixing leaks. Note that the vast majority of the "improvement" predates GSEP.

Per 310 CMR 7.73 fugitive methane emissions in the natural gas distribution system are calculated based on leakage factors for each type of pipe material times the miles of main distribution pipes and the number of service connections. Both the 1990 baseline for methane emissions and targeted reduced emissions are based on published leakage factors for the several pipeline materials, but the leakage factors were changed mid-stream. Newer leakage factors and calculations are based on a 2014 study at WSU [Lamb et al, "Direct Measurements Show Decreasing Methane Emissions from Natural Gas Local Distribution Systems in the United States"].

The effect of the switch to the newer leakage factors was a dramatic reduction in the calculated emissions from natural gas infrastructure. The apparent change is dramatic and suggests that there has been a huge reduction in methane emissions in Massachusetts, enough to satisfy the entire 80% reduction goals for 2050. What is not obvious is that DEP adopted a simple linear interpolation from the old factors to the new factors to show an improvement in pipe leakage rates year by year until 2014.

There is no actual reduction in emissions caused by the adoption of new factors, and this is the point. If the emissions factors were correct for 2014, then those same factors were correct for 1990 and should be applied retroactively to the pipe material inventory in 1990. Correcting the 1990 inventory also requires a recalculation of the emissions reductions goals for 2020 and 2050. Reductions in emissions as a consequence of replacing pipes will then better track real progress.

The plan must include incentives for zero emissions lawn maintenance equipment, and to incentivize private property owners to use their property to better sequester emissions and perform ecosystem services.

MASSACHUSETTS SIERRA CLUB

NATURAL AND WORKING LANDS (SLIDE 17)

We were pleased to see Natural and Working Lands included in the CECP. However, we have several concerns and suggestions for improvement.

1. **Forest Protection**. Overall, the CECP should address policy changes needed to increase atmospheric carbon sequestration from forests and carbon storage, particularly on state lands which are under the control of the administration. This should include analysis and public disclosure of the climate impacts from public lands logging and a clear mandate to permanently preserve the vast majority of public forests as well as to increase private forest protection. This reflects current science regarding both carbon sequestration and storage of mature forests as well as biodiversity preservation. Specifically, regarding Slide 17:
    a. **Reassess the concept of "Working Lands"** given that one of the most important functions of natural lands in the Commonwealth is natural carbon capture and storage.[7] At a minimum, public lands must therefore be left undisturbed and NOT be considered as a source for commercial commodification, including for the "durable wood market"[8] or for industrial-scale solar installations. Call on the legislature to increase funding to DCR in order to negate the need to harvest forest products from Massachusetts public forests. As forests continue to mature, we will benefit by their continuously increasing capacity to sequester and store atmospheric carbon.
    b. **No net loss**: **Expand reserves on public lands and make them permanent.** The objective to incentivize "no net loss of forests and farmlands" is not enough. In addition to "no net loss," we need to *increase* undisturbed forests and preserve wetlands to address the dual and interrelated crises of climate change and biodiversity loss. The goal to increase tree cover by 16,100 acres by 2030 is fine for urban areas, but low for the whole state. A more impactful target would be to at least double the size of state reserve areas to protect existing trees and allow for recovery - a proforestation approach. This would maximize ecological potential for carbon storage. It could also be a way to avoid having to buy carbon offset credits, thereby saving money for the state, and may even make it possible to sell carbon credits that provide revenue.

[7] Intergovernmental Panel on Climate Change. "Global Warming of 1.5 °C," 2018. https://www.ipcc.ch/sr15/.

[8] Ingerson, Ann. "Wood Products and Carbon Storage: Can Increased Production Help Solve the Climate Crisis?" Washington, D.C.: The Wilderness Society, April 2009. https://www.sierraforestlegacy.org/Resources/Conservation/FireForestEcology/ThreatsForestHealth/Climate/CI-Ingerson-TWS2009.pdf.

c. **"Study solar siting that minimizes environmental impact."** This also does not go far enough. We suggest changing this to "Study solar siting that *avoids* standing forests, other natural ecosystems and productive farmland, minimizes and *mitigates* environmental impact." The intention needs to focus FIRST and foremost on avoidance. Only if avoidance is not possible, should we look at "minimizing" impact, and if we're impacting natural lands at all, then that needs to be *mitigated* as part of the total plan.

d. 28% and 30% of NWL protected by 2025 and 2030 respectively should include both conversion and **resource extraction**, such as logging. The 20% of private forests and farmlands managed for carbon and resilience need proper incentives to protect them from resource extraction as well.

2. **Wetlands**. Similar to forests, the CECP should focus on and incentivize wetlands protection and restoration rather than "replicated wetlands." Like a forest that has been cut and then allowed to grow back over time, a created wetland takes time to restore the carbon lost in the original wetland , and is unlikely to ever recover its original biodiversity. This will not happen in the time that we have to address climate change. Rather than using the language of "no NET loss of stored carbon in wetlands," we suggest saying "no loss of wetlands in order to increase carbon storage and protect sensitive ecosystems."
3. **Promotion of timber, wood products, milling and related jobs**. These are industry incentives that do not belong in a statewide plan to reduce carbon emissions or increase carbon sequestration and storage. The amount of carbon stored in timber, including cross laminated timber (CLT) pales in comparison to intact forests that are allowed to mature into old growth. While we recognize that forest products will still be produced and used, and that local jobs are of critical importance, this should NOT be part of a Clean Energy and Climate Plan, particularly at the expense of forest protection.
    a. Rather than promoting native lumber, support quick-growing plants, such as hemp and bamboo, to replace wood, in buildings, clothing, etc. and improve carbon sequestration in soils.[9]
    b. Develop programs and incentives to reduce demand for wood products, encourage repurposing of existing buildings, and increase recycling and reuse of wood — all of which would help to reduce forest carbon emissions and increase forest carbon sequestration and storage.
4. **MEPA**. MEPA should not only be applied to forest clearing for conversion, but also for any forest management project, and comprehensive carbon counting should occur for all projects.

[9] Hoffman, Jenna. Will Industrial Hemp Unlock the Answers to Restoring Soil Health? Farm Journal (Jan. 2022) https://www.agweb.com/news/crops/crop-production/will-industrial-hemp-unlock-answers-restoring-soil-health

5. We are unclear what is meant by **"Forest Resilient and Forest Viability Programs."** In order to make meaningful public comments, we would need more information on these programs. To be transparent, we respectfully request additional information and an extended opportunity to comment.
6. **Carbon accounting**. All activities on NWL should include carbon accounting (not just emissions, but CO2 losses from extraction and soil disturbance, etc.)
7. **Biomass**. The 2025/230 CECP presentation acknowledges strong public opposition to burning biomass. However, the plan itself does not oppose the use of biomass for energy or contain any language that would change the current regulatory trajectory. Burning biomass needs to be explicitly and unequivocally disqualified from the RPS. This "dirtier-than-coal" source of energy increases pollution, CO2 emissions, destroys natural lands and forests and harms public health. This is a critical omission in the CECP outline. We must commit to move towards both lower emissions and forest preservation.

It bears emphasis that what we choose to do in the next five to eight years in our transition off emission-intensive energy systems will have a tremendous impact on the quality of life for Massachusetts residents, not only in terms of health, climate and costs impacts, but also in terms of how we situate our Massachusetts workforce in the race to build a renewable energy economy. Policies that equitably and effectively design the transition from fossil fuels must support the development of the new industries - in supply chain, installation, and operations and maintenance of energy efficiency and zero emissions energy systems - while protecting our vital natural resources. The Clean Energy and Climate Plans for 2025 and 2030 must mandate the inclusive development and implementation of programs and policies that benefit the Massachusetts public and ratepayers with affordable, equitable and reliable energy systems and the preservation of healthy and natural ecosystems.

Thank you for this opportunity to comment on behalf of the tens of thousands of Massachusetts Sierra Club members and supporters who care deeply about climate action and a healthy environment for all.

Sincerely yours,

Deb Pasternak
State Director, Sierra Club Massachusetts Chapter

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Secretary Kathleen Theoharides
Executive Office of Energy and Environmental Affairs
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April 30, 2022

RE: EOEEA – Draft 2025 and 2030 Clean Energy and Climate Plan Recommendations

Dear Secretary Theoharides:

The Nature Conservancy thanks the Baker/Polito administration for its leadership on climate change mitigation, adaptation, and resiliency. We are grateful for your collaboration on avoiding the unmanageable and managing the unavoidable with a shared vision of weaving together nature-based solutions and climate justice. We appreciate the opportunity to comment on the Executive Office of Energy and Environmental Affairs' (EEA) proposed revisions to the Draft Interim Clean Energy and Climate Plan for 2025 and 2030 (CECP).

Founded in 1951, The Nature Conservancy (The Conservancy) is a global environmental nonprofit working to create a world where people and nature can thrive. We have over 34,000 members in Massachusetts supporting our mission to protect the lands and waters on which all life depends. The Conservancy is committed to tackling climate change and to helping vulnerable people and places adapt to the impacts of a changing climate. We are doing this by working to reduce fossil fuel emissions, using the power of nature to remove carbon emissions already in the air, and helping people and nature become more resilient to the impacts we are already experiencing.

Since its establishment in 2012, the Conservancy has appreciated our appointment to a seat on the Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC). We are grateful for the opportunity to chair the Land Use and Nature-Based Solutions Work Group (NBS Work Group) and to provide input on the CECP.

The Conservancy believes the CECP is essential to providing a clear path to a people-centered approach to tackling the climate crisis and decarbonizing our way of life during the critical next ten years. We appreciate the Baker/Polito administration's continued leadership in setting a strong 2030 gross emissions goal, and then doing the even more challenging work of laying out an ambitious but feasible plan to reach that goal across all sectors of the Commonwealth's economy. The Conservancy offers these comments with great respect for the EEA staff who have toiled, despite the pandemic, to collaborate with stakeholders, manage consultants, and prepare the Decarbonization Road Map, technical analyses, the interim CECP, and the current draft CECP.

Overarching Recommendations for the CECP:

1. Strengthen focus on climate justice

   We strongly support the policy recommendations to reduce emissions and mitigate climate change that were developed by the five IAC Work Groups—Electricity, Transportation, Buildings, Land Use and Nature-Based Solutions, and Climate Justice—during the development of the original 2030 CECP and approved by the full IAC. Reaching consensus on these strategies involved considerable work by the Climate Justice Work Group to educate and collaborate with each of the other work groups and the IAC. **The IAC unanimously voted to recommend that the CECP include and prioritize climate justice.** In the revised 2025 and 2030 CECP, we hope that these strategies (those for natural and working lands are attached at the end of this letter) can be included within the text of the document and integrated into the top strategies. In EEA's presentations, we have noted that there are some strategies that appear to be more fully integrating the recommendations of the Climate Justice Work Group.

2. Include cross-cutting strategies

   The most efficient use of climate change policy and funding is for strategies that have more than one benefit. For example, strategies that have benefits in both the building and land sectors, or that achieve both greenhouse gas emissions and resilience goals. **We strongly recommend that the revised 2025 and 2030 ECP include the cross-cutting actions recommended by the IAC in its memo to EEA**, whether as a stand-alone chapter or otherwise more clearly highlighted within each sector chapter.

3. Provide parity of urgency and numeric goals for natural and working lands

   We appreciate the specific actions listed in the revised CECP that will increase protection of natural and working lands and ensure that they continue to provide valuable ecosystem services, including removal of carbon pollution (carbon sequestration). As we noted in the last round of comments, trees planted or wetlands restored now will yield increasing benefits each year through 2030, 2040, and beyond. Conversely, natural and working lands that are lost or degraded now have compounding impacts, with lost carbon sequestration now and each year through 2030, 2040, and beyond. If we act now, by 2030, natural climate solutions in Massachusetts can reduce and/or remove an additional 1-2 MMtCO2e (million metric tons of carbon dioxide equivalent) every year, the equivalent of taking ~215,000 to 435,000 cars off the road.[1]

   For these reasons, the most important actions the Commonwealth can take now regarding natural and working lands are "*no-regrets actions*," such as permanently protecting forest land and avoiding the degradation of coastal wetlands. The draft goal of protecting 28% of natural and working lands in Massachusetts by 2025 and 30% by 2030 is not only insufficiently ambitious to meet the current need, but it is possible that it would actually represent a decrease in the pace of land protection compared to the 2000s and 2010s. As we get closer to 2050, the more challenging and expensive the remaining emissions reductions will be, and we cannot afford to wait until 2030 or 2040 to minimize the loss of natural and working lands and release of the carbon stored on them. Some of the strategies in the revised CECP call for increased land protection funding and a focus on especially carbon-rich lands. **It is very important that these**

[1] Natural Climate Solutions US Mapper: https://nature4climate.org/u-s-carbon-mapper/ ; Average vehicle emissions: https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle

actions become a reality, and the current numeric goal for land protection should be increased. We also note that coastal wetlands can be directly converted, or they can be destroyed indirectly by nutrient pollution or storm runoff. It is important, in permanently protecting coastal wetlands, to address both direct and indirect conversion of these lands.

4. Enhance stakeholder process

We appreciate EEA's efforts to provide presentations and public forums regarding the revised CECP, and to provide translation in multiple languages. We especially appreciated the three stand-alone public webinars on natural and working lands, and forest carbon goals and policies. However, we did find it challenging to provide comments given short time period between EEA sharing the more detailed slides of proposed policies and the deadline for commenting.

Sector-based recommendations:

The Conservancy previously provided comments through the EEA GWSA portal on the interim CECP regarding energy and transportation. Given our expertise, we have focused on high-level comments on the proposed strategies for natural and working lands within the revised CECP below.

Overarching comments

Goal for the natural and working lands sector

The lack of natural and working lands sequestration and emissions reductions goals remains a missing piece in the revised CECP, though we acknowledge and appreciate that EEA's focus must always be on action, and not primarily on accounting. **When compared to the other sectors in the report, the lack of a clear, numeric goal both for reducing emissions and increasing the amount of carbon removed from the atmosphere by forests, farms, and wetlands each year undervalues the importance of the natural and working lands sector and fails to drive meaningful, ambitious action to improve the carbon balance within this sector.** Natural and working lands cannot only be brought in in 2050 to help meet net zero goals – as we stated above, we cannot afford to lose as many acres of these critical carbon-storing lands as we do each year. We need interim goals for this sector so that we can track progress toward 2050.

There is ample legislative and executive precedent for setting a numeric goal for emissions reductions and increases in carbon sequestration for the natural and working lands sector:

- The *Next Generation Road Map for Massachusetts Climate Policy Law,* enacted in March 2021, defined "Natural and Working Lands" and requires EEA's Roadmap plans to "contain a statewide baseline measurement and measure the current carbon flux on natural and working lands; [and], adopt statewide goals to reduce greenhouse gas emissions and increase carbon sequestration on natural and working lands."[2]

- In October 2020, the IAC voted unanimously to recommend that EEA "Define and codify land use as a separate sector and set numeric goals for reducing greenhouse gas emissions and for increasing carbon sequestration measured against the 1990 baseline and business

[2] https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8

as usual projections, as in other sectors."[3]

- Governor Baker committed to such a goal when he signed on to the U.S. Climate Alliance's Natural and Working Lands Challenge in 2020, which commits signatory states to: "undertake actions that will support a collective, Alliance-wide goal to maintain natural and working lands as a net sink of carbon and protect and increase carbon storage capacity, while balancing near- and long-term sequestration objectives."[4]

First protect, then manage and restore, natural and working lands

We appreciate the inclusion of the implementation hierarchy – protect, manage, and restore -- throughout the strategies in the revised 2025/2030 CECP. Protection is the base of the natural climate solutions hierarchy, and the preferred action wherever possible, because a portion of the carbon lost when we lose natural and working lands is essentially irrecoverable carbon. This cannot be regained within the next several decades, even with intensive management or expensive restoration of other nearby lands. As a reminder, protecting lands and carbon stocks does not mean stopping forestry and agriculture. We appreciate the increased attention paid in the revised 2030 CECP to the opportunities that improved forest management and soil health practices that offer to reduce and/or remove greenhouse gas emissions.

Comments regarding strategies in the CECP

CECP Strategy L1: Protect Natural and Working Lands (Keep NWL as NWL)

We appreciate the CECP's emphasis on protecting existing natural and working lands, including all three major types that occur within Massachusetts – farms, forests, and wetlands.

Expand landscape and watershed-scale conservation

We strongly support increasing investment in existing state agency land conservation programs and grants, as well as for including carbon as a criterion in them, where appropriate. We suggest additional, explicit commitments to:

- Priority set-asides for 1) conserving land near environmental justice communities and their water supply lands; 2) maintaining mature urban tree canopy; and 3) conserving large, interconnected forests (which contain the highest carbon stocks)
- Significant increases in state capital funding for land protection programs and grants, and using a dedicated portion of federal funding for land protection
- Increases in state operating budget funding to provide the staff necessary to administer state programs and ensure that carbon is prioritized
- Increase the annual cap on the Conservation Land Tax Credit incentive program, as this program has a backlog of already-vetted projects stretching out into 2024.

[3] "Implementation Advisory Committee Work Groups Proposed Guiding Principles and Policy Priorities" submitted to the Executive Office of Energy and Environmental Affairs on October 26, 2020, https://www.mass.gov/doc/iac-work-group-proposed-guiding-principles-and-policy-priorities-updated-10262020/download

[4] United States Climate Alliance. 2020. Natural and Working Lands Challenge (http://www.usclimatealliance.org/nwlchallenge)

We were glad to see EEA prioritize increasing investment in state land acquisition and conservation and planning grants, as well as include explicit land conservation metrics; however, we do not think these metrics are ambitious enough. As of 2019, according to Mass Audubon's Losing Ground VI report[5], 1.353 million acres of Massachusetts (27% of the state's land area) had been protected. To reach a goal of protecting 30% of lands by 2030 (~1.503 million acres), Massachusetts would need to protect an additional ~150,000 acres of land, which averages about 15,000 acres per year (between 2020 and 2030).

EEA may be using somewhat different numbers and calculations for land conservation baseline and rates; however, the Losing Ground report calculated that, between 2012 and 2017, public and private entities in Massachusetts, including state, municipal, federal, land trust, and private entities, protected 100,000 acres per year, averaging 20,000 acres each year. Based on these numbers, we are concerned that the current goal of 30% of MA by 2030, within the revised CECP and representing 15,000 acres protected per year, could actually represent a *decrease* in the rate of land protection in the Commonwealth.

Particularly with new federal funding sources available to support and accelerate land conservation in MA, we believe it is possible to reach a 30% protection goal by 2026, by increasing the pace of land protection by all entities, including the state agencies and grants funded through state programs. This goal is both ambitious, and achievable, and setting the 2030 goal to reflect this pace would highlight the Commonwealth's stellar history and current commitment to conserving open space for people and nature. We need a sufficiently ambitious goal in order to drive increased investment in land conservation programs and provide the Commonwealth with the amount of land available to sequester and store carbon that is possible, to help meet our 2030 emissions reduction goals and eventually our net zero goal.

Limit conversion and loss

We support the inclusion of incentives for Natural Resources Protection Zoning and tree retention bylaws, as well as the proposed changes to the way MEPA is triggered that recognize that there are many areas where converting far fewer than 50 acres of land to development would have a large greenhouse gas impact. We would request that EEA clarify that the trigger here is *permanent* conversion of natural and working lands to developed land, and not a temporary release of greenhouse gases, as might occur in the establishment of a new agricultural field, following a forest harvest or forest restoration project, or during the restoration of a wetland.

In order to meet our climate action goals, we need to significantly increase the amount of solar energy we produce in the Commonwealth. Reducing our reliance on fossil fuels is the single biggest action required to address climate change. Current market conditions and regulatory incentive structures, however, have the unintended consequence of making solar deployment on developed lands and brownfields more expensive than solar deployment on intact forest lands, resulting in the loss of natural and working lands that have a critical role to play in sequestering carbon pollution from fossil fuels. We appreciate the Commonwealth's efforts to rapidly deploy solar energy while minimizing impacts on natural and working lands. In October 2021, we joined

[5] Ricci, E.H., J. Collins, J. Clarke, P. Dolci, and L. de la Parra. 2020. Losing Ground: Nature's Value in a Changing Climate. Massachusetts Audubon Society, Inc., Lincoln, Massachusetts, 33 pp. https://www.massaudubon.org/content/download/41477/1007612/file/Losing-Ground-VI_2020_final.pdf

with other NGO partners to draft and sign a "Solar Siting Joint Statement" meant to continue and expand that effort. This statement includes the following goals:

- Maximize deployment of solar power within the more than 1 million acres of land that are already developed or degraded, including rooftops, parking lots, and other low-impact areas with minimal ecosystem service values;
- If further analysis shows that additional capacity is needed outside those areas, determine which natural or working lands and waters are most and least appropriate for solar energy using spatial analysis and stakeholder input; and,
- Avoid, minimize, and mitigate impacts to natural and working lands1 and waters and the valuable benefits they provide including biodiversity and climate resilience.

We support the Department of Energy Resources (DOER) conducting the Technical Potential Solar Study and plan to collaborate and be engaged in the public stakeholder process. We also support section 61 in the Senate's most recent climate change bill (*S.2842 An Act Driving Climate Policy Forward*) that requires DOER to make recommendations to the successor of the SMART Program.

Strengthen wetland protection

We appreciate the intent to retain and strengthen the Wetlands Protection Act to keep development out of the wetland buffer zones; however, it is important to note that today's major threats to wetlands originate throughout the watershed, including the flows of nutrients, sediment, and other pollutants from nearby impervious surfaces that degrade wetlands' resiliency and ability to serve as a nature-based solution to climate emissions and impacts. Policies that seek to protect wetlands must take a watershed-scale approach to address these challenges. Maintaining the integrity of the buffer zone is crucial to reducing the impacts of development near wetlands and must be one tool in a holistic approach to watershed-scale management for resilient, connected landscapes. Please see suggested additions under the "Manage NWLs" section below.

In addition, we suggest that EEA incorporate some of the IAC NBS Work Group's blue carbon recommendations in this section, such as:

- Regardless of federal level-interpretation of the Clean Water Act and the "Waters of the US" Rule, recognize blue carbon systems in Massachusetts as either waters, wetlands, or both, to ensure that all wetland systems in the state are protected in similar ways as inland wetlands.
- Explore existing legislation and other guidance to review if blue carbon ecosystems can be protected and/or restored under the Massachusetts Wetlands Protection Act. If not, develop recommendations for addressing this.
- Incorporate spatial extents of blue carbon systems in MassGIS' data layers of land use/land cover so that we can track loss or gain of these systems over time.

CECP Strategy L2: Manage Natural and Working Lands

Incentivize healthy soil practices and climate-smart forestry that balance ecosystem resilience and carbon

We appreciate the CECP's support for the programs that incentivize farmers and forest landowners to adopt practices that store and sequester more carbon in soils and plants. The goal of ensuring that 20% of private forests and farmlands are managed for carbon and resilience by

2030 is especially appreciated, as is a continued commitment to act on the findings and best management practices outlined in the Healthy Soils Action Plan. However, we would appreciate more clarity on what programs and practices specifically relate to the "20% of private forest & farmlands managed for carbon and resilience" metric. Understanding that would allow us to explore whether additional recommendations be added to support this metric, or whether the metric assumes a certain level of adoption of other incentive programs, such as those offered by federal agencies or the carbon markets.

We appreciate EEA adopting our recommendation to create a program that incentivizes climate-smart forestry. The Nature Conservancy, Mass Audubon, and others have worked with the Department of Conservation and Recreation (DCR) to develop a list of practices that increase forest carbon stocks and forest resilience to climate change. Incentive payments for these practices are being piloted in the Mohawk Trail Woodland Partnership region in northwestern Massachusetts. TNC would be happy to work alongside EEA and DCR to develop the Forest Climate Resilience Program pilot and to ensure that it is available not only to towns but to private forest landowners. To make this program accessible to as many landowners as possible, we recommend using a fixed rate of payment for different land classes, or for each management practice, to decrease the bureaucratic load on landowners. The program structure recommendations and sample budgets produced in the pilot region will be helpful in expanding this program.

Suggested additional recommendation – Watershed management for wetland resilience

While forests make up the majority of the Commonwealth's natural and working lands, blue carbon systems (coastal and near-shore wetlands) play an outsized role in carbon storage and fluxes. Acre for acre, the impacts of losing a blue carbon ecosystem are larger than the impact of losing an acre of forest. In addition to their carbon benefits, blue carbon systems have significant climate adaptation benefits and support fisheries, provide habitat, and filter water. The biggest threats to the health of blue carbon systems come from beyond their boundaries – particularly nutrient pollution from runoff and septic systems and development activities that change the flow of rivers, streams, and groundwater to and from these wetlands. We respectfully request that the CECP include an additional recommendation within the "Manage NWL" strategy related to managing watersheds, including:

- Improve stormwater management by developing incentives to reduce impervious cover and to disconnect unavoidable impervious cover from storm drains and surface water systems.
    - Nature-based solutions being piloted and implemented across the state play an important role in this goal. A homeowner and business education program would also help raise awareness about the connection between stormwater than the health of our blue carbon systems.
- Streamline general use approval for innovative and alternative (I/A) septic systems that reduce nutrient loading and develop programs that facilitate their installation.
    - Excess nitrogen and phosphorous from traditional septic systems leach into groundwater and surface waters, where they can degrade and even destroy blue carbon systems. I/A septic systems are much more effective at removing nutrients than traditional systems, and, in many cases, can provide nutrient reduction at levels like municipal sewer expansion at a fragment of the cost.

However, these systems are not being widely adopted due to regulatory challenges and uncertainties surrounding financing, as well as ongoing monitoring and maintenance structures to support these decentralized wastewater systems. TNC is grateful for MassDEP's partnership in collaborative problem-solving to address these challenges. The CECP should recognize the connection between nutrient pollution and blue carbon to encourage future progress on this important concern. The Commonwealth should streamline general use approval for alternative septic systems that reduce nutrient loading and provide support to towns for streamlining permitting, funding, and responsible management of these systems over the long term.

- EPA Region 1 is researching what level of nutrient pollution causes the destruction of blue carbon systems, and the CECP could incorporate this information to set a goal below which nutrient pollution must fall.

CECP Strategy L3: Restore Natural and Working Lands

We appreciate that this section has been added to this iteration of the CECP, as restoring natural and working lands is also an important strategy to ensure their carbon storage and sequestration capacity is maximized.

Increase urban and riparian vegetation

The Conservancy completed an analysis of reforestation areas that offer water quality and other benefits, in addition to carbon benefits. These areas, primarily owned by private landowners and municipalities, provide a significant opportunity to increase our carbon storage. In addition, the very successful Greening the Gateway Cities program has myriad climate benefits, including sequestering carbon, energy savings, and public health co-benefits. We also support the proposal to use the Municipal Vulnerability Preparedness program to advance this work.

The implementation hierarchy – protect, then manage and restore – applies to trees in developed areas, just as it does to forests, wetlands, and soils elsewhere. We were pleased to see consideration of tree cover in the metrics that EEA will track and seek to improve over time. It is important to match enthusiasm and resources for new trees with programs, policy, and funding that empower communities to steward and protect their existing trees. In relation to shade, ability to reduce air pollution, and ability to reduce energy use in nearby buildings, mature trees outperform their younger counterparts. Therefore, measures of tree canopy should be set up in a way that ensures that we are not losing mature tree canopy as we increase young tree canopy in cities and towns.

Improve wetland replication and expand wetland restoration

We appreciate the inclusion of this section, which may be another place where incorporating some of the IAC NBS Work Group's blue carbon recommendations could be helpful. Wetland restoration can play an important role in protecting the blue carbon stored in degraded or otherwise at-risk wetlands. Some additional could include:

- Streamline permitting processes for wetland restoration activities.
    - TNC encourages EEA to continue partnering with salt marsh restoration practitioners from across sectors to implement the action items identified at the March 25, 2022, meeting between EEA, state agencies, and nonprofit

organizations, including CZM, DEP, USFWS, Atlantic Coast Joint Venture, The Trustees, Mass Audubon, and Parker River. These include coordinated interagency regulatory review to prioritize action on the Atlantic Coast Joint Venture Massachusetts Salt Marsh Restoration Plan; scaling up nature-based restoration strategies proven to be high-benefit and low risk; and standardizing monitoring requirements. These actions would meaningfully reduce existing barriers to restoring and building resilience in these important blue carbon systems.

- Increase capital and operating funding for the Division of Ecological Restoration (DER).
  - DER is an important partner and funder for restoring and protecting blue carbon systems across the state. Increasing DER funding for grant-making and technical support, as well as operating funding for staff capacity, is critical for advancing wetlands restoration activities throughout the state.
- Support increased incorporation of blue carbon storage into nature-based solutions projects.
  - Carbon stored in wetlands, eelgrass beds, and other blue carbon ecosystems has accumulated over many years, and often centuries or millennia. Protecting blue carbon systems from destruction or degradation is critical to prevent the release of that carbon to the atmosphere. Built blue carbon systems cannot take the place of age-old blue carbon ecosystems in the short term. However, we can increase Massachusetts' long-term capacity to store carbon by incorporating blue carbon storage into nature-based solutions designed to address stormwater, reduce hazard risks, and mitigate other environmental problems. This can be accomplished through technical guidance, incentives for green infrastructure projects that include blue carbon storage and supporting research and collaboration to better understand the role that built blue carbon systems could have in meeting Massachusetts' climate goals.

CECP Strategy L4: Incentivize Durable Wood Products

We appreciate that the revised CECP makes the connection between the building sector and the use of sustainably harvested wood, and the carbon benefits of substituting wood for more carbon-intensive traditional building materials. However, unfortunately, the CECP still does not account for the embodied carbon in steel and concrete within the building sector.

Support local wood market to support local, rural economy

The launching of the Forest Viability program and focus on existing regulations and laws that encourage procurement and use of local wood products are appreciated. Just as we incentivize heating, transportation, and other technologies that have climate benefits but may, at least initially, cost more than their conventional counterparts, existing procurement policies allow for payment of a small premium when buildings and other deliverables are made using locally produced wood. Programs from other states, such as California's "Buy Clean California Act", may be useful resources in considering how to incentivize use of local wood. The goal of having 20% of Massachusetts wood used as durable wood products by 2030 is ambitious but important,

since carbon stored in long-lived wood products is carbon that will not be emitted to the atmosphere for many decades or even longer.

Track timber flows to better understand end use of MA timber

We also appreciate the tracking of where wood harvested in Massachusetts is processed, as one small step in better understanding how programs, like incentives for forest carbon and forest resilience practices that shift the forest over time to having more valuable, large-diameter trees, might also lead to more wood in longer-lived wood products. Including this as a question on Forest Cutting Plans is unlikely to create a reporting burden, but it will be important to ensure that this is not an onerous requirement for Massachusetts licensed foresters or landowners.

CECP Strategy L5: Explore Additional Carbon Sequestration

We appreciate EEA's commitment to first achieving deep greenhouse gas emissions reductions (gross emission reductions) across all sectors before considering ways to absorb or offset the remaining unavoidable greenhouse gas emissions. This is another reason that setting a goal for reducing emissions within/from the land use sector is critical, since offsets must be used as a last resort, after deep emissions reductions in all six sectors (including land).

Conclusion:

We appreciate the opportunity to comment on the 2025 and 2030 CECP and to participate in the IAC. Thank you for your time and consideration. Please feel free to contact me should you have any questions.

Sincerely,

Steve Long
Director of Government Relations

Appendix: Recommendations of the IAC Land Use and Nature Based Solutions Working Group for the Decarbonization Roadmap and the Clean Energy and Climate Plan for 2030, Submitted 9/28/2020

PREAMBLE

The Land Use and Nature Based Solutions Working Group supports the work of the Massachusetts Global Warming Solutions Act Implementation Advisory Committee (IAC); and we coordinate closely with the GWSA IAC Climate Justice Working Group. We are focused on creating and improving state policies, programs and incentives that use nature to help reach the state's Net Zero goals. The Nature Conservancy is coordinating the efforts of this Working Group. Other members include Appalachian Mountain Club, the Environmental League of Massachusetts, Mass Audubon, Metropolitan Area Planning Council, and The Trustees of Reservations.
Reducing greenhouse gas, especially from fossil fuels, is the most critical action we must take to mitigate climate change. However, only by harnessing the power of natural climate solutions to remove and store carbon can Massachusetts reach Net Zero greenhouse gas emissions targets. Natural climate solutions (NCS) are **actions to protect, restore, and better manage natural and working lands, such as forests, farms, and wetlands, to reduce and remove carbon emissions, with many co-benefits including resilience.** With currently available practices, Massachusetts' lands have the potential to remove and reduce **an additional 1-2 million metric tons CO2e per year.**

As we move toward net zero goals, and emissions reductions from other sectors become more challenging and expensive, NCS will become increasingly needed and important. *Nature is the only viable tool we have right now to remove carbon pollution already in the air at scale.*

To meet emissions reduction and carbon drawdown goals while making the best use of limited funding and resources, the NCS Working Group recommends that this hierarchy be followed in sequence:

1) **Protect** natural and working lands (NWL). Much of the carbon in these lands is irrecoverable; this carbon is emitted into the air when land is developed, and it is not possible to regain that lost carbon through management or restoration for over 30 years (the net zero timeframe).
2) **Manage** NWL in ways that sequester carbon in soil and plants over time. This includes monitoring agricultural and forest carbon stocks, including soil health, while ensuring steady supply of wood and food coming from Massachusetts' working lands.
3) **Restore** NWL when it has not been possible to protect or sustainably manage NWL. These actions include reforestation, city tree planting, restoration of wetlands, and actions to repair soil health.

For the purposes of this plan, the Land Use and Nature Based Solutions Working Group has focused on policy recommendations that are not already being implemented through state government. These recommendations are based on the full expectation that the Executive Office of Energy and Environmental Affairs will implement the recommendations of both the Healthy Soils and Resilient Lands Initiatives, and these priorities should be viewed as additive to those initiatives.

The Working Group's policy recommendations are offered with the following overall principles and guidance in mind:

Massachusetts should accurately and effectively utilize natural and working lands to achieve the benchmarks and goals in the state's Clean Energy and Climate Plan for 2030. The Commonwealth needs to take immediate and robust actions today, as investments in NWL need time and will pay enormous dividends in the future.

To effectively utilize NWL, the state should set numeric goals to:

• Reduce greenhouse gas emissions caused by the loss and poor management of NWL (emissions reductions), including the urban and suburban tree canopy; and,
• Increase the carbon dioxide that is removed from the atmosphere and stored in NWL (sequestration).

The state should establish a baseline for NWL to monitor changes in carbon emissions and removals, understand return on investment, and measure progress towards the state's carbon goals. If the chosen start date is different from 1990 (the date used in other sectors under the Global Warming Solutions Act), then state agencies should provide a transparent and comprehensive explanation for the different start date.

The state should create and maintain an annual greenhouse gas inventory of NWL emissions reductions and sequestration, including but not limited to, forests, farms, inland and coastal wetlands, and urban and suburban tree canopy. In the case of forest and agricultural products produced in Massachusetts but consumed elsewhere, and vice versa, carbon pools shall be counted, but not double-counted.

Overall, the state shall use the best available data and science when developing an annual NWL greenhouse gas inventory, numeric goal, and baseline.

The state should approach NWL strategies through a holistic lens. Strategies should consider co-benefits of investments in NWL and ways to achieve multiple objectives, including benefits of such lands to environmental justice populations, enhancing and improving climate resiliency and adaptation, protecting drinking water supplies, conserving fish and wildlife habitat, providing habitat connectivity, creating quality jobs, stimulating the economy, and creating and expanding outdoor recreational opportunities. Solely focusing policy on the carbon value of land-based resources could lead to unintended consequences and missed opportunities.

To reach the Commonwealth's climate and equity responsibilities, the state should develop partnerships, policies, programs, and funding mechanisms to protect, manage, and restore NWL. The state should incorporate the principles created by the IAC Climate Justice Working Group when forging said partnerships, policies, and programs and prioritize funding that corrects long-standing environmental injustices and makes historically marginalized communities more resilient to climate change.

Finally, in addition to meeting Massachusetts' carbon reduction goals, the inclusion of NWL is critical to meet the U.S. Climate Alliance Natural and Working Lands Challenge, and to align with international standards of carbon accounting and inventories.

The Land Use and Nature Based Solutions Working Group has identified a broad suite of actions that could be taken to activate NWL in the state's climate strategy. The following recommendations are a subset of the most urgent actions the Working Group believes the state needs to take between now and 2030 to maximize NWL contribution to the Commonwealth's climate goals.
These six recommendations have been drafted based on input on the broader list of strategies developed by the Working Group.

Top 6 Recommendations:

Category 1: Avoid Forest Conversion

Avoid the loss of forests in all geographies (rural, suburban and urban) by establishing new and increasing and streamlining existing grant and incentive programs for forest protection within the Executive Office of Energy and Environmental Affairs (EEA), and other state agencies, policies and programs. Programs should include priority set-asides for 1) conserving land near Environmental Justice (EJ) communities and water supply lands; 2) maintaining mature urban tree canopy; and 3) conserving large, interconnected forests (which contain the

highest carbon). To further protect forests in all geographies, add tree removal as a mandatory threshold under Massachusetts Environmental Policy Act for an Environmental Impact Review, for trees of a size to be determined by geography. Measure the carbon loss from deforestation as well as urban tree loss in greenhouse gas inventories.

Category 2: Restoration and protection of wetland systems' greenhouse gas sequestration and services (Blue Carbon)

Protect, manage, and restore inland and coastal wetland systems and their carbon flux by establishing new and strengthening existing regulations and guidance and compliance and enforcement that maximize ecosystems vitality, carbon capture and other ecosystem services and expanding wetlands and stream restoration programs 1) to reduce climate change impacts by reflecting future climate change projections (sea level rise, shifting temperatures, changing precipitation projections) under the Massachusetts Wetlands Protection Act and regulations; and, 2) to prevent water quality degradation from pollution, especially in nutrient sensitive areas with combined sewer systems, Total Maximum Daily Loads for nutrient pollution, septic systems, and stormwater MS4 permits.

Category 3: City trees and Reforestation

Retain existing city trees and set targets for planting new trees and for survival of planted trees in Environmental Justice communities, all 26 Gateway Cities and other urban centers. Prioritize the siting of trees where they will reduce heat island effects and lower the heating and cooling energy needs of nearby buildings and to absorb stormwater. Collect additional data on urban trees, where losses occur, and the types of development that are associated with loss. In suburban and rural areas, expand programs to reforest riparian and flood-prone areas (for example, by matching USDA Natural Resources Conservation Service cost-share funding).

Category 4: Net Gain of Ecosystem Functions/Services

Enact legislation to achieve a Net Gain of ecosystem functions/services (TBD), and the ability for natural resources to provide clean air and water, carbon sequestration, adaptation benefits, etc. The law should require that EEA 1) set a Net Gain goal; 2) measure and report land use conversion and trends, including trends in Environmental Justice communities that impact urban tree canopy cover; 3) create a spatial decision support tool to calculate net losses and gains, to quantify impacts and benefits, and to guide decision-making at all scales and across land use types; 4) provide incentives for protection and restoration; and, 5) promulgate regulatory requirements to avoid, minimize, and mitigate land use conversion.

Category 5: Increase carbon on working lands

Increase carbon stored on working lands and increase the quality of forest and agricultural products by employing a range of strategies including using grants and state and local incentives to: 1) pay and incentivize forest landowners to practice carbon-beneficial forestry practices (through existing programs, like the Family Forest Carbon Program and by creating new forest resilience programs); and, 2) pay and incentivize farmers to apply silvopasture, cover crops, no till, and the best management practices described in the Healthy Soils Action Plan.

Category 6: Operationalize nature-based solutions for new and redevelopment.

Create incentives for reforming local ordinances, bylaws, and permitting processes to ensure no net loss of ecosystem services through protection and maximization of green infrastructure/nature-based solutions in all new and redevelopment and combine gray/green infrastructure where needed. Some examples include Open

Space Residential Design, Natural Resource Protection Zoning by right, Transfer of Development Rights, green infrastructure and natural climate solutions design requirements in subdivision regulations and site plan review, and tree retention ordinances with unavoidable tree removals requiring payments into a local fund for tree planting. Make adoption of these rules a requirement for continued qualification as a Municipal Vulnerability Preparedness community, Green Community, other existing grant programs, and create new state incentives for communities to adopt these rules and to incorporate these principles into municipal projects.

The Trustees of Reservations
200 High Street | Boston, MA 02110

April 29, 2022

The Honorable Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Via Email gwsa@mass.gov

RE: Natural and Working Lands sector in the 2025 and 2030 Clean Energy and Climate Plan

Dear Secretary Theoharides,

The Trustees appreciates the efforts the Executive Office of Energy and Environmental Affairs (EEA) put into the Clean Energy and Climate Plan (CECP) for 2025 and 2030. Thank you for the opportunity to comment on this important plan to help achieve Net Zero climate mandates by 2050.

As a conservation organization that has protected 67,000 acres, including 120 miles of coast, The Trustees understands the power of nature to combat climate change. We look forward to working in partnership with EEA to implement the goals outlined in the Next Generation Climate Roadmap law to utilize Natural and Working Lands (NWL) to meet the state's ambitious emissions targets.[1]

The Trustees appreciates the actions outlined in the proposed CECP for 2030. However, we call on the Baker Administration include specific "limits" to utilizing Natural and Working Lands to help reach Net Zero by 2050, and "numerical benchmarks," targets and metrics for NWL in the CECP, as required by law.[2] The lack of specific numeric goals to utilize the land to reduce emissions and increase carbon sequestration undervalues the importance of NWL and weakens the drive to implement bold policies and create adequate funding for the NWL sector.

[1] The *Next Generation Road Map for Massachusetts Climate Policy Law* defines "Natural and working lands" as *lands within the commonwealth that: (i) are actively used by an agricultural owner or operator for an agricultural operation that includes, but is not limited to, active engagement in farming or ranching; (ii) produce forest products; (iii) consist of forests, grasslands, freshwater and riparian systems, wetlands, coastal and estuarine areas, watersheds, wildlands or wildlife habitats; or (iv) are used for recreational purposes, including parks, urban and community forests, trails or other similar open space land*. https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8

[2] https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8

NWL are required by law to meet the state's Net Zero goals, as they are the only tools we have to remove carbon pollution from the atmosphere at scale. NWL provide critical ecosystem services including clean air and water, critical habitat, food and wood products, and opportunities to improve human health and quality of life; and NWL support the state's outdoor recreation industry which contributes $10.5 billion annually to the state's GDP, directly supporting 114,000 jobs, and $5.5 billion in wages and salaries.[3] The importance of protecting, managing, and restoring natural systems' capacity to provide these services is increasingly important considering the impacts of climate change to NWL, including more intense storms, floods, droughts, and excessive heat. In Massachusetts, the Natural and Working Lands that offer the most carbon sequestration and storage benefits include forests, wetlands, and farms.

- **Forests** cover two-thirds of the state and are the most important of the NWL the Commonwealth can employ. Forests and trees across Massachusetts currently sequester 4.6 million metric tons of greenhouse gas emissions in the state every year[4] and have the potential to store 1-2 million metric tons more with currently available practices.[5]
- **Wetlands** are a critical landscape for carbon emission reduction. Globally, despite making up only 6-8% of global land surface, wetlands hold over 20% of the world's soil carbon.[6] Coastal wetlands face existential threats from climate change, especially sea level rise.
- **Farms** cover nearly 10% of the state's land area.[7] Available practices that strengthen and preserve soil organic matter make agricultural lands healthier and more effective at storing carbon, and lead to other benefits such as reduced water use and erosion. Urban agriculture creates jobs, and provides healthy food to local markets, while absorbing stormwater and heat.

Below please find more specific comments and recommendations on the latest CECP proposal to protect, manage, and restore Natural and Working Lands:

PROTECT Natural and Working Lands

We applaud the Baker Administration for calling for the protection of forests vulnerable to development and look forward to the details of proposed grant programs to conserve forests and farms. At a time when planetary warming is weakening forests and making them more vulnerable to invasive species infestations, pests and pathogens, and fluctuating weather conditions, the state must do everything in its power to protect and expand these lands to ensure that they remain resilient into the future. We are particularly interested in helping to create a large, dedicated source of funding for land and water conservation, restoration, and management of NWL, and new, innovative tools that will be used to permanently conserve those lands.

In addition to providing funds for state agencies and municipalities, we urge you to also dedicate increased grant dollars for nonprofit partners for NWL projects. It is NGOs, including the state's 140+ land trusts and watershed associations, which regularly leverage significant private investments and help cities and towns with planning, funding, and completing complex land and water conservation and

[3] U.S. Dept. of Commerce Bureau of Economic Analysis 2019 report. See https://outdoorindustry.org/state/massachusetts
[4] Annual carbon sequestration, 2010: Methods taken from Gu et al. 2019 and applied to Massachusetts. MA annual emissions, 2017: Appendix C: Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017 https://www.mass.gov/lists/massdep-emissionsinventories
[5] Nature4Climate, 2020. https://nature4climate.org/u-s-carbon-mapper
[6] Nahlik, et al., 2016. https://www.nature.com/articles/ncomms13835
[7] https://www.mass.gov/info-details/agricultural-resources-facts-and-statistics

restoration projects. Moreover, nonprofits accomplish this work rapidly - we have teams of specialists with decades of experience in supporting communities and state agencies and getting deals done.

The Trustees remains concerned about state incentives that encourage industrial-scale solar arrays in our forests. The state should be increasing incentives to develop solar on brownfields, parking lots, highway medians, rooftops, and other low-impact areas with minimal ecosystem service values. We call for the Clean Energy and Climate Plan to halt all solar development of forests, especially when incentivized by ratepayer dollars, until the state determines that additional capacity is needed outside already-impacted areas. Before that occurs, the state needs to complete comprehensive, statewide spatial analysis using stakeholder input, and a determination describing specific lands that are most - and least - appropriate for large scale solar development.

We request more details in the CECP on the Administration's proposal to expedite permitting of development projects in the outer 50 feet of the wetland buffer zone as an incentive for limiting impact on wetlands. The buffer is designed to protect wetlands' ability to provide ecosystem services – including carbon sequestration and storage. Wetlands are part of larger watersheds, of which regulated wetlands are just one part. For example, development and impervious surfaces often increase stormwater pollution to adjacent wetlands and beyond. Moreover, we question the feasibility of this approach. Alterations in outer wetland buffers still require review and, in some cases, stormwater design limits the feasibility of streamlining. Also, most local wetland bylaws and ordinances are stronger than the state Wetlands Protection Act and have mandatory or no disturb setbacks within the 100-foot wetland buffer. Fortunately, there are other tangible steps we can take to protect and restore wetlands. Please see the below proposal to streamline salt marsh permitting, as an example.

MANAGE Natural and Working Lands

The Trustees strongly supports the Administration's proposals to improve management of working farms and forests in the CECP and look forward to create numeric targets and working through these details with your agency experts.

As a start, we hope the state will soon overhaul the Chapter 61 forest management program. Chapter 61 currently helps keep over 290,000 acres of privately-owned forest from development and should be expanded and modernized by incentivizing use of climate smart forestry practices to manage these lands for carbon storage, as well. A redraft of pending state legislation, *An Act to create a forest carbon incentive program to enhance carbon storage on private timber land*, would accomplish these goals by providing additional incentives to private forest landowners when they commit to managing their forests for increased carbon storage. The latest version of this bill proposes a new program for forest owners who incorporate specific climate smart forestry practices into their forest management plans. The program would provide enhanced incentives for landowners to keep working forests conserved for 20 years (up from 10 years), thereby doubling the time that forests can grow and increasing the amount of carbon stored. To help offset lost tax revenue from enrolled lands, the legislation would provide grants to towns where the forest land is located. Improving Chapter 61 would be in line with other states. For example, Wisconsin's Managed Forest[8] [9] program requires a minimum enrollment of 25 or 50 years, with a greater tax break for the latter. Further, land can either be closed or open to public use, with the latter creating additional tax benefits. Timber harvested from these lands is certified, a special designation for lumber sales in the state. This program also features a withdrawal tax and fee to

[8] Managed Forest Law (Sections 77.80 to 77.91, Wis. Stats.) and its administrative rules (Chapter NR 46, Wis. Adm. Code)
[9] https://dnr.wisconsin.gov/topic/forestlandowners/mfl

discourage property owners from developing their land once enrolled. We hope the Administration will reform Chapter 61 administratively where possible, and advocate for passage of the legislation referenced above.

The Trustees owns 2,000 agricultural acres currently in our care, including 5 working farms, Community Supported Agriculture programs with 1,300 members, 56 community gardens, 3 farm stands, and active mobile markets. We are interested in partnering with the state to develop new grants and incentives to support practices recommended in the Healthy Soils Action Plan which should already be guiding sustainable farming throughout the state, creating healthier and more resilient local agriculture. However, we are discouraged that the Healthy Soils Plan has yet to be released and the details in the CECP surrounding carbon sequestration targets, and grants and incentives for agricultural lands are still lacking.

RESTORE Natural and Working Lands

The Trustees support the CECP's proposed increase in funding for the Greening the Gateway Cities, as well as significant funding to benefit Environmental Justice Populations in neighborhoods that lack tree cover but may not live in a Gateway City. We also strongly support significant investments in EEA's new tree planting program along rivers and streams. However, we request the state to set specific annual goals to plant a specific number of trees before 2030, if we are to realistically utilize trees to meet our 2050 Net Zero goal. New York City's success at planting one million trees is a good model, and there are others.

We also support EEA's proposal to allocate a portion of Municipal Vulnerability Preparedness Program grants for greening projects that include extensive tree planting, especially when such resilience projects quantify carbon sequestration and lessen urban heat island impacts. At the same time, we urge the state to focus on tree loss associated with state-funded projects and programs and hope the Administration will ensure that avoiding or minimizing tree loss is incorporated into state programs, and state-funded projects. All of this work needs to be quantified in terms of carbon benefits. We hope you will consider these requests when implementing the CECP.

As part of the state's Clean Energy and Climate Plan for 2025 and 2030, it is critical the state encourage restoration and protection efforts of imperiled salt marshes, by streamlining the permit process for nature-based resilience solutions and innovative restoration techniques, improving interagency coordination, increasing state grants, and helping to fund monitoring. We are grateful to see that EEA plans to streamline permitting process for projects that restore tidal wetland and salt marsh functionality. Below are specific proposals for salt marsh permitting reforms:

- Improve coordination between agencies when reviewing projects, and within different regional offices of each agency. Prioritize action on the Atlantic Coast Joint Venture Massachusetts Salt Marsh Restoration Plan across agencies and with nonprofit and federal partners. Assign a point person in each agency, and one EEA salt marsh restoration coordination lead.
- Use the Great Marsh EIR and results of projects to date as basis for guidelines on methodology for other similar salt marsh restoration projects in Massachusetts.
- Scale-up nature-based, high benefit and low risk salt marsh restoration methods: EEA agencies should provide clear and consistent guidance and target timelines for review, and affordable monitoring for ditch remediation, runnels, clog removals and microtopography projects.
- Continue to review regulations under the Massachusetts Environmental Policy Act, Wetlands Protection Act, and M.G.L. Chapter 91 to incorporate provisions for salt marsh restoration and

ensure consistency throughout those regulations.

- Standardize monitoring requirements and apply conditions that allow projects to proceed with adaptive management performance standards. Pilots are intensively monitored. Develop streamlined monitoring standards for new projects that are reasonable and feasible for applicants; align with urgency to scale up restoration given impacts from climate change.
- Increase capacity at EEA and agencies to implement new grants and incentives to help nonprofit partners and municipalities with costs associated with project management, permitting, and monitoring.

We applaud EEA's proposal to ensure no net loss of stored carbon in replicated wetlands and we urge the state to create similar no net loss targets for forested lands. We seek clarity on this proposal including how EEA is defining a "replicated" wetland and ways to feasibly achieve "no net loss." We also hope EEA will implement this provision thoughtfully and make exceptions for Nature-Based Solutions projects designed to restore habitat, improve climate resilience, and strengthen wetland ecosystems. For example, when nonprofits and local communities embark on wetland restoration projects that include natural fill (e.g., filling salt marsh ditches with salt marsh hay), we hope such projects will not be considered a "replicated" wetland under this proposal.

We also urge EEA to create targets for blue carbon specifically, and to build on the Blue Carbon Report and Online Calculator for determining Greenhouse Gas Budgets for Massachusetts Aquatic Ecosystem Restoration Projects. We hope the state will set numeric targets and create new restoration funding that avoid a net loss of carbon or enhance additional carbon sequestration from blue carbon systems, as coastal wetlands have some of the highest per acre climate mitigation potential.

To implement many of the bold initiatives proposed in the CECP, the state will need to identify and create new, robust dedicated sources of public funding and make significantly larger investments in Natural and Working Lands **today** if future generations are to reap carbon and resilience benefits in 2030, 2040 and beyond. The Trustees looks forward to working closely with you, agency experts and lawmakers to create state funds, policies, and programs, to support the use of Natural and Working Lands to meet our ambitious climate goals.

If you have questions, please contact me anytime at lorel@thetrustees.org or 617-360-1857.

Thank you for your consideration.

Sincerely,

Linda Orel
Director of Policy, The Trustees

Founded in 1891 by Charles Eliot, The Trustees preserves, for public use and enjoyment, properties of exceptional scenic, historic, and ecological value in Massachusetts. Today, 130 years after our founding, we are Massachusetts' largest conservation and preservation organization and with the support of our 150,000 members we care for 123 properties – more than 27,000 irreplaceable acres. The Trustees works with a variety of volunteer, nonprofit, and community-based partners in communities across the state to preserve remarkable, scenic landscapes and historic and cultural resources. thetrustees.org

TransitMatters Comment on Massachusetts' 2025 & 2030 Clean Energy & Climate Plan

We're excited about the great work EEA is doing to accelerate decarbonization across all sectors of the Commonwealth's economy and society. Greening our economy, improving public health outcomes, and protecting our environment is going to take a Herculean effort, but if any place can achieve aggressive targets, it's Massachusetts.

We want to focus our comments on the transportation sector- where we spend most of our time. To meet its climate goals, Massachusetts will need to eliminate gasoline-powered vehicles from the state's roadways within the next 25 years. But far too much of the Commonwealth's plan aims to accomplish this not with improvements to transit and safer streets, but with widespread subsidies for new electric vehicles. Massachusetts is the third densest state with scores of walkable communities, the fourth-largest transit system in the country, and a land area smaller than metro Houston. The Commonwealth needs to center the decarbonization conversation on expanding sustainable shared mobility options.

We're not Pollyanna-ish about the future. Of course, electric vehicles (EVs) will need to replace internal combustion engine vehicles. But that task could be accomplished considerably faster, at a lower cost, and more equitably if we could plan for a future with considerably fewer vehicles on the road. Far too many underestimate the importance of public transportation and active transportation in reducing carbon emissions equitably and in the short term.

The transportation sector is the largest, and therefore among the most important sectors to decarbonize (>40% of statewide emissions), but also among the hardest. Before the pandemic almost no progress had been made in reducing emissions since tracking began in 1990. In fact, the growing number of SUVs on the road have canceled out recent climate gains.

We need every tool in the toolbox to make headway in decarbonizing this difficult sector. The Commonwealth appears to be making a risky bet that electrifying existing transportation modes with new battery technology will get us the needed emissions reductions.

This approach overlooks a number of important considerations. Current EVs subsidies are inadequate for low-income buyers making the MOR-EV program a wildly inequitable program with 80% of subsidies going to the wealthiest zip codes in the Commonwealth. Rising costs of vehicles means that vehicles stay on the road longer making the transition more difficult. There is also the thorny question of the ethics of where we get batteries for electric vehicles- water shortages in Latin America as well as extractive mining and child labor in Central Africa are not sustainable paths for our future. A growing body of research shows that the transportation

decarbonization will require more holistic, integrated strategies than simply electrifying vehicles. Key strategies, still only partly addressed in the CECP, are existing zero- and low-emissions transportation solutions we have, including biking, walking, land use, travel demand management, and public transit.

We appreciate the changes made since the interim 2030 CECP, including support for MBTA communities, Bus Transformation, Complete and Shared Streets, and recognition of VMT reduction as a goal. However it is clear that the state has more work to do in this area. In particular, the emissions and complementary benefits of having well-functioning public transportation systems in Massachusetts appears to be mostly overlooked and under-developed. We have included our thoughts below.

The Role of Transit in Decarbonizing Transportation

Transit can play three distinct roles in lowering transportation sector GHG emissions:

1) Lowering emissions from transit vehicle travel i.e. more efficient vehicles, lower carbon fuels, and electrification
2) Avoided emissions from transit passenger travel
    - individuals traveling by transit emit 55% less GHGs per mile compared to travel by single-occupancy vehicle[1]
    - Every 3 passenger-miles traveled on transit displaces 1 passenger mile in a personal vehicle (the remaining transit passenger miles would be replaced by personal vehicle travel, according to travel surveys)[1]
3) Avoided emissions from increased land use efficiency and avoided community travel
    - A significant body of research shows that transit service leads to more efficient land use patterns that reduce vehicle miles traveled beyond the reductions directly attributable to transit passenger miles[1]

- Reducing transit vehicle emissions (#1 above) has received a great deal of attention (e.g. Bus Transformation program). While reducing these emissions is important, the value of existing and potential avoided emissions from transit travel (#2) and induced land use efficiencies (#3) appears to be overlooked.
- We can look at this quantitatively using data from a recent report on public transportation greenhouse gas emissions from the National Academies Transportation Research Board.[1] Specifically, for Massachusetts transit agencies (MBTA + RTAs):
    - Transit vehicle emissions amount to 0.47 MMT CO_2/yr in 2018, 1.5% of all transportation emission, or 0.7% of total statewide emissions
    - Travel on public transit in Massachusetts helped avoid 0.32 MMT CO_2/yr in 2018, 1.0% of all transportation emission, or 0.5% of total statewide emissions

[1] *An Update on Public Transportation's Impacts on Greenhouse Gas Emissions*

    - Transit-induced land use efficiencies in Massachusetts helped avoid 2.32 MMT CO_2/yr in 2018, 7.3% of all transportation emission, or 3.2% of total statewide emissions
        - Interestingly, the Boston metro regions has the highest transit-induced land use efficiency rate among 28 metros studied in the U.S: for every VMT reduced directly by transit travel, there is a reduction of 8.5 VMT due to transit-induced land use efficiency (national rate is 7.3; Springfield MA is 5.3)
    - Together, transit travel and land use efficiencies lead to 2.6 MMT CO_2/yr in avoided emissions in Massachusetts (8.3% of Transportation, 3.7% of all emissions)
    - Accounting for transit vehicle emission, net emission from public transit comes to -2.1 MMT CO_2/yr in Massachusetts (6.8% of Transportation, 3.0% of all emissions).
    - In other words, viewed comprehensively, transit has net negative emissions, wite avoided emissions being several times larger than the emission from transit vehicles.
- We can use the same data/report to examine future scenarios:
    - A 100% electrified transit vehicle fleet operating with zero carbon electricity would reduce emissions by 0.47 MMT CO_2/yr in 2018 (1.5% of transportation, or 0.7% of all emissions)
    - A 25% increase in ridership would lead to an additional 0.64 MMT CO_2/yr in avoided emissions (2.1% of transportation, or 0.9% of all emissions)
- From current data and future scenarios, it is clear that transit ridership and land use effects have greater influence on transportation sector GHG emissions than do transit vehicle emissions. Therefore maintaining, improving, and expanding transit service can and should play an important role in decarbonizing transportation. We support reducing emissions from transit vehicles, but this is a small piece of decarbonizing transportation overall and we need to be careful about mis-allocating resources, particularly if it leads to degradation in services, which would be counterproductive.
- EEA, in partnership with MassDOT, the MBTA, and RTAs, should adopt a 3-pronged public transit strategy of *maintain, improve,* and *expand* as part of the CECP's transportation plan:
    - *Maintain* existing service levels and ridership
    - *Improve* operations, system performance, and user experience to increase ridership, reliability, and viability as a mode
    - *Expand* the state's transit systems and service to serve more locations and users more of the time
- We appreciate support for the MBTA communities policy, which will help more transit-accessible housing options for people. However, we must point out that the benefits of this policy will not be fully realized without providing good transit service in the targeted locations, including good first and last mile connections.

- We appreciate the support for e-bikes, bikes, and walkability and encourage further funding and planning in this area. In particular, we believe these modes could be better integrated with transit as first/last mile solutions e.g. through dedicated MassDOT or MBTA/RTA program(s), which would help increase the population within convenient catchment areas of transit stations. We need further clarification of the legal status of e-bikes to be a priority in order to speed up adaptation of this critical mode.

Transit Electrification

We support this and are glad to see commitment to this administration to fully funding the MBTA's Bus Modernization Program. We are, however, concerned about the costs and trade-offs that a too rapid push towards battery electric buses would entail.Battery electric buses are still a very new technology and it's critical that the MBTA ensure that service quality doesn't degrade because of this transition. It is also critical that the MBTA evaluate the efficacy of the current plan and ensure that if battery electric buses are not meeting the service requirements in the next 2-3 years, alternatives such as in-motion-charging and opportunity charging strategies are employed.

It was quite disappointing to see no mention of Commuter Rail electrification. Commuter Rail uses twice as much diesel fuel and carries more than twice the passenger miles. It has the potential to displace some of the longest commutes leading to serious reductions in VMT and emissions. This is completely absent from the current transportation policies and is a massive missed opportunity. The lack of transformative investment risks the success of the MBTA multifamily zoning policy featured prominently in the CECP. The current fleet is too unreliable, slow, and infrequent to drive real mode shift. The MBTA's lack of progress and funding commitment since a 2019 Board vote has been a source of frustration for many. Worse yet, the MBTA's suggestion of not using existing proven technology puts the transformation further off and is likely to cancel out reliability gains.

Rail electrification via overhead catenary is proven technology with centuries-long track record, and unlike battery-based vehicles, can deliver significant performance improvements over existing fossil-fuel based trains. TransitMatters has done extensive research on how such a system could work for the MBTA, delivering subway-like service to much of Eastern and Central Massachusett. Rail electrification has been embraced by the FMCB, the current Senate Climate Bill, and various state and local leaders like Senate Transportation Chair Brendan Crighto and Mayor Wu. We ask that EEA adopt regional rail electrification as a key strategy to decarbonize Massachusetts' transportation sector, and make securing funding for this transformation a priority.

Policy & Financial Coordination for Public Transit

We need greater coordination between EEA, MassDOT, and MBTA. Climate policy and transportation policy are one in the same. EEA has done very careful energy technology pathways modeling to develop strategies for decarbonizing power, buildings, and light duty vehicles, however, we have not seen such careful strategizing when it comes to transportation

outside of personal motor vehicles. Recent decisions by the MBTA suggest it is being more reactive to public and political pressure, instead of doing holistic, proactive planning.

- Given the fundamental role of maintaining, improving, and expanding transit service in keeping down GHG emissions, it is imperative that the MBTA and RTAs receive stable funding going forward. There are several significant concerns here:
    - State funding for MBTA has been flat at FY2016 levels i.e. real decline of 15%
    - RTAs also have flat funding, with real decline of 2% since 2016
    - This will not covered by sustainable federal funds long-term, pandemic relief funding notwithstanding
    - In fact there's a need for lower fares, particularly for commuter/regional rail and low-income populations
    - The T faces a fiscal cliff in its operations budget as soon as next summer with the potential for fare hikes or service cuts
    - Raising fares would be counterproductive, drive passengers away, either to higher emissions mode or more limited access to jobs, services
    - Ongoing massive debt payments, with high rates, much of it inherited from the Big Dig; should be state, not MBTA responsibility
- For transit to remain a viable alternative to expensive and emissions-intensive motor-vehicle dependance, and to expand it as a low-carbon transportation option, stable, reliable dedicated funding is needed, and we encourage EEA to work with MassDOT, the rest of the administration, and the legislature to ensure these resources exist in the future.

In conclusion we urge EEA to consider not just tailpipe emissions, but the impact of PM 2.5, harm to the Global South, as well as deforestation and sprawl as threats to the environment and our health. And even though it is not in EEA's brief, we urge you to also consider roadway injuries and fatalities, and access to opportunity for low-income residents and those who are unable to drive. The CECP must include these residents and these concerns. There is not a way to address these issues and still have private single occupancy vehicles be the overwhelming focus of the Commonwealth's decarbonization plan. We have to think bigger. By doing so, we can solve more than just tailpipe emissions- we can make a healthier, more vibrant, more walkable, and more sustainable Commonwealth.

Background

- Electric Cars Won't Save Us
- Senate plan puts too much emphasis on electric vehicles
- MBTA is missing big opportunity with commuter rail
- TM statement on 2022 Senate Climate Bill

January 9, 2022

To: **Judy W. Chang, Undersecretary of Energy and Climate Solutions, EAA**
Via email: gwsa@mass.gov

FROM: Nancy Hazard
30 Spring Terrace, Greenfield, MA 01301
Nancy.hazard@worldsustain.net
Greenfield Tree Committee
Retired director, Northeast Sustainable Energy Association (NESEA)

RE: URBAN TREES - WHY IT IS IMPORTANT TO PLANT NATIVE TREES

Dear Ms. Chang,

Many thanks for your work and especially the 12/21 webinar on NWL (Natural Working Land).

I was pleased to see URBAN trees listed in the "Preliminary NWL Inventory" graph, and to see their potential contribution to our goal of reducing carbon dioxide in the atmosphere in the near term, as well as longer term.

As you know, in addition to the climate crisis, we also have a biodiversity crisis. Urban trees can significantly contribute to building habitat and addressing this crisis if trees native to our region, as opposed to non-native trees, are planted. **I would like to request that EEA give guidance to those responsible for urban tree planting, on the importance of planting species native to their area.**

Science behind my request:

Douglas Tallamy, PhD, Professor of Entomologist Wildlife Biology at U. Delaware, has published several books for the general public as well as numerous scientific articles on this topic.

In **Nature's Best Hope**, After quoting E.O Wilson as saying "If insects were to vanish, the environment could collapse into chaos." Dr. Tallamy makes the case that two insects – Lepidoptera (moths and butterflies), and bees are the two most important insect species for life as we know it. He states:

- Lepidoptera (moths and butterflies) are the most efficient insects at "transferring energy (food) from plants to other animals,"
- Bees are the most efficient insects at pollinating plants. 87% of our plants rely on pollinators for reproduction.

Dr. Tallamy also reports that scientists have found that insects are declining:

- in Europe insects have declined by 80% since 1970.
- In the Midwest, insects have declined 50% over the past 100 years.

To reverse this trend we need to provide insects with food, water, and shelter. Insects have co-evolved with plants for millennia, and scientists have found that "insects are fussy about which plants they eat. 'Specialization' is the rule, not the exception." (Tallamy, *Nature's Best Hope*)

Tallamy presents research that shows that trees, native to a particular ecosystem, that have co-evolved with insects, are preferred as food for the larval stage of Lepidoptera. For example, in western Massachusetts, a native maple tree (sugar, red, silver etc.) three hundred and ninety-three (393)

Lepidoptera species choose to lay their eggs on native maple trees, while only seven (7) Lepidoptera lay their eggs on Norway Maples.

This statistic is important because caterpillars, the larval stage of Lepidoptera, are soft and nutritious and are the preferred food by birds to feed their young – and it takes a LOT of caterpillars to do the job.

For example, chickadees need 6000-9000 caterpillars to raise a nest of four. Dr. Desiree Narango, UMass Amherst post-doctoral researcher, has found that in order to find that many caterpillars within a 50-meter radius of its nest, 70% of the plant foliage must be native to the area.

As you may know, Norway Maples are common street trees. In Greenfield, MA, 50% of our street trees are Norway Maples. And Norway Maples are not the only common non-native street tree. This must change.

There is an easy-to-use tool to help municipalities make informed decisions about their tree species choices. The **Native Plant Finder** database contains data Dr. Tallamy has collected on how many Lepidoptera species choose each species of plant. By putting in a zip code a prioritized list comes up.

In Conclusion: Please recommend that when planting trees and repairing urban forests, that habitat is also being built to support biodiversity at the same time that urban forests become even more important carbon sinks in our effort to address the climate crisis.

The importance of native trees should also inform forest management, and reinforce the importance of removing invasive non-native plants that are not contributing to supporting biodiversity.

Thank you again for your work, and for listening. I look forward to your response.

Yours,

Resources:

Native Plant Finder https://www.nwf.org/NativePlantFinder/
About **Dr. Douglas Tallamy**, author of **Natures' Best Hope** and other books.
https://www.udel.edu/faculty-staff/experts/douglas-tallamy/

About **Dr. Desiree Narango**

Greenfield Tree list. Two years ago, I worked with the Greenfield Tree Committee to develop a recommended list of primarily native trees appropriate for use as street trees and/or suburban yards.
Resilient Trees for Streetsides, Yards and Parks https://6dff8875-db8b-4c79-96a1-d3e91a8f1b76.filesusr.com/ugd/6710bd_b9b51f0f60be4f159612e178b1d4ba0c.pdf

About Me: I have spent much of my life seeking solutions to resource depletion and the climate crisis as a builder; director of the Tour de Sol, America's Green Car Competition and festival, a program of the Northeast Sustainable Energy Association (NESEA); co-founder of Greening Greenfield; and member of numerous City committees that aim to address the climate crisis.

To: Clean Energy Advisory Board
From: Charlie Cary, 978-697-8223
Re: Wood Residue
Date: 3/14/22

Millions of tons of wood residue are being generated each year by:

- Municipal and state governments,
- Private landowners,
- Forest product industries which harvest and make carbon sequestering products out of wood,
- Arborists,
- Utilities,
- Industries which use clean wood for crating.

Live trees are getting the credit they deserve in the fight against climate change but dead trees are not. Millions of tons of wood are cut each which cannot, or should not be left in place and will not be made into a carbon sequestering produce

I am against inefficient centralized wood fired power plants in urban areas, but I beg someone to ask the question: what is the highest and best use of millions of tons of wood generated annually in Massachusetts which can not, or should not, be left in place

This wood is most often chipped, loaded on trucks and dumped someplace to biodegrade, or transported to distant markets where its value doesn't cover transportation cost. This represents millions of tons of carbon and methane returning to the atmosphere is the short term. Its disposal is most often a drag on local economies as governments, business and land owners are actually paying to get rid of it.

I favor using this neglected resource as a local heating fuel to keep fossil fuel in the ground and energy dollars in local economies, but am certainly open to any better use than current practices. Recent research at the University of Massachusetts suggests particulate emissions from modern wood heating systems are similar to particulate emissions from oil burners. Good public policy is formed by weighing the costs and benefits of different actions and more focus is definitely needed on how to best use wood residue.

Science predicts that tree mortality will increase in the coming years due to climate change and imported bugs and disease. Shouldn't we be developing plans for what to do with this potentially valuable resource. Aggregating the current wood residues silos of production across the numerous sectors of our economy is the first step to focusing attention on an annually produced wood resources which could produce environmental, economic and social benefits.

Next time you pass a utility crew clearing electrical wires ask yourself: “Where is that wood going and are we maximizing its value”?

I welcome the opportunity to engage anyone reading this testimony in talking about the pro and cons of organizing a statewide, one year, inventory of what is happening to cut wood which is not being made into a carbon sequestering product.

December 24, 2021

Via electronic mail to gwsa@mass.gov
Global Warming Solutions Act Implementation Advisory Committee
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 021114

Subject: Approach to Complete the Clean Energy and Climate Plan for 2025 and 2030

These comments are filed in response to the information shared and the feedback requested at the public webinars titled "Approach to Complete the Clean Energy and Climate Plan for 2025 and 2030", presented on October 14 and 15 (the "October Webinars") by the Massachusetts Executive Office of Energy and Environmental Affairs ("EEA").

350 Mass

These comments are filed on behalf of 350 Massachusetts ("350 Mass"), a member-led network of climate activists. 350 Mass draws its inspiration from 350.org[1] and receives coordination, skillbuilding, communication, financial, fundraising, and operational support from the staff and board of Better Future Project ("BFP"). 350 Mass sees a grassroots climate movement as critical for achieving climate justice and maintaining a liveable world. 350 Mass does much of its work through local chapters called "nodes", currently sixteen in number, from the Berkshires to Cape Cod. Our volunteers also come together as members of statewide working groups to discuss and plan around specific topics, including in this case a group tracking implementation of An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy ("the Act"). Submission of these comments has been approved by the 350 Mass Statewide Steering Team and its elected Executive Committee.

[1] The "350" in our name comes from 350 parts per million, the concentration of carbon dioxide in the atmosphere considered safe by climate scientists ("350 Climate Science Basics." *350.Org*, https://350.org/science/).

Overview

We appreciate the public outreach and request for input that EEA has done in connection with implementing the Act, including through the October Webinars. We particularly appreciate the request for public comment made prior to issuing a full draft of the Clean Energy and Climate Plan ("CECP") for 2025 and 2030. Our comments below focus on the approach outlined in those webinars and request certain changes in that approach prior to EEA issuing a full draft in or around March 2022. We have organized our comments according to the three questions posed in those webinars:

1. Do you have any concerns with EEA setting limits on gross emissions while tracking and lowering net emissions through goal setting and policy development?
2. Do you have any concerns with EEA setting emissions sublimits to be consistent with the categories already in the statewide greenhouse gas emissions inventory?
3. Do you have any concerns regarding moving forward with the approach described today in completing the Clean Energy and Climate Plan for 2025 and 2030?

Detailed comments

I. Do you have any concerns with EEA setting limits on gross emissions while tracking and lowering net emissions through goal setting and policy development?

Yes - we have a concern about EEA's proposal to track net emissions to determine progress towards "net zero" by 2050, as discussed below.

We support EEA's proposal to set the emissions limits of greenhouse gasses ("GHGs") for 2025 and 2030 as a percentage of gross emissions reduction from the 1990 baseline level. We understand that means the CECP for 2030 will lay out a plan for reducing gross (not net) emissions by 50% by 2030, which is what the Act requires.[2] We recognize that the Act allows increases in carbon sequestration to achieve up to 15% of the 2050 target of "net zero". However, the Act does not require relying on that full 15%, and we believe that it would be dangerous and premature for EEA to do so at this time[3], because currently it is far from clear that 15% reduction through carbon sequestration by 2050 will be possible, whether through biological or technical methods. Even if possible, it similarly is far from clear that it would be more cost-effective than an equivalent reduction in gross emissions.

Instead, we support the recommendation made in comments submitted December 2, 2021 by representatives of six respected non-profit organizations (the "Group Comments").[4] Specifically,

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[2] The Act also clearly requires meeting the goal of reducing statewide emissions 75% by 2040 solely by reducing gross (not net) emissions.

[3] It is not clear to us from the October Webinars whether EEA plans to rely on that full 15% to meet the 2050 goal.

[4] The Group Comments were submitted December 2, 2021 to the Global Warming Solutions Act Implementation Advisory Committee ("GWSA-IAC") by representatives of the Acadia Center, the Conservation Law Foundation, Greater Boston Physicians for Social Responsibility, Mothers

we recommend that EEA not assume that the last 15% of reductions needed to meet Massachusetts' net-zero greenhouse gas emissions mandate will be accomplished through carbon sequestration, before additional studies and rigorous analysis show such assumption to be reasonable. In addition to the specific reasons for that recommendation outlined in the Group Comments, which we endorse, we want to emphasize our concern about the potential for estimates of carbon sequestration by natural systems to be exaggerated by parties who want to avoid the hard but more certain work of reducing gross emissions.

II. Do you have any concerns with EEA setting emissions sublimits to be consistent with the categories already in the statewide greenhouse gas emissions inventory?

We recommend that EEA adjust its approach to include in its CECP planning the GHG emissions from (A) several additional emissions sources already tracked by the statewide greenhouse gas emissions inventory; (B) producing "grey" and "blue" hydrogen; (C) transmission and use of natural gas; (D) producing "renewable" methane; and (E) producing steel and concrete – including, for (C) though (E), such products made outside but then used inside Massachusetts.

A. EEA should include in the CECP all significant emissions sources tracked by the current statewide GHG emissions inventory.

In the October Webinars, EEA proposed to set emissions sublimits for seven categories that closely correspond to the minimum list of six categories listed in the Act. EEA stated that these seven categories would be consistent with the statewide greenhouse gas emissions inventory ("Inventory"). However, these seven categories seem to omit three categories in the Inventory, which together were estimated to contribute about 3.5% of total emissions as of 1990: landfills, wastewater, and agriculture and land use. The Act authorizes EEA to include any other sector or source beyond the minimum list of six categories listed in the Act. We recommend including these additional categories that EEA is already tracking.

B. EEA should include the GHG emissions associated with producing "grey" and "blue" hydrogen, wherever that production occurs.

During one of the October Webinars, a participant noted that although hydrogen emits no GHGs when used as fuel, its production has a big carbon footprint unless it is produced using electricity from renewable sources. In terms of climate change, that carbon footprint of course has the same impact whether the emissions occur inside or outside of Massachusetts. The participant asked whether that would be accounted for in the EEA's approach to the CECP for 2025 and 2030. Responding on behalf of EEA, Judy Chang (Undersecretary of Energy and Climate Solutions) said that was a good question but EEA was not planning to address out-of-state GHG emissions except with regard to electricity generation.

This position is problematic, especially since natural gas utilities in Massachusetts are declaring

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Out Front Massachusetts, the Pipe Line Awareness Network for the Northeast (PLAN-NE), and the Sierra Club, and were captioned "Joint Comments re: October 12, 2021 Public Meeting".

interest in delivering hydrogen gas as a substitute or partial substitute for delivering natural gas (*i.e.*, fossil methane). To the extent they do so by procuring "grey" hydrogen (produced from fossil methane through steam reformation) or "blue" hydrogen (produced from fossil methane with carbon capture and storage), evidence suggests that the carbon footprint from doing so is actually greater than from burning natural gas.[5] Therefore, an approach to the CECP for 2025 and 2030 that ignores the GHG emissions from grey or blue hydrogen would tend to encourage utilities to substitute such hydrogen for natural gas, even though that would cause an increase rather than a decrease in overall GHG emissions. That would be contrary to common sense and the overall goals of the Act.

There is more than one way that EEA could avoid that unhappy result. For example, EEA could include hydrogen production in the "Industrial Processes" category. Apparently hydrogen production is not yet included in that category in the Inventory,[6] perhaps because the USEPA had not recognized it as an industrial process that emits significant quantities of GHGs on a national scale. As our economy may now be on the cusp of major technological changes, EEA should not feel constrained by the historical boundaries of its "Industrial Processes" category, and should include hydrogen production rather than ignore it.

To the extent grey or blue hydrogen is produced outside of Massachusetts for use as fuel inside the state, as noted above its climate impact would be no different than if produced in-state, and it should be treated no differently for CECP purposes. This would be parallel to the statutory mandate to consider the GHG emissions associated with electricity produced outside of Massachusetts for use inside the state, as well as produced inside.[7] We recognize some potential difficulty associated with quantifying the GHG emissions associated with producing grey or blue hydrogen outside of Massachusetts, but EEA should not let "the perfect be the enemy of the good". In other words, even a rough estimate of the average GHG emissions intensity associated with producing grey and/or blue hydrogen would be more accurate than effectively assuming zero emissions, which would be the effect if EEA ignores this issue.

C. EEA should include more complete estimates of natural gas leaks

EEA proposes to set a sublimit for the category "methane leaks from natural gas distribution and service", which the Act clearly requires. A recent report based on air monitoring in greater

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[5] See the Group Comments and sources cited therein, including (USEPA. "Emission Factors for Greenhouse Gas Inventories", 9 Mar. 2018, available at www.epa.gov/sites/default/files/2018-03/documents/emission-factors_mar_2018_0.pdf) and (Howarth, RW, Jacobson, MZ. "How green is blue hydrogen?", 12 Aug. 2021, Energy Science & Engineering 2021; 9, available at onlinelibrary.wiley.com/doi/full/10.1002/ese3.956, pp. 1676–1687).

[6] *See* Massachusetts Department of Environmental Protection ("MADEP"). "Statewide Greenhouse Gas Emissions Level: 1990 Baseline Update", May 2021, available at www.mass.gov/doc/statewide-greenhouse-gas-emissions-level-proposed-1990-baseline-update-including-appendices-a-b/download, p. 10.

[7] *See* the definition of "statewide greenhouse gas emissions" at Mass. General Laws Chapter 21N, Section 1, available at malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter21N/Section1.

Boston suggests that traditional methods have far underestimated actual methane emissions.[8] We appreciate the email response from EEA's Hong-Hanh Chu to one one of our members, stating "We are aware of this issue and are actively monitoring efforts by the U.S. E.P.A. to better estimate methane leaks from the natural gas distribution system and update their state greenhouse gas inventory tool." However, if USEPA does not timely provide such an update, EEA must include its own best estimates in the draft CECP for 2025 and 2030, which should include giving weight to the findings of that recent report.[9]

We also urge EEA to consider GHG emissions from pipeline leaks occurring outside of Massachusetts, for the same reasons outlined in the last paragraph of section II.B above.

D. EEA should include the GHG emissions associated with producing "renewable" methane

The Act's mandates to reduce GHG emissions may encourage not only (1) capturing methane that otherwise would be released from sources such as uncontrolled landfills and wastewater treatment plants, but also (2) more production of methane from crops grown for energy. Especially with regard to the latter, EEA should not assume it is carbon-neutral but rather should take account of the methane leakage rate, because there is evidence that biogas production and upgrading facilities leak methane at a rate of 2-4%, sometimes as high as 15%.[10]

As with the hydrogen issue discussed above, there may be more than one way that EEA could fold this issue into its CECP framework. For example, EEA could interpret the Act's "natural gas distribution and service" sector to include leaks associated with biogas production and upgrading facilities. Alternatively, EEA could include such facilities and their leaks in the "industrial processes" sector. As with the production of grey and blue hydrogen, EEA should consider those GHG emissions even if they occur outside of Massachusetts.

E. EEA should include the GHG emissions associated with producing concrete and steel

EEA has recognized that emissions are "generated by the manufacture of products elsewhere and the transportation of these products into Massachusetts (and thus 'embodied' in these products)."[11] EEA nevertheless has stated that excluding such emissions from the Inventory is consistent with (1) the structure of the Global Warming Solutions Act, (2) the difficulty of obtaining detailed information about such items produced outside of Massachusetts, and (3) the potential

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[8] Sargent, M.R, et al. " Majority of US urban natural gas emissions unaccounted for in inventories", PNAS 118(44), Nov. 2021, available at www.pnas.org/content/118/44/e2105804118.

[9] The evidence from that report also suggests that independent of fixing pipeline leaks, reducing natural gas consumption in favor of green alternatives could substantially reduce GHG emissions. *Id*, p.6.

[10] *See* the Group Comments and Grubert, Emily. "At scale, renewable gas systems could be climate intensive: the influence of methane feedstock and leakage rates" 2020 *Environ. Res. Lett.* 15 084041,, Aug 11, 2020, available at https://iopscience.iop.org/article/10.1088/1748-9326/ab9335.

[11] MADEP, "1990 Baseline Update", p. 18.

for double-counting the same emissions in more than one jurisdiction.[12]

None of these objections preclude EEA from considering embodied emissions in its approach to CECP planning. EEA should consider such emissions at least for steel and concrete, wherever produced. First, the structure of the original Global Warming Solutions Act has been modified by the Act that became law in March 2021, which authorizes EEA to include any other sector or source beyond the minimum list of six categories listed in the Act. Second, while it may be difficult to obtain detailed information about items produced outside of Massachusetts, as noted above, EEA should not let "the perfect be the enemy of the good"; even rough estimates for a few particularly GHG-intensive categories would be better than ignoring the issue of embodied emissions. Third, the potential for double-counting the same emissions in more than one jurisdiction seems more theoretical than real at this point in time, and should not inhibit good-faith EEA action in developing the CECP for 2025 and 2030; when and if a significant number of other jurisdictions implement regimes similar to the Act, EEA could make adjustments to avoid double-counting of emissions.

We believe that concrete and steel should be two of the first categories of products for which EEA considers embodied emissions in its approach to CECP planning. Steel, cement, and chemicals are the top three carbon dioxide emitting industries globally.[13] The concrete industry is responsible for about 8% of carbon dioxide emissions worldwide, largely due to the traditional way of making cement from limestone.[14] However, concrete can be made in ways that result in much less GHG emission[15], and state policies could drive greater use of low-carbon concrete.[16]

The steel industry accounted for 8% of the world's energy use in 2019, and about three-quarters of the sector's energy needs are met by coal.[17] However, like concrete, steel also can be produced in ways that result in much less GHG emission, ranging from recycling of steel to technologies under development such as hydrogen direct reduction.[18] There also are opportunities to use less-carbon-intensive materials in construction, such as cross-laminated timber. [19] Including embodied emissions in CECP planning, at least for major categories such as concrete and steel, would set the stage for applying relevant policy levers to drive use of construction materials that are less "carbon-intensive".

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[12] *Id*, p. 19.
[13] Gross, S.. *The Challenge of Decarbonizing Heavy Industry*, The Brookings Institution (June 2021), p. 1.
[14] *Id*., pp. 8-9; Rothman, M. "Can concrete, a major CO2 emitter, be made greener?, 8 Aug. 2021, available at www.pbs.org/newshour/show/can-concrete-a-major-co2-emitter-be-made-greener.
[15]Gross, *The Challenge,* pp. 8-9.
[16] *E.g.*, bills have been introduced in NY and NJ to give preference to lower carbon concrete in the bidding process for state-funded projects. Rothman, "Can concrete be made greener?".
[17] Gross, *The Challenge*, p. 5.
[18] *Id,* pp. 6-7.
[19] *See* Massachusetts Clean Energy Center. "How MassCEC Supports The Reduction of Embodied Carbon", 1 February 2021, available at www.masscec.com/blog/2021/02/01/how-masscec-supports-reduction-embodied-carbon.

III. Do you have any concerns regarding moving forward with the approach described today in completing the Clean Energy and Climate Plan for 2025 and 2030?

To summarize, 350 Mass would support moving forward with the approach described in the October Webinars, with these changes:

- Do not assume that the goal of net zero by 2050 can or should be achieved by reducing gross emissions by only 85%.
- Include GHG emissions from
    - landfills, wastewater, and agriculture and land use in Massachusetts;
    - producing “grey” and “blue” hydrogen used in Massachusetts;
    - transmission and use of natural gas, including the latest evidence;
    - producing “renewable” methane used in Massachusetts; and
    - producing concrete and steel used in Massachusetts.

We believe these changes are necessary to guide the regulatory and other policy-making decisions that must follow, to draft and implement the CECP for 2025 and 2030 in a way that fully achieves the mandates and intent of the Act.

Thank you for considering these comments.

AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
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December 23, 2021

Undersecretary Judy Chang
Undersecretary of Energy and Climate Solutions
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge St. Suite 900 Boston MA 02114
Submitted via email to gwsa@mass.gov

Re: Massachusetts Clean Energy and Climate Plan for 2025 and 2030

Dear Undersecretary Chang,

These comments are submitted by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI), on behalf of our member companies, regarding Massachusetts Clean Energy and Climate Plan for 2030.

AHRI represents more than 300 air-conditioning, heating, and refrigeration equipment manufacturers. In North America, the annual output of the HVACR and water heating industry is worth more than $44 billion. In the United States, the industry supports 1.3 million jobs and $256 billion in economic activity annually.

AHRI's members include many of the nation's largest manufacturers of products, such as electric equipment used for space and water heating equipment for use in residential and commercial applications. These applications can assist the Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC) goal of emissions reducing policies, programs, or actions that contribute to achieving the emissions reductions established in Massachusetts Interim Clean Energy and Climate Plan for 2030. As an industry, we believe there are important considerations that must be made by policymakers when assessing electrification and building decarbonization policies. AHRI hopes to be a resource and partner in Massachusetts' decarbonization efforts.

AHRI appreciates the work that Massachusetts' Office of Energy and Environmental Affairs has put into its Clean Energy and Climate Plan for 2025 and 2030 and is eager to share feedback on its analysis and plans. AHRI understands that Massachusetts especially requested feedback regarding the following.[1]

1. Massachusetts Executive Office of Energy and Environmental Affairs (EEA) setting limits on gross emissions while tracking and lowering net emissions through goal setting and policy development

[1] October 2021 Public Webinar: Approach to Complete the Clean Energy and Climate Plan for 2025 and 2030. Accessed via https://www.mass.gov/doc/oct-14-15-2021-presentation-on-approach-to-complete-the-20252030-cecp/download.

2. EEA setting emissions sublimits to be consistent with the categories already in the statewide greenhouse gas emissions inventory.
3. Concerns regarding moving forward with the approach described in the October 14 and 15, 2021 webinars in completing the Clean Energy and Climate Plan for 2025 and 2030.

AHRI notes that it would be extremely helpful to better understand the way that gross and net emissions might be used in the regulatory process. At first blush, it seems like this may be duplicative. Perhaps a follow-up conversation would be helpful to clarify this intent.

AHRI Recommendations

AHRI recommends that Massachusetts work to:

- conduct emissions and cost savings analyses consistent with the full spectrum of product efficiencies and commercially available technologies in North America;
- use available data sources (EIA, CBECS, etc.) to establish a baseline distribution of fuels and equipment within the Commonwealth at the household and individual commercial building level;
- shift building codes to performance-based requirements and require that existing large commercial buildings track energy usage;
- ensure that any recommendations demonstrate cost effectiveness and equity for all residents, especially taking into consideration the availability of products and cost of transition;
- consider grid reliability and capacity as it impacts critical services provided by HVACR and water heating equipment for all residents especially those in rural communities;
- adopt an incentive program to encourage the adoption of emissions-reducing appliances, and update its study of market efficiency to include a market shift anticipated by programs that incentivize improved efficiency equipment;
- follow a technology agnostic approach; and
- adopt the latest version of ASHRAE 90.1 or its equivalent into their building codes.

AHRI's comments primarily address Massachusetts' goals of implementing sector-based controls and corresponding emissions sub-limits to be consistent with the categories already in the statewide greenhouse gas emissions inventory as presented in the October 14 and 15, 2021 public stakeholder webinar.

AHRI recommends that Massachusetts conduct emissions and cost savings analyses consistent with the full spectrum of product efficiencies and commercially available technologies in North America.

AHRI appreciates Massachusetts' diligence in developing comprehensive modeling inputs to help capture the full spectrum of products installed in the Commonwealth. These

products are accurately itemized in Massachusetts' Building Sector Report.[2] A thorough analysis of electricity generation capabilities and limitations is an important step in determining a pathway to minimize greenhouse gas emissions. For example, in locations where coal or other high carbon intensity energy sources are used in generating electricity, building electrification would result in an increase in greenhouse gas emissions. Accordingly, the creation of market-based incentives to upgrade the current mix of heating equipment could be beneficial.

Performance-based decarbonization policies that do not favor certain technologies over others will prevent inadvertent emission increases while electricity generation still relies on carbon-intensive power plants. For example, dual-fuel heating systems are comprised of an electric heat pump and a natural gas furnace. The heat pump is used to meet the heating load of a building until the equipment reaches its heating capacity, at which point the gas furnace is used to meet the supplemental building heating load and to maintain the heating setpoint temperature. Incorporating these systems into decarbonization policy in Massachusetts is a critical step to avoiding increased emissions while also ensuring sufficient heating in colder climates.

U.C. Davis conducted a study detailing that natural gas and other fossil fuels supply baseload and peak electricity demand in Massachusetts. Due to the higher marginal emissions rate of this supply, additional electricity use will generate higher emissions than that of natural gas.[3] This should be incorporated into life cycle analyses of emissions of heating equipment.

AHRI recommends that Massachusetts use available data sources to establish a baseline distribution of fuels and equipment within the Commonwealth at the household and individual commercial building level, also differentiating between rural and urban communities.

Massachusetts likely contains approximately one percent of all heat pumps installed across the country, based on AHRI's analysis of the U.S. heat pump market.[4] Residential buildings are powered primarily by natural gas in Massachusetts (46% in 2018, according to the Lawrence Livermore National Laboratory (LLNL)).[5]

Massachusetts can use its understanding of the baseline market of HVACR equipment to analyze the efficacy of its policies. With this knowledge, Massachusetts will also be able to

[2] Buildings Sector Report. December 2020. Accessed via https://www.mass.gov/doc/building-sector-technical-report/download.
[3] Nelson Ditcher, Aref Aboud, Analysis of Greenhouse Gas Emissions from Residential Heating Technologies in the USA p. 8-12 (2020).
[4] The installed base of HVACR and water heating equipment is publicly available from the Energy Information Administration (EIA) Residential Energy Consumption Survey (RECS) and Commercial Building Energy Consumption Survey (CBECS).
[5] LLNL Energy Flow Charts. Accessed via https://flowcharts.llnl.gov/commodities/energy.

share how its market transformation can occur. AHRI looks forward to sharing data and resources with Massachusetts to ensure this robust analysis is as accurate as possible.

AHRI strongly supports further development of Massachusetts' study of the full range of HVACR equipment within the Commonwealth, including all efficiencies and capacities of furnaces, heat pumps, and other potentially targeted products, to better understand the distribution of fuels and equipment used within the Commonwealth, differentiating between rural and urban communities. This will allow Massachusetts to create more effective policies that help achieve its goals in the instances where there are cost-effective market-based drivers for consumers to switch to new or more appropriate technologies. Use of this inventory will better estimate the energy savings potential the Commonwealth can achieve.

AHRI recommends that Massachusetts shift building codes to performance-based requirements and require that existing large commercial buildings track energy usage.

The preliminary draft recommendations state that Massachusetts should measure energy usage and make that information accessible to inform later energy performance standards for commercial buildings. AHRI supports the requirement for private commercial buildings greater than 10,000 square feet to track use of energy where the benefit is more likely to justify the significant cost of energy modeling that is unique to each building.[6,7] AHRI believes this will help Massachusetts achieve its future goals, as identified in the Clean Energy and Climate Report for 2030.[8]

AHRI recommends that Massachusetts ensure that any recommendations demonstrate cost effectiveness and equity for all residents especially taking into consideration the availability of products and cost of transition.

AHRI encourages Massachusetts to consider consumer equity in its decarbonization policies. Policies dependent upon building electrification for reducing emissions, if not carefully executed, are likely to place an undue financial burden on low-income households.

HVACR and water heating equipment is often replaced on an emergency basis when equipment has failed beyond repair, especially for families with low to moderate incomes.

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[6] New York City Mayor Michael Bloomberg signed the Greener, Greater Buildings Plan in 2009 that required facility owners of private buildings over 50,000 square feet to annually benchmark energy. The area requirement for public buildings – 10,000 square feet – was considerably lower and conducted for public benefit rather than a cost justified emissions reduction measure. Only after a decade of benchmarking was the market ready to extend the requirement for private buildings to 10,000 square feet. Buildings with complex systems have greater opportunities to improve efficiency through lower-cost options, such as updates to the building automation system, whereas smaller buildings, with simpler systems, have few opportunities beyond schedule optimization and proper equipment maintenance.

[7] Note that energy modeling costs were not included in the report and should be considered as they are significant and unique by building.

[8] Interim Clean Energy and Climate Report for 2030. December 30, 2020. Page 33. Accessed via https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download.

The cost to update just the electrical panels required to support the adoption of heat pump water heaters is thousands of dollars. The need to upgrade electrical panels would often further delay the completion of the work, as additional contractors and code inspections may be required. In emergency situations such delays in restoring a supply of heating and hot water would at a minimum be disruptive, and in many circumstances could render a home temporarily uninhabitable and thereby pose significant health concerns and additional financial hardship. When considered in combination with the higher cost of the new equipment, this unfairly increases the burden for families that may have little to no savings.

Even if 120V equipment is available for a standard home outlet, the use of such equipment would still add installation costs. A standard utility closet used to house a gas water heater typically does not have standard 120V outlets readily available. Because of this, an installation of a 120V heat pump water heater (HPWH) will still require an electrician to install an additional outlet for hookup. On top of this, with the push for electrification, it is very likely that the current panel will not have the available capacity to handle an additional line being run to it. Consequently, the consumer will still need to upgrade their current electrical panel and incur the additional costs and delays described above.

AHRI recommends that Massachusetts perform a holistic cost-benefit analysis of any decarbonization policy and ensure that any recommendations are equitable to all its residents.

AHRI recommends that Massachusetts consider grid reliability and capacity as it impacts critical services provided by HVACR and water heating equipment for all residents.

Separately, as decarbonization policies become more pervasive, load on the grid increases which could limit energy reliability in Massachusetts. In addition, in rural areas where the electricity grid is already unreliable, families and businesses often must depend on other energy sources, including fossil fueled home generators, especially for heating and refrigeration due to frequent disruptions in power supply.

Additional infrastructure will need to be built to support the significant increase in electricity demand.[9] This infrastructure will be particularly costly in rural areas and need to demonstrate reliability in severe winter weather and under high wind conditions. Additional electricity demand could require importation from other states, which in turn would likely result in higher marginal emissions and transmission losses from the grid.

AHRI recommends that Massachusetts adopt an incentive program to encourage the adoption of emissions-reducing appliances and update its study of market efficiency to

[9] T.D. Inoue notes that the additional energy in winter months can double the electricity demand for a household for heating alone without heat pump water heating demand. Accessed via https://tedsenergytips.com/2019/01/06/what-arethe-biggest-electricity-consumers-in-a-typical-home/.

include a market shift anticipated by programs that incentivize improved efficiency equipment.[10]

AHRI supports incentive programs (including for training[11]) to encourage the adoption of high efficiency appliances, such as air source heat pumps (ASHP), water source heat pumps (WSHP), and ground source heat pumps (GSHP). Incentive programs have been effective in driving the adoption of high efficiency appliances in other jurisdictions. For example, organizations like the Consortium for Energy Efficiency (CEE) and Environmental Protection Agency (EPA) ENERGY STAR Programs have been successful in increasing the installation of higher efficiency equipment across the U.S. Funding is especially needed to increase market awareness of high efficiency equipment. Massachusetts should also allocate funding to examine the current HVACR and water heating workforce to ensure the Commonwealth can meet challenges of installation and maintenance workforce readiness.

Massachusetts should study market efficiency to include a market shift anticipated by programs that incentivize improved efficiency equipment as the federal equipment efficiency incentives will likely lead to a market shift that Massachusetts should include in its assumptions. For example, AHRI has found that owners of existing buildings can achieve substantial energy savings by replacing outdated technology with both new fuel-burning and electric space heating products. This replacement of equipment should also be incentivized.

AHRI recommends that Massachusetts consider dual fuel heat pump/furnace systems as a necessary transitional strategy for building decarbonization. Dual fuel systems will help manage peak electrical loads while simultaneously reducing building source emissions as marginal electricity generation relies on gas "peaker" plants. Additionally, these systems do not require a heavy increase on electrical service panel load, thus reducing upfront installation costs. Massachusetts, before requiring any transition to heat pumps in existing homes, should evaluate the adequacy of the grid to respond to new winter electric load profiles with steeper peaks and should include the cost of an electric service panel increase that will be faced by consumers .

Also, in homes that do not have air conditioning, ducting will increase the cost to consumers. Beneficial electrification programs should consider these costs (e.g., electrical

[10] Incentives for the adoption of high-efficiency appliances provides states with an effective means of driving the use of high efficiency appliances without adopting requirements that conflict with the federal preemption prohibitions in the Energy Policy Conservation Act , 42 U.S.C. § 6291 *et. seq*. and the Department of Energy's federal preemption regulation at 10 C.F.R. § 430.33, which were put in place to ensure that the unintended consequences of the creation of a patchwork of regulations do not develop across the country. Incentives can also be targeted to lower- and middle-income households to reduce the inequities noted above.

[11] Industry has observed challenges throughout the country related to workforce readiness when it comes to installation and maintenance of these type of products. Massachusetts should provide time to train plumbers and technicians.

service panels and ducting) and prioritize whole-home and whole-building solutions to ensure any policy results in actual reduced greenhouse gas emissions.

AHRI recommends Massachusetts follow a technology agnostic approach.

All technology providing significant energy and environmental benefits should be evaluated, regardless of fuel type. Additionally, consumer choice, technological neutrality, and ultimate affordability in terms of both upfront and operating costs should be considered.

AHRI recommends that Massachusetts adopt the latest version of ASHRAE 90.1 or its equivalent into Massachusetts' building codes.

ASHRAE 90.1 is a model code that sets standards for HVAC equipment, boilers, and water heaters and is regularly updated to ensure its applicability to the latest technologies. Updating Massachusetts' building codes with the latest version of ASHRAE 90.1 or its equivalent will maximize the efficiency of equipment and the relevance of building energy efficiency requirements within the Commonwealth. Adopting the latest version of ASHRAE 90.1 would also introduce an opportunity to align building requirements among both state and local jurisdictions.

Conclusion

AHRI appreciates the opportunity to respond to Massachusetts' Clean Energy and Climate Plan for 2025 and 2030. AHRI hopes these comments are supportive in the Commonwealth's development of its 2025 and 2030 decarbonization plan. We are also eager to meet at your earliest convenience to provide additional technical support.

Respectfully,

Helen Walter-Terrinoni

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Cc:

Vivian Cox
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December 2, 2021

VIA ELECTRONIC MAIL ONLY

Global Warming Solutions Act Implementation Advisory Committee
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 021114
gwsa@mass.gov

Subject: Joint Comments re: October 12, 2021 Public Meeting

Thank you for the opportunity to provide feedback on the presentation given at the Global Warming Solutions Act ("GWSA") Implementation Advisory Committee ("IAC") public meeting held on October 12, 2021 regarding sector and cross-sector updates from IAC working groups and state staff. We greatly appreciate your work so far for these meetings and for updates to the Clean Energy and Climate Plan ("the Plan" or "CECP"); however, we believe there are some areas which require significant work before the Plan is finalized. Accordingly, please find below joint comments from the undersigned recommending changes to improve sector analysis, emissions accounting, and the CECP.

1. *What are your concerns with EEA setting limits on gross emissions while tracking and lowering net emissions through goal setting and policy development?*

- The assumption that the last 15% of greenhouse gas emissions reductions will be achieved by carbon sequestration lacks support; accordingly, we recommend adopting a more aggressive gross emissions reduction goal.

There are serious concerns as to the accuracy of accounting in emissions tracking and carbon sequestration. Massachusetts Executive Office of Energy and Environmental Affairs ("EEA") has set a target of 85% reduction of gross emissions and assumes that the last 15% of reductions needed to meet Massachusetts' net-zero greenhouse gas emissions mandate will be accomplished through sequestration. We recommend that EEA conduct additional studies as to carbon sequestration and negative emissions in Massachusetts, as there appears to be no rigorous analysis behind the assumption that the last 15% of emissions reductions needed to achieve Massachusetts' climate mandates can be accomplished through carbon sequestration. Massachusetts' Decarbonization Roadmap did not model a path for getting to a sequestration amount that bridges the gap to net-zero and found that only a fraction of this last 15% will come from in-state forests and soils (5 MMTCO2e of the 14.1 MMTCO2e needed for 15% sequestration)[1] It remains to be seen where the last 9.1 MMTCO2e of sequestration will come from. As acknowledged in the Roadmap, Massachusetts lacks geological features, such as salt caverns, for long-term storage of carbon via direct air capture or other methods of carbon capture.[2] A suggested possibility in the Massachusetts Roadmap is that the Commonwealth could work with neighboring states in a regional effort to enhance natural carbon stocks and sinks;

[1] https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download
[2] https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download

however, this has not been studied as to sequestration potential or cost. This approach, and other approaches for sequestering emissions at the scale needed to achieve 15% sequestration, come with inherent technological, economic, and jurisdictional boundary risk. In addition to having to rely on complex carbon credit standards, Massachusetts would have to rely on outside parties with their own interests, which will complicate and may hinder our ability to achieve net-zero by 2050.

The Roadmap acknowledges that while it is likely technically possible to reduce gross emissions from the energy system to zero by 2050 in Massachusetts, it would be extremely costly. This point is well taken, but without an accurate comparison between the marginal cost of reducing gross emissions versus the marginal cost of sequestering carbon, a comparison the Roadmap did not undertake, it is impossible to make reasonable assumptions related to the most cost-effective level of carbon sequestration (e.g., 15%, 10%, 5%) needed to achieve net zero emissions by 2050. The subsector targets are fundamentally based on the assumption that sequestering the final 15% of emissions en route to net zero will be more cost effective than mitigating the final 15% of emissions, but there has been no quantitative analysis to date to back up this assertion.

Due to the inherent risk of relying on 15% sequestration without a rigorous analysis charting a cost-effective and technically feasible path for achieving that level of carbon sequestration, we recommend adopting a more aggressive gross emissions (total and sublimits) reduction goal as a conservative approach that will reduce reliance on future sequestration that currently carries significant uncertainty.

EEA is already aware that the gross emissions tracking it has historically undertaken is inadequate for tracking progress towards net-zero, and that tracking net emissions is necessary. We recommend adopting a more aggressive approach as to gross emissions subsector reduction targets given that we do not yet have net-zero accounting in place. There is no downside to a more aggressive approach; if appropriate, standards can be relaxed in the future.

2. *Do you support EEA setting emissions sublimits to be consistent with the categories already in the statewide greenhouse gas emissions inventory? If not, what are your concerns?*

- EEA needs to either ensure that the inventory upon which sublimits are based is reviewed and any flaws eliminated, or sublimits need to consider flaws in Massachusetts' greenhouse gas inventory.
- Massachusetts' greenhouse gas inventory needs to accurately account for greenhouse gas emissions from hydrogen, including emissions released from hydrogen production.
- Massachusetts' greenhouse gas inventory needs to accurately account for greenhouse gas emissions from emissions-intensive sources of biomass.

All greenhouse gas inventories, by their very definition, are flawed because they are setting geographical boundaries around a problem that is inherently global. Massachusetts' greenhouse gas inventory is no different, and any sublimits based on such inventory will be likewise faulty. While it is impossible to create a perfect greenhouse gas inventory, EEA should first attempt to fix some of the core flaws with the inventory – such as the lack of accounting for methane leaks

from gas distribution pipes, lifecycle emissions of "renewable" gas, lifecycle emissions of hydrogen, and embodied emissions of concrete and steel. Doing so will ensure that emissions sublimits based on the inventory are more accurate and not significantly distorted by arbitrary geographical constraints.

Some of the key limitations of Massachusetts' greenhouse gas inventory include the following. First, except for the case of imported electricity, the inventory accounts only for in-state emissions. This approach does not account for emissions associated with production and transportation of liquid and gaseous fuels, such as fossil gas, biomethane or "renewable natural gas" and hydrogen. For example, in the case of gray hydrogen produced from steam methane reformation out of state and imported into Massachusetts, the emissions associated with creating 1 MMBtu of hydrogen are approximately 45% greater than the emissions resulting from the combustion of 1 MMBtu of fossil gas (76.92 kg CO2 per MMBtu for hydrogen vs. 53.06 kg CO2 per MMBtu of fossil gas)[3].

Within the accounting structure of Massachusetts' greenhouse gas inventory, combustion or use of gray hydrogen in a fuel cell is not associated with any greenhouse gas emissions; when combusted, hydrogen forms water and is considered a low-carbon fuel. However, hydrogen is not an energy source. Rather, like electricity, hydrogen is an energy carrier that must be produced from other substances.[4] Accordingly, it is important to account for the greenhouse gases that are emitted in its production. Accounting for the greenhouse gas emissions that result directly from the production of hydrogen must be included even when such hydrogen production occurs outside of Massachusetts. This line of thinking applies not only to gray hydrogen, but also to blue hydrogen - i.e., hydrogen produced from fossil methane with carbon capture and storage. The undersigned note that the first and only peer-reviewed paper to date addressing blue hydrogen estimates that the equivalent carbon dioxide emissions from blue hydrogen, per unit heat energy, exceed that of simply burning fossil gas directly.[5] Further, a gray hydrogen and fossil gas blend of 20% hydrogen by volume (about 7% by energy because the energy density per unit of volume is significantly lower for hydrogen than fossil gas) would be shown in Massachusetts' greenhouse gas inventory as a 7% reduction in building fuel emissions, but in reality would increase building fuel emissions by at least 3%.[6] It is problematic that Massachusetts' greenhouse gas inventory, a tool used to quantify greenhouse gas emissions reduction progress towards net zero targets, would treat imported emissions intensive grey hydrogen and carbon-neutral green hydrogen in the exact same manner; even within the same type of fuel, accounting for nuances in fuel production emissions is crucial to ensure that Massachusetts will achieve its climate mandates.

Massachusetts' greenhouse gas inventory is also limited in that it treats biogenic emissions as an informational item and does not consider the impact of biogenic emissions on overall statewide emissions totals despite differences in emissions impact depending on the type of biomass

[3] https://www.epa.gov/sites/default/files/2018-03/documents/emission-factors_mar_2018_0.pdf
[4] https://www.eia.gov/energyexplained/hydrogen/.
[5] Howarth, RW, Jacobson, MZ. How green is blue hydrogen? Energy Sci Eng. 2021; 9: 1676– 1687. https://doi.org/10.1002/ese3.956.
[6] Replacing 7% of the fossil gas energy content in the distribution system with gray hydrogen, which on average carries a greenhouse gas emission intensity 45% greater than fossil gas, would increase total greenhouse gas emissions from gas distribution by over 3%. ~7% x ~45% = ~3.2%

feedstock. For example, "renewable" gas manufactured from waste methane that would otherwise have been emitted into the atmosphere could be considered close to carbon neutral. On the other hand, "renewable" gas manufactured from methane that is intentionally produced should not be considered carbon neutral. Literature quantifying methane leakage from biogas production and upgrading facilities suggest methane leakage at a rate of 2-4%, having been found as high as 15%. These leak rates include only production and upgrading and not transportation, storage, and end use.[7] Peer-reviewed science assumes 0.8% methane leakage for transportation, storage, and end use for fossil gas and renewable gas, resulting in a total of 2.8-4.8% total leakage rate for renewable gas.[8] The same study assumed a reasonable FNG supply chain leak rate of 2.8%. Assuming an average 3.8% RNG supply chain leak rate, a 2.8% FNG supply chain leak rate, and using 20-year global warming potential (GWP) values, the methane leakage greenhouse gas footprint of RNG derived from intentionally produced sources of biogas is 50% of the combustion plus methane leakage greenhouse gas footprint of FNG. Under any scenario where the RNG supply chain leak rate exceeds 5.8% for RNG produced using intentionally created biogas the RNG greenhouse gas footprint exceeds that of FNG. When renewable gas is intentionally produced and its leak rates are fully accounted for, it is evident that there is little to no greenhouse gas benefit from replacing fossil gas with "renewable" gas. Finally, recent data based on direct measurement of gas in the atmosphere over greater Boston indicate that 2.5 percent of all fossil gas brought into the greater Boston area is leaked into the atmosphere[9]; accordingly, DEP's method of methane accounting should be updated to consider this factor.

It is important to consider the greenhouse gas emission impacts of renewable gas manufactured from intentionally produced methane (e.g., energy crops versus true "waste methane" including landfills and wastewater treatment plants). There is not enough carbon-neutral waste methane available to make a significant dent in total fossil gas demand. It is estimated that capturable waste methane, including from sources like uncontrolled landfills and wastewater treatment plants, represents less than 1% of current fossil gas demand nationally across all sectors (power generation, industrial, residential, and commercial), or roughly 3.5% of commercial and residential fossil gas demand.[10] These numbers do not include intentionally produced methane, for example from energy crops. Accordingly, renewable gas would need to be generated from intentionally grown sources, such as energy crops, to displace a significant amount of fossil gas; this is a critical issue to consider when discussing the replacement of significant amounts of fossil gas with renewable gas as a potential pathway to achieving Massachusetts' climate mandates.

If subsector targets are to provide the driving force for Massachusetts' climate policy, EEA must ensure that such targets actually address key sources of emissions such as steel and cement; this can be done in part by pushing for reforms in building design and construction to decrease emissions resulting from embodied carbon, including building less and reusing existing structures; designing lighter buildings with increased structural and material efficiency; reusing

[7] Emily Grubert 2020 *Environ. Res. Lett.* 15 084041, *At scale, renewable gas systems could be climate intensive: the influence of methane feedstock and leakage rates*, Aug 11, 2020, available at: https://iopscience.iop.org/article/10.1088/1748-9326/ab9335.
[8] Id.
[9] https://www.pnas.org/content/118/44/e2105804118
[10] Id.

construction materials; utilizing low-carbon materials; and optimizing materials. As currently designed, the Massachusetts' greenhouse gas inventory – and the subsector targets derived from this inventory – in no way capture the GHG emissions benefits of constructing a building from, for example, cross laminated timber versus carbon-intensive concrete and steel. Emissions standards for buildings must consider the impacts of embodied carbon. It is estimated that by 2040, embodied carbon will be responsible for nearly 60% of global new construction emissions, as opposed to operational carbon emissions. Unfortunately, where operational carbon emissions can be reduced by incorporating energy upgrades and renewable energy, embodied carbon emissions are locked in place as soon as a building is constructed. Accordingly, Massachusetts must promote development of ways to reduce carbon emissions from use of concrete, insulation, and steel, the use of each of which results in embodied carbon emissions.[11] Fortunately, technology with the potential to help reduce these emissions is in development here in Massachusetts.[12]

Finally, any building codes including a net zero stretch code provision must target net zero emissions, promoting electrification and providing municipalities which opt-in with the authority to prohibit on-site combustion in new buildings and major rehabilitations.

3. *Do you support EEA finalizing the Interim 2030 CECP to be the Clean Energy and Climate Plan for 2025 and 2030? If not, what are your concerns?*

- The undersigned would not support finalizing the Interim 2030 Clean Energy and Climate Plan for 2025 and 2030 without certain important changes.

At present the undersigned have significant concerns with the content of the Interim 2030 CECP, as laid out above and in our respective comment letters submitted in March 2021 and would not support EEA finalizing it to be the Clean Energy and Climate Plan for 2025 and 2030 unless important changes occur. Key among our concerns are issues of greenhouse gas emissions inventory, lack of support for the assumption that we can achieve the last 15% of emissions reduction through sequestration, and more. We welcome and encourage continued dialogue with EEA with the hope that together we can achieve a successful outcome in this endeavor.

Very truly yours,

Kyle Murray, *Acadia Center*
Priya Gandbhir, *Conservation Law Foundation*
Andee Krasner, *Greater Boston Physicians for Social Responsibility*
Ania Camargo, *Mothers Out Front Massachusetts*
Cathy Kristofferson, *Pipe Line Awareness Network for the Northeast (PLAN-NE)*
Sarah Krame, *Sierra Club*

[11] https://www.masscec.com/blog/2021/02/01/how-masscec-supports-reduction-embodied-carbon.
[12] Id.

GREEN ENERGY CONSUMERS ALLIANCE

Judy Chang
Undersecretary of Energy and Climate Solutions
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Green Energy Consumers Alliance
284 Amory St.
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October 26, 2021

Dear Ms. Chang,

Thank you very much for your work to implement the directives of the 2021 Next Generation Roadmap bill ("Roadmap bill") and update the 2030 Clean Energy & Climate Plan (CECP) to realize 50% greenhouse gas emissions (GHG) reductions by 2030. Green Energy Consumers Alliance appreciates the updates you provided to the public in webinars on October 14 and 15, 2021. During the webinars, you indicated that EEA would continue to accept feedback on the 2025 and 2030 CECPs until December 24, particularly in response to three key questions. In response to Question 2 (*Do you have any concerns with EEA setting emissions sublimits to be consistent with the categories already in the statewide greenhouse gas emissions inventory?*), we do not have any concerns. However, Green Energy Consumers respectfully submits the following comments in response to Questions 1 and 3.

In response to Question 1 *(Do you have any concerns with EEA setting limits on gross emissions while tracking and lowering net emissions through goal setting and policy development?),* **Green Energy Consumers Alliance strongly believes that the limits set by EEA should be on gross emissions, not net emissions.** However, we are not opposed to EEA tracking and lowering net emissions at the same time, as long as the state's first priority remains preventing more carbon dioxide emissions from being produced in the first place.

In response to Question 3 (*Do you have any concerns regarding moving forward with the approach described today in completing the Clean Energy and Climate Plan for 2025 and 2030?),* we offer the following, referring the Preliminary Timeline on slides 13 and 14 of the October presentations:

1. **The Clean Energy Standard (CES) must be increased.** Slide 13 does not include a row for increasing the CES and it is not clear from the slide whether CES regulations would be considered as mentioned in the draft CECP. Increasing the CES to 60% as soon as the Commonwealth begins to receive hydro power from Canada is essential, especially given the Roadmap bill's requirement for a 50% GHG reduction. We also would like to see regulations promulgated that would require municipal light plants to "catch up" to the investor-owned utilities on electricity sector emissions by 2030.
2. **The Clean Heat Commissions' recommendations must be included in final 2025 and 2030 CECPs.** Slide 13 shows that the CECP will be final for both 2025 and 2030 by July 2022. Yet, the Clean Heat Commission's recommendations will not be concluded until December 2022, and no date is shown for implementation of those recommendations. This mismatch

of dates is a concern insofar as decisions made in 2022 regarding the electricity and transportation sector could be insufficient absent information about the quantity of emission reductions coming from the building sector via the Heating Fuels Emissions Cap.

3. **The Transportation & Climate Initiative (TCI-P) is critical but not certain.** On Slide 14, we note that the chart indicates that the TCI-P model rule has been established. We strongly support TCI-P and would like to see more detail about how TCI-P would be implemented and, as a contingency, what the Commonwealth's "Plan B" is in case TCI-P fails to happen.

We would also like to take this opportunity to reiterate some of our key points on the December 2020 draft CECP, which we believe are even more necessary now in light of the 5% increase in emissions reductions required by 2030:

1. **Transportation:** Public transportation is the backbone of our transportation system. The CECP should call for robust investments in expanding public transportation to reduce vehicle-miles-traveled and electrifying it to reduce emissions. It would be appropriate at this time to indicate to the public how revenue from the TCI-P could be allocated towards these objectives.
2. **Building Sector:** The Three-Year Plan currently before the Energy Efficiency Advisory Council is an improvement over the first version. Nonetheless, the number of heat pumps that would be installed from 2022-2024 under this plan would place the Commonwealth severely behind schedule on the way towards the goal of one million heat pumps by 2030. We clearly cannot rely on MassSave to reach our 2030 heat pump installation goals, so the onus is on the Clean Heat Commission to determine how to accelerate installations.
3. **Electricity Supply:** The CECP must increase the CES as mentioned above. To put it bluntly, until we see actual policies in place that would move the needle on transportation and building emissions, the electricity sector will have a lead role in meeting the 2030 overall target.

Thank you again for the opportunity to provide comments. Please do not hesitate to reach out with any questions.

Sincerely,

Larry Chretien
Executive Director
Green Energy Consumers Alliance
larry@greenenergyconsumers.org

nationalgrid

Sheri Givens
Vice President
US Regulatory & Customer Strategy

December 22, 2021

Via E-Mail

Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
gwsa@mass.gov

Re: Massachusetts Interim Clean Energy and Climate Plan for 2030 – Updated Public Comments of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid

Dear Secretary Theoharides:

In light of the enactment of the Commonwealth's climate change legislation, *An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy,* on March 26, 2021, and National Grid's 2021 Net Zero Plan Update issued on November 4, 2021, which updated its Net Zero by 2050 Plan (together the "Net Zero Plan"), Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid ("National Grid" or the "Company") is pleased to submit updated comments on the Interim Clean Energy and Climate Plan for 2030 ("Interim Plan"), which in effect supersede the Company's March 22, 2021 comments. As detailed in its Net Zero Plan, National Grid is committed to advancing all the necessary solutions to deliver affordable, reliable decarbonized energy to its customers no later than 2050. National Grid believes that many of the ten key areas of focus identified in its Net Zero Plan are well aligned with the Commonwealth's "strategy actions" identified in the Interim Plan. National Grid looks forward to continued engagement with the Baker-Polito Administration, including the Executive Office of Energy and Environmental Affairs ("EEA"), to implement and, in some instances, improve upon the strategy actions across the various economic sectors in which the Company is involved.

What follows is National Grid's current thinking on certain strategy actions identified in the Interim Plan and input on three questions, posed by EEA at its October 2021 public webinar, "Approach to Complete the Clean Energy and Climate Plan for 2025 and 2030". National Grid appreciates the opportunity to provide this input and feedback and looks forward to the release of the final Clean Energy and Climate Plan for 2030.

Sincerely,

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INTERIM CLEAN ENERGY AND CLIMATE PLAN FOR 2030
UPDATED COMMENTS OF NATIONAL GRID

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INTERIM CLEAN ENERGY AND CLIMATE PLAN FOR 2030

UPDATED COMMENTS OF NATIONAL GRID

Executive Summary

National Grid submitted comments on the Interim Clean Energy and Climate Plan for 2030 ("Interim Plan") on March 22, 2021, and appreciates the opportunity to submit updated comments on the Interim Plan in light of the enactment of the Commonwealth's recent climate change legislation, *An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy* ("Climate Law") on March 26, 2021.[1] We share the Commonwealth's commitment to deep decarbonization and are committed to partnering with the Commonwealth and our customers to advance decarbonization and the Commonwealth's ambitious 2030 emissions limit in ways that maintain the affordability, resilience, and reliability of our energy system. Achieving the levels of decarbonization envisioned in the Interim Plan will require broad engagement from all stakeholders, including the public, non-profit, and private sector. In the comments that follow, National Grid, based on its experience and ongoing efforts in each of the economic sectors, offers some specific recommendations for how to advance the Commonwealth's emissions reduction goals in cost-effective ways to achieve a net zero economy. We look forward to continuing our engagement with the Commonwealth and stakeholders on the proposed strategies.

In October of 2020, National Grid announced its own Net Zero by 2050 Plan, which cemented our goal of achieving net zero emissions by 2050. In November of 2021, we released our 2021 Net Zero Plan Update[2] (as updated, the "Net Zero Plan"), which, among other updates,

[1] On March 26, 2021, Governor Baker signed into law *An Act Creating A Next-Generation Roadmap for Massachusetts Climate Policy*, which requires the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) Secretary to set interim emissions limits and sector-specific sublimits every 5 years. The 2030 emission limit shall be at least 50% emissions reduction below the 1990 baseline, and the 2040 emissions reduction shall be at least 75% emissions reduction below the 1990 level. It also specifies July 1, 2022 as the deadline for the adoption of the 2025 emission limit and sublimits, the 2030 emission sublimits, and the release of a comprehensive plan to achieve those limits. In compliance with the new law, EEA will develop and finalize a Clean Energy and Climate Plan for 2025 and 2030 by the deadline.

[2] The Company intends to provide annual progress updates to the Net Zero Plan.

now includes emissions reductions associated with the sale of electricity and gas to our customers. The Net Zero Plan outlines our approach to advancing a wide range of solutions to achieve the clean energy goals that we share with the Commonwealth, and identifies ten key areas of activity:

- Reducing demand through energy efficiency and demand response;
- Decarbonizing the gas network through use of renewable natural gas ("RNG") and hydrogen;
- Reducing methane emissions from our gas network and across the supply chain;
- Supporting efficient electric and hybrid-electric heating options for customers;
- Interconnecting large scale renewables with a 21st century grid;
- Enabling and optimizing distributed generation;
- Eliminating sulfur hexafluoride ("SF_6") emissions;
- Advancing clean transportation;
- Further reducing indirect emissions from operations; and,
- Pursuing innovative carbon management practices.

Additionally, National Grid is collaborating with the Science Based Targets initiative ("SBTi"), a non-profit coalition that drives climate action in the private sector by partnering with companies on their emission reduction strategies and verifying that their plans will meet the overall reduction of well below 2 degrees Celsius set by the Intergovernmental Panel on Climate Change ("IPCC"). We are proud to say that National Grid is the only investor-owned utility in North America that has achieved external SBTi verification for both direct and indirect greenhouse gas ("GHG") emissions (Scope 1, 2, and 3 emissions). In the single year since National Grid announced its net zero carbon commitment in October 2020, we have:

- Set more aggressive targets (including interim targets for Scope 3 emissions from sold electricity, gas and procured goods and services);
- Identified and advanced grid upgrades needed to deliver more renewable electricity;
- Recommended new clean transportation investments to our regulators; and
- Advanced our suite of necessary solutions for clean heating (including electrification, decarbonized fuels, and networked geothermal).

As we work to enable a net zero future, National Grid continues to make important investments in safety, reliability, and storm response, while providing greater assistance to income-eligible customers. This involves targeting the highest-emitting fuels and sectors first, optimizing the utilization of existing electric and gas networks, and ensuring affordability of service for customers. It will require accelerating the pace of clean energy and emission-reducing investments, sustained technological innovation, and policy design that meets these objectives as cost-effectively as possible. Significant challenges and opportunities will undoubtedly emerge as we work to decarbonize transportation, achieve a very low-carbon electricity sector, introduce carbon-neutral and zero-carbon fuel technologies such as RNG and hydrogen, and transition to next-generation heating systems. Across sectors, multiple potential pathways to net zero exist, and enabling the most efficient approach will require investment along multiple technology development fronts and policies that do not preclude potentially cost-effective solutions. Key objectives for policy should include reducing barriers to innovation or customer adoption of decarbonized solutions, incentivizing the most cost-effective emissions reductions, minimizing or avoiding areas where policies may duplicate or conflict, and keeping customer affordability and adoptability at the forefront.

National Grid's updated comments reflect the Company's current thinking based on events, which have occurred over the past several months since the Company's last set of comments were submitted to EEA in March 2021. We highlight these events and any resulting changes reflected in our updated comments:

- *Transportation Sector:* Our updated comments reflect the Administration's recent announcement that it is no longer advancing the Transportation and Climate Initiative Program ("TCI-P"), and we recommend a concerted effort to develop policy solutions that cost-effectively reduce emissions in the sector and replace the funding that TCI-P would have provided for publicly beneficial investments to support transformation of the transportation sector. The comments also address the potential for federal infrastructure funding to support transportation sector strategies and recommend coordination of available funds with in-flight and planned utility programs.
- *Building Sector:* Our updated comments further describe the importance of integrated, complementary, and decarbonized electric and gas networks to reliably and affordably decarbonize buildings, including the potential for hybrid, dual-fuel (electric and gas) heating to achieve net zero emissions limits and the potential for policy to decarbonize natural gas supply such as procurement standards for RNG and hydrogen similar to those enacted in several other states.
- *EEA Emissions Questions:* Our updated comments address EEA's questions from its October 2021 public webinar, which generally support EEA's proposal to set emissions limits based on gross emissions while simultaneously tracking and lowering net emissions. The Company recommends that EEA pursue collaborative, data-driven processes to arrive at these limits with the input of key stakeholders, including the utilities and energy efficiency program administrators. We also recommend EEA consider finalizing and adopting the Interim Plan as the plan for 2025 and then developing a new plan addressing 2030 to reflect further developments in this dynamic policy and industry landscape.

National Grid supports the Commonwealth's objectives and many of the strategies presented in the Interim Plan and has provided comments to enhance or refine other strategies where there potentially are missed opportunities or adverse customer impacts. We look forward to supporting the Commonwealth as it further develops these recommendations and remain committed to doing our part to help the Commonwealth advance decarbonization across the economy while ensuring affordability, resilience, reliability, and accessibility for all customers.

I. TRANSPORTATION SECTOR

As the Interim Plan notes, the transportation sector represents 42% of the Commonwealth's GHG emissions. Achieving the Commonwealth's decarbonization goals will require a fundamental transformation of the transportation sector, with electrification at the forefront. Success will require robust charging availability at reasonable costs, consumer willingness to adopt electric vehicles ("EVs"), and sufficient vehicle offerings to enable this choice. Near term challenges for the Commonwealth include expanding access to electric charging infrastructure, educating and engaging customers, and reducing up-front vehicle and electric vehicle supply equipment ("EVSE") costs to customers. As we look to accelerate this transition, new and innovative solutions and partnerships will be necessary. The public, non-profit, and private sectors will need to engage and collaborate in new ways as well. National Grid, through its existing EV Phase I & II Programs[3] and its proposed EV Phase III Program,[4] together the ("EV Programs"), in Massachusetts, has and will continue to make meaningful progress in addressing these challenges and enabling transportation electrification in ways that make sense for our customers and the distribution system. These programs will address the comprehensive needs of electrifying the transportation sector, including

[3] *See* D.P.U. 17-13 for the Company's EV Phase I Program and D.P.U. 18-150 for the Company's EV Phase II Program.
[4] *See* D.P.U. 21-91 for the Company's proposed EV Phase III Program, filed on July 14, 2021.

residential, public, workplace, and fleet programs. National Grid looks forward to leveraging its experience and lessons learned in serving as a partner to EEA and other key stakeholders as the Commonwealth advances the strategies outlined in the Interim Plan. We offer specific comments on individual strategies below.

Strategy T1: Cap Transportation Sector Emissions and Invest in Clean Transportation Solutions

Given the magnitude of transportation sector emissions, policy efforts to advance the transformation of the sector and place limits on transportation sector emissions must remain an urgent priority for the Administration if decarbonization goals are to be achieved, particularly given the Administration's recent announcement that it is no longer advancing the TCI-P. National Grid supported TCI-P as a foundational initiative to promote transportation sector decarbonization in the region and remains appreciative of Governor Baker's leadership in working to advance this innovative regional program. While the Company understands the Administration's reluctance to advance TCI-P without a viable regional program, advancing the Administration's emission reduction goals for the transportation sector will require a concerted effort to develop policy solutions that cost-effectively reduce emissions in the sector and replace the funding that TCI-P would have provided for publicly beneficial investments to support transformation of the transportation sector.

While forthcoming federal funds will help to advance these goals, more substantial and sustained sources of funding will be needed to support transformation of the sector. Key funding needs include funding to accelerate EV adoption, including sustained support of rebates for the purchase of light-duty vehicles, fleets, transit, school buses, and other medium- and heavy-duty vehicles and support for the purchase of charging equipment to enable the infrastructure needed to facilitate EV adoption. In addition to these priorities, National Grid supports funding for micro-mobility, transit system expansion and electrification, and other land use/smart growth programs

that will help the Commonwealth reach it goals. Finally, the Company supports a focus on equity in the application of current and future sources of funding with an emphasis on ensuring that overburdened and underserved communities benefit from clean transportation projects and programs. For example, in the context of TCI-P, National Grid supported the allocation of 35% of TCI-P proceeds for the purpose of providing benefits to these communities.

The Company is committed to enabling electric transportation in its service territory through programs that provide cost-effective infrastructure investments and innovative customer offerings. National Grid's current programs in the Commonwealth include incentive offerings for our customers to install make-ready infrastructure and EV chargers, incentive offerings for residential customers to charge during off-peak hours, and advisory services to support fleets in their pathways to electrification. Additionally, the Company has proposed a comprehensive suite of offerings within its Phase III Program. These programs are critical to meeting the needs of National Grid's customers, providing necessary support and the infrastructure backbone to support electrification of transportation. Directing any state or federal funding toward activities that complement existing utility programs will enable the Commonwealth to maximize the impact of such funding.

Finally, the Company looks forward to continued engagement with EEA and stakeholders to further consider policy options to limit transportation sector emissions. For example, in the absence of a program that prices transportation sector carbon emissions, a Low Carbon Fuel Standard ("LCFS") could provide an opportunity to incent necessary investment in clean transportation and reduce emissions. Key considerations for discussion include treatment of electric fuel and opportunities to spur development of markets for RNG and hydrogen.

Strategy T2: Implement Coordinated Advanced Clean Vehicle Emissions and Sales Standards

National Grid supports the Commonwealth's commitment to adopt and implement: the

California Advanced Clean Cars II Standard by the end of the year in which the standard is finalized by California; the ZEV purchase mandates of the California Advanced Clean Trucks rule; and the Advanced Clean Fleets rule by the end of the year in which the rule is finalized by California.

The Company also supports the ambitious and achievable goals of the Medium-and Heavy-duty ZEV MOU and recognizes the importance of the enabling framework and Action Plan. National Grid recommends that the framework development process include utilities, which provide critical support for make-ready and charging infrastructure and advisory services for fleet-owning customers. National Grid has been assisting customers across its jurisdictions to enable fleet electrification and understands the level of support needed to successfully transition fleets to EVs. National Grid looks forward to expanding its fleet programs in the coming year and collaborating with the Massachusetts Department of Environmental Protection ("MassDEP") as the Action Plan is developed to provide lessons learned from the Company's existing fleet advisory programs, as well as insight into the infrastructure upgrades and investments that will be required throughout this transition.

Strategy T3: Reduce Upfront ZEV Purchase Cost Burden

National Grid agrees that reducing the up-front costs of EVs remains an essential action to encourage EV adoption and supports the actions identified in the Interim Plan to address this issue. Forthcoming federal funds and grants can help to accelerate adoption, but additional robust and sustainable sources of funding will be necessary to meet adoption targets by the end of 2025. Providing rebates at point of sale can increase the attractiveness of rebates by reducing the immediate upfront cost burden for customers. The Company recommends that any low and moderate income ("LMI")-focused offerings also be implemented at point of sale. The Company

also recommends that point of sale rebates be expanded to include pre-owned vehicles, which will help to facilitate LMI access.

The Company encourages the ongoing support and sustainable funding for the Massachusetts Department of Energy Resources' ("DOER") MOR-EV programs for light-, medium-, and heavy-duty vehicles. As incentives are necessary for light- and medium-duty vehicles, they are equally important for heavy-duty vehicles. And, while the proportional incremental cost of replacing a traditional gas or diesel heavy-duty vehicle is often far more than a light-duty vehicle, the GHG and air pollution reductions are significant and necessary in achieving the Commonwealth's GHG emissions limits. National Grid recommends expanding incentives to support additional heavy-duty EV adoption. Additionally, National Grid recommends close collaboration with its existing and future programs to provide comprehensive support with fleet advisory services and infrastructure incentives.

Strategy T4: Deploy Electric Vehicle Supply Equipment & Enable Smart Charging

National Grid looks forward to further collaboration with EEA and DOER to expand its programs focused on providing Massachusetts' residents and entities rebates and incentives to expand access to public, workplace, fleet, and residential charging. The Company proposed a comprehensive suite of programs in its Phase III Program filing, which included offerings to help meet the infrastructure and charging needs of all its customers. Given affordability and the convenience to EV owners of being able to charge at home, proposed residential offerings seek to enable all customers, whether they reside in a single-family home or large apartment building, access to charging at their place of residence. These offerings will provide support for deploying at-home Level 2 charging and will assist customers in maximizing off-peak charging.

With respect to direct current fast charging ("DCFC"), the Company recognizes that, at current expected utilization levels, applicable electric rate structures may make private investment

in DCFC stations unattractive. The Company's rates are structured to be reflective of the cost to serve customers in a given class. To that end, existing rate structures are not punitive towards EV charging. However, given the importance of DCFC deployment to enable widespread EV adoption, the Company has submitted a proposal for a demand charge discount program to facilitate commercial EV charging to the Massachusetts Department of Public Utilities ("DPU") pursuant to the recent Transportation Bond bill, *An Act Authorizing and Accelerating Transportation Investment*, Chapter 383 of the Acts of 2020. Additionally, the Company seeks to further reduce the barriers to DCFC deployment through its proposed expanded make-ready incentives and EVSE rebates.

Time varying rates and advanced demand response have an important role to play in ensuring that EVs are integrated in a way that limits peak demand impacts and enhances system efficiency. Time varying rates can provide a consistent signal to customers to avoid charging at peak times, and active demand response programs can help avoid the potential system costs imposed by the highest peak load days. Managed charging provides an even greater opportunity to enhance load management and improve system efficiency, and the Company has also proposed in its Phase III Program filing to expand both residential and fleet offerings to include these capabilities. Development of fair and effective rates for EV charging now will play an important role in enabling wide-scale EV deployment over the next decade.

Strategy T5: Engage Consumers & Facilitate Markets

National Grid is supportive of the efforts identified in the Interim Plan to engage consumers and facilitate markets. The Company supports and encourages the Commonwealth to expand consumer awareness, outreach, and education efforts, which are critical to accelerating EV adoption. With respect to efforts around medium- and heavy-duty vehicles and fleets, the Company supports the Massachusetts Clean Energy Center ("MassCEC") in developing pilot programs to

further expand resources and best practices. As the Interim Plan recognizes, the Company currently has programs to support fleets and has proposed a number of additional programs in the Phase III Program filing to support fleet planning and infrastructure needs. Going forward, it will be prudent to align any federal and state programs with utility programs to leverage the resources offered and lessons learned and ensure that efforts are complementary and not duplicative. For example, resources through the Bipartisan Infrastructure Law will help the Commonwealth accelerate transportation, but the funds will not be enough to meet the goals of the Interim Plan. When possible, these funds should be coordinated with utility programs to benefit customers, eliminate redundancy, and maximize the investments. Ongoing partnership between state entities, utilities, and other market participants will maximize the benefits of electrification programs and accelerate EV adoption.

Strategy T6: Stabilize Light-Duty VMT & Promote Alternative Transportation Modes

National Grid supports the proposed actions to reduce vehicle miles travelled ("VMT") and promote Smart Growth, as part of a holistic strategy to reduce transportation GHG emissions.

II. BUILDING SECTOR

National Grid recommends that the Commonwealth pursue integrated and complementary electric and gas decarbonization strategies to affordably and equitably achieve its climate goals in the building sector. Achieving the Commonwealth's GHG emission reduction goals for the building sector will require substantial adoption of efficient electric heating equipment (i.e., heat pumps) to displace the use of emitting fuels for heating. It will also require the use of carbon-neutral and zero-carbon fuels ("decarbonized fuels") as part of a holistic, decarbonized energy economy that can be resilient during extreme weather events, limit the incremental electric capacity (including distribution, transmission and generation capacity) required to serve future winter-peaking loads,

and track with achievable rates of customer equipment turnover from existing heating systems to new ones.

Multiple studies for the Northeast region[5] have recognized the value of building sector decarbonization strategies that prioritize both heat electrification and decarbonized gas (RNG and hydrogen), including hybrid or dual-fuel customer heating systems that pair heat pumps with gaseous fuel for meeting heating needs on the coldest days.[6] Given the complex challenges of building decarbonization, as well as remaining uncertainties about the cost and practicalities of strategies at scale, it is important to open up as many potential technology pathways as possible, and avoid prematurely foreclosing potentially promising pathways, to maximize the number of available strategies for policymakers and customers in the decades ahead.

Millions of buildings across the Northeast may be very difficult to fully electrify, due to building type, age, condition and/or occupancy. For example, in a study of New York City's pathways to climate neutrality, a feasibility analysis for the city's building stock suggested a range of electrification potential between 31% and 62% of square footage.[7] Achieving levels of equipment installation to achieve the coming decades' GHG emission limits will likely be challenging. Heating equipment is typically replaced on an as-needed basis under significant customer time pressure, complicating the task of encouraging widespread customer adoption of new or unfamiliar heating technologies. Policy strategies reliant on doubling the levels of organic equipment turnover to achieve electrification targets risk significantly missing GHG emissions goals, if relied on exclusively. Deploying a combination of decarbonization strategies, including

[5] See e.g., E3 and EFI, Net-Zero New England: Ensuring Electric Reliability in a Low-Carbon Future, November 2020; The Brattle Group, Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050, (Dec. 2020), available at http://www.energy.ri.gov/documents/HST/RI%20HST%20Final%20Pathways%20Report%205-27-20.pdf; and Pathways to Carbon-Neutral NYC (Apr. 2021), available at https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/Carbon-Neutral-NYC.pdf

[6] In the Company's energy efficiency programs, these dual-fuel customer systems are referred to as "partial-displacement" heat pump installations.

[7] Pathways to Carbon-Neutral NYC (Apr. 2021), pp. vi and 7-8, available at https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/Carbon-Neutral-NYC.pdf

both electrification and gas decarbonization, would mitigate this risk through reducing the pace and scale of required customer heating system replacements.

Coordinated and complementary decarbonized energy networks can also reduce the risk of relying on a single energy system for the region's heating capacity. With a majority of gas pipelines buried underground, the gas distribution system is naturally less susceptible to disruptions from storms or other inclement weather events. In the Northeast, natural gas today provides approximately three times more peak energy for heating than the electric network provides on the coldest winter day.[8]

Leveraging existing gas networks could avoid siting, permitting, and constructing up to 50 gigawatts ("GW") of incremental winter peak capacity (generation, transmission and distribution infrastructure) compared to a full-electrified heating scenario in National Grid's Northeast service territory.[9] (This added capacity would be in addition to the amount required to serve a highly-electrified transportation sector.) Incremental heating-only electric capacity equates to roughly 73% of today's electric capacity served in the region by ISO-NE and NYISO, and would encompass not only the transmission system capacity but also local distribution infrastructure such as new substations that would need to be constructed in constrained areas under scenarios with extremely high levels of fully-electrified heating. Hybrid building decarbonization strategies can save customers significant costs in the long-run through optimizing the amount of incremental electric network costs associated with large-scale fuel-switching.

Existing gas infrastructure can deliver decarbonized fuels to customers, further reducing emissions with lower dependence on consumers making major capital outlays for their homes and businesses. In particular, this can help manage the incremental costs for low-and-moderate income

[8] For example, daily natural gas consumption by sector in New England for the 2021 year shows a February peak day gas consumption for residential/commercial use of 3.1BCF compared to consumption for electric power of approximately 1 BCF. Available here: https://www.eia.gov/dashboard/newengland/naturalgas
[9] Internal National Grid analysis.

customers with more limited opportunities to directly invest in new heating equipment (such as heat pumps) compared to more affluent customers.

An integrated building decarbonization strategy can support individual customer choice of decarbonization alternatives, meet the region's needs for resiliency, minimize duplicative system investments, and maximize the number of potential options available to policymakers to meet the challenges ahead. Such a strategy will be more likely to reach net zero goals by 2050 than one reliant on a single technology. The Interim Plan should recommend further support for decarbonized fuels and hybrid heating system deployment, alongside the advancement of fully-electrified heating, to maximize the Commonwealth's chance of success in meeting its building sector emissions limits.

Strategy B1: Avoid Lock-In of Building Systems That Are Not 2050-Compliant

Necessary policy to decarbonize natural gas supply for heating.

As part of the next Clean Energy Climate Plan, EEA should recommend market-based solutions to advance decarbonized fuels for heating and other difficult-to-electrify sectors. Policymakers in other states[10] have advanced procurement standards for decarbonized heating fuels consistent with the approach taken to electric Renewable Portfolio Standard programs or low-carbon fuel standards for transportation; incorporating even modest proportions of fuels such as RNG and hydrogen can lead to significant emission reductions across our gas networks. For example, if Massachusetts natural gas sellers were to replace just 5% of existing natural gas sales with RNG by 2030, this would result in a 7.7% reduction in annual GHG emissions, equaling more than 1.7 million metric tons of CO2-equivalent reductions per year, roughly the same as the annual emissions of 370,000 light-duty vehicles.[11]

[10] Including Oregon, Colorado, Minnesota, and Nevada.

[11] Internal National Grid analysis. Emissions reductions assume a mix of RNG from anaerobic digestion, including landfill gas, animal manure, wastewater, and food waste. Estimates are based on average carbon intensities of RNG produced from these feedstocks, across a 25-state region of the Eastern US

Additional policy strategies, such as options for customers to purchase decarbonized fuels from gas suppliers, could enable customers to elect a higher proportion of clean heating fuel based on their own climate goals or obligations under state policy. Decarbonized fuel supply from RNG and hydrogen can scale to cost-effectively help decarbonize heating alongside electrification policies. RNG supply in the US is growing,[12] and volumes necessary for the Northeast could be achieved through RNG procurement from supply resources across the Eastern US at pro-rata levels equivalent to our region's share of the Eastern US supply of geologic gas. For example, National Grid USA today accounts for 15% of the residential and commercial gas demand in the Eastern US and could help meet net zero emissions limits through procurement of an equivalent share of the estimated Eastern US RNG production potential. Renewable hydrogen similarly can scale to supply a large proportion of the region's heating need, reaching at least a 20% blend of today's gas volumes. In-region production of renewable hydrogen can complement the planned build-out of offshore wind in the Northeast by utilizing the excess wind power to produce hydrogen at times of lower electricity demand.

Ultimately, we encourage the Administration and all stakeholders to look at a wide range of policy options that can be reviewed by stakeholders and policymakers to find the right combination of programs to serve customers and achieve the Commonwealth's environmental goals.

Development of a high-performance stretch code.

National Grid is generally supportive of the use of codes and standards as a low-cost pathway to driving improved building performance and reduced emissions from the building sector. That said, EEA should consider two important caveats as it finalizes the Interim Plan around stretch codes.

[12] See for example, https://energy-vision.org/wp-content/uploads/2020/12/EV-Argonne-2020-RNG-Release.pdf

First, a high-performance stretch code should not be used as means of allowing or enacting municipal bans on new gas connections in the interest of driving adoption of electric heat pumps in lieu of gas heating. Dual-fuel efficient heating systems should qualify for stretch code compliance, along with the use of low-carbon fuels such as RNG and hydrogen. While electric heat pumps will play a critical role in decarbonizing the building sector, the substitution of low- and no-carbon fuels for traditional natural gas can decarbonize gas networks and building energy use that relies on them, and gas networks can play a key role in providing peak demand energy for hybrid gas-electric heating systems. Foreclosing customer options to utilize gas systems despite the role that those systems can play in decarbonizing the building sector could increase both operating costs for customers as well as increase building costs for developers and owners of new housing construction. This is particularly challenging at a time when the Commonwealth is facing significant housing affordability challenges and will exacerbate existing economic inequities within the Commonwealth. As such, instead of bans on gas connections, the Commonwealth's building sector policies should retain as a core tenet the ability of customers to choose the heating options that best meet their needs and that are aligned in the long run with the Commonwealth's decarbonization goals.

Second, it will be essential that any stretch code enactment ensures an ongoing role for the energy efficiency Program Administrators in providing builders and homeowners with access to the technical expertise, vendor networks, and incentives that are the hallmarks of the Commonwealth's current nation-leading energy efficiency programs. Absent access to these tools, the cost to developers (which will ultimately be reflected in higher housing prices) of complying with stretch code requirements would likely increase dramatically.

Elimination of incentives for fossil fuel equipment in new construction situations.

National Grid does not support a blanket ban on providing incentives to customers in support of the pursuit of any class or category of cost-effective energy efficiency. The Green Communities

Act obligates all energy efficiency Program Administrators to pursue all cost-effective energy efficiency savings for customers. To the extent that rising baselines (i.e., increasing efficiency of 'standard' fossil fuel based heating equipment) are reducing opportunities for the Program Administrators to cost-effectively and cost-efficiently (i.e., balancing benefits against overall customer costs) realize incremental savings through the promotion of higher-efficiency fossil fuel-based heating equipment, decisions around incentives for this equipment should be driven through the existing energy efficiency programs' data-driven planning and stakeholder engagement processes, not mandated through administrative sanction.

Additionally, the premature elimination of any incentives would not have the desired effect of reducing near-term GHG emissions. The removal of incentives for high-efficiency, cost-effective fossil-fuel based heating systems will not drive most customers to the early adoption of electric heating measures as intended – rather, it will push customers towards the purchase and installation of lower efficiency equipment utilizing their preferred fuel choice. This will have the impact of increasing emissions in the near-term.

In light of the anticipated substantial role for heat electrification under any decarbonization pathway, given the assumed 20-year life of a typical heating system, a customer decision to install a high-efficiency fossil-fuel based heating system over the next ten years does not lock that customer into continuing to use that system in 2050 and beyond. Rather, customers installing a new efficient heating system in the upcoming decade will likely have another opportunity to revisit their heating system fuel choice, at a time when the costs of electric heat pump options have likely decreased, and the range of options has increased. Encouraging customers to install a high-efficiency fossil-fuel heating system in the near term will still deliver important GHG reductions, particularly as we work to decarbonize the gas distribution system. Additionally, gas-fueled

technologies like thermal heat pumps and hybrid gas/electric systems can play important roles in achieving Net Zero by 2050.

Moreover, because low- and no-carbon fuels can decarbonize gas networks over time, for many customers long-term usage of gas-fueled heating will be the best option for achieving GHG emissions reductions. Such customers should have incentives to adopt highly-efficient gas-fueled heating systems. As they become cost-effective, new technologies such as thermal heat pumps and hybrid gas/electric heating systems should be eligible for incentives since they can play an important role in building sector decarbonization.[13] The Commonwealth should continue to support policies to accelerate the cost-effectiveness of these technologies so that they may be deployed sooner.

Strategy B2: Pivot the Market for Building Envelope Retrofits and Clean Heating Systems

DOER will work to phase out incentives for fossil fuel heating systems as soon as possible, limiting fossil fuel heating system incentives in the 2022-2024 Three Year Plan, and ending all fossil fuel heating system incentives by the end of 2024.

For the same reasons that National Grid does not support the nearer-term elimination of cost-effective incentives for high-efficiency fossil fuel-based heating system measures in the new construction sector, National Grid only supports the elimination of incentives for high-efficiency fossil-fuel based heating system measures where cost-efficient savings are no longer available from those technologies.

Collectively, in 2019 the energy efficiency Program Administrators supported customer adoption of over 7,000 high-efficiency fossil-fuel based heating systems, generating an estimated 79,000-ton reduction in lifetime CO_2 emissions as a result of these system purchases and installations. As in the new construction sector, the elimination of these incentives and the Program Administrators' complementary customer engagement and education efforts are unlikely to have the

[13] Along with other Massachusetts energy efficiency Program Administrators, in the 2022-2024 energy efficiency plan, National Grid has proposed to include support for full- and partial-displacement heat pumps for gas heating customers.

desired impact – preventing customers from accessing these programs will not lead most customers to convert to electric heating systems – rather, these customers will be more likely to purchase and install lower efficiency heating systems utilizing their current fuel choice, leading to increased near-term emissions from these buildings.

This change would also have a profound impact on the Program Administrators' efforts on behalf of income-eligible customers. The elimination of incentives for high-efficiency fossil-fuel based equipment would force the Commonwealth's most vulnerable customers to switch to electric space and water heating options in order to access and benefit from the Program Administrators' "no cost to the customer" income-eligible heating system replacement programs. Perversely, even with the receipt of a no-cost system, this will increase space and water heating costs for many of these customers, as operating and fuel costs in the Commonwealth for even the highest-efficiency electric-based heating options far outstrip the operating and fuel cost of pipeline natural gas-based heating systems. Additionally, many of these customers may lack the space and ventilation requirements necessary for the use of an air-source heat pump based hot water system, effectively locking them out of receiving energy efficiency program support for hot water heating system upgrades.

DOER will work to increase electrification through Mass Save® programs through air source and ground source heat pump incentives and consumer education in 2022-2024.

National Grid is supportive of near-term increases in the electrification of the building heating sector in the Commonwealth, particularly in situations where those conversions can cost-effectively displace a current customer's reliance on delivered fuels (e.g., home heating oil and propane) or electric resistance heat. For example, in the Company's proposed (2022-2024) three-year energy efficiency plan, the Company committed to supporting the installation of over 28,000 heat pumps displacing a customer's fossil fuel system and electrifying over 30 million square feet of commercial space at a budgeted aggregate incentive cost of greater than $400 million.

The scale and pace of the increases suggested through the Interim Plan, however, require careful consideration on two dimensions: (1) development of a reliable and sustainable air source heat pump market in the Commonwealth; and (2) required costs.

Statewide energy efficiency programs installed over 3,500 heat pumps either partially or fully displacing oil or propane heating systems in 2020. To achieve the goals set forth in the Interim Plan, the Program Administrators would have to grow annual installations by over 28 times the current program efforts. A more reasonable target growth rate could allow for continued significant progress towards the Commonwealth's goals, while allowing for the market developments (customer education, installation contractor training and workforce development investments, distribution network development) necessary to support sustained market transformation. Attempts to prematurely force these volumes before the necessary market developments have occurred are likely to degrade the customer experience of the very early adopting customers that the Commonwealth will need to be advocates for the technology in order to drive sustainable, long-term market growth. Conversely, the potential for negative experiences by these "early adopters" could represent a significant setback to medium-term adoption aspirations.

In 2020, National Grid paid an average incentive of $4,000 per home to market rate customers installing heat pumps for the purpose of full displacement of an existing heating system, and the Company has proposed similar incentive levels for market rate customers in its 2022-2024 energy efficiency plan, with a new significant increase in incentives for moderate income customers. Simply multiplying this number against 100,000 homes per year suggests necessary incentive costs of $400 million per year to support that volume of conversions. In reality, achieving the level of growth and market penetration required to get to 100,000 homes per year would require increases in incentives. Additionally, higher incentives would be required for income eligible, and, potentially, moderate income customer segments in order to make these conversions economically

feasible. After further grossing up these incentive costs to account for necessary programmatic expenses (e.g., customer outreach and engagement, system inspections and rebate processing, workforce development efforts), total programmatic costs could be expected to exceed $600-700 million per year, or $6-7 billion in total over 10 years. These costs also ignore the required customer contribution (i.e., the portion of the installed system cost not covered by incentives) to funding the conversion or replacement of an existing heating system; at an assumed average incremental customer contribution of $6,000 per conversion, this would add another $600 million per year in total investment required to achieve 100,000 conversions per year.

Placing 100% of these costs on electric customers (the sole current source of funding for the incentives necessary to make air source heat pumps economic for displacement of delivered fuels for heating purposes today) is not a tenable option. In fact, such an outcome would be counter-productive, as it would increase the costs of the very electricity needed to power these heating systems, thus requiring even greater incentives to drive the customer economics necessary to support the customer interest and adoption required to achieve the Commonwealth's decarbonization goals. Alternatively, the Interim Plan should actively pursue and plan for alternative funding sources to support required incentives, including, but not limited to, funding from state and federal general revenues.

DOER will work to expand access to energy efficiency and clean heating for low- and moderate-income renters and homeowners in environmental justice (EJ) communities through targeted community-based incentives and outreach programs, and increased funding for pre-weatherization barriers.

National Grid remains deeply committed to ensuring that the benefits of energy efficiency reach all of its customers. In the Company's proposed three-year energy efficiency plan, 14.81% of planned budgets are dedicated to the Company's income-eligible programs, which are expected to produce almost 10% of total GHG emissions reductions realized. This commitment, as always, needs to be balanced against costs, which are borne by all customers (including both income-eligible

as well as market rate customers). For a variety of reasons, supporting customer adoption of energy efficiency in these segments is significantly more expensive than driving similar savings from market rate customer segments. The Company's income-eligible programs are a foundational element of its broader energy efficiency programs in the Commonwealth, and the Company is steadfast in its commitment to ensuring equitable access to our programs for all customers. The costs of substantial expansions of any program offering, though, must be understood and weighed against resulting energy burdens on all customers (including many of the customers targeted in the Interim Plan identified strategy above).

Additionally, it must be recognized that at current retail electric and natural gas prices, even air source heat pumps provided at no cost to income-eligible customers are likely to increase the energy burdens of customers currently relying on natural gas for heating. The Commonwealth's decarbonization pathway must account for the unique challenges facing our most vulnerable residents, and strategies must be developed and deployed to ensure these customers do not bear a disproportionate burden associated with this transition. The Company does not believe that wholesale near-term electrification of these customers' heating needs, absent a substantial re-thinking of how this could be achieved, meets this standard.

Serving renters, particularly through interventions (including weatherization and heating system upgrades) that require capital investments in buildings, also remains a particularly concerning challenge in energy efficiency programs across the country. Generally referred to as the 'split incentive' problem, the fact that decisions and funding for building upgrades are required of parties (building owners) that are distinct from the beneficiaries (the building occupants/renters) of the resulting energy savings remain a significant barrier to driving adoption of capital-intensive (including weatherization and heating system upgrades) energy efficiency measures in this customer segment. This is not to suggest that non-owner-occupied buildings cannot or should not be an

important component of the Commonwealth's building decarbonization strategy – just that such participation will require differentiated approaches (and likely higher costs) than approaches that can be expected to deliver similar outcomes from owner-occupied homes and buildings.

EEA and DOER will seek near-term means to enhance MassCEC funding to support continued market development for building decarbonization.

National Grid is supportive of identifying and accessing all potential means of funding to support the substantial and necessary market development efforts that will be required to support the Commonwealth's building decarbonization efforts.

Strategy B3: Convene the Commission and Task Force on Clean Heat & Cap Heating Fuel Emissions

The Baker-Polito Administration will convene a Commission and Task Force on Clean Heat by May 2021.

National Grid looks forward to working with Chair Theoharides and the other members of the Commission and Task Force on Clean Heat. We believe that all of the electric and gas distribution utilities serving Massachusetts customers can bring valuable perspectives and experience to this important work, both from the perspective of their role in meeting customers' energy needs as distribution utilities, as well as, in their role as energy efficiency Program Administrators.

National Grid anticipates the Commission and Task Force's efforts to advise on policy recommendations, including emissions caps as one of its most consequential undertakings, given the expected customer cost and effort required to reduce GHG emissions across the Commonwealth's millions of buildings. The Company urges the Commission to look at the means to preserve and grow customer support for clean heating policies and technologies by ensuring that near-term emissions limits are set to be achievable and that compliance pathways are affordable and practical for customers, leveraging all available electric and gas decarbonization strategies.

MassDEP will develop and implement by 2023 a long-term declining emissions cap on heating fuels following consultation in 2021 with the Commission and Task Force on Clean Heat regarding the cap structure and levels consistent with meeting or exceeding GWSA required emissions reduction levels.

Ideally, a cap on heating sector emissions would be part of an economy-wide approach to capping carbon emissions using market-based mechanisms to cost-effectively achieve carbon emissions reductions across the economy. Such an economy-wide emissions cap approach is likely to meet the Commonwealth's overall emission limits more cost-effectively than emissions caps on heating fuels alone. The proceeds generated under a market-based approach should be invested in activities that will lower the cost of decarbonization for customers.

Under a market-based emissions cap, a portion of revenue from the heating sector should be directed to support the provision of incentives to customers to enable the transition to high-efficiency electric heating options and mitigate bill impacts that would otherwise occur to electric customers as a result of paying those incentives. Specific attention should be given to low-income customers and energy-intensive trade-exposed industrial customers. Second, revenue should be invested in the following activities that will support additional advancement of heating sector decarbonization, including: (1) incentives for RNG production and interconnection; (2) incentives for hydrogen production and blending projects; and (3) incentives for heat electrification (both air source and ground source heat pumps) for delivered-fuels customers through existing, successful energy efficiency program administration channels and efforts.

III. ENERGY SUPPLY SECTOR

As is recognized in the Interim Plan, significant progress has been made in the decarbonization of the electricity sector, as the Commonwealth's GHG emissions from this sector were reduced by 52% between 1990 and 2017. The electricity sector, with its emissions of 13.6 MMTCO2e in 2017, represented 19% of the of the Commonwealth's total GHG emissions. While

its share of total emissions is significantly lower than those contributed from the transportation and buildings sectors, the electricity sector emissions must still be reduced by another 30-40% by 2030 for EEA's Interim Plan to be achieved. Achievement of this Interim Plan will require the deployment of significant capacities of new clean energy resources, the continuing contributions from existing clean resources, and significant investments in the transmission and distribution systems required to ensure delivery. However, successful achievement also requires a critical focus on ensuring investments are made in the most efficient and cost-effective manner possible for customers. We offer specific comments and suggestions below for successfully achieving the Interim Plan for the energy supply sector.

National Grid believes the fundamental requirements for success include: (1) the ability to procure the clean energy required through competitive, regional wholesale markets allowing all clean resources, regardless of technology or age/vintage, to compete based on their costs; and (2) greater use of regional and inter-regional coordinated transmission planning to allow for more reliable and cost-effective interconnections of these clean resources. In addition, as described above in the Company's comments under the building sector, the Interim Plan should recognize the necessary contributions of low-carbon fuels, including RNG and hydrogen to meeting GHG emissions limits, and the Company respectfully submits that these energy sources also be considered in sections of the Interim Plan devoted to energy supply. National Grid looks forward to working with the Commonwealth to successfully achieve its GHG emissions reduction goals.

Strategy E1: Fill Current Standards & Execute Procurements

National Grid supports EEA's strategies to continue to ensure all existing procurements for renewable energy and transmission are completed on time and to ensure compliance with existing

portfolio standards and emissions regulations. These actions are critical steps in meeting the Commonwealth's 2030 decarbonization goals for the electric sector and putting Massachusetts' electric sector on a viable path to Net Zero by 2050 – a goal supported by National Grid.

Meeting existing emissions limits will require additional considerations in other areas of the electric sector, including a buildout of distribution and transmission networks, infrastructure and resource siting and permitting and balancing customer costs. In-region large-scale transmission and transmission networks to interconnect offshore wind and high-voltage direct current interconnections to neighboring regions such as Hydro Quebec will be key to meeting existing and future procurement targets. EEA should consider additional strategic actions to streamline the development of transmission solutions that support cost-effective achievement of existing policy goals, such as leveraging the ISO-New England ("ISO-NE") Public Policy Transmission Upgrades Process.[14]

Additionally, the ability to site and permit large-scale renewable projects and the utility infrastructure needed to safely and reliability interconnect such projects to the distribution and transmission systems has proven to be more challenging in New England than in other regions. EEA should consider additional strategic actions to address siting and permitting challenges for new renewable energy resources and distribution and transmission projects that could become barriers to meeting existing and longer-term renewable procurement and decarbonization goals if left unaddressed. Such strategic actions could include, but not be limited to, streamlining and/or consolidating permits issued by the Commonwealth for renewable energy projects and associated interconnection infrastructure, which could be issued on an expedited timeline and based on use of best management practices (as discussed further in response to Strategy E4 and E5, below). Lastly,

[14] See ISO-New England, Public Policy Transmission Upgrades *available at* https://www.iso-ne.com/system-planning/system-plans-studies/public-policy-transmission-upgrades/

but most importantly, EEA must balance customer bill impacts and overall cost against the pace and scale of decarbonization as the Commonwealth transitions its energy supply sector. The accelerated development of competitive, regional wholesale market-based procurement processes for clean energy will be instrumental to meeting decarbonization targets while keeping costs down for customers. The DOER's May 2019 Offshore Wind Study concluded that an additional procurement for 1,600 megawatts ("MW") of offshore wind under the existing long-term contracting model is likely to provide cost-effective benefits to customers and contribute to achieving Global Warming Solutions Act ("GWSA") targets, but noted that the cost-effectiveness of this approach is highly dependent on the regional renewable energy certificate ("REC") market.[15] However, the Offshore Wind Study also cautioned that there are risks associated with having a significant portion (approximately 60%)[16] of electricity demand under long-term contracts. Absent adequate cost recovery and remuneration for entering into a significant magnitude of long-term contracts, the cumulative impacts of these obligations could negatively impact the financial strength of the distribution companies to the detriment of the companies, shareholders and customers.[17] Moreover, the Offshore Wind Study noted that having a high amount of energy tied up in long-term contracts may impact wholesale markets and shift risk to customers as energy markets change.[18] Sufficient consideration and time must be allowed for the development of competitive markets, as well as for the benefits of rapidly developing advances in technologies and supply chains to be fully realized for the Commonwealth.

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[15] DOER Offshore Wind Study at 5-7 (2019), available at https://www.mass.gov/doc/offshore-wind-study/download.
[16] Approximately 80% of the Massachusetts electric distribution company demand will be satisfied under long-term clean energy contracts once the remaining 2,400 MW (of 5,600 MW total) of legislatively mandated procurements of offshore wind are completed and in service.
[17] Id. at 12.
[18] Id.

Strategy E2: Develop and Coordinate Regional Planning and Markets

The Company agrees with this strategy and is proactively working with other stakeholders to advance the design of additional markets and reforms for the existing ISO-NE administered wholesale markets to allow the clean energy goals of the Commonwealth and other New England states to not only be accommodated by ISO-NE's competitive wholesale markets, but also cost-effectively achieved through them. To achieve their clean energy goals, Massachusetts and other states are currently relying primarily on (1) individual solicitations, which offer long-term contracts to facilitate the financing of specified new clean resources, and (2) the short-term markets in which the entities serving the load in the state purchase clean energy attributes from existing resources at prices driven more by administratively set requirements and alternative compliance payments ("ACP") than the cost for such resources to produce the clean energy. A new Forward Clean Energy Market (or an Integrated Clean Capacity Market) based on a regional forward auction allowing all clean energy resources, new and existing, to compete on an equal basis to meet the total demand of participating states would allow for the Commonwealth's clean energy goals to be achieved more efficiently and cost-effectively. ISO-NE, market participants, and state entities are engaged in the evaluation of such potential market enhancements as part of the ongoing Pathways to the Future Grid study. Preliminary market modeling results indicate that whether through a pathway including the addition of a Forward Clean Energy Market, Net Carbon Pricing, or a Hybrid of the two, total social costs would be notably lower than a Status Quo based pathway which would continue to rely on long-term contracting by electric distribution companies.

Along with wholesale market additions and reforms, additional transmission needs for delivering increased clean energy generation will need to be planned over a longer time frame, and in a more forward-looking manner than at present. This may involve changes to both regional planning processes and regional transmission tariffs to advance transmission solutions in a way that

does not constrain the connection of large-scale renewables at the scale needed to meet the Commonwealth's 2030 and 2050 clean energy goals.

With offshore wind resources anticipated to be a primary source of the clean energy required by the Commonwealth and other Northeastern states to achieve a decarbonized energy system, it is critical that the associated transmission delivery facilities be well-planned and coordinated. Project-dedicated radial interconnections, resulting from the project-by-project planning utilized to date, are not likely to be the best transmission solutions for delivering to shore the vast quantity of offshore wind energy anticipated. A more networked, coordinated, and expandable transmission delivery system could provide many benefits, including greater reliability, reduced environmental disturbance, and lower costs to customers.

In order to understand and achieve such benefits, additional interstate and inter-regional technical studies may be needed, including studies of offshore factors like potential siting and rights of way to minimize environmental and fisheries impacts and cable runs, optimize landfall locations, etc., as well as onshore factors like interconnection points and potential impacts on the existing transmission system, including potential needed transmission system upgrades. Cost studies providing a preliminary assessment of the feasibility/cost-effectiveness of various proposed configurations (e.g., radial vs. looped, etc.) might also be needed. Such a systematic and comprehensive approach to transmission planning for the offshore wind will help secure maximum benefits for customers and the environment in the long run.

Finally, National Grid recommends that EEA consider the potential value of increased coordination between electric and gas utilities in system planning processes, with the objective of optimizing whole energy system investment to support decarbonization. For example, electric transmission and distribution planning scenarios should account for both highly-electric scenarios and those using decarbonized fuels, to assess the potential for decarbonized fuels to help mitigate

the amount of incremental electric capacity (transmission, distribution, and generation) under long-term scenarios.

Strategy E3: Align Attribute Markets with GWSA Compliance

National Grid is concerned that the Interim Plan might suggest a more important and useful continuing role for the existing Clean Energy Standard ("CES") and Renewable Portfolio Standard ("RPS") type requirements than should be afforded. While such requirements may continue to be necessary for establishing and monitoring the amount of clean energy entitlements required for the Commonwealth's GWSA compliance, they should not be utilized, for example, to "tune" the short-term markets for clean attributes if the goal is to efficiently and cost-effectively procure the clean energy and associated investments required in the long run. A Forward Clean Energy Market, Net Carbon Pricing, or a Hybrid of the two, would be notably more efficient and cost-effective than these types of requirements/short-term markets.

Retail electricity suppliers must often rely primarily on these short-term markets to procure the clean and/or renewable energy certificates they require to satisfy annually increasing yearly RPS type requirements. However, such short-term markets are neither effective nor efficient in driving new investments in renewable resources, especially new large-scale renewables ("LSRs"). Moreover, they should not be expected to achieve significantly more clean energy production from existing renewable resources which, with low to zero fuel costs, are already sufficiently incentivized to produce their clean energy whenever able. Rather than resulting in prices truly reflective of any additional cost of producing clean energy, the legislatively/administratively set requirements and the administratively set ACP prices, in the absence of a forward market and longer-term commitments necessary for new resources to compete, produce a market with a vertical demand curve that results in pricing that simply heads to the ACP price when the market is slightly short of supply and quickly heads towards a price of zero (or the transactional cost) when there is surplus. Moreover, any change

to those legislatively/administratively set requirements and/or administratively set ACPs in any state can quickly change the REC prices for the entire region. As a result, simply maintaining or expanding the RPS type requirements without a true market in place to allow all new and existing clean energy resources the ability to compete based on their costs will not result in the cost-effective procurement of the clean energy required from new and existing resources required by the Commonwealth and the region. The Company recommends a competitive, regional wholesale market-based procurement processes for clean energy, and absent that, a single clean energy standard that allows all technologies, new and existing, to compete and be counted towards the Commonwealth's clean energy goals. By creating fragmented requirements, the separate CES and RPS programs put the Commonwealth in the position of picking winners and losers instead of allowing the market to determine the most cost-effective solutions.

If the Commonwealth does not adopt a single, unified clean energy requirement that allows for all technologies to compete, and instead continues under the current tiered and technology-specific approach, it will result in unintended consequences. Most concerning, it would likely result in environmental attributes purchased under existing long-term contacts not being counted towards the Commonwealth's clean energy goals in RPS/CES-type requirements. This, in turn, would unnecessarily increase costs for customers.

Even in its current form, the CES does not allow for all of the clean energy generation to be counted towards compliance because the bulk of the CES requirements need to be met through RPS Class I RECs. Specifically, clean energy certificates ("CECs") from Section 83D of the Green Communities Act, St. 2008 c. 169, cannot be used for the RPS Class I requirement of the CES; instead, Section 83D CECs can only be used to comply with the CES requirements above the RPS Class I requirements. As a result, there will be many years when the Section 83D generation/CECs far exceed the percentages above the RPS Class I requirements, and therefore many of the CECs

will not count towards CES compliance despite having been purchased through the 83D procurement process. In 2027, for example, under the current CES framework, none of the environmental attributes expected to be purchased under the Section 83D long-term contracts will be needed to meet the CES requirement in that year. This will result in all of the remaining environmental attributes purchased under Section 83D being retired without recognition towards any renewable requirement or the CES. Unlike other environmental attributes, excess CECs cannot be monetized through sales to third parties. While such Section 83D generation will not be used for CES compliance, it will be used in the Commonwealth's GHG inventory reductions and help meet the goals of the GWSA. Thus, it is important that the Section 83D generation be recognized in the single, unified clean energy requirement, as National Grid proposes.

National Grid encourages EEA and DOER to combine the fragmented clean energy standards to provide a comprehensive view of Massachusetts' progress in combatting climate change. Regardless of the ultimate methodology selected, it is critical to ensure that all environmental attributes that will be received from existing contracts can be used toward the clean energy standards. Aggregating and simplifying all the Commonwealth's clean energy policies also will provide the public and the Legislature with more information, enhanced transparency, and allow for improved decisions and resource planning. A single, unified clean energy requirement would much better align with the GHG inventory reductions and the goals of the GWSA. Cost-effective decisions cannot be made with an incomplete assessment of Massachusetts' status in meeting its clean energy goals.

Strategy E4: Continue to Deploy Solar in Massachusetts

National Grid supports the stated strategy action of ensuring on pace solar development after 2025 in the context of an interconnection process that is evolving to accommodate the increasing saturation of distributed energy resources and the land use constraints around the siting

of large ground mounted solar facilities. The DOER's 3,200 MW solar incentive program, Solar Massachusetts Renewable Target ("SMART") Program, regulated by the DPU, has been highly successful in incenting solar. Massachusetts has the second highest density of installed solar megawatts per square mile in the US, followed by Rhode Island.[19] The Company has about 3,000 MW of connected and pending solar facilities in its service territory.[20] The Interim Plan projects that an additional 2 GW of deployed solar is needed to achieve Net Zero by 2050. National Grid agrees that investing in a flexible, responsive, and reliable electricity grid is essential to that transformation.[21]

The rapid growth of solar in the Commonwealth already has necessitated modifications to the distribution system to ensure that it can continue to operate safely and reliably with a high penetration of solar, as well as upgrades to the transmission system to support the distribution system modifications. The development of large solar farms has strained the interconnection to support smaller distributed generation facilities serving on-site electricity needs. Past state policy and solar business models have prompted a significant number of multi-MW solar farms in lieu of building mounted solar installations. When saturation of solar on the electric distribution system was low, this was the preferred business model as multi-MW solar farms cost less to develop on a per kilowatt ("kW") basis and were less risky than building mount projects. However, as the lightly loaded electric distribution system in rural parts of the state has become increasingly saturated, the costs and time to interconnect these multi-MW solar farms have risen due to the need to now pay for transmission system upgrades to accommodate these multi-MW solar farms. This shift has increased installed costs of solar farms to be sometimes on par with the installed costs of building mounted solar. Building mounted solar allows for generation to be sited at the load, thereby reducing losses, and providing

[19] U.S. Energy Information Administration (extrapolation from the data).
[20] National Grid Reply Comments on Straw Proposal at 3, D.P.U. 20-75.
[21] CECP 2030 at 37 and Table 5.

peak load reductions on the existing electric distribution system which can provide for deferral of incremental infrastructure needs. Meeting the Commonwealth's goal of supporting an additional 2 GW of solar between 2025 and 2030 will require efficient utilization of all forms of solar development. DOER should explore paths to market that send appropriate signals to prioritize development of true distributed generation projects to capture the above-noted system benefits (e.g., potential deferral and reduced losses of generation serving actual on-site loads), while working on solutions to enable continued larger-scale ground-mounted development in a sustainable and low-impact manner. In addition, the Commonwealth should consider expanding its strategy for procurement of low-cost solar energy to resources outside of the state, where land and development costs have shown to be more available and lower, respectively. In short, solar policy development should take account of the increased system impact and associated interconnection costs of large-scale greenfield solar, and better align with the planning and cost allocation goals currently being explored by the DPU.

In the interim, the DPU has risen to the challenge of interconnecting large amounts of solar facilities under current programs by opening an extensive investigation into revising the distributed generation interconnection tariff. To date, the DPU has issued orders revising the interconnection procedures to incorporate the interconnection of energy storage systems, to provide tools to make the distributed generation interconnection process operate more efficiently, and to provide greater transparency into the transmission studies that are necessary to avoid adverse impacts on the safety and reliability of the transmission system from the aggregation of large amounts of solar on the distribution system. The Company applauds the DPU for its vision and its innovative and highly-effective administration of this docket (D.P.U. 19-55), which is addressing interconnection issues for high penetration of renewable energy (primarily solar as of today) that are first in the nation.

Deploying an additional 2 GW of solar to achieve Net Zero by 2050 will require anticipatory investments in the distribution and transmission systems, instead of investments in response to the interconnection requests of specific distributed generation facilities. The DPU opened a ground-

breaking investigation into planning for and implementing such anticipatory investments and offered a Straw Proposal for achieving that. As discussed under Strategy E6 and in its filings in that docket, the Company is enthusiastic about the DPU's Straw Proposal, which would "require a system planning analysis for infrastructure investment in consideration of clean energy and climate policy objectives, incorporation of DG investments, and development of associated planning criteria."[22] The DPU anticipates that these proactive investments will benefit all customers, "by providing the flexibility needed to design optimal solutions that can take into account the evolving needs of the distribution system," that is, that will result in the "flexible, responsive, and reliable electricity grid" Interim Plan contemplates.[23] This proceeding also is investigating the appropriate assignment and allocation of costs for infrastructure investments that benefit all customers and has issued an order authorizing a new cost allocation methodology on a provisional basis to expedite such investments.

As the Company discussed in its comments in D.P.U. 20-75, external challenges outside the control of the Company and the other electric distribution companies will inhibit integration of solar into the electric power system if those challenges are not addressed.[24] Chief among those challenges is the lack of long-term state targets for solar and other distributed energy resources and land availability to site large solar arrays. A 2050 megawatt target, including intermediate targets, for the amount of solar the Commonwealth will incent after the current solar incentive programs sunset (currently anticipated to be after 2025) would provide valuable input for the distributed energy resource long-term planning process contemplated in D.P.U. 20-75. The Company would welcome EEA's and DOER's leadership in setting such targets and in projecting the location and pacing of future solar development. National Grid has been examining various blockers to the timely

[22] Vote and Order Opening Investigation at 6, D.P.U. 20-75.
[23] Plan at 27.

[24] National Grid Comments on Straw Proposal at 48-49, D.P.U. 20-75. The Company also identified a third external challenge: collaboration with ISO-NE to refine the regional wholesale electricity markets to better align with the clean energy mandates of the New England states.

development of large solar arrays and other types of renewable distributed generation and potential steps to address these blockers. Project permitting, including environmental permitting, siting approvals, and local authorizations, is a major bottleneck to constructing large solar array interconnections. Depending on the type of project and permits triggered, the permitting process can take two or more years. Streamlining permitting is critical to accelerated development of distributed generation. To that end, the Company has identified a number of potential reforms to streamline permitting while still protecting environmental resources and public interests. The most impactful of these reform concepts is the creation of a "one-stop" consolidated permit process encompassing all state and local authorizations, which would address timing concerns and provide the certainty needed for the successful planning and implementation of the massive increase in renewable energy infrastructure needed to meet the Commonwealth's goals. This can be done without compromising the Commonwealth's commitment to environmental protection by using established, extensive best management practices and removing unnecessary duplication during the permitting process.

The Company agrees that employing the best land management practices that protect critical Massachusetts species and ecosystems are important. The Commonwealth's goals will need to be continually balanced with the ability of utilities to construct the infrastructure that is necessary for the growth of renewable energy, as well as land use for the renewable resources themselves. Infrastructure projects necessary to support the growth of renewable energy could include new, expanded, refurbished, replaced or upgraded transmission and/or distribution lines or substations, and the infrastructure necessary to interconnect renewable energy generation to transmission and/or distribution facilities.

An additional avenue that EEA could consider that would reduce land-use impacts, in particular from solar development, would be standards regarding the power density of new developments, such as requiring the use of higher-efficiency solar modules, and single or multi-

axis tracker technology. This would help to boost the expected energy output per acre of newly developed land and lessen overall land use concerns.

Strategy E5: Develop a Mature Offshore Wind Industry in Massachusetts

National Grid supports the Commonwealth's efforts to work with the Bureau of Ocean Energy Management ("BOEM") and other regional stakeholders to identify new lease areas, coordinate project schedules, and support an efficient, on-pace federal permitting process.

National Grid agrees that to achieve the most efficient and on-pace permitting for these projects, streamlining the BOEM leasing process is important. Moreover, streamlining the permitting for all federal, state and local permits needed for offshore wind projects as well as the associated interconnections and system upgrades is also critical. Specifically, National Grid believes that the Interim Plan must include a comprehensive strategy for streamlining state and local permitting of renewable energy related projects and for engaging with the federal government, not only with respect to BOEM's leasing program, but also with respect to other required federal permits and consultations. Achieving the Commonwealth's 2050 climate goals will require comprehensive coordination and creative solutions from all stakeholders. One major bottleneck, often overlooked, is project permitting, including environmental permits, siting approvals, and local authorizations. Depending on the type of project and permits triggered, the permitting process can take two or more years. This applies not only to new generation facilities, but also to utility projects needed to support renewable generation such as new, expanded, refurbished, replaced, or upgraded transmission and/or distribution lines or substations, and interconnections of renewable energy generation to transmission and/or distribution facilities. These timeframes represent a significant challenge to meeting the Commonwealth's climate goals. Permit streamlining is critical and can significantly reduce the time to secure permits for public

utility and renewable energy projects while still achieving the highest levels of environmental protection.

The Company respectfully suggests that the "regional stakeholders" involved in the permit streamlining effort should include the Army Corps of Engineers, the MassDEP, the Massachusetts Environmental Policy Act Office, and Coastal Zone Management ("CZM"), [25] in addition to local permitting authorities such as conservation commissions, as well as the utility companies.

Early planning with respect to offshore wind generation projects, as well as the transmission and other interconnection facilities required to bring offshore wind energy onshore, is critical. For the Commonwealth to meet its 6 GW by 2040 goal, EEA will need to look closely at permitting timeframes and take proactive steps to streamline review and permitting timelines for the interconnection facilities. National Grid welcomes the opportunity to work with the Commonwealth in developing permit streamlining reforms.

Strategy E6: Incorporate GWSA into Distribution-Level Policy Considerations

National Grid supports incorporating GWSA goals into distribution system planning. As National Grid and the other Massachusetts electric distribution companies progress their Grid Modernization efforts with their four-year investment plan proposals, the value of avoided carbon-dioxide emissions will be an important consideration in assessing the benefits and costs of those investments.

[25] The Company is a member of CZM's Energy and Infrastructure Technical Work Group that supported the development of the Massachusetts Ocean Management Plan. In June of 2020, as part of the 5-year mandatory review of the Massachusetts Ocean Management Plan, the Company submitted comments including specific recommendations on the siting of interconnection facilities. The Company's comment letter to CZM is provided as Attachment A. development of the Massachusetts Ocean Management Plan. In June of 2020, as part of the 5-year mandatory review of the Massachusetts Ocean Management Plan, the Company submitted comments including specific recommendations on the siting of interconnection facilities. The Company's comment letter to CZM is provided as Attachment A.

The Company's proposed Grid Modernization Plan for 2022–2025 aligns with the Commonwealth's clean energy goals by proposing necessary investments to transition to Net Zero by 2050, when solar and wind are projected to be the majority sources of energy. These proposed investments include advanced meter infrastructure and functionality, investigation into the requirements and functionality that will be needed to integrate a distributed energy resources management system ("DERMS") platform with the Company's advanced distribution management system, and two demonstration projects to study new distributed generation interconnection schemes and the options for interconnecting increasing amounts of renewable energy to the Company's system.[26]

As discussed under Strategy E4, potentially ground-breaking future state distributed energy resource planning is under consideration in D.P.U. 20-75. The DPU has identified the need for the Massachusetts electric distribution companies to conduct a distribution system planning analysis to identify distribution system infrastructure investments to achieve the Commonwealth's clean energy and climate policy objectives, in particular, the interconnection of solar and other distributed generation facilities.[27] The Company is enthusiastic about this opportunity and has provided detailed comments describing its current distribution system planning process and a proposal for a future state integrated planning process.[28] This integrated planning process, if implemented, will greatly enhance the ability of the Company to optimize and integrate grid investments to allow for deep electrification, while maintaining affordability for customers. DOER is participating in D.P.U. 20-75, as is the Office of the Attorney General. The Company respectfully suggests that, as the

[26] D.P.U. 21-32 –Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid 2022-2025 Grid Modernization Plan Filing, filed July 1, 2021.
[27] Vote and Order Opening Investigation, Attachment A at 4, D.P.U. 20-75.
[28] National Grid Comments on Straw Proposal, supra, at 16-22.

DPU has open dockets on the distribution system planning process, there is no need for legislation to address that process.

IV. MITIGATING OTHER SOURCES OF EMISSIONS

National Grid supports efforts to curb the direct emissions of Massachusetts' small industrial sector by targeting a 50% reduction by 2030 from a 1990 baseline. While the two largest sources of direct GHG emissions from the operation of our electric and gas networks, specifically SF_6 and methane, are addressed by the MassDEP's regulations, National Grid has set even more aggressive internal targets to reduce emissions. National Grid has committed to an 80% reduction in GHG emissions by 2030 from a 1990 baseline. Additionally, National Grid has also set a target for reducing SF_6 emissions 50% from a 2019 baseline by 2030. However, achieving emissions reductions from energy delivery networks must be pursued with caution to ensure that reliability of the system is not jeopardized. As illustrated by recent events in Texas, energy delivery interruptions can have severe impacts.

Strategy N1: Target Non-Energy Emissions That Can Be Abated or Replaced

Based on its recent experience in substantially reducing SF_6 emissions from its electrical transmission system in Massachusetts and adjoining jurisdictions in New York and Rhode Island, National Grid does not believe that it is necessary or appropriate for the Commonwealth to adopt phase out or replacement requirements for SF_6-containing gas insulated switchgear in line with those proposed in 2020 by California regulators or to otherwise tighten the thresholds and underlying policy concerning SF_6 emissions from such equipment incorporated in MassDEP's Reducing Sulfur Hexafluoride regulation (310 CMR 7.72). Over the past five years, National Grid has reduced its SF_6 emissions well beyond that of the Massachusetts GHG emissions limit of 50% from 1990 to 2030. These reductions have been achieved through targeted equipment replacements, improved

tracking of SF_6, more expedient leak repairs, improved SF_6 handling procedures, and enhanced equipment design. Although National Grid has proactively engaged with circuit breaker manufacturers regarding the availability of non-SF_6 alternatives, there is currently no feasible non-SF_6 alternative gas (based on properties such as operating temp, global warming potential, operating history, and longevity) that is presently on the market or that is likely to be within the 2030 timeframe. That said, 115 kilovolt ("kV") vacuum circuit breakers are expected to be available in 2022, but the design is still immature with no units yet in-service.

Further, even if non-SF_6 high-voltage equipment were available today, the impact on 2030 emissions would be small. National Grid has approximately 1,400 pieces of electrical operating equipment in Massachusetts that contain SF_6. Accordingly, assuming National Grid's usage of such equipment is representative of other utilities in the Commonwealth, relevant equipment requirements in Massachusetts are not significant enough to leverage manufacturers to expedite the development of non-SF_6 alternatives. Equipment phase-out mandates to encourage development of non-SF_6 alternatives would instead be better initiated on the federal level.

Energy delivery networks by their very nature must be distributed throughout the Commonwealth and National Grid's operation and maintenance of its assets may take place in areas of environmental importance. National Grid understands the important role played by environmental habitats from the local ecosystems to combating climate change. In fact, the Company has recently committed to enhancing the environment on 10% of its fee-owned lands. However, it is important to balance environmental protections and enhancements with the need to maintain and expand the network as needed to facilitate the delivery of clean energy.

V. PROTECTING OUR NATURAL AND WORKING LANDS

Strategy L1: Protect Natural and Working Lands

As stated in National Grid's Environmental Sustainability Policy, National Grid takes its responsibilities to the environment very seriously. As part of its planning process for every project, National Grid evaluates wetland impacts and strives to avoid and minimize temporary and permanent impacts to the greatest extent possible. Where possible, the Company seeks to avoid and minimize wetland impacts by:

- using existing access routes;
- avoiding and minimizing stream and wetland crossings;
- conducting work in wetlands manually;
- using construction mats in wetlands to minimize soil disturbance and rutting;
- coordinating the timing of work to be least impactful wherever possible; and
- considering alternate routes or work methods to minimize impacts in wetlands.

In developing and funding an expanded suite of incentive-based programs to achieving no net-loss of forest and farmland, EEA must not impede the ability of utilities to construct the infrastructure that is necessary for the growth of renewable energy. Infrastructure projects necessary to support the growth of renewable energy could include new, expanded, refurbished, replaced or upgraded transmission and/or distribution lines or substations; and infrastructure necessary to interconnect renewable energy generation to transmission and/or distribution facilities. As discussed in the Company's comments on Strategy E4, the Company already implements a number of strategies to protect habitats and species.

In continuing to protect and restore inland and coastal wetlands, EEA should recognize the importance of utility maintenance exemptions in regulations to allow for maintaining, refurbishing, replacing or upgrading transmission and/or distribution lines or substations. Revisions to the Massachusetts Environmental Policy Act ("MEPA") are currently being considered relating to the

replacement and maintenance provisions for utilities; these should be strengthened and not weakened.

National Grid recommends that EEA develop a state in-lieu fee program tied to the Massachusetts Wetlands Protection and Clean Water Acts. Such a program could be a funding mechanism for preserving forest and farmland. Current mitigation options under the Wetlands Protection Act and regulations and the Water Quality Certification provisions of the Clean Water Act and regulations are quite limited. This puts utility companies at risk at having their projects or portions of their projects denied or delayed as they attempt to develop mitigation plans. National Grid urges the Commonwealth to consider implementing an in-lieu fee program that would provide permittees an option to use in-lieu fee payments as mitigation for their project impacts and would allow for more significant efforts (including the aggregation of multiple project payments) to restore and enhance inland and coastal wetland and wetland buffers, including forested wetlands and farmland rather than each regulatory program requiring differing mitigation standards be met, often fragmenting the opportunity to realize more comprehensive ecosystem benefits.

Strategy L2: Manage for Ecosystem Health and Enhanced Carbon Sequestration; and Strategy L4: Develop Sequestration Accounting and Market Frameworks

As evidenced by its Net Zero Plan, National Grid has positioned itself as a leader in the transition to a clean energy economy by aggressively targeting reductions in our GHG emissions. While emission reductions must be a priority, National Grid recognizes the importance of understanding and enhancing natural sequestration and acknowledges there also is a role to be played by carbon off-setting. As such, National Grid supports Strategy L2: Manage for Ecosystem Health and Enhanced Carbon Sequestration and Strategy L4: Develop Sequestration Accounting and Market Frameworks.

National Grid manages an extensive network of Right-of-Ways which, while performing the intended vital function of energy distribution and transmission, also provides valuable habitat for birds, pollinators and other wildlife. There also may be a potential opportunity for this resource to be managed to support carbon sequestration through the conduct of research and identification and implementation of best management practices. While climate change is certainly a global issue, National Grid also supports the development of a local carbon sequestration market framework as encouraging local mitigation efforts is important to build community awareness and engagement. This approach is consistent with National Grid's internal Carbon Offsetting Policy which, following the completion of all reasonable steps to reduce emissions, prioritizes the procurement of local carbon sequestration offsets.

VI. EEA EMISSIONS QUESTIONS

In October 2021, the EEA hosted a public webinar, "Approach to Complete the Clean Energy and Climate Plan for 2025 and 2030", which included three discussion questions. EEA requested input from interested stakeholders regarding emissions accounting and tracking, gross vs net emissions, the categories of emission sublimits, and the general approach to completing the Clean Energy Climate Plan for 2025 and 2030. National Grid provides its responses to the three questions below.

Question 1: Do you have any concerns with EEA setting limits on gross emissions while tracking and lowering net emissions through goal setting and policy development?

National Grid is supportive of the proposal to set emissions limits based on gross emissions while simultaneously tracking and lowering net emissions. Gross emission reporting has greater maturity and is how such emissions are reported today. While we completely agree that carbon sinks are an important piece of the Net Zero puzzle, and one that we plan to pursue in relation to our land

holdings, we believe that additional time is needed to develop programs and processes for consistent reporting. We also recommend that while annual monitoring of emissions may be conducted, it is important to consider the long-term trends as year-to-year variation may be expected due to weather and other external factors.

Question 2: Do you have any concerns with EEA setting emissions sublimits to be consistent with the categories already in the statewide GHG emissions inventory?

National Grid believes EEA's approach, which incorporates sublimits for emission categories identified in the Climate Law into the current statewide GHG inventory categories, is appropriate. We urge EEA to pursue collaborative, data-driven processes to arrive at these limits with the input of key stakeholders, including the utilities and energy efficiency Program Administrators, and other subject matter experts. While recognizing the importance of sublimits and milestone years, we also urge EEA to consider the cumulative impact of emissions in intervening timeframes and not ignore the value associated with eliminating emissions between the milestone years. Furthermore, the sublimit-setting process may be well-served by taking into account the historical performance of various policy strategies against prior sectoral reductions targets, in the formulation of new sublimits. Finally, we encourage a broad view of emissions be taken, such as the consideration of a fuel's full value chain emissions (e.g., to reflect the emissions reductions from biofuels) and the comprehensive impact analysis of fuel switching (e.g., to ensure emissions reductions actually result).

Question 3: Do you have any concerns regarding moving forward with the approach described today in completing the Clean Energy and Climate Plan for 2025 and 2030?

Given the need to address the risks posed by climate change, National Grid believes that EEA should finalize the Interim 2030 Plan to be the Clean Energy and Climate Plan for 2025 and that a new plan should be developed addressing 2030 goals and emission limits. Given the dynamic

nature of developments in this arena, we believe that the Commonwealth would benefit from such additional planning. An updated plan in several years' time could allow for evaluation of the Interim Plan's deployment strategies for new end-use technologies and supply resources, together with associated electric and gas network infrastructure requirements – as well as consideration of additional potential strategies and technologies needed to achieve 2030 reductions, which may not have been prioritized in the Interim Plan. An updated Clean Energy and Climate Plan for 2030 could account for not only the progress of clean energy development and deployment strategies, but also assess the impacts of ongoing and planned clean energy strategies to increase energy affordability and equity in the Commonwealth.

VII. CONCLUSION

National Grid appreciates the opportunity to submit updated comments on the Interim Plan. National Grid is prepared to work together with the Administration to advance the Commonwealth's ambitious decarbonization goals in ways that maintain the affordability, resilience, reliability and accessibility of our energy systems. National Grid hopes that the recommendations offered herein will help advance those goals in the most cost-effective way possible for consumers, by reducing barriers to innovation encouraging efficient investment of capital, and keeping customer affordability and adoptability at the forefront. National Grid looks forward to supporting the Commonwealth as it further develops these recommendations and remains committed to doing our part to help the Commonwealth advance decarbonization across the economy while ensuring affordability, resilience, reliability and accessibility for all customers.

Wendy B. Levine
Assistant General Counsel
Environmental Permitting

June 24, 2020

By E-Mail (lisa.engler@state.ma.us)

Lisa Berry Engler, Director
Massachusetts Office of Coastal Zone Management
251 Causeway Street, Suite 800
Boston, MA 02114

Re: MA Ocean Management Plan Review

Dear Lisa:

Boston Gas Company, Massachusetts Electric Company, Nantucket Electric Company and New England Power Company, each d/b/a National Grid (collectively, "National Grid"), respectfully submit the following comments as part of the second Massachusetts Ocean Management Plan review and update. National Grid is an international electricity and gas company delivering energy to millions of customers across Great Britain and the northeast United States, with gas and electric transmission and distribution operations in Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

As you requested, National Grid's comments focus on notable trends and issues associated with coastal/ocean-related energy and infrastructure, as well as recommendations for priority science and data actions for the next five years of the Ocean Management Plan. National Grid submits these comments in support of the Commonwealth's path-breaking work on marine protection and planning, which is grounded in science and developed with extensive public and stakeholder input. In providing these comments, National Grid seeks to ensure that the needs of the Commonwealth's energy users and the goals of the Commonwealth's renewable energy policy remain in the forefront of considerations as the five-year review and update of the Ocean Management Plan are finalized.

Notable Trends and Issues

Few trends have been as impactful, since the last Ocean Management Plan update, as the acceleration of offshore wind development in the Commonwealth. In 2016, Massachusetts established its initial requirements for procurement of offshore wind in Section 12 of "An Act to Promote Energy Diversity," St. 2016, s. 12 (the "Energy Diversity Act"), enacting Section 83 of "An Act Relative to Green Communities," St. 2008, c. 169. Section 83C set the initial rules and requirements for offshore wind procurement in Massachusetts, requiring the first 1600 MW of offshore wind to be solicited and under contract by 2027. Ultimately, this procurement was completed seven years ahead of schedule. In 2018, new legislation, "An Act to Advance Clean Energy," St. 2018, c. 227, s. 21(a) (the "Clean Energy Act"), directed the Massachusetts Department of Energy Resources ("DOER") to study whether to procure an additional 1600 MW of offshore wind generation by 2035, and whether to solicit independent offshore wind transmission. In 2019, DOER concluded that Massachusetts electric distribution companies

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should procure an additional 1600 MW of offshore wind "if found to be cost-effective," possibly by way of two 800 MW solicitations to be conducted in 2022 and 2024.

These actions by the Commonwealth are taking place alongside federal agency development of standards and guidelines for offshore wind projects that will have profound effects on the offshore wind industry. Further changes are being driven by the array of parties, including developers and operators, drawn to this active offshore development environment. The agreements governing the relationships between these parties, including between developers and utilities, continue to evolve as well. In sum, Massachusetts has catalyzed a level of offshore wind activity that shows no signs of abating.

The following comments address siting for electric transmission cables for conventional generation and siting for gas pipelines, but more particularly address siting for transmission cables to deliver electricity from offshore wind projects.

1. Siting Constraints for Cables and Pipelines

As National Grid commented during the 2014 Ocean Management Plan review, the Ocean Management Plan delineates six areas of "special, sensitive or unique" ("SSU") resources that apply to cables, and seven SSUs and two types of concentrated water-dependent uses that apply to gas pipelines. Cables and pipelines are presumptively excluded from areas of the specified SSUs, and pipeline proponents must "avoid, minimize, and mitigate impacts" to concentrated areas of the specified water-dependent uses. These exclusions and requirements could present major barriers to projects with significant public benefits, including those that support state, regional and federal renewable energy initiatives. Likewise, they may inhibit utilities' efforts to increase electrical reliability, decrease electrical costs, and combat global warming by using renewably generated power.

The 2015 Ocean Management Plan's inclusion of four preliminary offshore wind transmission cable corridors for further survey, characterization, and assessment was a positive step. However, as shown in Figure 29 of the 2015 Ocean Management Plan, there remains almost no way to bring an electric cable to shore between Cape Ann and outer Cape Cod. Similarly, according to Figure 30 of the 2015 Ocean Management Plan, there is almost nowhere in Massachusetts coastal waters to site a natural gas pipeline outside of the applicable SSUs and water-dependent use areas. To bring a cable to shore between Cape Ann and outer Cape Cod, or to bring a pipeline to shore almost anywhere on the Massachusetts coast, project proponents will be forced to overcome the presumption of exclusion from SSUs, and pipeline proponents will also have to avoid, minimize and mitigate impacts to the areas of concentrated water-dependent uses.

Additionally, it appears that the preliminary offshore wind transmission corridors were identified solely based on the SSU area mapping. They do not appear to consider any engineering or

installation constraints, including consideration of water depth and proximity of landfall sites to viable electric grid interconnection locations. Moreover, the Ocean Management Plan entirely prohibits transmission cables in the Cape Cod Ocean Sanctuary, meaning that for a project to connect to Boston or the North Shore it would be required to remain in federal waters, which would increase the cable length and any anticipated impacts.

These constraints may especially impact the burgeoning offshore wind industry. Given the pace of offshore wind development and the number of projects in planning or under development, there will be an increasing need to accommodate offshore cables to deliver renewable energy to onshore users. These cables will need to be located in various areas within the Ocean Management Planning Area, including within the SSUs. To accommodate this need, the Ocean Management Plan should employ a flexible framework that acknowledges the environmental benefits to be gained from transmission projects supplying offshore wind generated power to Massachusetts households and businesses.

There are various possible solutions to this problem, some of which National Grid identified in its comments on the 2014 draft update.

- **Revisit SSU delineations.** The extent of the North Atlantic Right Whale Core Habitat SSU in Cape Cod Bay should be re-evaluated. It does not appear to be justified, because it is based only on 2013 data, and it presumptively excludes cables from Cape Cod Bay. As shown in Figures 22 and 23 of Volume 2 of the 2015 Ocean Management Plan, basing the SSU delineation on 1998-2014 data (or any more current data) may leave an open corridor through Cape Cod Bay. Likewise, the area of North Atlantic Right Whale core habitat mapped just south of the southern edge of Martha's Vineyard should be reconsidered.

- **Reduce presumptive exclusions.** The list of SSUs (and, for pipelines, water-dependent uses) from which cables and pipelines are presumptively excluded should be more limited. For example, whale habitat can be addressed with time-of-year restrictions; cable installation on areas of hard and complex sea bottom can sometimes be accomplished using cable installation methodologies that do not require blasting or dredging for the offshore portion (jet plowing, controlled flow excavation, mass flow excavation, or other similar techniques) and using horizontal directional drilling near shore.

- **Identify optimal routes that are presumptively permissible.** Given the constraints imposed by the Stellwagen Bank National Marine Sanctuary and the Cape Cod Ocean Sanctuary, any offshore cable bringing power from the north to any location between Cape Ann and Provincetown must go through a narrow corridor off of Cape Ann (see Appendix Figures 4-1 and 4-2 in the 2015 Ocean Management Plan). Therefore, there is a need to create presumptively acceptable routes within that corridor. In doing so, it will be vital to provide adequate spacing between utility lines for initial construction and future repairs. Repairs typically require more

corridor width than the original installation. In addition to these presumptively permissible routes, new projects should continue to be permitted in other locations if they meet the existing performance standards.

- **Exempt Public Necessity or Convenience Projects from SSU Restrictions.** A transmission project that is found to be a public necessity or convenience project could be exempted from the SSU presumptive exclusions on the condition that an appropriate mitigation fee is set aside to mitigate for any actual, permanent impacts to species or habitats. The mitigation fee would be established in relation to the mitigation fee schedule presented in the 2015 Ocean Management Plan given the acknowledged public benefits of such projects.

2. Evaluating Offshore/Onshore Interconnections

The Ocean Management Plan should encourage interconnections from offshore generation that take advantage of existing infrastructure where possible. For example, the former Brayton Point Power Station presents a logical choice for interconnection because the surrounding transmission system was previously developed to accommodate the former on-site generation. Other viable interconnection points are identified in the ISO New England 2019 Economic Study - Offshore Wind Transmission Interconnection Analysis (available at https://www.iso-ne.org/static-assets/documents/2020/05/osw-econstudy-transmission-interconnection-analysis-may-2020-nonceii.pdf).

The Ocean Management Plan should identify corridors for offshore transmission cables that prioritize efficient interconnections with existing onshore infrastructure. In doing so, the Ocean Management Plan should incorporate analyses undertaken, including future studies, by ISO New England and others.

3. Regulatory Coordination and Streamlining

New transmission facilities are subject to an array of reviews and permitting requirements, including by the Energy Facilities Siting Board, the Department of Public Utilities, the Massachusetts Department of Environmental Protection (MassDEP), the Massachusetts Environmental Policy Act Office, as well as federal and local agencies and agencies in neighboring states. The Ocean Management Plan should promote efficient review and permitting by seeking to coordinate reviews and to minimize potential conflicts between reviewing agencies and the Commonwealth's renewable energy goals. This effort could include using the Ocean Management Plan to: (1) actively coordinate the environmental review and permitting process between agencies; (2) establish presumptions in favor of siting projects that are consistent with Ocean Management Plan-designated corridors; and (3) prioritize and rank the sensitivity of resource areas and habitats to guide siting decisions and environmental impact reviews.

Other Comments on the Ocean Management Plan

1. Mitigation Fee Schedule: The mitigation fee schedule presented in the 2015 Ocean Management Plan accounts for the appropriate set of factors and provides a reasonable degree of transparency and predictability. However, as National Grid has commented before, the mitigation fee schedule should permit a fee reduction for public necessity or convenience projects.

2. Maintain Definitions for Bottom Habitats: To foster a sense of predictability and consistency, the updated Ocean Management Plan should maintain the definitions for delineating hard bottom and complex bottom habitats that appear in the 2015 Ocean Management Plan.

Priority Science and Data Recommendations for Next Five Years

After more than ten years of Ocean Management Plan implementation, the Commonwealth should continue to refine existing data and to collect additional data as new data gaps are identified.

1. Eelgrass Mapping: The last publicly available eelgrass mapping performed by the state occurred in 2015, when the MassDEP released mapping that subsequently was incorporated into the Ocean Management Plan. Eelgrass is an ephemeral resource, so updated nearshore mapping of eelgrass would be useful as part of future Ocean Management Plan reviews. It also would assist offshore wind developers seeking to identify potential cable routes that can avoid direct impacts to eelgrass beds, and it would be useful to estimating the impacts associated with sediment dispersion caused by cable installation activities.

2. Seabed Characterization: High Resolution Geophysical (HRG) Survey and Acoustic Basement Mapping would provide additional certainty regarding sediment characterization. HRG technology continues to evolve, so an updated, state-led HRG survey should be conducted. It would benefit planning for all projects, specifically by identifying hard bottom habitats, potential historical or archaeological features, rock interfaces, and the top of glacial till. If the State does not undertake an updated HRG survey, the Ocean Management Plan should identify preferred seabed characterization methodologies.

Similarly, the state should undertake a coastal geological assessment for on-shore landing areas to assist in modeling or confirming the presence of sufficient cable landing burial to outlast natural sand deposition cycles and coastal storm surges.

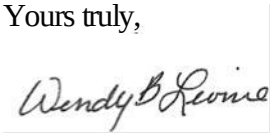
3. Performance Standards for North Atlantic Right Whale Core Habitat: The performance standards for core whale habitat may warrant re-evaluation, specifically to

determine whether to alter the performance standards from "avoidance" to a combination of time-of-year restrictions, vessel speed limits, and marine species observer requirements.

4. Munitions and Ordnance Study: The state should undertake a survey of Munitions and Explosives of Concern and Unexploded Ordnance (MEC/UXO) to assist in characterizing potential transmission corridors given that military records may be confidential and given that the expense of identifying and evaluating MEC/UXO on a project-specific basis can be substantial.

National Grid appreciates the opportunity to provide these comments and is committed to continuing to work with the Commonwealth on the development and implementation of the Massachusetts Ocean Management Plan. Thank you for your consideration of our comments.

Yours truly,



Wendy B. Levine

cc: J. Newman (electronic only)
A. Agostino (electronic only)
D. Campilii (electronic only)
P. Wall (electronic only)
N. Hitti (electronic only)

WEST BOYLSTON MUNICIPAL LIGHTING PLANT

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Telephone (508) 835-3681 Fax (508) 835-2952

October 15, 2021 (sent via email)

Executive Office of Energy and Environmental Affairs
Secretary Kathleen Theoharides
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: Comments on the Clean Energy and Climate Plan for 2025 and 2030

Dear Secretary Theoharides,

Thank you for the opportunity to submit comments related to the Clean Energy and Climate Plan for 2025 and 2030 (CECP). The owners and ratepayers of West Boylston's Municipal Lighting Plant (WBMLP) appreciate and support the Commonwealth's efforts to reduce greenhouse gas (GHG) emissions and decarbonize the entire state economy.

Please accept the following comments related to the CECP:

- WBMLP's ratepayers, through their locally elected Board of Light Commissioners adopted a Greenhouse Gas Emission Standard (GGES) in August 2019 and updated our GGES in February 2020. West Boylston's GGES requires net-zero GHG emissions by 2050, with interim goals of 50% by 2030 and 75% by 2040. The CECP should include information about locally controlled MLP's who adopted GHG emission standards.

- The Acts of 2021 created a statewide Greenhouse Gas Emissions Standard (GGES) applicable to all municipal lighting plants (MLP). The MLP GGES achieves the same "net-zero" GHG emission goal in 2050 applicable to the distribution companies and competitive energy suppliers. The CECP should include information about the MLP GGES legislation.

- Emission data in the interim CECP is outdated and misleading. EEA must collect and publish emission data more rapidly. The CECP references 2017 data when 2019 data was readily available. Significant changes occurred in the electric sector since 2017. For example, coal and oil generation are no longer significant contributors to MA GHG emissions. Please consider collecting and publishing emission data more rapidly. Timely and accurate data is important for consumers who pay for our decarbonization programs.

- The CECP should focus on the two major sectors contributing to most of the states GHG emissions. The 2019 GHG emissions from the top three sectors in MA were:

2019 MMTCO2e	Sectors
25.5	Building Heating & Cooling (More than 2x electricity sector)
31.9	Transportation (Approx. 3x electricity sector)
10.8	Electricity Sector/Consumption

The electricity sector reduced GHG's 62% by 2019, compared to the 1990 MA baseline emission year. No other sector has made significant progress to date. Please consider incentivizing electrification of the buildings and transportation sectors by including a carbon price on fossil fuels used in the building and transportation sectors.

- The interim CECP states MLP's are 14% of the load and are not subject to the RPS, CES, and CES-E requirements. The CECP shouldn't mislead the public by inferring MLP's haven't contributed to the Commonwealth's GHG emission reductions. MassDEP's 2018 GHG Reporting Program Summary Report compares the percent of total retail kWh sales that are non-GHG emitting. MLP's have a higher percentage of non-GHG emitting energy compared to the electric utilities and competitive suppliers. West Boylston's 2018 energy supply was 50% non-GHG emitting.

MassDEP GHG Reporting Program	2018 % Non-GHG Emitting
Electric Utilities	21%
Competitive Supplies	17%
Municipal Light Plant (MLP) Average	32%
West Boylston's MLP	50%

- The New England electricity sector is operated and administered by ISO-NE. Massachusetts relies on significant electricity imports from surrounding states to meet our energy needs. New England's electricity sector emission rate is 493.8 CO2e lbs. per MWh; one of the lowest in the nation (See attachment 1, table 1). At the same time, MA consumers pay some of the highest electricity rates in the nation (See attachment 1, table 2). The CECP should include this information to compare our state and regions GHG reduction efforts.

On behalf of WBMLP's ratepayers please consider our concerns and concerns regarding the CECP.

Sincerely,

General Manager

Attachments:

1. Table 1, 2019 regional control area electricity sector emission rates and table 2, 2019 average price of electricity per state.

Attachment 1:

Table 1: 2019 eGRID Electricity Sector Emission Rates

eGRID Subregion Acronym	eGRID Subregion Name	2019 CO2e lbs/MWh (Emission Rate)
NYUP	NPCC Upstate NY	233.0
CAMX	WECC California	455.3
NEWE	**NPCC New England (ISO-NE)**	**493.8**
AKMS	ASCC Miscellaneous	551.3
NYCW	NPCC NYC/Westchester	555.1
SRVC	SERC Virginia/Carolina	679.1
RFCE	RFC East	698.5
NWPP	WECC Northwest	719.9
SRMV	SERC Mississippi Valley	809.6
FRCC	FRCC All	864.5
ERCT	ERCOT All	872.4
U.S.	U.S. Average	889.2
SRTV	SERC Tennessee Valley	955.6
AZNM	WECC Southwest	956.9
SRSO	SERC South	974.0
SPSO	SPP South	1,006.7
RFCW	RFC West	1,074.4
SPNO	SPP North	1,077.6
MROW	MRO West	1,106.4
AKGD	ASCC Alaska Grid	1,120.8
HIMS	HICC Miscellaneous	1,195.6
RFCM	RFC Michigan	1,197.0
NYLI	NPCC Long Island	1,218.9
RMPA	WECC Rockies	1,250.6
MROE	MRO East	1,512.6
PRMS	Puerto Rico Miscellaneous	1,543.3
SRMW	SERC Midwest	1,595.9
HIOA	HICC Oahu	1,707.6

Source: https://www.epa.gov/egrid

Table 2: 2019 Average retail price of electricity

State	(cents/kWh)
Hawaii	28.72
Alaska	20.22
Connecticut	**18.66**
Rhode Island	**18.49**
Massachusetts	**18.40**
New Hampshire	**17.15**
California	16.89
Vermont	**15.36**
New York	14.34
Maine	**14.04**
New Jersey	13.42
District of Columbia	12.27
Michigan	11.56
Maryland	11.24
Wisconsin	10.66
Arizona	10.52
Delaware	10.52
Florida	10.44
Minnesota	10.33
Kansas	10.26
Colorado	10.17
South Carolina	10.02
South Dakota	9.96
Indiana	9.91
Georgia	9.86
Alabama	9.83
Pennsylvania	9.81
Tennessee	9.69
Missouri	9.68
Ohio	9.58
Illinois	9.56
Virginia	9.52
North Carolina	9.45
Mississippi	9.28
Iowa	9.08
Nebraska	9.08
Montana	9.02
New Mexico	8.99
North Dakota	8.85
Oregon	8.81
Nevada	8.78
Kentucky	8.61
Texas	8.60
West Virginia	8.49
Utah	8.24
Arkansas	8.22
Wyoming	8.10
Washington	8.04
Idaho	7.89
Oklahoma	7.86
Louisiana	7.71

Source: https://www.eia.gov/electricity/sales_revenue_price/