Clean Energy and Climate Plan for 2050 Public Comment – Letters Submitted

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Please identify a single entity (EEA Secretary?) that will coordinate the implementation of this plan and be accountable to the public for meeting milestones and defending decisions. Please also define a mechanism for the public to be kept abreast of progress to the plan, such as quarterly reporting and/or updated milestones on a website.

Please also provide insight into the assignment of goals to organizations in the executive branch (such as MassDEP and DPU), and the allocation of funds, if any, to these organizations for the purpose of implementing this plan. Ensure they are involved in the creation of any goals that are ultimately allocated to them.

Please explain how these agencies will be incented to accept and implement goals that are in their area of responsibility? Create motivation for them to still seek to implement this plan when budgets are tight and something has to give. (I.e., recommend their unique responsibilities are included in the tasking that is reported to the governor and the public each year.)

Please dictate that the sublimits required to be defined by sector must be identified for the 5-year increments that the economy-wide reductions are defined for.

Please make the model used for assessing GHGs public, to include assumptions made, GHG contributors included, and formulas used? This will help both with the ability of the public to provide support and obtain insights, but can also help municipalities who seek to do similar assessments at the local level.

Please show not only the sublimits below the 1990 level, but also below current level. Please also express emissions in both percentage and in actual absolute levels.

Please provide explanations for any area which is allowed to grow rather than reduce GHG emissions (e.g., industrial processes).

The agriculture sector emits great amounts of carbon; why are there no sublimits imposed? Please include agricultural sublimits that will help to foster sustainable agriculture in MA.

Please explain why biofuels are in this mix at all. They may speak to energy independence, but they do not contribute to emission reductions.

Relying on off-shore wind is better for powering communities close to the wind farms, but less effective to powering communities further away due to transmission losses. Please consider including more distributed options as well, to include promotion of solar canopies over our numerous parking areas, as well as rooftop solar.

I applaud efforts to increase family-friendly, affordable housing stock along the commuter rail lines; but I note that those seeking affordable housing will be put off by the cost of the tickets for commuter rails. Perhaps work with the DPU to discover ways to reduce the cost of commuter rail service to enhance ridership and also enable underprivileged families to even consider moving to these new homes in the suburbs?

Should this plan include a strategy to include the conversion of empty commercial spaces into residential ones, if current virtual work trends continue, rather than continually building more space when existing space is empty.

Should the plans include promotion of multi-use zoning that encourages neighborhood gyms, stores, and community centers, etc. for the purpose of getting folks out of their cars and onto their feet or bikes or scooters?

The decommissioning of some natural gas piping will dovetail with the use of “Green Natural Gas” from extinct landfills, that the utilities are planning on (or at least National Grid is). The energy goals should address methods for minimizing leakage and inspections of the new piping.

How do the Building Sector’s Key Targets & Metrics translate to percentage of residences and commercial square feet?

Without disincentives to plunder forested land for the sake of building solar farms, industry will cut trees to put up solar. The net carbon balance of this is typically net negative. Please provide a negative incentive for cutting trees to erect or enable solar. MEPA review will only help if the removal of carbon sequestration in trees is viewed as legitimate grounds for rejecting a project.

The “Future of Fuels” bullet implies that biogases and synthetic combustion emissions are not currently in the inventory. This should change. Bio-based combustion has the added penalty of outputting black carbon, which darkens snow and other surfaces and warms the planet.

Please describe with specifics how the GHG inventory has been created and will be monitored. Calling out a “bio-physical approach” is interesting, but the success or failure of the plan is dictated by the details of what is included and how the data is collected.

October 21, 2022

BY ELECTRONIC SUBMISSION

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

RE: Public Comments on the Massachusetts Clean Energy and Climate Plan for 2050

Vicinity Energy Inc. (Vicinity) is pleased to provide comments on the proposed emissions limit, sublimits, goals and policies for the Massachusetts Clean Energy and Climate Plan for 2050 (CECP 2050). We congratulate Secretary Card and the staff of the Executive Office of Energy and Environmental Affairs (EEA) for their commitment to achieve an economy-wide reduction of greenhouse gas emissions in Massachusetts of at least 85% below the 1990 level, one of the most ambitious emission reduction plans in the United States.

Vicinity operates a vast district energy network that supplies thermal energy to over two hundred and thirty buildings and more than 70 million square feet of space in Boston and Cambridge. This thermal energy heats buildings, heats and chills water supply, cools spaces during summer months by way of steam-driven air conditioning, and enables advanced production technologies that rely on processes such as sterilization and humidification. Vicinity serves many of the most critical customers in Boston and Cambridge, including all the major downtown hospitals. Ongoing reliability of supply to these customers is of the utmost importance as we transition to a decarbonized future.

Currently, Vicinity operates a combined heat and power (CHP) unit in Cambridge (Kendall Station), which generates electricity delivered to the grid as well as cogenerated thermal energy. Producing thermal energy from a central plant eliminates the need for installation and management of less efficient on-site boilers (thereby increasing emissions), increases the reliability of energy supply and eliminates the dangers of on-site fuel combustion.

In October of 2020, Vicinity released our own 2050 Net Zero Carbon Roadmap and, with this plan in place, we know we can make unique and vital contributions to the Commonwealth's goal**.** As part of Vicinity's 2050 Net Zero Carbon Roadmap, we have already taken drastic steps toward the decarbonization of our operations and a migration away from carbon emitting fuels. These efforts will have a dramatic impact on the carbon footprint of the 70 million square feet of space we serve today as well as the future buildings we connect to our system.

The backbone of Vicinity's decarbonization plan is to electrify its operations by generating steam using electric boilers and heat pumps and procuring renewable electricity from the grid as our primary fuel source. (eSteam™: https://www.vicinityenergy.us/products-services/esteam). The electrification of individual buildings in Boston and Cambridge will be an incredibly challenging and expensive task in the time frame required. By connecting to the district energy system, building owners will have the ability to successfully meet state and local regulations and have access to 100% renewable, carbon-free thermal

energy. **This plan will enable us to eliminate 400,000 tons or more of carbon annually by 2035, which will greatly impact the reduction of emissions in the Commonwealth.** (See Appendix A)

As noted in the recently released Clean Energy and Climate Plan for 2025 and 2030 (CECP 2030), emissions from the operation of Massachusetts buildings were equal to approximately 30% of the Commonwealth's total greenhouse gas emissions in 2020. This is a direct result of the building sector's heavy reliance on on-site combustion of fossil fuels for space and water heating. Across much of the Commonwealth, building efficiencies and the electrification of heating can be relied on to decrease emissions.

However, in urban areas, dense construction and the long lives of commercial buildings will make it nearly impossible to electrify without significant retrofit costs and grid congestion. In these areas, production of thermal energy with progressively lower carbon content at a central plant and supplying it to end use customers through an extensive district energy distribution network will remain the most efficient and cost-effective way to condition these buildings without compromising reliability. With that reality in mind, the "Buildings Sector" section of the final CECP 2050 should identify district energy distribution (i.e. steam, hot water, chilled water, etc.) as a valuable tool to be relied on by the Commonwealth to achieve its 2050 net zero statewide greenhouse gas emissions goal.

Rather than extending the current policy based on the recommendations from the MA Commission on Clean Heat (Building Sector) and the CECP 2030 (Building and Power Sectors), we recommend including the following policy portfolio considerations:

- As an alternative to, or in conjunction with heat pumps, building owners should evaluate connecting to the district energy system where available, leveraging thermal energy delivered in the form of steam, hot water, or chilled water. Thermal energy heats and cools buildings by transferring energy from the district energy network to/from the buildings heating and air conditioning systems. It also enables advanced production technologies for clinical and life sciences manufacturing and research that rely on processes such as sterilization and humidification. For many buildings, connecting to the system will be more efficient, more reliable due to system redundancies, and cost effective depending upon the building, location, and existing infrastructure. During cold periods when heat pumps require auxiliary heating to meet building requirements, district heating could provide the needed "lift" to meet critical high temperature processes that cannot be served by heat pumps alone.

- In densely developed urban areas, where building-by-building electrification may prove to be difficult and expensive, customers who are currently receiving steam through the district energy system should be encouraged to continue doing so. Customers in urban areas who are unable to electrify their heating uses should be incentivized to obtain their thermal energy needs by connecting to a district energy system that can leverage low carbon and renewable energy sources whenever feasible.

- Vicinity's procurement strategy for renewable electricity to generate eSteam™ is intentionally flexible. As we discuss options to serve our customers with renewable thermal energy (eSteam™), we are proposing a few different renewable alternatives, including Power Purchase Agreements – Physical, Power Purchase Agreements – Financial, and Renewable Energy Certificates ("RECs"). Our intention is to design our renewable energy purchasing to be compliant with state and local regulations. We strongly recommend the Commonwealth

recognize a multitude of carbon neutral electrical sources and a diversity of decarbonized certification to allow time for large scale renewables to come online. These sources should include:

1. Renewable/decarbonized certificates for electrical supplies outside of the New England ISO grid; and
2. Carbon neutral electricity generated sources and associated certificates of generation within and outside the New England Grid.

- The Alternative Portfolio Standard (APS) currently lists the criteria for large, water-source heat pumps to qualify for the program and the means to generate APS credits. This is stipulated within 225 CMR 16. The Massachusetts Department of Energy Resources (DOER) Guideline (*Metering and Calculating the Useful Thermal Output of Eligible Renewable Thermal Generation Units*), which is referenced within the same legislation, stipulates criteria that effectively eliminates the largest and most efficient industrial heat pump complexes from consideration. The DOER's guidelines provide specific temperature requirements that are not applicable to high temperature industrial heat pumps and only apply to those appropriate for residential and small commercial settings. In addition, the DOER guidelines introduce efficiency criteria that effectively eliminate any industrial heat pump complex seeking to generate at temperatures well above normal spacing heat or domestic hot water use. This not only introduces confusion, but also partially excludes Vicinity's aggressive, efficient, and exciting heat pump complex from the program. We do not believe these guidelines are in the best interest of Massachusetts's decarbonization efforts. We recommend EEA support the following changes to DOER guidelines:
    1. The DOER Guideline should be revised to use temperature criteria that is reflective of a high temperature heat pump;
    2. The DOER Guideline should use a coefficient of performance (COP) that reflects the type of COP that is achievable when doing high temperature discharges and high temperature lifts; and
    3. The DOER Guideline should recognize waste heat (suitable for industrial heat pumps) as a qualifying heat source.

- Incentivize the use of energy sourced from alternative fuels by facility owners. Energy sourced through electrification, renewable natural gas, other biogenic fuels, hydrogen blends, etc. can be used to achieve carbon emission reductions with minimal infrastructure changes to facilities currently using pipeline gas.

- As accurately noted in the CECP 2030, "additional clean energy resources are likely to be needed to ensure there are sufficient balancing resources available when intermittent renewable energy is not available". Vicinity recommends updating the Clean Peak Energy Portfolio Standard to include thermal energy storage systems as a qualified energy storage system and updating the clean peak resource definition to include the dispatch of thermal energy to an interconnected thermal energy distribution network. Similar to electric energy storage systems, thermal energy storage systems will allow Vicinity to procure the greenest, most affordable electricity when it is available (typically overnight, offshore wind), generate heat, and store it in the thermal battery until district heating demand is high (early morning as buildings heat up for the workday). As a result, Vicinity will dramatically lower the average cost of renewable thermal energy for our customers.

Finally, the Massachusetts Commission and Task Force on Clean Heat has been tasked with addressing statutory, regulatory, and financing mechanisms needed to develop reliable and affordable clean heat solutions in the Commonwealth's buildings by 2023. While the role of the Commission and Task Force, in consultation with the Massachusetts Department of Environmental Protection, is to design and recommend long-term emission caps on heating fuels, it will be imperative for this Commission to also identify sustainable and cost-efficient ways to replace natural gas and oil with clean alternatives to heat buildings adequately and reliably across the Commonwealth. As experts in the field, Vicinity would like to be a resource for this Task Force.

The EEA's 2050 Decarbonization Roadmap focuses on actions needed to achieve "net-zero" carbon emissions by 2050 through a rapid transition to the use of carbon-free and resilient energy resources. Vicinity looks forward to working with the Administration to achieve these ambitious emission reduction targets.

Vicinity is dedicated to a Clean Energy Future. With decades of experience tackling global energy problems on a local level while using local resources, Vicinity is committed to ensuring more efficient, reliable, and resilient generation of thermal energy for consumers across the Commonwealth, especially in its urban centers. We appreciate that the report acknowledges the role natural gas, when used most efficiently, must serve as a crucial resource to ensure the reliability of electricity supply through 2030 and beyond. We urge the Commonwealth and EEA to recognize the contribution that CHP and district-wide steam distribution infrastructure can make in achieving its 2050 emission reduction goals and to be explicit in identifying it as a tool to be used in that process.

Thank you again for the opportunity to provide comments on the CECP 2050. We welcome the opportunity to discuss these comments in greater detail with the Secretary and staff.

Respectfully,

Jaclyn Bliss
Chief Customer Officer

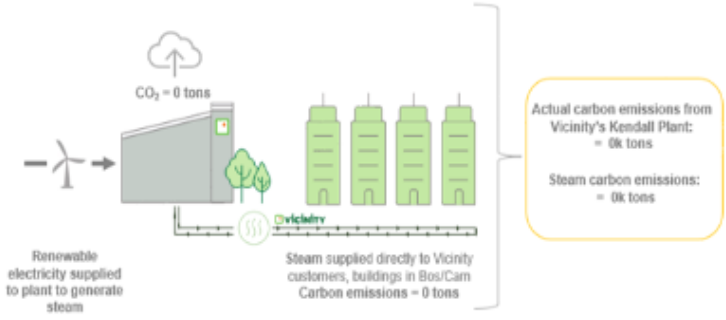
Vicinity Energy Inc.
vicinityenergy.us

Appendix A – Vicinity's Renewable eSteam™

Carbon Benefits of Vicinity's *Renewable* eSteam™ for Boston and Cambridge

Commercial buildings represent the highest source of carbon emissions in major cities, making them one of the most important targets in urban decarbonization.

To address this challenge, Vicinity now offers renewable steam to its customers in Boston and Cambridge. Instead of fossil fuels, Vicinity utilizes carbon-free electricity to generate eSteam™. Vicinity will procure electricity from renewable, carbon-neutral energy sources like wind and solar, and using state of the art technologies in our plant, will turn these electrons into steam. This means there will be **zero carbon emissions** associated with the eSteam™ we supply to our customers.



October 21, 2022

Bethany Card
Secretary of Energy and Environmental Affairs
Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 1020
Boston, MA 02114

Subject: UndauntedK12 comments on the Draft 2050 Clean Energy and Climate Plan

Dear Secretary Card, Undersecretary Chang, and the 2050 Clean Energy and Climate Plan Team:

Thank you for this opportunity to comment on the draft Massachusetts 2050 Clean Energy and Climate Plan. We appreciate the work to create this plan which stretches over decades and implicates all facets of the Commonwealth.

UndauntedK12 is a non-profit organization with a mission to support America's K-12 public schools to make an equitable transition to zero carbon emissions while preparing youth to build a sustainable future in a rapidly changing climate. We work with district, state, and federal leaders to animate climate action in the K-12 sector. We believe deeply that the education sector has a transformational and underappreciated role in fostering climate action. We also see the opportunity for climate action in public schools to support a more equitable future. Lastly, we believe that given the grave generational injustice inherent in climate change that we have a moral responsibility to provide young people with every opportunity to learn about and benefit from the climate solutions that are the key to their livable future.

We offer the following comments as you refine this plan.

Manifest an all-of-state response with support for capacity-building & collaboration

While it is crucial to craft a plan that is based on a solid accounting of emissions sources and pathways to reduction, this technical detail is simply the foundation. In order for the Commonwealth to achieve its goals, leadership, mobilization, and coordination are crucial. Specifically, we need to mount an all-of-state response in which we activate all parts of our state government. The 2050 plan should make explicit the state agencies that are critical to achieving the state's goal. For example, the Massachusetts School Building Authority which oversees investment in our largest form of public infrastructure - our K-12 schools - should be mentioned

as a key actor to achieving a decarbonized future. Because the work to achieve our 2050 goals must be urgently underway, we cannot waste any time in ensuring that the leaders and staff in these agencies understand the important role they must embrace in leading the state's transformation to an equitable zero carbon future. The 2050 plan can and must make clear that achieving net zero by 2050 requires a collaborative whole-of-state response and that the state will make investments in capacity-building to support this work.

Adjust for a new landscape created by The Inflation Reduction Act

Since Massachusetts issued its last Clean Energy and Climate Plan, President Biden signed into law the Inflation Reduction Act. The Act represents a dramatic shift in the landscape and creates massive opportunity for both the public and private sectors. The new plan should incorporate strategies and tactics to maximize the extent to which the Commonwealth is able to fully leverage the tools and resources available through the Inflation Reduction Act as well as the Bipartisan Infrastructure Law. For example, Massachusetts schools could claim billions in incentives as we replace and upgrade HVAC systems to address IAQ, heating, cooling, and ventilation needs.

Recognize the transformative and essential role of education

Sustaining decades of climate action, transforming mindsets, and preparing a workforce to ensure Massachusetts leads in a new clean economy are decades-long undertakings that must begin today. Beginning today means beginning in our schools. Our education system has an essential role to play in climate action that includes showcasing climate solutions, enhancing community resilience, and preparing young people to meet the challenges of the future. The 2050 plan should acknowledge the powerful role of our education systems and call education leaders into this work as valuable and needed partners.

Thank you again for your leadership and commitment to devising a plan that will guide the Commonwealth's climate action and serve as a model for other states across the country.

For questions about these comments, I can be reached at sara@undauntedk12.org.

Sincerely,

Sara Ross
Co-founder
UndauntedK12

The Trustees of Reservations
200 High Street | Boston, MA 02110

October 21, 2022

The Honorable Bethany Card, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: *Natural and Working Lands in the draft Clean Energy and Climate Plan for 2050*

Dear Secretary Card,

The Trustees of Reservations appreciates the commitment by the Executive Office of Energy and Environmental Affairs (EEA) to tackle climate change head on, and EEA's proposed Clean Energy and Climate Plan (CECP) for 2050. Thank you for the opportunity to comment on this critical effort to achieve the state's laudable Net Zero mandates.

The Trustees has been working internally on a carbon transition. In 2021, we established an internal Environmental Sustainability Task Force (ESTF), and throughout 2022, the ESTF convened monthly to deliberate on a transition philosophy and framework, climate mitigation and sequestration targets and strategies, greenhouse gas (GHG) inventory assessment, staff insights and priorities, and sustainable investing. The ESTF is considering an approach for going beyond net zero over time and a model that could be transferable to other organizations, landowners, state, and local government. This will require both reducing the GHG emissions associated with the construction, operation, and maintenance of our built and natural environments to as close to zero as possible *and* acquiring, managing, and maintaining the Trustees' natural resources in a way that captures and stores additional carbon year over year.

The Trustees is also an active member of the Global Warming Solutions Act Implementation Advisory Committee's Land Use and Nature-Based Solutions Work Group. We look forward to continuing our partnership with the state 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.

Below please find comments similar to those we submitted last April in response to the 2025/2030 CECP, focused on the critical role that Natural and Working Lands play in mitigating climate change impacts.

Natural and Working Lands

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.[1] 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[2] and have the potential to store 1-2 million metric tons more with currently available practices.[3]
- **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.[4] Coastal wetlands face existential threats from climate change, especially sea level rise.
- **Farms** cover nearly 10% of the state's land area.[5] 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 recommendations to protect, manage, and restore Natural and Working Lands:

PROTECT Natural and Working Lands

We applaud the Baker-Polito 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 – on private as well as public lands. 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; and call on agency officials to steer resources toward Environmental Justice Populations.

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 Trustees and the state's 140+ land trusts and watershed associations, which regularly leverage significant private

[1] U.S. Dept. of Commerce Bureau of Economic Analysis 2019 report. See https://outdoorindustry.org/state/massachusetts
[2] 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
[3] Nature4Climate, 2020. https://nature4climate.org/u-s-carbon-mapper
[4] Nahlik, et al., 2016. https://www.nature.com/articles/ncomms13835
[5] https://www.mass.gov/info-details/agricultural-resources-facts-and-statistics

investments and help cities and towns with planning, funding, and completing complex land and water conservation and 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 is concerned about state incentives that encourage industrial-scale solar arrays in our forests. We support state incentives to develop solar on brownfields, parking lots, highway medians, rooftops, and other low-impact areas with minimal ecosystem service values. And we call for the CECP to halt 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 a comprehensive, statewide spatial analysis using stakeholder input, and a determination describing specific lands that are most - and least - appropriate for large scale solar development.

MANAGE Natural and Working Lands

The Trustees strongly supports the Administration's proposals to improve management of working farms and forests and look forward to creating 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. We will support legislation in the next session that would accomplish these goals by providing additional incentives to private forest landowners when they commit to managing their forests for increased carbon storage by incorporating specific climate smart forestry practices into their forest management plans and 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[6] [7] 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 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 6 working farms, Community Supported Agriculture programs with 1,300 members, 56 community gardens, 3 farm stands, and active mobile markets that support communities in Boston living in food deserts. 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.

[6] Managed Forest Law (Sections 77.80 to 77.91, Wis. Stats.) and its administrative rules (Chapter NR 46, Wis. Adm. Code)
[7] https://dnr.wisconsin.gov/topic/forestlandowners/mfl

RESTORE Natural and Working Lands

The Trustees supports the Greening the Gateway Cities program, 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 tree planting program along rivers and streams. However, we request the state to set annual goals to plant a specific number of trees by 2050, 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 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 2050, 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:

- Hire a coordinator who is devoted to helping multiple agencies review projects. 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 for 2050, 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 2050 and beyond. The Trustees looks forward to continuing our internal work, and partnering 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
Senior Director Government Relations
The Trustees

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Secretary Bethany A. Card
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

October 19, 2022

Subject: Comments on 2050 Clean Energy and Climate Plan

To Secretary Card:

Thank you for providing an opportunity to comment on the draft interim Clean Energy and Climate Plan (CECP) for 2050. Transportation for Massachusetts supports the Commonwealth's efforts to provide a more sustainable, equitable, accessible, well-connected, and cleaner transportation system to allow our economy to grow while reducing greenhouse gas (GHG) emissions.

The Commonwealth has made progress on reducing GHG emissions, especially in the electricity sector, through investing in renewable energy and energy efficiency. GHG emissions from transportation, however, remain stubbornly high -- the single largest contributor in the state of any sector of our economy.

The Draft CECP is a good start toward reducing emissions, but must be improved if we are to achieve our goals as a Commonwealth. We recommend that the Executive Office of Energy and Environmental Affairs (EEA) strengthen the 2050 CECP in a number of ways to reflect a multi-pronged approach to reducing transportation emissions, including tailpipe pollution that disproportionately harms marginalized communities. These provisions include; flexing federal highway dollars approved in the Infrastructure Investment and Jobs Act (IIJA) from roads to transit to invest in communities that lack access to public transit including rural communities across the Commonwealth, focusing electric-vehicle (EV) adoption on buses and public fleets; increasing EV sales goals to 50% by 2030; reducing the upfront EV cost burden and increasing incentives for electric bikes (e-bikes); focusing on environmental justice (EJ) populations; implementing strategies to reduce vehicle miles traveled (VMT); and improving and expanding

public transportation and biking and pedestrian infrastructure. We have outlined specific comments for these and other initiatives in the sections below.

Expand Transportation Options Throughout the Commonwealth

The 2050 CECP plan must invest in public transportation, biking, and walking as strategies to reduce VMT and GHG emissions. In addition to the electrification of the bus fleets and implementing the Rail Vision approved by the MBTA Fiscal and Management Control Board, promotion of and investment in public transportation are critical to a sustainable clean future.

The first recommendation of the Baker Administration's Commission on the Future of Transportation report, completed in December of 2018 is to, "Prioritize investment in public transit as the foundation for a robust, reliable, clean, and efficient transportation system…because 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."[1]

In addition to investments in public transit, the Commonwealth should make investments in walking and biking infrastructure around public transit stations so pedestrians and cyclists can safely access public transportation.

The MBTA, Regional Transit Authorities (RTAs), and MassDOT should work together to create a comprehensive statewide plan to maximize federal funding for public transit through the Infrastructure Investment and Jobs Act (IIJA). Through the IIJA, states have an opportunity to unlock billions of dollars of additional funding for public transit by flexing federal highway dollars to public transit. MassDOT, RTAs, and the MBTA can flex funding from the following programs:

- Funding from the National Highway Performance Program (NHPP) to pay for transit near a highway, if a cost-benefit analysis shows the transit project would be more cost-effective than expanding the highway.
- The Surface Transportation Block Grant Program, the second-largest highway formula program, allows states to invest in transit infrastructure without any additional requirements. The same is true for the new Carbon Reduction Program. States control most funding in these programs but substantial amounts have to be spent in large metro areas, where the metropolitan planning organization plays a major role in deciding how money is spent.
- The Congestion Mitigation and Air Quality program (which can fund projects only in areas where air quality violates EPA standards) can also be used for transit. The

[1] Commission on the Future of Transportation, *Choices for Stewardship:Recommendations to Meet the Transportation Future: Volume 1;* Page 36, 2018. https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download

implementation of CMAQ varies by state, but MPOs often play the lead role in deciding how to spend funding within their boundaries.

The U.S. Department of Transportation recently published a resource outlining which programs are flexible, describing the administrative process for "flexing" federal highway dollars, and referencing real-world examples of where programs were used for transit, such as a Texas project to improve sidewalks near bus stops and a Connecticut project to install secure bike parking at a train station.

Investing in public transportation has many co-benefits for public health beyond reducing congestion and reducing single occupancy vehicle (SOV) trips. Studies show that investment in public transit increases physical activity (PA). A 2015 study of transit users in Salt Lake City showed that "public transit users spend approximately 20 min per day in PA on days they use transit and 10 min per day on days they do not use transit, compared with approximately 5–6 min per day in PA for non-transit users."[2] Increased PA improves individual health, reduces the burden on the health care system, lowers health care and employer costs, and improves overall public health. In addition, increased use of public transit will reduce traffic fatalities for Massachusetts residents. According to the Centers for Disease Control (CDC), "An analysis of the transportation fatality risk in the U.S. found that the fatality rates per billion passenger miles traveled between 2000 and 2009 were 0.11 for buses, 0.24 for urban mass transit rail trains, 0.43 for passengers on commuter rails, and 7.28 for drivers or passengers in a car or light truck."[3]

Public transit also produces significantly less GHG emissions per mile than SOVs. We agree with the Commission on the Future of Transportation's report that "Only by attracting and retaining new riders can the Commonwealth see the benefits that transit can provide for GHG reduction, congestion relief, economic growth, and community revitalization."[4] A 2010 study by the Federal Transit Administration shows that "heavy rail transit, such as subways and metros...produce 76% less in greenhouse gas emissions per passenger mile than an average single-occupancy vehicle (SOV). Light rail systems produce 62% less and bus transit produces 33% less." See the graphic below:

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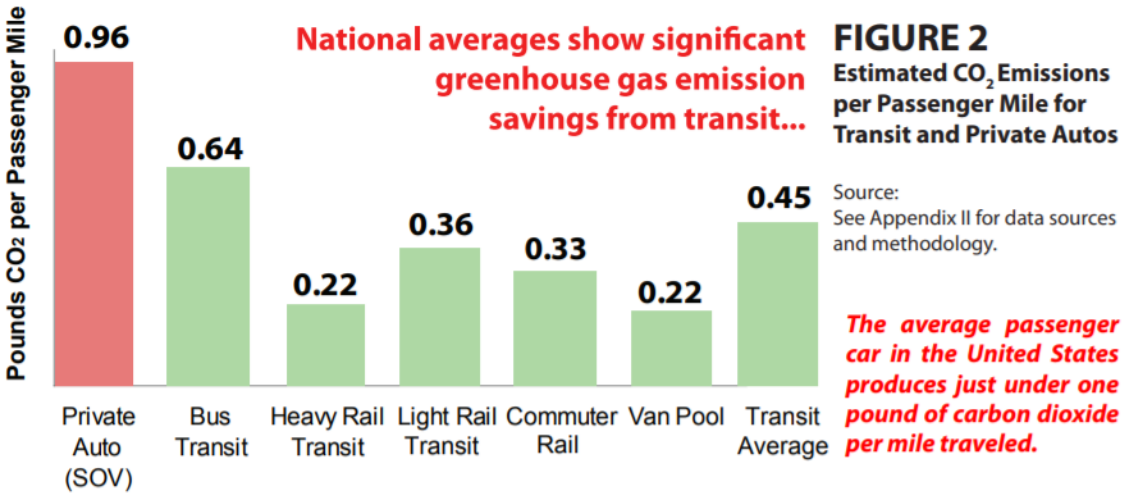
[2] Harvey J. Miller, et al."Public transit generates new physical activity: Evidence from individual GPS and accelerometer data before and after light rail construction in a neighborhood of Salt Lake City, Utah, USA," Health Place, September 1, 2015. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4679466/

[3] https://www.cdc.gov/policy/hst/hi5/publictransportation/index.html from Savage I. Comparing the fatality risks in United States transportation across modes and over time. Research in Transportation Economics. 2013;43(1):9-22.

[4] Commission on the Future of Transportation, Choices for Stewardship:Recommendations to Meet the Transportation Future: Volume 1; Page 36, 2018. https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download



Source: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/PublicTransportationsRoleInRespondingToClimateChange2010.pdf

To promote more equity in the transit systems and increase access to public transit for EJ communities, the MBTA and RTAs should adopt innovative fare policies that increase access to public transportation for low-income riders. The CECP should set targets for increased investment in public transit including promotion of ferry, bus, commuter bus, commuter rail, and subway services. 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.

Finally, Massachusetts should require companies of 50 employees or more to offer pre-tax commuter benefits for their employees. Cities and states, including San Francisco and New Jersey, have adopted laws to mandate offering these benefits to employees. A 2016 report to the California legislature on the effects of commuter-benefit mandates showed that an estimated 44,000 employees in the San Francisco Bay Area shifted from driving alone to another form of transportation. This resulted in a reduction of an estimated 35,778 tons of CO2 emissions over the first 12 months of the program's implementation. There is no reason to believe that similar results would not materialize if Massachusetts were to adopt a statewide mandate.

Reduce Upfront Zero Emission Vehicle Purchase cost Burden

Incentivizing zero emission vehicles (ZEVs) for individuals, businesses, and institutions at the point of sale with rebates through the MOR-EV program will continue to bring down the upfront costs of ZEVs over time. This strategy, however, falls short of widespread adoption in EJ

communities as ZEVs continue to be priced much higher than internal combustion engine vehicles (ICEVs).

We recommend Massachusetts commit to implementing a ZEV rebate program for moderate-and-low income residents, and mandating MOR-EV rebates at point of purchase.

In addition to rebates for EVs sold for passenger cars and light and heavy duty vehicles, the MOR-EV program should include e-bikes and offer upfront incentives for e-bike purchases. Municipalities like Ashland, OR offer incentives for e-bikes including up to $300 incentives and British Columbia currently offers $1,050 rebates. Colorado has authorized a $12 million program for e-bike incentives and the state of Connecticut approved a $10 million e-bike rebate program. Lowering the upfront costs of e-bikes will make them more accessible to more residents -- especially low-income residents in EJ populations -- while also promoting mode shift and transportation alternatives to reduce dependency on single-occupancy vehicles.

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, Massachusetts 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. According to the Commission on the Future of Transportation's report "While Massachusetts is among the top ten states in terms of the number of charging stations and outlets presently available, more work needs to be done to provide a sufficient charging infrastructure to support vehicle electrification."[5]
- Launch curbside/utility pole charging programs in collaboration with municipalities, and establish incentives for other challenging sectors.
- Require utilities to propose alternative rate structures and consumer incentive programs to encourage charging overnight or at other beneficial times.
- 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.

[5] Ibid, pg. 26. https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download

Reduce Rather than Stabilize Vehicle Miles Traveled

Reducing vehicle-miles-traveled (VMT) is perhaps the most important strategy to reduce GHG emissions from the transportation sector and promote alternative transportation modes. The Commonwealth cannot just "stabilize VMT" -- we must reduce VMT on an annual basis through the CECP and other strategies. If we do not provide opportunities for Massachusetts residents to do less driving, we simply won't be able to meet our environmental and quality-of-life goals.

Under the status quo, VMT is projected to increase 21% from 2010-2030. By the 2030 CECP's own admission, "Since 1990, the number of vehicle-miles traveled (VMT) annually has steadily increased and passenger vehicle purchases have trended toward larger vehicles (e.g., sport utility vehicles) in the last decade. The increase in VMT and vehicle size has largely offset the emissions benefit from more stringent federal fuel efficiency standards." If we reduce VMT, it makes all of our goals on transforming our fleets and greening our grid easier to achieve, while also delivering substantial, lasting co-benefits in cost-effective ways. Measures to reduce VMT must be paired with efforts to accelerate the transition to electric vehicles. Both strategies will be critical.

We appreciate the clear goal to reduce commuter VMT per employee by 15% by 2030. To build on this, we suggest applying this goal to all trips, rather than just commutes. California has already adopted this same target of reducing VMT per capita by 15% by 2030. We must invest in a transportation system where residents can use public transit or active transportation for the 87% of daily trips that are not commutes.

Coordinate Between Agencies

The Commonwealth needs to include land use and housing policies in a holistic approach to the transportation sector. This involves including DHCD, 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. Shifting land use patterns and improving multi-modal options has many co-benefits, including improving economic mobility, reducing commute times, improving public health outcomes by reducing air pollution and traffic fatalities, and conserving open space, which is necessary for carbon sequestration to be a successful mitigation tool. Mode-shift should be an explicit goal for the Commonwealth.

Study and Implement Congestion and Roadway Pricing

MassDOT should establish a plan and target date to implement congestion or roadway pricing in Greater Boston. Studies of cities and regions around the world show that congestion pricing reduces car traffic and congestion in some cases up to 30%. Congestion pricing in Massachusetts could provide a consistent source of funding for commuter rail, bus, and subway service, and

improve quality of life for residents. Based on an analysis of expected revenue loss from the gas tax and EV uptake, the need to establish a plan and target date to implement road pricing is only more important the longer it takes to accomplish this. The Commission on the Future of Transportation also recommends that "MassDOT should consider various congestion pricing strategies that compel changes in default transportation behaviors on corridors that are or could be served by transit and/or new mobility options. In order to provide an economic market signal, MassDOT should consider and pilot congestion-pricing strategies."[6]

The Legislature recently passed a roadway and congestion pricing commission as part of the transportation bond bill that was amended by Governor Baker that would have started this process. Out of the ten most populous metropolitan areas in the country, metro Boston is the *only one* that does not use some form of time of day roadway pricing to control congestion.

Thank you for you for allowing us to comment on the 2050 CECP and we hope you will incorporate our recommendations to set targets for fleet electrification, implement congestion pricing, expand incentives for EV infrastructure and e-bikes, reduce rather than stabilize VMT, coordinate between agencies to implement TOD projects, and invest and promote public transportation.

Sincerely,

Pete Wilson
Senior Advisor
Transportation for Massachusetts

[6] Ibid, pg 42.
https://www.mass.gov/doc/choices-for-stewardship-recommendations-to-meet-the-transportation-future-volume-1/download

The Nature Conservancy
in Massachusetts
99 Bedford Street, Suite 500
Boston, MA 02111

tel [617] 532.8300
fax [617] 532.8400
nature.org/massachusetts

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

October 21, 2022

RE: Draft *Clean Energy and Climate Plan for 2050* Recommendations

Dear Secretary Card:

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 *Clean Energy and Climate Plan for 2050* (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.

The Conservancy has appreciated our appointment to a seat on the Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC), since its establishment in 2012. We are grateful for the opportunity to co-chair the Land Use and Nature-Based Solutions Work Group (NBS Work Group) and to provide input on the CECP.

Thank you for your leadership in developing a robust and comprehensive 2025/2030 CECP, especially the new emphasis on the essential role protecting, managing, and restoring Natural and Working Lands. The Conservancy believes the 2050 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 thirty years. We appreciate the Baker/Polito administration's continued leadership in responding to ambitious new laws that set targets, 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 worked so hard to collaborate with stakeholders, manage consultants, and prepare the Decarbonization Road Map, technical analyses, and CECP.

Recommendations on Cross-Cutting & Enabling Policies:

We appreciate the inclusion of cross-cutting strategies in this iteration of the CECP and respectfully offer the following recommendations:

1. Workforce Development

   Implementing the CECP provides a tremendous opportunity to train and scale up a 'green' workforce. We are glad to see this explicitly highlighted in the CECP; however, jobs related to natural and working lands carbon storage and sequestration are not clearly included. In order to increase tree planting and retention, the Commonwealth will need trained arborists, nursey workers, etc., and sustainable forest management will require current and future foresters and harvesters to be trained in climate smart forestry practices. There is also a suite of jobs associated with installing and maintaining nature-based solutions, such as green infrastructure, for achieving goals in adaptation, resiliency, and water quality. These kinds of jobs should be included in new training programs, vocational education, university partnerships, and Corps programs developed by the state and explicitly included in workforce development recommendations.

2. Climate Leadership

   We are glad to see the state commit to being leaders and educators as we transition to a Net Zero future. We would suggest that the Department of Conservation and Recreation (DCR) be included in this section, as well. DCR management of its own Woodlands provides an opportunity to teach and inspire private landowners by demonstrating climate-smart forestry practices. These same practices on private lands are not always available for others to view and learn from.

3. Environmental Justice and Just Transition

   During the 2025/2030 CECP process, the IAC unanimously voted to recommend that the CECP include and prioritize climate justice. We continue to support that recommendation and hope that climate justice is integrated into each sector's strategies and metrics in the 2050 CECP. In terms of the overarching recommendation in this section, we strongly recommend that the 2050 CECP include a timeline and milestones for when EEA will "begin tracking and setting goals." The process of developing goals for clean energy and climate investments in environmental justice communities should also include members of those communities themselves to inform the development, implementation, and oversight of policies and programs to meet those goals. Therefore, this strategy should also include a meaningful stakeholder opportunities and corresponding timeline. These additional elements are important for transparency, accountability, and good governance.

In addition to the above, we urge the inclusion of the following additional cross-cutting recommendations:

1. Increasing municipal, regional and NGO capacity

   The ambitious goals, programs, and policies included in the CECP will require an 'all hands-on deck' approach to implementation. Existing state funding and programs are already challenging for smaller or under-resourced municipalities to access. Solving this problem, and preventing new funding and programs from overwhelming existing capacity, will require cooperation and

partnerships between municipalities, regional planning agencies and other regional partners, and nonprofit and community groups. Simplicity of grant and loan applications, administration, and reporting for communities and partners should be a goal of any new or expanded funding sources and programs in order to scale up the work of reducing emissions quickly and efficiently. This need for regional capacity and public/private partnerships should be included in the cross-cutting and enabling policies section and this section should make commitments of state funding for municipalities, regional entities, and nonprofit and community partners.

2. Enhance stakeholder process

We appreciate EEA's efforts to provide presentations and public forums regarding the 2050 CECP and to provide translation in multiple languages. However, we did find it challenging to provide comments given the short time period between EEA's hearings and the deadline for commenting. We hope that, in the future, more time can be provided so that stakeholders have ample time to consider and comment on proposals.

Sector-based recommendations:

The Conservancy has previously provided comments on the 2025/2030 CECP that still remain relevant to the 2050 CECP, and we hope EEA will refer back to those (for convenience, they are attached as an appendix to this letter). Given our expertise, we have focused on high-level comments on the proposed policies, targets, and metrics for natural and working lands (NWL) within the 2050 CECP below.

Extension of Current Policy:

Expand NWL conservation with federal and state funding, state support to municipalities and RPAs, and options to channel private investments to NWL conservation.

This strategy will be critical to implementing the actions outlined in the 2025/2030 and 2050 CECPs; however, this strategy should also include funding to nonprofit organizations, community-based organizations, and other local partners (as mentioned above). Groups like land trusts and watershed associations already work closely with municipalities and regional planning agencies, have technical capacity often lacking at the municipal level, and efficiently lead and manage complex conservation and restoration projects like those outlined in the CECP. Currently, very few state grants are available to nonprofit organizations, despite the critical role they play in advancing land conservation and restoration across the state.

Please see additional details below in the section "Key Metrics and Targets" regarding our goals for expanding conservation.

Encourage local tree supply and expand planting efforts to more state partners (e.g. NGOs, schools, youth groups).

This strategy is critical if we are to reach tree planting and reforestation goals. Many groups, including TNC, have calculated that existing nursery supply in the eastern US is far below what is required given ambitious and necessary goals for reforestation. We must increase local nursery capacity and provide workforce development and training for those who plant and maintain trees, as well as get better at determining where natural regeneration of forests can be successful and doing the needed prep work (treatment of invasive species, preparation of soils, control of deer

browse) to allow forests to grow. We suggest EEA consider how the state might stand up state nurseries or support expansion of nurseries, especially in partnership with New York state which has been exploring options to increase the supply of tree seedlings. Finally, to ensure that seedlings/saplings are available to environmental justice and under-resourced communities, these communities should be given priority, potentially through preferential pricing and specific goals for numbers of trees provided.

Develop methodologies for quantifying GHG emissions implications of large-scale land clearing and potential options for mitigation, including reuse of wood for long lived wood products and contributions to tree planting and land conservation efforts.

We appreciate EEA's desire to use data driven approaches, and we strongly suggest they refer to existing studies and reports. For example, under a U.S. Climate Alliance grant, Clark University completed a report on *Avoided deforestation: A Climate Mitigation Opportunity In New England And New York*. Given EEA's interest in exploring regional opportunities for natural and working lands carbon, it is critical that the data and metrics we use are aligned with those of other states. This regional report would be a logical starting place to build from and could be updated in future years if new or different data becomes available.

We also suggest that EEA revisit ideas from previous policy efforts to partially avoid, minimize, and mitigate the impact of land clearing. As just one example, requiring developers to choose from options such as clearing a smaller footprint for buildings, retaining individual large trees rather than cutting mature trees and later planting small saplings as part of the landscaping, or paying to transport and process, rather than burn, low value wood could all be shovel-ready, low-cost options that could reduce the emissions from development.

New Policies:

Explore regulatory pathways to limit deforestation

We are pleased to see that this idea is being considered and look forward to working with EEA on this to take it from an exploratory effort to tangible and meaningful policy. In a net zero framework, Massachusetts cannot afford to lose forests, blue carbon ecosystems, or other carbon-sequestering acres, especially not at the current pace of loss. In addition to their carbon sequestration benefit, those lands are usually equally important in climate change adaptation, making any loss a triple loss – one that emits greenhouse gases, forgoes any future carbon sequestration, and leaves both human and natural communities more vulnerable to climate change impacts.

Key Metrics and Targets:

Net NWL emissions of [ ]% below the 1990 level by 2050

The inclusion of a limit to emissions from natural and working lands is appreciated, and we hope that the 2050 CECP includes a numeric goal rather than a placeholder. Like any other sector, we need to reduce emissions from natural and working lands, while also increasing the amount of carbon sequestered. Both goals – for reductions to emissions from activities such as deforestation and degradation of wetlands, and for increases to the amount of carbon sequestered by activities such as urban tree planting and healthy soils practices – should be clearly laid out in the 2050

CECP along with interim benchmarks and the activities required to reach them. We suggest that, as a starting point, EEA might consider the US Climate Alliance "Opportunity Assessment" prepared for the state, The Nature Conservancy's US State NCS Mapper, and/or EEA's own projections of what is ambitious but feasible. As with all of the sectors in the 2050 CECP, the goals may need to be revised over time, but having a clear goal is helpful to inspire sufficient investment in and scaling of the excellent policies and programs outlined in the 2025/2030 CECP for the natural and working lands sector.

40% of MA land and water permanently conserved by 2050

We applaud the state's goal of permanently protecting 40% of MA lands and waters by 2050. This will require protecting an average of approximately 25,000 acres/year between now and 2040, which in turn will require an increase in the pace of land protection by state agencies, and an increase in incentives, grant programs, and other mechanisms to support municipalities, land trusts, tribes, community-based organizations, and other entities. The longer we take to reach that pace, the higher the subsequent annual acreage goals will need to be. We also recommend maintaining an ultimate goal of permanently protecting 50% of MA lands and waters by 2060, which extends the need to protect approximate 25,000 acres/year until 2060. Resources such as the Wildlands, Woodlands, Farmlands and Communities dashboard and Mass Audubon's Losing Ground series provide helpful context around the current pace of loss and the needed increase in conservation.

At least 64,400 acres of new urban and riparian trees by 2050

We are glad to see an explicit goal for increasing urban and riparian tree cover in the CECP. However, 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, tree retention is also important and goals for tree canopy should also 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, and particularly in Environmental Justice communities, all 26 Gateway Cities, and other urban centers.

As there will be a limited supply of seedlings/saplings, we recommend EEA prioritize the siting of trees where they will have both climate mitigation and other benefits (e.g., where they might reduce heat island effects, lower the heating and cooling energy needs of nearby buildings, and absorb stormwater). EEA should collect additional data on urban trees, where losses occur, and the types of development that are associated with loss. In suburban and rural areas, programs should prioritize reforesting riparian and flood-prone areas (for example, by matching USDA Natural Resources Conservation Service cost-share funding).

Finally, it will take significant on the ground resources to achieve this goal; therefore, it should be paired with strategies to staff up relevant state programs (like Greening the Gateway Cities and urban and streambank reforestation), to support increasing municipal staff, to support contracting with those who do the actual work of planting the trees, and to create workforce development opportunities in this field.

Alternative compliance mechanisms:

The supplemental slides included in EEA's public presentations are helpful in explaining a net zero framework. EEA's interpretation is that it will be in compliance with the law if the remaining emissions from all sources in 2050 are equal to or less than the amount of carbon that is captured or sequestered in the state by all sources that year. What to do in the (somewhat likely) event that 2050 emissions are higher than the amount that can be absorbed within the state is a challenging question with no perfect answer; one that other states with large populations and ambitious climate goals (e.g. CT, NY) are also facing.

We understand that EEA is discussing how to reach net zero emissions in 2050 with several other net zero states. This collaboration was included in the 2025/2030 CECP, though not the slides presented about the 2050 CECP. If EEA decides to explore a framework for alternative compliance -- such as offsetting or trading emissions within Massachusetts (or consumed in Massachusetts) in other states or places -- if net zero goals are not met within the state, then transparency, accountability, and strong oversight will be key. We also suggest that EEA closely follow the national and especially international (Article 6) negotiations that are happening on this issue to increase the chances that Massachusetts is ready to take a lead role if there is federal action to put a price on carbon or other national climate regulations and policies.

One thing that remains clear is that achieving sector-specific goals under the CECP for the natural and working lands cannot be used an excuse for avoiding emissions reductions in any sector. We appreciate EEA's commitment to first achieving deep greenhouse gas emissions reductions (gross emission reductions) across all sectors, including natural and working lands, before considering ways to absorb or offset any remaining unavoidable greenhouse gas emissions. This is another reason that setting a goal for reducing emissions within the natural and working lands sector is critical, since offsets, if used at all, must be used as a last resort after deep emissions reductions in all six sectors. The most critical action to take now for natural and working lands is to move forward on no-regrets strategies and programs, such as the increase in land protection, climate-smart management, and expanded restoration of natural and working lands laid out in the 2025/2030 CECP, to have the best chance of achieving the ambitious goals laid out in the 2050 CECP.

Conclusion:

We appreciate the opportunity to comment on the 2050 CECP and to participate in the Implementation Advisory Committee (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

CC: Judy Chang, Undersecretary of Energy and Climate Solutions
Hong-Hanh Chu, Global Warming Solutions Act Program Manager

Enclosed:

- TNC comment letter on the Clean Energy and Climate Plan for 2025/2030, Submitted 4/30/22
- 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

Appendix: TNC comment letter on the Clean Energy and Climate Plan for 2025/2030, Submitted 4/30/22

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:

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 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 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.

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 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

[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
[2] https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8
[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)
https://www.massaudubon.org/content/download/41477/1007612/file/Losing-Ground-VI_2020_final.pdf

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.

October 21, 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 2050 Clean Energy and Climate Plan

Dear Secretary Theoharides, Undersecretary Chang, and the 2050 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 2050 Clean Energy and Climate Plan.

The Chapter has provided extensive comments on all rounds of the CECP planning process, and all of those earlier comments still stand. This set of comments provide an overall recommendation, with key considerations for a number of the slides, and an in depth policy dive into the Natural Based Solutions slide (Slide 13) of your presentation.

Overall Recommendations

The finalized Plan must more quickly frontload the decarbonization of our economy so that we reduce our emissions sooner. Too often, targets for 2030 allow for too much emitting infrastructure expansion between now and 2030, which unnecessarily creates more work and expense for the people of the Commonwealth in reaching the mandated 2050 emission reduction targets. In the short term, those new combustion-based infrastructure and appliances will continue to cause unnecessary harm to Massachusetts residents with dirty pollution; raise overall rates of accumulated ghg gasses in the atmosphere, subject ratepayers to rollercoaster price spikes, and cause more expense when they must be replaced and retooled for non-combustion technologies in the following decades.

The presentation of the 2050 CECP, in only 20 slides, is very general and lacks detail. We recommend another public comment period in November after the CECP is further fleshed out. Of particular interest are the interim emissions limits and sector sublimits beyond the 2030 targets.

Additionally, recent federal legislation (the Bipartisan Infrastructure Act and Inflation Reduction Act) boost clean energy and climate in countless ways. Has the CECP team fully considered and modeled their impact? Can some of the targets and deadlines be more aggressive?

Based on the slide deck, the 2050 CECP must better define the actions, dates and resources needed to remove the barriers to achieve the state's 2050 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.

Key Considerations on Specific Slides:

Slide 7 Sector Sublimits and CECP Policy Framework

There is not enough detail here to fully comment on this slide. We have questions below, and look forward to further information forthcoming before finalization of the plan.

We are curious if the transportation sector includes all the fueling at Logan and other airports?

Natural Gas Distribution emission reductions are lower in 2050 compared to 2030 (71% vs 82%), meaning that emissions are higher in 2050. On the other hand, as gas distribution leaks are fixed and customers transition off gas, reducing leaks from meters and fittings, gas leaks emissions should *decline* deeply. Please explain and correct.

Slide 8 What Does 85% GHG emissions reduction by 2050 look like?

We know that Transportation Emissions were lowered in 2020 due to the Coronavirus Pandemic. Does the 86% 2050 target take that into account?

The penultimate bullet says most gas pipelines will be replaced by fossil-free alternatives. It's highly unlikely that it will be feasible to transport H2 over significant distances without leaks, explosion risk, etc. Landfill, wastewater, and other biogases are unlikely to have significant additional supply. Please clarify whether this bullet refers to underground or other electric transmission lines, or other non-combustion alternatives, which will be needed.

Slide 9 Transportation Sector

Please revisit our extensive comments on the 2025/2030 CECP and the draft interim CECP, as those recommendations stand. The policies outlined in the slide must have better timelines and metrics for implementation.

The "New Policy" to "Require commitment to smart charging as part of all EV incentives by 2031" is good. Given the large federal incentives for EVs and availability of smart chargers, we suggest advancing the date to 2026. Also, we suggest a roadmap of increasing capability in the smart chargers, from scheduled charging and utility-controlled charging (as in Connected Solutions) to two-way electricity flow that can support the grid at peak times.

The "New Policy" around hydrogen fuel should only support local use of the fuel, to minimize leaks, since H2 is a powerful indirect global warming gas.

Slide 10 Buildings Sector

The 2050 CECP must provide timelines and metrics for the policies listed in Slide 10, and if necessary, must indicate any corresponding legislative statute required to advance that particular policy.

The 2050 CECP must have a stated timeline (we recommend at the latest 2028) whereby no new buildings that are heated and cooled by emitting technologies are built. By stopping the building of new emitting infrastructure and appliances hook-ups, we will more easily reach our emissions reductions targets while saving Massachusetts ratepayers money.

Please provide further information on the Clean Heat Standard and Clean Heat Clearinghouse, including a timeline for their development.

Slide 11 Power Sector

The 2050 CECP must better outlay the policies needed and whether there is a corresponding legislative statute required to advance the policies listed.

As part of rate design, there must include rates for time of use and for two-way energy flows. For the latter, see the virtual power plant (VPP) by Green Mountain Power (VT).

Slide 13 Natural and Working Lands

We have already commented on the CECP 2025/2030 proposal and those comments still stand. The following remarks address the "Extension of Current Policy" to the CECP 2050 as well as Key Targets and Metrics.

1. The primary policy goal of the CECP 2050's NWL sector must be to **draw down atmospheric carbon and to promote biodiversity**. Failure to do so will prevent us from reaching the climate goals of the IPCC, President Biden's executive order to preserve mature and old forests, and to meet the CECP 2050 emissions reduction goals. Maintaining resilience of biodiversity and ecosystem services depends on conservation of 30% to 50% of Earth's land and oceans, maintained in near-natural ecosystems. The best way to accomplish this goal is to preserve mature and old growth forests, cease harvesting trees on public lands and promote solar siting and infrastructure on already disturbed landscapes. This will allow for current forests to achieve old growth status**,** maximize carbon sequestration and storage and will protect habitats far beyond saving single targeted species or conducting habitat restorations.

2. **Expand NWL conservation with federal and state funding, state support to municipalities and RPAs, and options to channel private investments to NWL conservation.** This is an implementation objective or strategy that supports the above goal, which we endorse. However, we would like to highlight an important semantic issue: "conservation" is different from "preservation." Conservation is generally understood to mean that the land is not allowed to be developed; however, it can be (and is) used for purposes of extraction which degrades its ecological value. As we stated in our previous comments, the interests of the Commonwealth would be better served to *preserve* our natural lands, including forests, wetlands and grasslands, i.e., protect them from all human-caused disturbances.

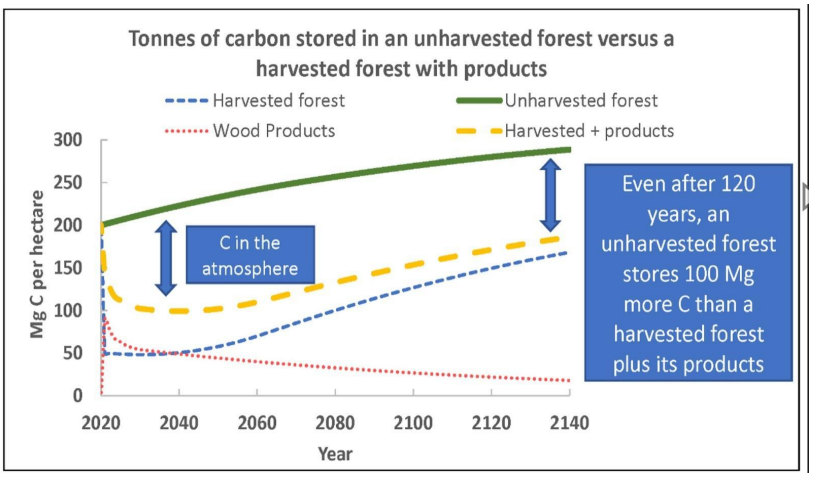
3. **Encourage local tree supply and expand planting efforts to more state partners (e.g. NGOs, schools, youth groups)**. The goal to plant 64,400 trees by 2050 must include strategies and funding to help municipalities, particularly environmental justice communities, to prioritize planting and long term maintenance of trees to maximize their ability to cool neighborhoods and store carbon and improve biodiversity. This program would be best administered through mandated municipal tree plans. Local tree supply must be supported by research and funding to identify, grow and expand our stock of native trees that are best adapted to climate disruption.

Because so many planted trees do not survive, we recommend including ongoing care and monitoring of newly planted trees as part of this objective. This is more costly, but the planting is irrelevant without these resources and assurances that trees survive to maturity. The Key Target and evaluation Metric should therefore include **X** acres of ***established*** trees.

Redevelop the current workforce within agencies that practice forest management on public lands, directing them instead to focus on urban forestry and tree equity.

Finally, please note that planting trees is great for the future, but saving mature trees in neighborhoods and incentivizing private landowners to protect mature and legacy trees is even more important. This should be included in the plan.

4. **Develop methodologies for quantifying GHG emissions implications of large-scale land clearing and potential options for mitigation, including reuse of wood for long-lived wood products and contributions to tree planting and land conservation efforts.** This statement is very confusing and needs significant clarification. From what we can understand, however, it has several serious flaws.
    a. First, if large-scale land clearing is valued only, or even primarily, for its GHG emissions, then we are ignoring the many other services provided by natural lands, such as fully developed habitat areas, water absorption and purification, air quality and human health benefits. This cannot be traded for decreased emissions.
    b. Second, mitigation cannot truly replace what is lost in land clearing. Furthermore, natural landscapes' qualities instantly vanish when they are cleared and take decades to centuries to fully recover, if they ever do. Carbon storage and ecosystems services are needed *now.*
    c. Third, it is unclear what " 'reuse' of wood for long-lived wood products" means. Is this another way of describing timber extracted from a forest? Estimates of the amount of carbon from "large-scale land clearing" that ends up in "long-lived wood products" varies, but is minimal compared to the amount of carbon released from both the vegetation and soil of cleared land, particularly over time. Logging converts mature and old forests to younger forests, which results in a significant loss of total caron stores, even when wood products are considered (see graph)



d. Alternatively, could this statement be using the word "reuse" referring to repurposing wood products? If so, then that should be a separate policy objective. Repurposing wood and other building/construction materials would contribute greatly to emissions reductions as well as forest preservation and should be incentivized.
e. Fourth, we cannot understand how "contributions to tree planting and land conservation efforts" relates to the rest of the statement. Please clarify.

Additional Comments

In addition to comments on the CECP 2050 content presented on the slides, we would like to offer several suggestions for further policies. We understand that there is an existential, urgent mandate to reduce/eliminate carbon emissions. Prioritizing renewable energy is one strategy with great promise in achieving this goal. However, it is not the only means and must be done judiciously so as not to cause more long-term harm than the relief it provides in the short term. It is therefore imperative that natural lands be fully utilized as part of the climate solution, and not be sacrificed in the process.

Biodiversity collapse is part of the same crisis, with tens of thousands of vertebrate species suffering population declines of nearly 70% on average over the last 50 years. Here in North America, for example, the overall abundance of birds has declined by some three billion birds, or 29% of 1970 abundance

(Rosenberg et al. Science 366: 120-124, 2019) As these authors state: "This loss of bird abundance signals an urgent need to address threats to avert future avifaunal collapse and associated loss of ecosystem integrity, function, and services." We simply cannot afford to lose more land and still have a habitable planet, even if we can generate "clean" energy by doing so. We MUST be smarter and more efficient in our use of space.

The following comments suggest strategies to ensure that we maintain our natural environment while moving towards equitable, clean energy climate solutions:

5. Form a new Forest and Climate Commission whose mission is to maximize the climate resiliency and adaptation of all public and state forests, watersheds, and wetlands. Commission membership would include a forest ecologist, a climate ecologist, forest and biodiversity research scientists, geologist and bio-geochemists to monitor flow of water, CO2, methane through the ecosystem, environmental economist, municipal planners, members of sustainability and energy commissions from cities and towns in all regions of the state and the general public, particularly from EJ communities.

6. Conduct independent, verifiable, transparent forest carbon assessments of the current status and management options of all municipal and state agencies.
    a. Carbon accounting of the complete life-cycle assessment of all timber harvests and products, extended one hundred years post-harvest. Trace destination (in or out of state?) and uses of all harvested trees, including all parts of trees. For example, deforestation, transport, and production of pellets and chips contribute significantly to rising atmospheric CO2. Scientists report that if deforestation for biomass production continues at accelerating rates (as planned), it will be nearly impossible to reach net zero emissions by 2050. Bioenergy Carbon Capture and Storage (BECCS) is incredibly expensive and the technology has not been proven to be scalable after receiving billions of dollars in subsidies. Massive atmospheric CO2 removal can be achieved if biomass incentives are redirected to solar, wind, and geothermal energy, and incentives are used for CCS for cement, steel, and high C emissions industries.

7. When considering renewable energy siting, EEA must address the following:
    a. Policies which highly incentivize all solar siting to be located on already developed and disturbed landscapes. We acknowledge the complexity of this issue, including cost, related infrastructure and logistical barriers. Yet, forests and natural lands are the single most effective way to decrease atmospheric carbon. There simply is no technology that

exists that can accomplish this to the scale that our natural lands do, and they do it for free.

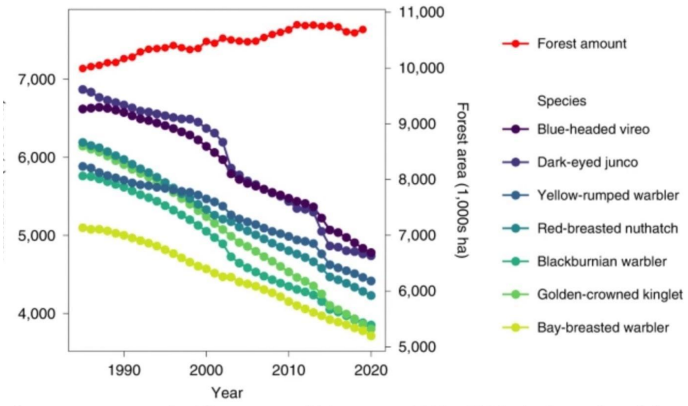
b. Carbon deficits after a renewable project is removed and the land is allowed to revert (if ever), since what will subsequently grow will take many decades to reach the sequestration and storage potential that it would have had if it had never been cut in the first place.
c. Biodiversity loss that will occur from land use change, a cost that cannot be quantified and compared the way that carbon can, but which must be considered in its role in a habitable planet. In many instances, biodiversity loss from land management is permanent.
d. Cost to communities, first and foremost, EJ communities, but also communities that are impacted by changes caused by soil destruction, such as poor water quality, stormwater runoff, heat islands, air and water quality pollution, disturbances during installations and low property values

8. Use carbon emissions data to adjust activities, as needed, to reach benchmark target goals, including:
    a. Designate all state forests and watersheds in DCR and DFW as carbon and biodiversity reserves. Commercial logging should be prohibited.
    b. Public, state natural lands would no longer be Natural, WORKING lands. Natural working lands would be restricted to private forests, which constitute the majority of forest land in the state. Commercial harvesting on the remaining private lands would continue to adequately supply a sustainable forestry. This change - to minimal management and no logging on public lands - would vastly improve the climate benefits of our forests. This is important because, if left intact and undisturbed, "Northeast secondary forests have the potential to increase biological carbon sequestration between 2.3 and 4.2-fold."

    Forest research is providing growing evidence that current forest management practices add to the climate and biodiversity crises. It is critically important to reverse course. Conservation practices that support the logging industry must be replaced with policies to preserve mature and old forests. In a recent study, "Forest degradation may be a primary cause of biodiversity decline in managed forest landscapes,"researchers documented avian breeding habitat loss from 1985 - 2020 and found a high correlation between forest degradation and shrinking population size for 94% of bird species studied. Logged forests are degraded forests. "Sustainably" logged forests, while maintaining forest cover, prevent trees from maturing and growing old. As this graph

from the study illustrates, tree age is the most important factor in maintaining biodiversity of birds, and all of the interconnected species in the forest ecosystem.

Forest degradation rather than loss drives habitat declines in old forest-associated bird species.

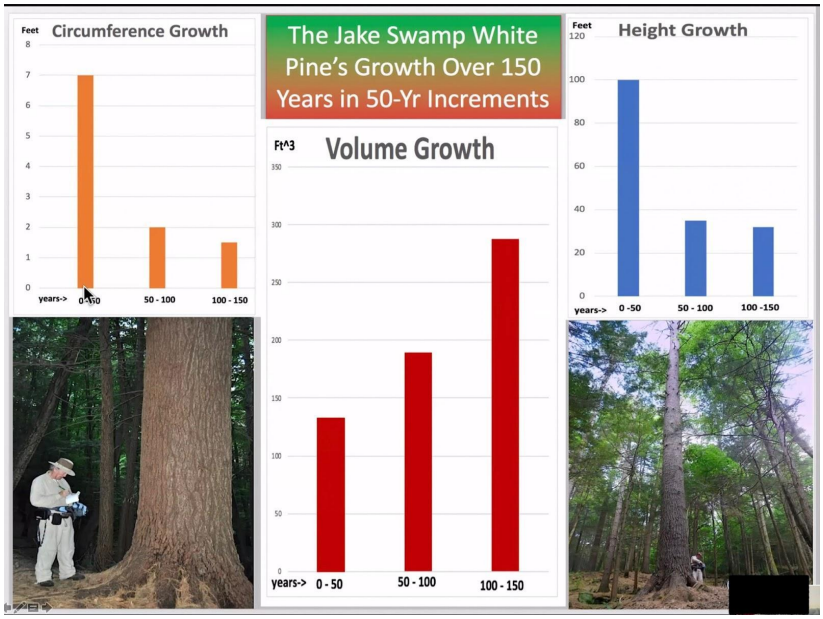


s forest cover grew (red line on graph) between 1980 - 2020, the integrity of the forest ecosystem declined, and bird habitat dropped precipitously.

Forest Degradation Drives Widespread Avian Habitat and Population Declines, Betts et al.
https://doi.org/10.1038/s41559-022-01737-8

Managed forests that are logged, for no matter what reason—sustainability, thinning, habitat restoration, fire suppression, insect control—are degraded forests. Contrary to current forestry practices that promote logging for forest health, fire suppression, pest control, etc., mature, old forests accumulate the most carbon, are the most biodiverse, most fire resistant, contain the fewest insect infestations and invasives.

These graphs illustrate how mature forests continue to accumulate carbon as they age.



The current practice of harvesting mature and old trees to maintain "forest health" is based on the claim that because younger trees grow faster, they sequester and store more carbon than older trees. This inaccurate assumption does not include all the variables. It looks only at the rapid growth rate of tree circumference and height during a tree's first 50 years, while ignoring the constant, massive increase in volume and carbon accumulation for one hundred and fifty years. Large 200-, 300-, 400-year-old trees continue to annually accumulate additional carbon. In addition to "saving old-growth" trees, in New England, it is critical to allow mature trees to grow and accumulate massive amounts of carbon for centuries, extensively increasing the range of old-growth forests.

9. Be very cautious of carbon credits, which essentially allow pollution to continue at its source. At the same time, landowners that sell offsets often use forested land that they have no intention of logging. This ultimately does more harm than good because it does nothing to truly decrease emissions. This allows corporations to pollute while conducting business as usual. An analysis by (carbon)plan, Systematic over-crediting of carbon Offsets, estimates that nearly 30% of credits sold "do not reflect real climate benefits." Transparency and accountability are key, and carbon offsets to date have a poor track record.

   Additionally, there should be no carbon credits on public land: the ecological services of OUR forests are NOT for sale!

10. Finally, we should work with private landowners to incentivize keeping forested land intact, such as the addition of a new category of Chapter 61 (perhaps “Ch 61C”?) to provide carbon credits to private landowners to allow more trees to mature and grow old.

Slide 14 Cross Cutting and Enabling Policies

We commend the focus on workforce development as it is clear that we need to scale our workforce up considerably to meet our climate goals. We are glad to see explicit direction for retraining workers who are facing job loss especially from the shift off of a dirty energy economy. The plan should explicitly create workforce development programs that ensure good jobs (which include good pay – comparable to fossil energy industry jobs – and proper training and certifications) in these new sectors; and to see that these programs are designed to bring workers from marginalized, low income, and impacted communities into this stronger and more inclusive and diverse workforce across the state.

Climate Leadership programs should include the proposed Green Communities 2.0 program and support for all towns to create a tailored climate action plan or to adopt a generic action plan.

Conclusion

We look forward to seeing a more complete 2050 Clean Energy and Climate Plan and being able to provide comments on a much more detailed presentation.

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

Deb Pasternak
State Director, Sierra Club Massachusetts Chapter

COMMENTS ON THE CLEAN ENERGY & CLIMATE PLAN FOR 2050

SUBMITTED OCTOBER 21, 2022

TO THE MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY

AND ENVIRONMENTAL AFFAIRS

THE CLEAN ENERGY & CLIMATE PLAN FOR 2050 (CECP) IS DEEPLY FLAWED. THE CECP 2030 EMISSIONS SUBLIMITS FOR 2030 AND PROPOSED SUBLIMITS FOR 2050 ARE NOT ACHIEVABLE CONSIDERING WELL-ESTABLISHED TECHNICAL AND ECONOMIC REQUIREMENTS FOR AN ADEQUATE, AFFORDABLE AND RELIABLE POWER GRID.

- Doubling existing solar and wind generation, along with rapid expansion of offshore wind generation will require investments over $60 billion. DESPITE THIS MASSIVE INVESTMENT, CO2 EMISSIONS WILL RISE SUBSTANTIALLY BY 2030 AS EXISTING NUCLEAR PLANTS ARE FORCED TO RETIRE.

- CECP EMISSION SUBLIMITS WILL DRIVE EXPANSION OF RENEWABLES BEYOND WHAT CAN BE USED BY OUR POWER GRID. Each new investment in wind and solar generation becomes more expensive, wasteful and disruptive to the regional competitive energy market. By 2030, approximately 18% of the new power being generated by renewables WILL BE WASTED because it is produced when not needed.

- OPERATING SUBSIDIES FOR EXCESS SOLAR AND WIND GENERATION WILL RESULT IN NEGATIVE PRICING OF WHOLESALE ENERGY THAT WILL CAUSE NUCLEAR PLANTS AND OTHER CLEAN GENERATION TO RETIRE PREMATURELY, defeating the intent of decarbonization.

- TECHNOLOGY DOES NOT EXIST TO ECONOMICALLY STORE SURPLUS POWER FROM RENEWABLES. Batteries have limited capability and surpluses occur unevenly making recovery of surpluses impractical and prohibitively expensive.

- ELECTRIFICATION OF BUILDINGS AND TRANSPORTATION WILL REQUIRE LARGE ADDITIONS OF RELIABLE AND FLEXIBLE NON-EMITTING NEW POWER GENERATION FAR BEYOND WHAT WILL BE AVAILABLE AND AFFORDABLE. Projected growth in winter loads resulting from building electrification will overwhelm the region's power generation capabilities given limits to winter gas supply and the absence of new reliable and flexible generation options. The likely outcome will be HIGHER EMISSIONS from expanded use of gas and oil fired power plants since substitute "clean" fuels will not be available or affordable.

- A recent report from ISO New England suggests that retiring our nuclear units will damage the future power grid to such an extent Massachusetts residents WILL NO LONGER BE ASSURED OF RELIABLE ELECTRIC POWER SUPPLY IN WINTER MONTHS.

- COSTS OF THE CECP POLICY FRAMEWORK ARE A MASSIVE WASTE OF MONEY and an unreasonable burden on the taxpayers and ratepayers of Massachusetts. A $60 B investment in wind and solar to reduce CO2 emissions is completely negated by the retirement of our nuclear units. Much higher electric rates will seriously harm Massachusetts consumers, drive inflation and force many businesses and jobs out of the state.

- Large investments in new transmission and distribution lines mandated to support the expansion of wind and solar generation will do little to reduce emissions and will impose another massive cost burden on ratepayers.

- The Biden Administration set the Social Cost of Carbon at $51/ton as a policy guideline up to which the costs of reducing carbon emissions are justified. The unsubsidized costs of wind and solar generation are much higher than the generation from gas power plants, resulting in carbon abatement costs many times this $51guideline. Most of our distributed solar generation cost over $700/ton, 17 times this guideline, and cannot be justified by any reasonable interpretation of the economics, placing an unnecessary burden on taxpayers and rate payers.

- The economic lives of new wind and solar installations is only 20 years, and may be shorter if surpluses reduce market revenue and encourage early retirement. This will require expensive replacement systems and additional subsidies not addressed in CECP.

- The massive subsidies needed to pursue CECP 2050 limits will overwhelm the competitive wholesale market for energy, socializing most of the cost of electricity and destroying the intended effects of deregulating our power grid. We will be paying more for subsidies in our electric bills than we are for wholesale energy costs.

THE PLAN IS A GIGANTIC POLICY MISTAKE.

Public officials in the Massachusetts Executive Office of Energy have a responsibility to the citizens of the state to STOP and RE-CONSIDER THIS DEEPLY FLAWED AND HUGELY EXPENSIVE PLAN WHOSE DAMAGE TO CONSUMERS, THE REGIONAL ECONOMY AND THE POWER GRID FAR EXCEEDS THE VALUE OF LIMITED CO2 REDUCTIONS.

Several key points highlight the basis for these flaws in the CECP which must be addressed in informing the public of the likely impacts from this policy.

1. CECP 2030 pursues the addition of about 6.4 GW of offshore wind generation and a doubling of current 5 GW of existing offshore wind and solar to reduce current 33 MTPY

regional power sector CO2 emissions to about 17 MTPY by 2030, assuming MA represents half of regional CO2 emissions.

- Reducing CO2 emissions below 20 MTPY is not achievable, because about 18% of the new wind and solar energy produced in 2030 can't be used because it occurs at the wrong times. There's no solar energy in the evening when power consumption and CO2 emissions are highest. Similarly, the wind blows only 30-40% of the time mostly at times when its not needed. Increasing wind and solar generation has declining impact on evening emissions.
- Several recent reports issued by ISO New England, MIT and others clearly conclude that REPLACING FLEXIBLE GAS GENERATION WITH INFLEXIBLE WIND AND SOLAR GENERATION, EVEN WITH BATTERY STORAGE, CANNOT SUPPORT A RELIABLE POWER GRID. Surplus wind and solar energy occur unevenly, and adding large amounts of storage would be poorly utilized and extremely expensive.
- THESE REPORTS ALSO SHOW THAT SETTING AGGRESSIVE TARGETS FOR ELECTRIFICATION OF BUILDINGS AND TRANSPORTATION CANNOT BE SUPPORTED WITH ADEQUATE FLEXIBLE AND RELIABLE CLEAN GENERATION. POLICIES DRIVING RAPID ELECTRIFICATION WILL RESULT IN LOSS OF GRID RELIABILITY MADE WORSE BY RETIREMENT OF THE THREE NUCLEAR UNITS, SEEING LARGE INCREASES IN FOSSIL GENERATION AND RELATED CO2 EMISSIONS.

2. New England currently supplies enough inflexible solar, wind, hydro, nuclear and imported power to satisfy low load periods. Adding large amounts of wind and solar generation will flood the market with subsidized surplus energy offered at negative prices. SUBSIDIZED SURPLUSES WREAK HAVOC WITH COMPETITIVE MARKETS. By 2030, negative prices could occur 40% of the time, making it impossible for New England's existing nuclear plants to continue operating. Retiring Pilgrim in 2019 increased CO2 emissions by 2.8 MTPY. Loss of market revenue due to surpluses will force the remaining three nuclear plants to close and increase regional CO2 by 13.7 MTPY.

   This will make 2030 CO2 emissions higher than they are today, more than eliminating the intended benefit of over $60B in publicly supported investments. Massachusetts EEA officials need to recognize this outcome, and re-evaluate key technical and economic limits to decarbonization.

3. THE HIGHER POWER DEMANDS FROM ELECTRIFICATION REQUIRE A MAJOR EXPANSION OF NEW ENGLAND'S POWER GENERATION FACILITIES THAT PROBABLY CANNOT BE MOBILIZED IN THE TIME FRAME ALLOWED BY THE PROPOSED LIMITS. A higher level view needs to be taken of the overall economic and environmental impacts of electrification to demonstrate viability and affordability.

4. COSTS OF THE CURRENT PROGRAM ARE STAGGERING AND UNJUSTIFIED.

- The current plan requires a capital investment of $61 billion by 2030. Even this huge sum is incomplete because it fails to take account of the expenses required to make the new transmission and distribution improvements it would require.

- UNSUBSIDIZED COSTS FROM NEW WIND AND SOLAR GENERATION WILL BE 2-10 TIMES HIGHER THAN GAS GENERATION IT INTENDS TO REPLACE. Battery storage projects add another $150 to $500/MWh to already high energy costs and can recover only a small fraction of the wasted surplus power.

- The Biden Administration's guideline for the social cost of carbon reduction is $51 per ton. New wind and solar installations will reduce CO2 at costs ranging from $85 to $278 per ton for wind and solar generation. And the cost of reducing a ton of CO2 skyrockets to over $740 for distributed solar generation. Required transmission and distribution improvements push these costs much higher. CECP pathways to NetZero CANNOT BE RATIONALIZED BY ANY LEGITIMATE ECONOMIC OR POLICY METRICS! .

- TAXPAYERS AND RATEPAYERS WILL PAY FOR THESE COSTS. Electric rates will have to more than double, and tax revenues will be diverted from important infrastructure and social programs. HIGHER ENERGY COSTS WILL DRIVE INFLATION AND MAKE REGIONAL BUSINESSES LESS COMPETITIVE. Other regions with high energy prices have seen serious economic damage and loss of jobs. THE HIGH COSTS OF CECP WILL SERIOUSLY HURT CONSUMERS AND THE LOCAL ECONOMY.

- The CECP planning documents fail to inform the public of this massive new financial burden and its negative consequences. THIS REPRESENTS A MAJOR FAILURE IN YOUR AGENCY'S PUBLIC RESPONSIBILITIES.

- A number of key policy issues related to the concerns described above should be carefully reviewed. Extending the lives of existing nuclear generation is imperative in minimizing CO2 emissions. Increasing regional wind and solar generation conflicts with this because they compete for base load energy market space. Excessive solar and wind generation produces subsidized surpluses that reduce revenue to all inflexible generation. RPS progressive requirements should be suspended to avoid producing excess inflexible generation that conflicts with the output from our nuclear plants. Subsidies for distributed residential solar are excessive and not justified by their limited contribution to CO2 reductions, and should be discontinued. Electrification targets should be suspended until grid adequacy and reliability challenges can be effectively addressed. High costs and

grid reliability problems experienced in Texas and California should be carefully studied to ensure they do not occur in New England.

Information demonstrating the problems associated with the CECP is provided in the report Technical and Economic Limits for Renewable Power Integration in New England, available at www.CenterACI.com. A summary "Synopsis and Key Findings" will be provided to facilitate the understanding of key issues.

SUBMITTED

OCTOBER 21, 2022

REINER W. KUHR

Energy Technology Economist

22 Lyndale Road

South Yarmouth, MA 02664

Reiner_kuhr@centeraci.com

617 470 7615

Executive Office of Energy and Environmental Affairs
100 Cambridge St,.
Suite 1020
Boston, MA 02114

Date: October 21, 2022
Subject: Comments on the Clean Energy & Climate Plan for 2050: Limit, Sublimits, Goals, & Policies Public Hearings

I am a PhD Student at Tufts University in the Department of Civil and Environmental Engineering. My expertise is in offshore wind and evaluating pathways to reaching carbon neutrality by 2050. I would like to give feedback on the EEA's modeling of electricity demand and generation capacity.

On slide 11 of the presentation, you propose that in 2050 approximately 27 GW of solar and more than 20 GW of offshore wind will be needed in 2050 to meet the proposed emission sublimit. This is compared to the 3.2 GW of offshore wind and 8.4 GW of solar that the 2030 CECP proposed. In 2030, the EEA models that 50 TWh of the total 73 TWh consumption by the grid will be clean. I converted the generation capacity provided by the EEA into terawatt hours, using Equation 1, to compare to the total electricity demand from the grid.

$$Eq\ 1. \frac{Generation\ Capacity\ (GW)\ x\ 8760\ hours/year\ x\ Capacity\ factor\ (\%)}{1000} = Annual\ Generation, TWh$$

In Table 1 I have provided the generation capacity, capacity factor, and the results of the calculations for 2030, and in Table 2 I have provided the same but for 2050. I have highlighted in yellow the sections of Tables 1 and 2 that are not currently available or that I provided. For 2030, I receive the same result as the EEA did; 50 TWh of clean electricity.

Table 1. Resource distribution in 2030

Resource	Generation Capacity	Capacity Factor	Annual Generation
Offshore Wind	3.2 GW	0.45	12.6 TWh
Solar	8.4 GW	0.25	18.4 TWh
Storage	2.9 GW	0.75	19 TWh
Sum of Renewables			50 TWh
Total Electricity Demand in a Year			73 TWh

Table 2. Resource distribution in 2050

Resource	Generation Capacity	Capacity Factor	Annual Generation
Offshore Wind	20 GW	0.45	78.8 TWh
Solar	27 GW	0.25	65.9 TWh
Storage			
Sum of Renewables	47 GW		144.7 TWh
Total Electricity Demand in a Year			

For 2050 the total electricity demand is not available yet, but the results of the modeled renewable generation can be summed; 144.7 TWh. This is approximately double the projected total electricity demand in 2030.

As a comparison to the EEA numbers, I have provided numbers for Massachusetts from the Princeton Net Zero America report[1]. This report has been lauded by the National Academies of Sciences, Engineering and Medicine as one of the most comprehensive reports they have reviewed about pathways to net zero. Values for 2030 are reported in Table 3, and values for 2050 are reported in Table 4.

Table 3. Princeton's numbers for MA in 2030

	Generation Capacity	Capacity Factor	Annual Generation
Offshore Wind	3.8/3.2 GW**	0.46	15.3/12.9
Solar	2.7/2.6 GW**	0.20	4.7/4.6
Storage	--	--	0.37 TWh
Sum of Renewables			20.4/17.9 TWh
Total Electricity Demand in a Year			62.5 TWh

Table 4. Princeton's numbers for MA in 2050

	Generation Capacity	Capacity Factor	Annual Generation
Offshore Wind	26.1/21.1 GW**	0.47	107.5/86.9 TWh
Solar	17.2/11.6 GW**	0.20	30.13/20.3 TWh
Storage	--	--	4.4 TWh
Sum of Renewables			142.03/111.6 TWh
Total Electricity Demand in a Year			118 TWh

** The first number is for the base land use case, the second is for the constrained land use case.

[1] https://netzeroamerica.princeton.edu/?explorer=year&state=massachusetts&table=2050&limit=200

One observation is that the offshore wind numbers, using the constrained land use assumption from Princeton, is close to the EEA's number for offshore wind in 2050. The solar numbers vary significantly, with the base land use number from Princeton being the closest at about 17 GW, but that is 10 GW less than the EEA's number. These numbers likely vary due to differences in model assumptions, neither set is right or wrong. An accurate accounting for the differences between results would be quite useful for understanding and for evaluation of different resource portfolios.

The ability to perform the basic arithmetic to ensure that the resource generation portfolio can meet the projected demand is critical and provides a verification of the model's numbers. It can be done for the 2030 numbers but not for 2050. To that end, I hope that the EEA will build upon their Appendix A: Technical Pathways Modeling of the Massachusetts Clean Energy and Climate Plan for 2025 and 2030. The Princeton report's data explorer online is an excellent tool, and I hope to see a similar format as a way of increasing the EEA's numerical accessibility.

I thank you for the opportunity to give feedback on the Clean Energy and Climate Plan of 2050.

Respectfully,

Rebecca Wolf, BS, MS.

PhD Student at Tufts University.

NRG Energy, Inc.
804 Carnegie Center
Princeton, NJ 08540

October 21, 2022

Judy W. Chang
Undersecretary for Energy
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge St.
Boston, MA 02114

Dear Undersecretary Chang:

NRG wishes to convey its strong support for the Commonwealth's Clean Energy and Climate Plans (CECP) for 2030 and 2050. We write to applaud one important aspect of those plans: the commitment to make use of a forward clean energy market (FCEM) to help achieve the Commonwealth's carbon reduction goals beginning in 2030 and continuing through 2050.

An FCEM has the potential to harness the strength and efficiency of both technological and economic competition in wholesale markets to achieve those goals. The competition can foster more rapid deployment of new carbon-free generation resources at lower prices than current methods while maintaining the financial viability of existing carbon-free resources.

We recognize that many states, including Massachusetts, have relied on one-off contracts to enable development companies to finance and build new, carbon-free resources. These contracts have substantially reduced the initial risks associated with building and successfully operating the first generation of such technology. The result has demonstrated both the technological feasibility and ability to finance the new carbon-free technologies that will power the 21st century.

However, those contracts have come at a steep price. Procurements to date have almost always specified a single technology and have been foreclosed to other competitive technologies that have a demonstrated ability to provide carbon-free generation. Moreover, ratepayers have been required to protect that single eligible technology from the price competition that would otherwise come from other technologies, whether existing or new.

The consequences of the current reliance on customized long-term contracts have been significant, for both the Commonwealth's carbon reduction goals and for the state's electricity consumers. As you know, a study produced by the Analysis Group earlier this year for ISO-NE estimated that the current method of single technology contracting will be much more expensive than the cost it would take to achieve the same level of carbon reductions that would be achieved using an FCEM.[1]

An FCEM achieves these results because it unleashes the power of competition among all resources that can generate electricity without emitting carbon. For example, it could include

[1] Analysis Group White Paper; Pathways Study: Evaluations of Pathways to a Future Grid; April, 2022 (https://www.analysisgroup.com/Insights/publishing/pathways-study-evaluation-of-pathways-to-a-future-grid/)

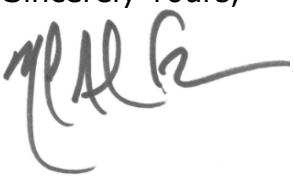
NRG Energy, Inc.
804 Carnegie Center
Princeton, NJ 08540

competition among solar, wind, hydro and nuclear sources of generation or other emerging technologies. In addition, market competition is likely to lead to a more rapid deployment of carbon-free resources than the time-consuming bidding procedures and in-depth government reviews required for state-sanctioned contracts.

To be effective, an FCEM must be carefully designed and have substantial participation by electricity consumers across multiple states. Massachusetts regulators have shown they understand this and have taken important steps to develop an FCEM design that will be resilient and effective. NRG stands ready to work in collaboration with Massachusetts and interested stakeholders on this endeavor.

We appreciate the recognition the CECP has given to this innovative and promising method for accelerating the pace of carbon reduction and reducing the cost that ratepayers will bear in order to achieve the state's laudable carbon-reduction goals.

Sincerely Yours,



Neal A. Fitch
Senior Director, Regulatory Affairs
NRG Energy, Inc.

Northeast Hearth, Patio, and Barbecue Association
PO Box 28, Sudbury, MA 01776 . 978-440-0344 . nehpba.org

October 18, 2022

Executive Office of Energy and Environmental Affairs
100 Cambridge St #900
Boston, MA 02114

Dear Executive Office of Energy and Environmental Affairs,

My name is Karen Arpino, and I am writing on behalf of The Northeast Hearth, Patio & Barbecue Association. The Northeast Hearth, Patio & Barbecue Association (NEHPBA) is a trade association representing more than 300 individual member hearth and fireplace retail and related companies throughout the Northeast. In the Commonwealth of Massachusetts, we have over 60-member companies supporting 350 families. The vast majority of our members are independent "mom and pop" small businesses that play a large role in the communities and markets they serve across the Commonwealth.

On behalf of our Massachusetts members and residents, we appreciate the opportunity to comment on Massachusetts Clean Energy and Climate Plan for 2050. We ask you take the comments below into consideration when crafting the Future of Energy in Massachusetts.

- In weighing the costs of heat pumps, it is very clear that Massachusetts and the EEA must include options for alternative heat sources and supplemental heat in addition to heat pumps. Massachusetts has some of the highest electric bills in the country. The federal funds used to subsidize heat pumps are finite and will leave low-income households behind.
- If Massachusetts implements heat pumps statewide, powerplants would need to burn more natural gas, oil, coal, and propane to keep up with increased energy demand thereby increasing emissions. In fact, it is expected that emissions in New England will increase by 60% in this coming winter alone.
- Since most electric heat pumps (i.e. mini splits) struggle to keep homes warm when temperatures plunge, this will require that traditional heating systems are also used to ensure that homes can stay warm, increasing both utility and maintenance costs to residents.
- Transitioning to heat pumps can cost up to $25,000 which does not include the electrical upgrades to homes that will also be needed which can range upwards of $5,000. Many homeowners do not have the necessary funds to convert to heat pumps and too many households are already experiencing energy poverty.
- With the rapidly increasing electric rates expected by ISO New England, there could not be a worse time to implement electric heat pumps. Existing buildings are challenging and expensive to retrofit. Older, drafty homes are especially hard to convert, and separate indoor air quality

appliances are needed when using portable heat pumps which do not have air quality components.

- Retrofitting homes to heat pumps is ineffective when implemented before households have completed the necessary home weatherization demands that many existing homes in Massachusetts need. Additionally, higher BTUs are needed for cooling a home than are needed for heating a home. Therefore, too often heat pumps are inadequate in the colder weather while leaving homes cold and damp in the summer.
- According to Northeast Energy Efficiency Partnership, Clean Energy and energy efficiency stakeholders from the region lack confidence that the existing heating performance metric (HSPF) for air source heat pumps provides the necessary information to adequately characterize heating performance across the heating season, particularly at low temperatures. In addition, supplemental information provided by manufacturers to demonstrate performance in cold temperatures is not standardized or consistent.

NEHPBA recognizes the changing landscape of the energy and fossil fuel industry. We are committed to working with government officials and regulators at all levels to increase access to more sustainable and climate centric fuel sources throughout our homes and businesses. That being said, we cannot be so quick to think that by promoting the use of all-electric heat pumps and moving away from natural gas and other fossil fuels, our electric grid will have the capacity to sustain this increased volume in output. While unintended, this will result in skyrocketing electric rates and home prices, and potentially inhibit access to more affordable sources of fuel and power—negatively affecting the most vulnerable among us.

Thank you for your consideration of our comments. Please do not hesitate to contact me at (978) 440-0344 or via email at Karen@NEHPBA.org with any questions.

Sincerely,

Karen Arpino
Executive Director
Northeast HPBA

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

By Electronic Mail: gwsa@mass.gov

Re: Massachusetts 2050 Clean Energy and Climate Plan (CECP)

Dear Secretary Card:

Thank you for the opportunity to provide input on the 2050 Clean Energy and Climate Plan (CECP).

NextEra Energy Resources, LLC (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.

Seabrook Station continues to play a critical role in providing baseload, cost-effective, carbon-free energy to the regional grid. Near-term, cost-effective, emission-free resources will become increasingly important as we head into this winter. With winter prices expected to be more than 60% higher than last winter, the state needs to take a balanced approach to implement this clean energy transition with ratepayer impacts top of mind. Seabrook's size, combined with its ability to produce electricity reliably

[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%)

and consistently compared to the intermittent and less predictable output of wind and solar resources, ensure that Seabrook will remain essential in creating a carbon-free Massachusetts.

To achieve its greenhouse gas emissions reduction mandates and reduce the strain on the New England natural gas market, 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. We were pleased to see the inclusion of language in Chapter 179 of the Acts of 2022, *An Act Driving Clean Energy and Offshore Wind* directing the state to explore regional or multi-state efforts to procure long-term contracts for clean energy or participate in other regional efforts to reduce emissions. Solicitation of 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 online.

To that end, NEER provides the following comments:

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 cost-effectively."[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 low price, which has already saved Connecticut ratepayers $79 million since the beginning of 2022. Relative to observable ISO-New England market prices, Connecticut ratepayers are projected to save an average of $107 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 operating. Specifically, ISO-New England's 2021 Economic Study on Future Grid Reliability showed that retiring the nuclear units in New

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[2] Massachusetts Clean Energy and Climate Plan 2025 and 2030 (June 30, 2022) https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/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

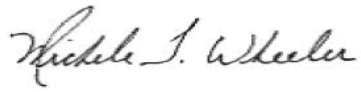
England resulted in the utilization of higher-cost generation -- particularly natural gas units -- and higher Locational Marginal Prices (LMPs) through the majority of the year. Similar to LMPs, production costs increased under all model scenarios by approximately 53 percent. Additionally, on average 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.

Furthermore, recent ISO New England economic studies for the year 2030 show that nuclear generation will continue to reduce emissions for years to come. Seabrook's estimated 2030 emissions reductions correspond to roughly to taking 480,000 cars on the road and consumer cost savings of approximately $500 million annually in New England. Replacing Seabrook's generation would increase the demand and price for Regional Greenhouse Gas Initiative (RGGI) CO_2 allowances, potentially by as much as 20% by 2030. These price increases would be passed on to consumers in Massachusetts and other RGGI states.

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.

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 2050.

Respectfully submitted,



Michele T. Wheeler
Vice President, Regulatory & Political Affairs NextEra Energy Resources, LLC

NEPGA
NEW ENGLAND POWER GENERATORS ASSOCIATION, INC.

October 21, 2022
Bethany Card, 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 2050

Dear Secretary Card:

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 2050.

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.

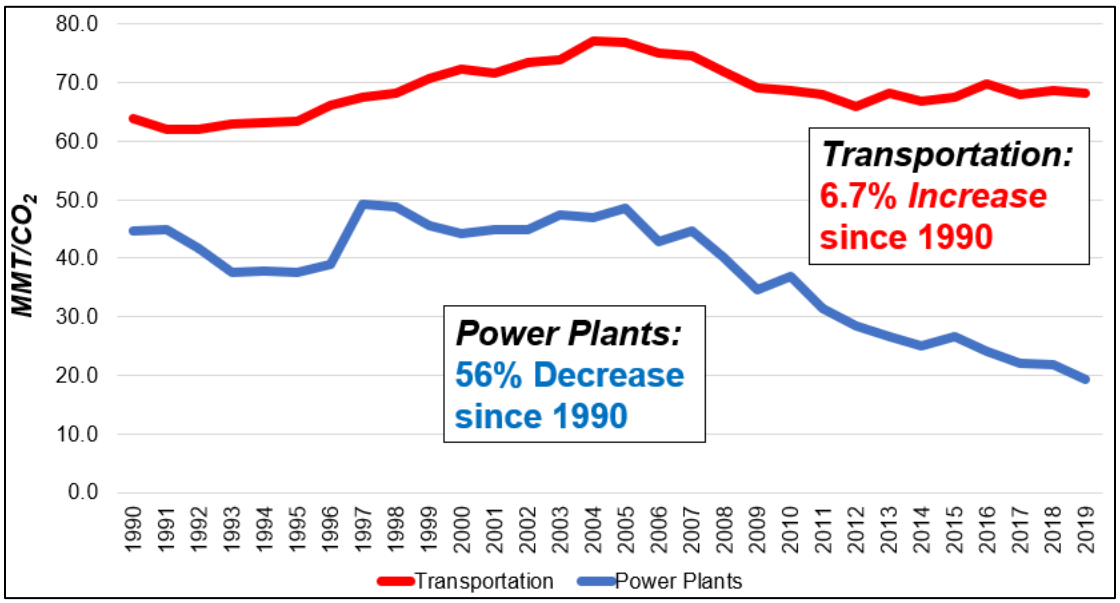
NEPGA's mission is to support competitive wholesale electricity markets in New England. We believe that open markets, guided by stable public policies, are the best means to provide reliable and competitively-priced electricity for consumers. A sensible, market-based approach furthers economic development, 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.

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 remained 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%.[2]

[1] The comments expressed herein represent those of NEPGA as an organization, but not necessarily those of any particular member.
[2] Source: http://www.eia.gov/environment/emissions/state/ (Released April 13, 2022)

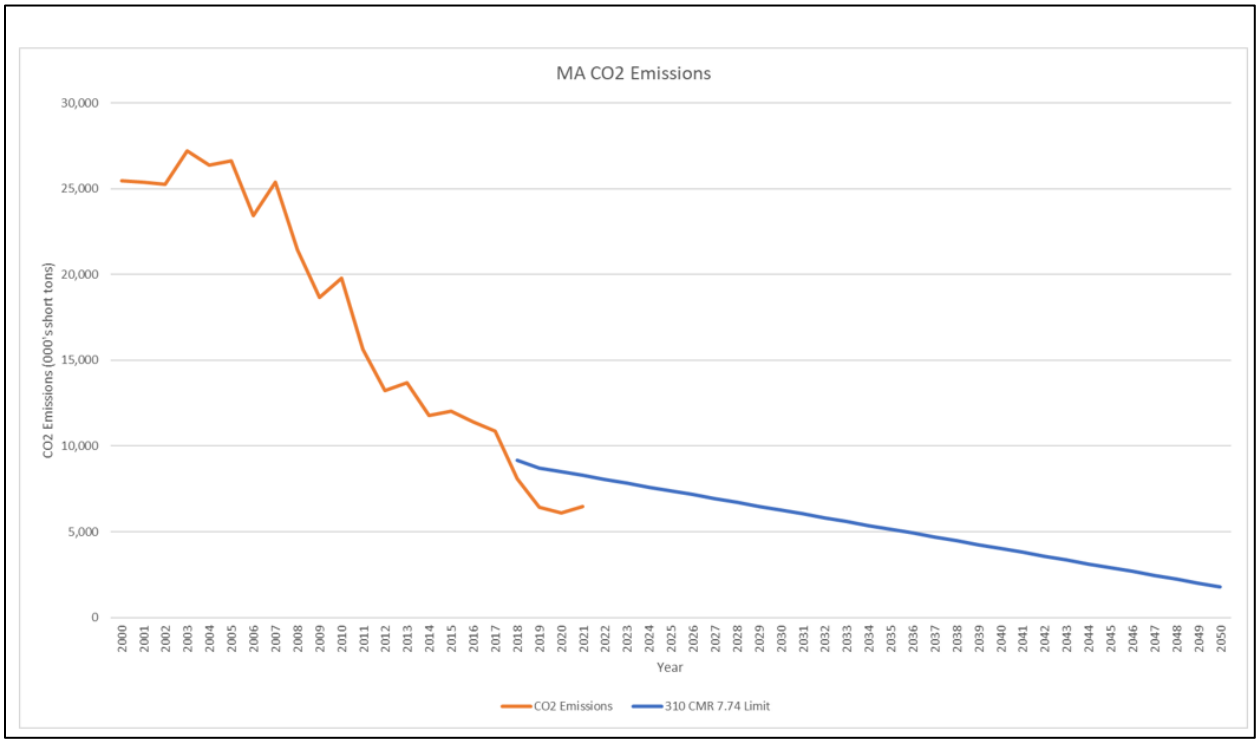
Massachusetts Emissions since 1990



Source: http://www.eia.gov/environment/emissions/state/ (Released April 13, 2022)

Moreover, as depicted below, the power generation sector in Massachusetts is on track to continue to reduce emissions, as the Commonwealth established declining hard caps for power plants via 310 CMR 7.74.

Massachusetts Power Generation Emissions: Historic Data and Future Mandates



Source: Regional Greenhouse Gas Initiative CO_2 Tracking System
(https://www.rggi.org/allowance-tracking/emissions)

NEPGA appreciates that EEA is considering the role of *all* economic sectors to meet new policy imperatives through the CECP 2050 because the state clearly will not achieve its overall climate goals by focusing on the electric sector alone. Data from the Energy Information Administration, for example, shows that transportation not only saw its emissions rise since 1990, but today represents more than twice the emissions from any other sector in the Commonwealth's economy.[3] We therefore applaud EEA's proposal to reduce transportation emissions by 86% in the proposed 2050 CECP.

NEPGA also appreciates the specific metrics that EEA has identified in meeting its goals, such as the need for nearly all passenger vehicles and most medium and heavy-duty vehicles to be electric by 2050 and for the majority buildings to be heated and cooled by electric heat pumps in the same year.

NEPGA's membership is well positioned to be a partner as the Commonwealth continues to decarbonize its economy. In fact, the power plants that NEPGA's members own and operate are poised to become the very backbone of economy-wide decarbonization efforts. Consider: The state's 2020 *Energy Pathways to Deep Decarbonization* study indicates that electricity load could increase significantly by 2050, from approximately 65 TWh to 105 TWh.[4] This analysis is echoed by the work of ISO New England, which is forecasting that demand for electricity will meaningfully grow over the next decade.[5]

As businesses and families increase their dependence upon electricity for necessities such as commuting and home heating, the reliability and affordability of the electric grid will become ever more important to the quality of life in, and economic strength of, the Commonwealth. The power sector has been preparing for this increased electricity demand for years and will be ready to continue to reliably serve the many and important needs of New England's decarbonized economy.[6]

Because economy-wide decarbonization will require New Englanders to use more electricity than they ever have in the past, it is critical for the state to pursue options that will ensure that generating resources are fairly compensated through the most efficient and competitive ways possible.

NEPGA applauds EEA's proposal to develop a "successor" to procurements through a regional market mechanism. For more than 20 years, competition in the region's wholesale electricity markets has ensured the most efficient prices for consumers and placed financial risks on those most able to manage them – all while also driving down emissions.

While it is clear that New England needs to make significant investments in large quantities of clean energy in order to decarbonize its economy, it is critical to evolve public policy away from long-term contracts for a variety of reasons.

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[3] Source: http://www.eia.gov/environment/emissions/state/ (Released April 13, 2022)
[4] https://www.mass.gov/doc/energy-pathways-for-deep-decarbonization-report/download
[5] https://isonewswire.com/2022/05/10/electricity-use-in-new-england-expected-to-increase-over-the-next-decade-according-to-2022-celt-report/
[6] In collaboration with ISO New England and stakeholders across the region, NEPGA's members have been working on ways to better align the wholesale electricity markets with the massive changes anticipated for the region's grid and economy. Examples of such efforts include the "Resource Capacity Accreditation in the Forward Capacity Market" and the "Day-Ahead Ancillary Services Improvements" projects.

Long-term contracts incentivize only a small portion of the infrastructure needed to address the demands of climate change – at a needlessly high cost to society.[7] They are also financially unsustainable over time and force captive ratepayers to bear undue financial risks. For example, one needs to look no further than Avangrid's recent announcement that it will postpone two of its major offshore wind projects by a year and seek to rewrite some of its contracts because of cost pressures and supply-chain challenges.[8]

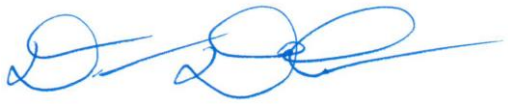
Perhaps most damagingly, long-term contracts undermine the competitive electricity markets, which have already significantly reduced carbon while also keeping the electric grid reliable and its prices competitive. The region's wholesale electricity markets are, and will continue to be, critical to the Commonwealth's ability to cost-effectively meet its energy and climate goals.

If the region were to place a meaningful price on carbon, it would incentivize investors to put their resources into low and non-emitting generation and also continue to foster competition among existing resources to further reduce their emissions. This latter point is critical because many studies indicate that most, if not all, of the existing power generation fleet will be needed for reliability for decades to come. While NEPGA has and will continue to support carbon pricing, we also recognize that it is insufficient for one state to try to go it alone – even a state with a relatively large energy demand, such as Massachusetts. It would also be insufficient to apply a carbon price to only one sector. For these reasons, we applaud the Commonwealth for continuing to show such responsible leadership on these issues and use the 2050 CECP to call for region to work together.

NEPGA looks forward to continuing to work with EEA and other 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 in 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.

Sincerely,



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Dan Dolan
President

[7] https://isonewswire.com/2022/04/20/iso-ne-finalizes-study-analyzing-potential-market-designs-for-the-future-grid/
[8] https://www.bostonglobe.com/2022/09/22/business/supply-chain-issues-slow-development-major-mass-offshore-wind-farm/

Michael C. Calviou
Group Head of Regulatory Strategy & Policy

October 21, 2022

Via E-mail

Undersecretary Judy Chang
Office of Energy & Environmental Affairs
100 Cambridge Street., Suite 1020
Boston, MA 02114

Re: Clean Energy & Climate Plan 2050

Dear Undersecretary Chang:

National Grid appreciates the opportunity to comment on the Office of Energy and Environmental Affairs (EEA) proposed long-term framework for the 2050 Clean Energy and Climate Plan (2050 CECP or the 2050 Plan). National Grid thanks the EEA for its efforts to solicit feedback and evaluate public input on the 2050 Plan.

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[1] (as updated, the Net Zero Plan), which 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 we share with the Commonwealth. 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).

National Grid's ongoing modernization of the electric and gas networks we operate remains foundational to achieve net zero greenhouse gas (GHG) emissions in the Commonwealth. Our electric system investment programs and proposals – such as distribution Grid Modernization, advanced metering infrastructure (AMI), and transmission and distributed system upgrades to enable renewable electricity – are designed to deliver flexibility, resilience and decarbonization. In our gas

[1] https://www.nationalgridus.com/media/pdfs/our-company/net-zero/cm8610-net-zero-sm.pdf

delivery network, we are working in communities across the Commonwealth to replace or eliminate aging infrastructure, targeting a 90% reduction in methane emissions from our 1990 baseline by the completion of the programs, and enabling the future delivery of fossil-free fuels to fully displace the use of geologic gas by 2050.

National Grid agrees with many of the recommendations identified by the EEA for continuing the Commonwealth's leadership in decarbonizing the electricity and transportation sectors, reducing energy demand through increasing efficiency and broadly deploying efficient heat pump technologies. National Grid recognizes the value that a longer-term plan can provide to accelerate decarbonization and appreciates EEA's recognition for the need to allow "room for some uncertainties as each sector decarbonizes."[2] At the same time, as the Commonwealth sets emission sublimits for a date almost 30 years away, it is essential that the policy mechanisms and programs acknowledge the real uncertainty that remains, and provide sufficient flexibility in order to be successful in the face of this uncertainty. Feasibility and affordability of decarbonization must remain at the forefront, and policies should enable investment along multiple technology development fronts rather than preclude or limit solutions available to the Commonwealth.

The following comments are intended to support the Commonwealth's achievement of 2050 CECP targets by suggesting modifications that increase their feasibility and affordability, while also recognizing the diverse needs and preferences of customers. In particular, National Grid recommends that the 2050 Plan ensure the decarbonization of heat for buildings and industry that leverages existing gas infrastructure to achieve decarbonization at the lowest societal cost and maintains the resiliency of the energy sector far into the future. National Grid's April 2022 Clean Energy Vision[3] announced our plan for decarbonizing the heating sector and eliminating fossil fuels from our gas networks, through 4 interrelated pillars: energy efficiency, targeted electrification and networked geothermal, hybrid electric-gas heating systems, and 100% fossil-free fuels (replacing geologic natural gas with renewable natural gas (RNG) and clean hydrogen). Using these 4 pillars, our plan achieves net zero GHGs for the Commonwealth at a cost that is 15-20% lower than the "electrify everything" approach ($800-1,000 per household per year) and relies on customer equipment conversion rates that are more likely to be achieved, based on real-world experience.[4]

[2] Slide 6, *Clean Energy & Climate Plan for 2050,* MA Executive Office of Energy and Environmental Affairs, October 6, 2022
[3] https://www.nationalgrid.com/document/146251/download
[4] https://www.nationalgrid.com/document/146251/download

Supplies of RNG and clean hydrogen are accessible and feasible within this decade, and hold even more potential over the longer-term. The 2050 Plan should recognize the strategic role these fuels can play in supplementing electrification strategies. Today, National Grid customers account for 15% of residential and commercial gas demand in the Eastern U.S. To achieve our Clean Energy Vision, we need to procure 10-20% of Eastern U.S. RNG potential and combine this RNG blend in a ratio of approximately 70/30 by energy content with clean hydrogen cumulatively across our entire network to completely eliminate the need for fossil gas. A 2019 national study suggests that Eastern US RNG feedstocks have the potential to create between ~740-1390 trillion British thermal units (tBtu)/year for the use of the greater region by 2040, with further potential to expand to 2050. By 2050, National Grid plans to be using 50 tBtu of RNG in Massachusetts from both in-state and out-of-state sources under our Vision.[5]

By 2030, the U.S. Department of Energy (DOE) aims to reduce the production cost of clean hydrogen by 80% to $1 per kilogram,[6] and many analysts expect the recently-enacted federal tax incentives to support hydrogen pricing around this level by the end of the decade. Widely available clean hydrogen at this price level could become cost-competitive to use in the heating, industrial, power generation, and transportation sectors. With the potential of up to 60 gigawatts (GW) of offshore wind across the Northeast region, National Grid sees the potential for more than 200 tBtu of regional hydrogen production through electrolysis to serve multiple end uses, including displacing fossil gas.

To develop and preserve optionality for the broadest range of viable solutions for our customers, National Grid recommends the 2050 Plan consider the following high-level changes:

Emissions Sublimits & Accounting

- Provide clarity on how the emissions sublimits were determined and why the sublimits provide the greatest benefit at the least cost for the Commonwealth
- Address the potential for future mechanisms to adjust the emission sublimits if needed based on cost and feasibility of achievement
- Ensure that forthcoming accounting for biofuels and synthetic fuels in the Commonwealth's GHG inventory will fully and fairly account for the emissions reduction value of these fuels, inclusive of any and all upstream emissions reductions from out-of-state supply resources

[5] 2019 American Gas Foundation: Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment
[6] https://www.energy.gov/eere/fuelcells/hydrogen-shot

- Increase focus on providing broad public engagement on the requirements, costs and benefits (near-term and long-term) of the Plan's clean energy strategies

Power Sector

- Consider additional strategic actions to address siting and permitting challenges for new renewable energy resources and distribution and transmission projects
- Support a streamlined review process by the new Grid Modernization Advisory Council and the DPU for the necessary plans and cost recovery frameworks for incremental electric T&D infrastructure needed to deliver renewable electricity
- Provide detailed support for how the EEA can support increased regional collaboration for transmission planning
- Include additional recommendations for resiliency and reliability of electric infrastructure under an increasingly electrified energy system
- Consider how planning approaches can best support mitigation of incremental electric network build-out through the strategic use of fossil-free fuels on the existing gas network

Buildings Sector, Non-Energy & Industrial

- Recommend the passage of legislation requiring gas suppliers to reduce carbon intensity of delivered gas through the procurement of decarbonized fuels
- Ensure MassSave remains an essential driver of customer adoption of clean heat solutions, building upon and leveraging Program Administrator experience, knowledge and progress
- Not recommend or assume decommissioning of gas infrastructure but rather prioritize piloting of targeted electrification approaches and evaluation of gas infrastructure depreciation schedules
- Recognize hybrid gas and electric heating as a beneficial option for a significant portion of the Commonwealth's gas customers while managing the overall level and distribution of societal costs
- Explore the development of hydrogen customer "clusters" to help decarbonize the commercial and industrial sectors, as well as transport and power generation applications

Transportation

- Recommend EV charging load management approaches tailored to the needs of diverse sites and customer types, rather than a blanket approach

The remainder of these comments expand on these recommendations, organized by sectors of relevance to the Company addressed in the 2050 Plan.

I. EMISSIONS SUBLIMITS & EMISSIONS ACCOUNTING

In the proposed 2050 emissions sublimits, the EEA proposes the greatest reduction in the Buildings sector. The proposed emission sublimits by 2050 for the Residential Heating & Cooling sector are 95% below 1990 levels and 91% below 1990 levels for the Commercial & Industrial Heating & Cooling sector. The emissions sublimits for the other sectors are 93% for Power, 86% for Transportation, -27% for Industrial Processes, and 71% for Natural Gas Distribution & Service.

Regarding the proposed emission sublimits, National Grid provides the following suggestions:

1. **In the final 2050 CECP, the EEA should provide clarity on how the emissions sublimits were determined and why the sublimits provide the greatest benefit at the least cost for the Commonwealth.** For clarity, the final 2050 Plan should also establish the global warming pathway scenario (i.e., 1.5 degree or 2 degree warming target) its reductions are designed to achieve on behalf of the Commonwealth.
2. **The 2050 Plan should address the potential for future mechanisms to adjust the emission sublimits if needed based on cost and feasibility of achievement.** Significant challenges and opportunities will undoubtedly emerge as we work to decarbonize transportation, achieve a very low-carbon electricity sector, transition to next-generation heating systems, and introduce carbon-neutral and zero-carbon fuel technologies such as RNG and clean hydrogen.
3. **The 2050 Plan should ensure that forthcoming accounting for biofuels and synthetic fuels in the Commonwealth's GHG inventory will fully and fairly account for the emissions reduction value of these fuels, inclusive of any and all upstream emissions reductions from out-of-state supply resources.** National Grid appreciates that the draft Plan anticipates the creation by 2024 of a "convention/guiding principles for GHG emission accounting methodologies for biobased and synthetic fuel combustion emissions...[including] how to include these emissions into the baseline and total emission accounting." This guidance will be essential to establishing GHG accounting for the production and use of RNG and clean hydrogen to reduce emissions.
4. **The 2050 Plan should increase focus on providing broad public engagement on the requirements, costs and benefits (near-term and long-term) of the Plan's clean energy strategies.** Affordability and minimizing customer disruption are key to customer support

for—and ultimately the success of—the transition to net zero. To the extent climate policies result in excessive costs, adverse reliability impacts or conditions that lead businesses or residents to relocate to other states or not locate in Massachusetts, such a result would cause not only economic leakage, but also frustrate the Commonwealth's goal to mitigate climate change. Especially in the current commodity and inflationary environment, the costs of the 2050 Plan's strategies should be clearly understood and communicated, with corresponding initiatives to minimize those costs and ensure equity in both cost and benefits for all customers.

II. POWER SECTOR

Achieving the goals of the 2050 Plan will require new clean electric generation and investments in transmission and distribution systems to be made at an unprecedented pace and scale. The EEA's proposal to transition toward a forward clean energy market, reforms to regional transmission planning and cost allocation, continued investments in electric infrastructure for modernization, including deployment of AMI and rate design, are all critical enablers of clean electricity. Additionally, we emphasize certain points and provide suggestions as below:

1. **The 2050 Plan should consider additional strategic actions to address siting and permitting challenges for new renewable energy resources and distribution and transmission projects.** The ability to site and permit large-scale renewable projects and utility infrastructure needed to interconnect to the distribution and transmission systems has proved to be more challenging in New England than in other regions. Project permitting, including environmental permitting, siting approvals and local authorizations, is a major bottleneck, and can take two or more years. National Grid recommends 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. National Grid welcomes the opportunity to continue working with the Commonwealth in developing and resolving the issues related to siting and permitting.

2. **The 2050 Plan should support a streamlined review process by the new Grid Modernization Advisory Council and the Department of Public Utilities (DPU) for the necessary plans and cost recovery frameworks for the incremental electric transmission and distribution infrastructure needed to deliver renewable electricity required by the 2030/2050 emission sublimits.** We have identified up to 1,200 MW of renewable capacity that could be enabled by up to $700 million in transmission and distribution upgrades by 2030. The DPU should approve new cost recovery proposals as expeditiously as possible and ensure an appropriate balance of recovery from connecting renewable developers and electric customers broadly, building on new frameworks developed in the D.P.U. 20-75 docket.
3. **The 2050 Plan should provide detailed support for how the EEA can support increased regional collaboration for transmission planning.** In-region large-scale transmission and transmission networks to interconnect offshore wind and high-voltage direct current interconnections to neighboring regions such as Quebec will be key to meeting existing and future procurement targets. EEA should consider additional strategic actions to support 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.
4. **The 2050 Plan should include additional recommendations for resiliency and reliability of electric infrastructure under an increasingly electrified energy system.** With increased dependance on electric infrastructure, additional considerations and investments will be necessary to increase system reliability and resiliency.
5. **The 2050 Plan should consider how planning approaches can best support mitigation of incremental electric network build-out through the strategic use of fossil-free fuels on the existing gas network.** In the D.P.U. 20-80 Future of Gas docket, the Independent Consultant Report identified that a high electrification pathway could increase electric peaks from roughly 22 GW in 2020 to over 64 GW by 2050.[7] The consultant also found that the high electrification pathway would require between 18 and 43 GW of clean firm power, defined as hydrogen, natural gas with carbon capture and sequestration, nuclear, or long duration battery storage, while pathways that leverage the gas system to provide peaking services would need 10-30

[7] D.P.U. 20-80 Independent Consultant Report Part 1: The Role of Gas Companies in Achieving the Commonwealth's Climate Goals p. 59 https://thefutureofgas.com/content/downloads/2022-03-21/3.18.22%20-%20Independent%20Consultant%20Report%20-%20Decarbonization%20Pathways.pdf

GW firm electric capacity by 2050.[8] A high electric scenario would require electric supply capacity to increase by about 3.5 times to cover a cold winter day and associated transmission and distribution lines. Utilizing the gas infrastructure system to deliver fossil free gas would require 25 GW less electric capacity and associated transmission and distribution lines in New England.[9] The 2050 Plan should consider how joint electric and gas system planning can reflect the value of the existing gas network for avoiding electric infrastructure.

III. BUILDINGS SECTOR

National Grid broadly supports the proposed 2050 emissions sublimits and anticipates enabling achievement of these limits through our Clean Energy Vision described above. In our 2050 Vision, 50% of buildings in Massachusetts will be heated via electric heat pumps, 25% will be heated with a hybrid of electric heat pumps and equipment using fossil-free gas and 25% will rely fully on fossil-free gas for heating. Achieving this plan will require widespread adoption of efficient electric heating equipment (i.e., heat pumps) to displace the use of GHG emitting fuels for heating. National Grid is supportive of a broad-based public education program to build awareness of efficient and lower-carbon technologies for customers' homes and businesses.

At the same time, multiple cold climate heat decarbonization studies[10] have recognized the added value of pairing heat electrification with the use of fossil-free fuels (RNG and clean hydrogen), encompassing hybrid or dual-fuel customer heating systems that can meet heating needs on the coldest days at a lower cost to customers and society. In addition, National Grid has heard from many existing gas customers committed to decarbonization that RNG and clean hydrogen are essential elements of their own sustainability roadmaps. In many instances, fossil-free gas is the only real alternative suitable for their energy needs. Institutional customers with central heating facilities, such as universities, do not expect to be able to electrify these facilities and are seeking clean fuels to achieve their emissions targets. Hospitals and other critical facilities require levels of energy resiliency that cannot be met through electric-only solutions, and in many cases are mandated to maintain dual-fuel energy sources.

[8] D.P.U. 20-80 Independent Consultant Report Part 1: The Role of Gas Companies in Achieving the Commonwealth's Climate Goals p. 61-62 https://thefutureofgas.com/content/downloads/2022-03-21/3.18.22%20-%20Independent%20Consultant%20Report%20-%20Decarbonization%20Pathways.pdf

[9] National Grid Clean Energy Vision, p. 19-21. https://www.nationalgrid.com/document/146251/download

[10] These studies include the 2020 Princeton Net Zero America Study; LCRI Net Zero 2050: US Economy-Wide Deep Decarbonization Scenario Analysis; 20-80 Independent Consultant Report; and the Philadelphia Gas Works Business Diversification Study.

Among our residential customers, more than 80% of customers who access heat pump incentives today combine those heat pumps with a fuel-based source of heating rather than fully electrifying.[11] If the Commonwealth's building sector were to decarbonize by 2050 using only electric heat pumps, 90,000 homes would need to remove their fuel-based heating equipment in order to fully electrify each year (roughly 2,000 homes per week, every week, until 2050). In these scenarios, either electrification rates would need to increase by roughly 15-20 times, or half of households and businesses would need to replace their gas appliances and heaters before their useful end of lives. By allowing customers to cost-effectively combine some use of heat pumps with continued use of gas that is fossil-free by 2050, the Commonwealth can rely on more feasible expectations for customer equipment adoption that are also better tailored to our climate zone and avoid requiring large and costly modifications to buildings and heating systems to achieve decarbonization goals.

Accordingly, we offer the following suggestions:

1. **The 2050 Plan should recommend the passage of legislation requiring gas suppliers to reduce carbon intensity of delivered gas through the procurement of decarbonized fuels.** This should provide market certainty required to develop sufficient supply fossil-free gas using existing energy infrastructure. The 2025/2030 CECP recognized the near-term role that fossil-free fuels can play, indicating that "Optionality and Flexibility" were a "Key Pathway Feature," and recommended reducing the carbon intensity of pipeline gas by 2% by 2025 through the use of fossil-free fuels such as RNG and clean hydrogen.[12] The 2050 Plan should recommend the expansion of these targets to at least 20% by 2035, with a path to increasing targets that could fully eliminate the use of fossil gas by 2050. Policymakers in other states[13] have advanced procurement standards for fossil-free gas consistent with the approach taken to electric Renewable Portfolio Standard programs or low-carbon fuel standards for transportation; establishing and then scaling these policies will be essential to lead to significant emission reductions across our gas networks.

[11] (16,235 total ASHP - 2,933 total full ASHP replacements) / 16,235 total ASHP customers = 82% partial ASHP installations from Mass Save, "Massachusetts Energy Efficiency Program Administrators Quarterly Report, Fourth Quarter, 2021", section titled Bi-Annual Data, at 3 of 75, 2021, available at https://ma-eeac.org/results-reporting/quarterly-reports/

[12] Page 29, *Massachusetts Clean Energy and Climate Plan for 2025 and 2030.* 30 June 2022, https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/download

[13] Including Oregon, Colorado, Minnesota, and Nevada.

2. **The 2050 Plan should ensure MassSave remains an essential driver of customer adoption of clean heat solutions, building upon and leveraging Program Administrator experience, knowledge and progress.** Creating a new organization with redundant roles and customer touchpoints to deliver these solutions, without alignment with MassSave, would likely create customer confusion, be less efficient and slow progress toward goals. As one of the largest Program Administrators, National Grid offers our assistance in the development of a clearinghouse using the established program delivery infrastructure, as well as the pursuit of additional external funding for greater and faster adoption of clean heat solutions.

3. **The 2050 Plan should not recommend or assume decommissioning of gas infrastructure but rather prioritize piloting of targeted electrification approaches and evaluation of gas infrastructure depreciation schedules.** The 2050 CECP should recognize the value of continued utilization of existing gas networks to deliver fossil-free fuels instead of assuming that "most natural gas pipelines are likely phased out." Decarbonized gases could play a major role in meeting the Commonwealth's energy needs and avoid over-reliance on an electric-only energy pathway with higher cost, lower resiliency and more limited customer choice than a multi-fuel one.

   Massachusetts would need to consider the requirements and timeline around customer notification, customer response timelines and options, and financial and logistical support for customers who are encouraged or directed to remove their gas service as a means of effectuating the removal of their delivery infrastructure. National Grid aims for at least one of our geothermal pilot projects to connect customers to a geothermal system who are currently served by a segment of leak-prone pipe (LPP). [14] Customer appetite to disconnect from the gas system is the critical condition of this LPP pilot objective, and simply put, National Grid could not plan for decommissioning of any delivery infrastructure unless all existing customers were to no longer require service from it. At the same time, with the expectation of significantly decreased gas demand and the potential for a lower number of customers utilizing gas by 2050, it would be prudent for the Department of Public Utilities to consider more accelerated depreciation of gas infrastructure to avoid the potential for unsustainable delivery cost increases for future customers.

[14] D.P.U 22-62 Geothermal Implementation Plan at pg. 4

4. **The 2050 Plan should recognize hybrid gas & electric heating as a beneficial option for a significant portion of the Commonwealth's gas customers while managing the overall level and distribution of societal costs.** By looking to the experience of other cold-climate regions such as Quebec, rather than warmer jurisdictions such as California, which do not have the same heating needs, Massachusetts can better decarbonize buildings in a way that works well for customers. These hybrid electric heating strategies have real-world support and have been implemented in Quebec, Canada between Energir and Hydro Quebec.[15] In May 2022, the Quebec energy regulator approved a GHG emissions reduction program that was jointly proposed by Hydro-Quebec and Energir, which are the largest electric and gas utilities in Quebec. This dual energy program encourages customers to install heat pumps while maintaining gas furnaces. It is expected to reduce gas consumption by more than 70% and offset 540,000 tons of carbon dioxide equivalent by 2030.[16] Further, as discussed above, such strategies limit the level of electric system infrastructure needed to meet peak demands relative to full electrification.

   High rates of electrification could cause gas bills to rise for customers that choose not to or are unable to electrify, as the investment costs required to maintain the gas distribution system would be spread among fewer customers, including those who cannot afford the upfront costs of new electric equipment. In the example cited above, to mitigate the impact that electrification would have had on gas customers, Hydro-Quebec will pay Energir for gas demand lost to electrification. This will cause electric and natural gas rates to increase by roughly the same percentage. Ratepayer savings will be more equitably distributed across electric and natural gas customers to manage the cost impacts for both commodities.[17] This program is expected to save $1.5 billion Canadian dollars ($1.1 billion U.S.) compared to full electrification.[18]

IV. NON-ENERGY & INDUSTRIAL

National Grid supports the EEA's recommendations regarding promoting energy efficiency upgrades, reducing the use of hydrofluorocarbons and SF6, and the solid waste reduction master plan. In National Grid's US Net Zero Plan we established a goal of reducing SF6 emissions 50% by 2030 and eliminating SF6 emissions by 2050.[19]

[15] https://www.energir.com/en/about/media/news/partenariat-inedit-hydro-quebec-et-energir/
[16] Id.
[17] Id.
[18] Id.
[19] https://www.nationalgridus.com/media/pdfs/our-company/net-zero/cm8610-net-zero-sm.pdf

Additionally, we offer the following suggestions:

1. **The 2050 Plan should explore the development of hydrogen customer "clusters" to help decarbonize the commercial and industrial sectors, as well as potential transport and power generation applications.** The commercial sector through large scale space heating offers an opportunity to increase clean hydrogen use in steam and other commercial heating systems that could prove difficult to electrify. The Massachusetts industrial sector is almost certain to be difficult to electrify and will require fossil-free fuels, such as RNG and clean hydrogen. The EEA has proposed an emission sublimit for industrial processes of -27%. This means that the EEA expects emissions from industrial processes to increase by 27% compared to 1990 levels by 2050. Clean hydrogen may be able to help significantly reduce the emissions from the industrial sector.

   Since hydrogen and natural gas are both gases, hydrogen can substitute for natural gas in the production of some industrial processes, such as in the chemical industry as a fuel for furnaces and boilers. Other countries, including, Japan and Sweden, have begun piloting projects where clean hydrogen is replacing natural gas as the heating source in carbon intensive manufacturing.[20] The Massachusetts Clean Energy Center and the Massachusetts Department of Energy Resources are currently participating in developing an application for the Northeast to become one of the regional clean energy hydrogen hubs through the Department of Energy and as defined in the federal Bipartisan Infrastructure Investment and Jobs Act.[21] National Grid has submitted data for multiple potential projects in MA and NY.

V. TRANSPORTATION

National Grid has actively supported transportation electrification for over 10 years by installing and managing charging stations, providing support and incentives for our customers to enable adoption and deployment, supporting our own employees to drive EVs, and leading by example as we electrify our internal fleet. National Grid also sees a role for hydrogen fuel cells in supporting transportation that is hard to electrify either because the load is too large to be supported by batteries on the vehicle

[20] Columbia Center on Global Energy Policy; Green Hydrogen in a Circular Carbon Economy: Opportunities and Limits Pg. 36 https://www.energypolicy.columbia.edu/sites/default/files/file-uploads/Green%20hydrogen%20report,%20designed,%2009.07.21.pdf

[21] https://www.masscec.com/northeast-hydrogen-hub

or the charging infrastructure would be too large a draw on the distribution grid, requiring interconnection with the bulk power grid.

The 2050 Plan is clear about the importance of continued charging infrastructure development to enable broad-based electrification of transport "including a network of public fast charging stations sufficient to serve the needs of a fully electrified fleet, as well as support for charging at homes and workplaces".[22] We are working with state agencies in Massachusetts and New York to partner on a proposal to access federal funding for a charging corridor along I-90 from Boston to Buffalo. In support of this effort, National Grid recently led a study[23] to forecast the electric system requirements from public electric vehicle charging at specific points along highways in Massachusetts out to 2045. The results indicated that light duty vehicles (LDVs) will require significant electric peak demand as early as 2030, some may even exceed the typical limit for distribution system interconnection. Furthermore, medium and heavy-duty vehicles (MHDVs) will compound the peak demand such that many sites will require 10 to 20 megawatts (MW) by 2045. Proactive and collaborative planning and investment will be necessary to ensure we match the pace of market adoption while optimizing the cost effectiveness and timing of electric system upgrades.

In this section of the draft 2050 Plan, we offer the following suggestion:

1. **The 2050 Plan should prioritize continued hydrogen development for transportation use cases working closely with vehicle manufacturers,** and should address the full range of potential transportation categories, including ferries, tugs and commercial boats/ships, as well as airport ground equipment and auxiliary power units.

2. While National Grid agrees that "smart" or managed charging will be a critical component for the future load growth related to electric vehicles (EVs), the **2050 Plan should recommend load management approaches tailored to the needs of diverse sites and customer types, rather than a blanket approach** requiring a commitment to managed charging with all EV incentives by 2031.

[22] Slide 9 of the EEA CECP for 2050 Public Presentation
[23] *Forthcoming working paper*. National Grid, Calstart, RMI, Geotab, Stable: "Electric Highways: Understanding, Accelerating, and Lowering the Cost of Fast-Charging Deployment for Carbon-Free Transportation", October 2022.

VI. CONCLUSION

National Grid supports the EEA in developing the 2050 Plan, supports the stated emissions limits and remains committed to the shared goal of net-zero emissions by 2050. The reality is that there are some important uncertainties along the path to achieve that goal, and that policy choices today will have significant impact on the decarbonization options available to customers and businesses, as well as on the cost of electricity and gas that we deliver in the Commonwealth. As we continue our own efforts to decarbonize, National Grid will remain highly engaged and transparent about our progress, acknowledging when challenges or new opportunities arise. We are committed to working with elected officials, regulators, labor, customers, advocates, and other stakeholders to accelerate solutions that achieve our shared goals while supporting the continued reliability, affordability and resiliency of the Commonwealth's energy systems.

Public Comments Regarding Clean Energy & Climate Plan for 2050
Submitted to the Massachusetts Executive Office of Energy & Environmental Affairs
Oct. 11, 2022

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

In her summarizing comments at the Oct. 6 2022 public hearing, Undersecretary Chang said that Massachusetts needed to dramatically transform its economy. I totally agree! In fact for much of my 61 years, I have viewed the solution to many of our energy and environmental problems as requiring such transformation. Unfortunately, when it comes to the Power Sector (page 11 of presentation), EEA is continuing with the same old paradigm, assuming centralization rather than distributed solutions. This could be because thinking differently is hard or it could be that the forces benefiting from the current paradigm (utilities) have much at stake in keeping things the same. Either way, the as Undersecretary Chang stated, the paradigm must change.

Specifically, I am referring to centralized power generation versus truly distributed generation. In none of the documents from or stakeholder discussions with EEA or DOER has there been mention of a dramatic shift from generating energy centrally to generating in a distributed manner. While there has been mention of some diversified generation such as rooftop solar, these solutions remain seemingly at the edges of the stated plans.

I would suggest that for the transformation Undersecretary Chang referenced, what is needed is for a shift in thinking which centers the need for dramatic decentralized power generation as a core part of the solution – be it solar on rooftops, wind by municipalities and small businesses, etc. Most notably, the move to distributed energy generation removes the need for large scale installations, especially for solar, thereby removing the threats to our limited yet vital natural systems of carbon sequestration and storage systems – forests, undisturbed soil, and wetlands. These are the only sequestration and storage systems we have at large scale and as Undersecretary Chang acknowledged, they are an essential part of getting to net zero.

In addition, aggressively moving to distributed solar, wind, heat shifts from building and maintaining infrastructure that must be extensive, is and will be expensive, and is increasingly vulnerable due to worsening climate change induced storms. With a distributed generation paradigm we will be using energy close to where it is developed – either locally or on-site – so the needs for as extensive infrastructure is less, thereby less cost and less vulnerability.

Ultimately, a distributed energy generation system/ paradigm is a more resilient approach and a model EEA should be more strongly recommending.

Additionally, on the Power Sector slide (page 11) there is reference to permitting and siting with Environmental Justice in mind. The bullet reads "*Ensure that siting and permitting decisions consider the impact of energy projects on environmental justice (EJ) communities"*. I would

strongly suggest that an additional bullet is needed that reads - "*Ensure that siting and permitting decisions consider the impact of energy projects on* ***the environment, ecosystem services, public health and public safety****"*.

On the Natural and Working Lands slide (page 13) I was encouraged by the suggested requirement proposed "*development projects clearing forest must undergo MEPA environmental impact review."* This review is desperately essential since industrial scale solar are now destroying environmentally sensitive and important land in places like SE Mass and where requests for MEPA reviews have been actively denied. But I would suggest that the MEPA requirement be extended for all large scale development regardless of the type of generation.. This is sadly a classic situation of profit and industry versus the public good and the environment. This is an old dance and without regulation there is no way to create a new dance whereby the environment, ecosystem services, public health and public safety are protected. For our transformed energy system to truly be resilient and sustainable in the longterm, it must provide these protections. I would ask EEA to require that all large scale installations impacting forests, wetlands, agricultural land or water systems have a MEPA review.

This need for protections is most relevant in two specific instances. The first is in regards to energy storage systems in the form of lithium ion batteries. The Commonwealth has an initiative to dramatically expand energy storage throughout the state, setting up another situation of development versus environmentally appropriate siting. There is significant documentation that lithium ion batteries do catch fire and even explode. There is even public acknowledgement of this fact among the energy industry itself. So, as planners EEA must acknowledge this tendency and related risk and plan accordingly. Generally speaking, batteries are a fine idea but the current technology of lithium ion batteries has demonstrated risk. When they catch fire, which some will eventually do, the current best practice is to try and minimize thermal runaway by flooding them with water as they burn themselves out, often over days. The fire results in seriously toxic chemicals being released in the air and when dowsed over time with large amounts of water, these toxins are washed into the groundwater. This can permanently contaminate the land and the groundwater systems including drinking water wells and acquifers, and it can risk forest fires, further destroying a vital carbon sequestration and storage function and releasing more carbon into the atmosphere.

Currently, it seems there is little protective guidance by the Commonwealth in regards to the siting of energy storage systems. For example, there are now large, 100MW systems being proposed and permitted in the woods (i.e Wendell, MA) where communities have no infrastructure and no professional firefighting or emergency management departments – basically placing energy generation above protection of the environment, carbon storage and sequestration, and the safety of the community. There are also energy storage systems being proposed on Areas of Critical Environmental Concern (such as Norton, MA) where aquifers and drinking water are directly threatened. In both instances, the local economy and environment would be permanently damaged by a battery fire and its resulting contamination.

Similarly, the installation of large scale solar requires tens or hundreds of acres of forest to be removed. This has an environmental impact. Not only is carbon storage and sequestration lost but the loss of forested land means a loss of contiguous forests. It is scientifically recognized that

non-contiguous forests, even those cut in half, are less resilient. In all cases, crucial ecosystem services are diminished. Given climate change, we need to expand our resilience and strengthen ecosystem services rather than diminish them. Specifically, large scale solar installations in forests cause erosion, can change both above and below surface water flows - which in turn effect drinking water, aquifers and can cause local, persistent flooding (effecting homes and roads).

It should be very apparent that not requiring environmental review for large scale power installations – energy storage and solar, in particular, is irresponsible and antithetical to creating a more resilient Massachusetts.

Finally, a note regarding solar. While Undersecretary Chang stated that solutions should be bottom up as well as top down, and that the state should work with local stakeholders, this is not possible when it comes to solar development and municipalities. Currently, municipalities are severely constrained by statute in how they can zone solar, since they are limited to reasons of public health, welfare and safety. Lawyers for developers can easily sue or threaten to sue since it can be hard to legally prove that environmentally sound siting is based on public health, welfare and safety. EEA and the administration should actively support codifying the ability of local zoning to reasonably regular solar and striking existing provisions in MGL Chapter 40A Section 3.

Thank you for your time and consideration.

Michael DeChiara
-Shutesbury Planning Board
-Chair, Shutesbury Energy and Climate Action Committee

MASSACHUSETTS
Interfaith Power & Light

P. O. Box 600163, Newton, MA 02460 • 617-244-0755 • www.MassIPL.org

Secretary Bethany A. Card
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA

Dear Secretary Card,

I am writing on behalf of Massachusetts Interfaith Power & Light's over 250 faith communities who share the commitment to addressing climate change as an expression of their faith to provide comments on the Clean Energy and Climate Plan (CECP). A growing number of our members are making commitments to achieve the Commonwealth's 2030 and 2050 carbon reduction goals. All major faith traditions and denominations have published statements that climate change is a threat to the sacredness of the Earth and a matter of justice since those suffering most from climate change today have contributed least to this phenomenon.

To help our members fulfill their commitment to carbon emissions reduction, Massachusetts Interfaith Power & Light (MassIPL) offers what we call an *Environmental Stewardship Assessment*, our version of a building and energy assessment tailored to the unique architecture and variable usage patterns of these buildings. We have completed over 300 of these assessments in our 20 years, giving us insight into opportunities and challenges confronting these buildings as they try to achieve CECP goals. We have multiple examples of our members who have reduced their carbon emissions 50% or more with a combination of building envelope and heating system upgrades (see https://www.massipl.org/congregation-success-stories). However, a primary strategy in many of these cases is oil-to-gas conversion, a strategy we will not employ in the future.

My comments are directed toward the challenges of meeting the building sector sublimits in the CECP given the age and construction of many of our members' buildings which often date to the 19th century while a large number were built in the post-World War 2 era. We believe our experience is also relevant to many other buildings in the Commonwealth: the Commercial Building Energy Consumption Survey (CBECS) states that 33% of buildings in New England were built before 1946. These buildings will need to significantly improve their energy performance in order to meet the sector sublimit goals. In order to electrify buildings of this age and substantially reduce their carbon emissions, they will require deeper retrofits and will require different strategies than current Commonwealth programs support.

> We recommend that EEA develop new programs and sources of funding that will enable deeper retrofits in older buildings. Projects under these programs should be evaluated primarily by their carbon reduction potential with incentive payments linked to the carbon reduction.

Discussion

The faith-based building sector is larger than often perceived and, due in part to the age and condition of the buildings, emits a greater amount of carbon than other building typologies of similar size. With the assistance of MassCEC interns over the past 2 years, MassIPL has documented that there are **2,951 buildings** operated by faith-based organizations including worship facilities, parsonages, schools, and offices. (We have not included any health care, nursing homes, affordable housing, or other facilities that may be operated by faith-based organizations). Our research and modeling show that:

- 60% of these buildings were constructed before 1946
- The faith-based building sector accounts for **277,669 metric tons CO2e**.
- Faith-based buildings represent **2.25% of commercial building emissions** in the Commonwealth.
- Worship facilities in the Commonwealth have an **average EUI of 65.3**.

As with any building, reducing the carbon footprint of these buildings will require a combination of building envelope measures and electrifying heating systems.

Building Envelope Measures

Electrifying these buildings without reducing their EUI will be cost-prohibitive. But tightening the building envelopes presents specific challenges due to their architecture, materials used, and construction techniques that differ substantially from building practices of the last 50 years. We commonly see that these issues cannot be addressed within the existing energy efficiency programs, especially MassSave.

To illustrate, let me provide a specific example: in 2021 we did an energy assessment for a church with a steam heating system, a total of 31,000 square feet, with different sections of the building constructed from 1896 through the 1950's. We focused on one wing of the complex: a 3-story 10,000 square foot 1950's era concrete masonry unit/stucco exterior structure that houses their church school classrooms and is rented to a nursery school during the week. We noted the following conditions:

- No wall insulation
- Original single pane aluminum frame windows that are over 50% of the wall area
- Minimal insulation under the roof but about 18 inches of space between the ceiling and the underside of the roof.
- The entire 10,000 square feet is one zone of their steam heating system.

As a first phase of pursuing a path to Net Zero, we envision removing this structure from the steam distribution with heating supplied by air source heat pumps that would enable creating multiple zones. But given the likely heat loss due to the conditions noted above air source heat pumps would likely be uneconomic.

We proposed the following approach to a retrofit to improve the building performance in preparation for a heating system replacement:

1. Exterior insulation
2. Reducing the window area while replacing the existing windows with double- or triple-pane units
3. Blown-in insulation under the roof.

We had a MassSave assessment to review these measures, during which the contractor noted that MassSave provides no incentives for windows or exterior insulation. Further, they identified that the ceiling construction was metal lath plaster which would be difficult to drill through to blow in insulation and thus would not meet the financial requirements of the MassSave program.

As a result, no work has been done to date. But the reduction of the heating load and converting from a single-zone steam heating system to a multi-zone ASHP system offers significant carbon reduction potential. Although this church is in a relatively affluent community, a project of this scope will be challenging for them to afford without financial support.

Electrifying Heating Systems

Our research shows that about half of worship facilities use oil as their primary heating fuel, with natural gas primary in 45%. Replacing these systems with heat pumps will require professional design and engineering studies to properly calculate heat load, design the system, and specify equipment. While MassIPL always recommends working with a mechanical engineer on any heating system replacement, it will be especially important in the electrification process. We are seeing initial successful conversions when the faith organization gets this professional help. But this is unfamiliar to most of our members and adds expense to an already expensive project. Providing incentives to ensure that this step is taken will ensure the maximum carbon reductions are achieved.

In addition, the age and history of these buildings often present other obstacles to substantial renovations that would be required for electrification:

- **Undersized electric service:** we recently worked with a church which had 100-amp service and needed to upgrade it to replace their failing gas boiler with an air source heat pump.
- **Live knob and tube wiring:** another church just rewired 16 circuits to remove knob-and-tube wiring while others we work with aren't sure whether the knob-and-tube wiring is still live.
- **Vermiculite/asbestos insulation:** we see this much less commonly but we can anticipate seeing it as these deeper retrofits are pursued. We have seen asbestos insulation for old steam pipes that has been encapsulated but if the system is removed, would need full remediation.

Outline of a Retrofit Incentive Program

The examples above (as well as the experience MassIPL has had working with over 300 faith-based buildings) suggests the following components of a retrofit incentive program for older buildings:

- **Support for comprehensive building and systems analysis.** Creating an effective retrofit plan requires in-depth understanding of the existing buildings and heating system. Rarely do these buildings have blueprints, detailed construction plans, or documented knowledge of the materials and operations of the heating system. Consultants in construction, mechanical engineering, and other disciplines may be needed to establish foundational knowledge.
- **Incentives for remediating limiting conditions.** If the building analysis discovers these problems, they will need to be corrected before other work begins.
- **Support for building science analysis.** Because of the unique characteristics of these buildings, common air sealing and insulation techniques may risk creating problems. Building science consultants would anticipate potential problems and recommend alternate materials and techniques to avoid them.
- **Support for modeling of the potential energy savings and carbon reduction.** These buildings are likely to be more difficult to work in than other building typologies and decision-makers will need a basis on which to decide which measures have the greatest carbon reduction potential. An energy model provides a quantitative basis for these decisions.
- **Incentive amounts that reflect the lifetime carbon reduction potential of measures.** In contrast to relatively younger buildings where modest incentives are sufficient to catalyze building performance improvements, these older buildings will require larger incentives. Tying these incentives to the carbon reductions achieved will ensure that incentive spending aligns closely to the goals of the CECP.

Worship facilities are a specific example of the kind of older structures that make up a substantial portion of the Commonwealth's building stock. Achieving the CECP's goal of a 91% carbon emissions reduction in the commercial building sector will likely require that these buildings improve their energy performance even as new buildings meet today's energy performance standards and relatively younger buildings upgrade to improve performance. But the challenges of this older building stock require additional analysis and planning, different approaches to carbon reduction, and correcting other conditions.

Thank you for this opportunity to provide input to the 2050 CECP. I'd be happy to discuss these ideas and concerns in more detail with you or your staff at any time.

Sincerely,

James D. Nail
President
Massachusetts Interfaith Power & Light
jnail@massipl.org
508-789-6289

October 21, 2022

ELECTRONIC SUBMISSION
Bethany A. Card, Secretary
Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: **Joint Comments of the Massachusetts Energy Efficiency Program Administrators on the Clean Energy and Climate Plan for 2050**

Dear Secretary Card:

As the Program Administrators of the Mass Save® energy efficiency program,[1] we thank you for the opportunity to comment on the Clean Energy and Climate Plan for 2050 ("2050 CECP"). Drawing upon our knowledge and experience implementing the program, we offer the following comments on the strategies outlined in the 2050 CECP for transforming the building sector. Specifically, the Program Administrators:

(1) support creation of a Building Decarbonization Clearinghouse and believe that we are uniquely positioned to be the most effective administrators of this role;
(2) support pursuing additional external funding for more rapid heat pump adoption in the Commonwealth; and
(3) note that program oversight and evaluation frameworks that are designed to ensure appropriate and beneficial use of public funds are key elements of any decarbonization effort.

The Program Administrators are both deeply committed to, and well-positioned for, helping the Commonwealth achieve a clean, equitable energy future by providing electric and gas customers with energy efficiency and beneficial electrification improvements for their homes and businesses. The Mass Save program, as implemented by the Program Administrators, has been an extremely effective tool in helping Massachusetts customers reduce greenhouse gas emissions while also reducing their energy costs. Since 2010, through work with our customers, contractors, government officials, and diverse stakeholders, the program has achieved over 5.6 million metric tons CO_2e in GHG emissions reductions from energy efficiency and electrification. The 2022-2024 Three-Year Plan explicitly aligns the Mass Save Program with the Commonwealth's GHG

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1 The Massachusetts Program Administrators are: The Berkshire Gas Company, Fitchburg Gas & Electric Light Company d/b/a Unitil, Liberty Utilities (New England Natural Gas Company) Corp. d/b/a Liberty, Massachusetts Electric Company, Nantucket Electric Company, Boston Gas Company and former Colonial Gas Company, each d/b/a National Grid, NSTAR Electric Company, NSTAR Gas Company and Eversource Gas Company of Massachusetts, each d/b/a Eversource Energy, and Cape Light Compact JPE.

emissions reduction efforts, including specific GHG emissions reduction and equity targets and allocates nearly $900 million to support customers looking to electrify their homes and businesses.

For more than a decade since the passage of the Green Communities Act, and for 25 years prior to that, the Program Administrators have developed and implemented nation-leading energy efficiency plans across the Commonwealth. Over this period and in connection with the role many of us play in managing energy distribution systems, the Program Administrators have developed deep institutional knowledge, experience, relationships, and program infrastructure necessary to deliver energy efficiency and electrification.

A. The Program Administrators Have a Strong Track Record of Delivering Energy Efficiency and Electrification under the Mass Save Program

The energy efficiency programs in Massachusetts are administered pursuant to the Green Communities Act, G.L. c. 25, §§ 19, 21, 22. The statute requires the Program Administrators to prepare, every three years, an energy efficiency investment plan that provides for the acquisition of all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply. G.L. c. 25, §§ 21(b)(1)-(3). Starting in 2018, the legislation was explicitly amended to incorporate "strategic electrification." G.L. c. 25, §§ 21(b)(2).[2] The Program Administrators pursue energy efficiency and strategic electrification measures, including, but not limited to, weatherization, heating systems, and active demand reduction programs. These energy efficiency and electrification measures provide benefits to customers in the Commonwealth in the form of reduced energy costs and reduced GHG emissions, as well as other energy system benefits, such as avoided transmission costs, avoided distribution costs, and low-income customer benefits. G.L. c. 25, § 21(b)(2); D.P.U. 08-50, at 5 (2008). The program also supports a robust contractor infrastructure, including for heat pump installers, promotes businesses and industry in the Commonwealth, and focuses on equitable delivery of benefits to customers, including serving low-income customers through a partnership with the low-income weatherization and fuel assistance program network, which also leverages significant federal funding to support these critical customers. The Program Administrators work closely with the Energy Efficiency Advisory Council ("EEAC") to ensure energy, capacity, climate, and environmental goals are met through a sustained and integrated effort. G.L. c. 25, §22(b).

The current three-year energy efficiency plan for 2022-2024 is designed to meet a GHG emissions reduction goal of 845,000 $MTCO_2e$. Under this plan, the Program Administrators expect to weatherize approximately 180,000 homes and apartments and install at least 60,000 cold-climate, residential heat pumps. To support market transformation and growth in Massachusetts, the Program Administrators are engaging manufacturers and distributors to encourage them to begin serving the Massachusetts market. We have also launched the Heat Pump Installer Network to recruit and train residential contractors on program offerings and heat pump installation, with over 700 contractors already participating. To ensure that all customers can benefit from these

[2] The Green Communities Act, as amended by the Energy Act of 2018, St. 2018, c. 227.

offerings, the Program Administrators have increased outreach to Environmental Justice communities through programs such as the Community First Partnership, which, among other things, funds a local energy advocate in participating communities to help them take advantage of programs. The Program Administrators also support Main Streets events that engage small businesses and non-profits, and the Clean Energy Pathways program that provides workforce development training for youth in these communities. The program is increasing its efforts to serve other prioritized communities, such as renters and English-isolated customers, through a set of new initiatives under the Renter Strategic Plan and the forthcoming language access plan. Finally, the Program Administrators are working to streamline access to the program for low- and moderate-income residents by launching new approaches for income verification.

The energy efficiency plans consistently deliver benefits not only to the individual customers who participate but also to the entire energy system, driving down costs associated with energy supply, distribution, and transmission, as well as costs of environmental compliance. This reduction in energy system costs provides benefits to all customers in the Commonwealth, including those who do not individually participate in the energy efficiency programs, because it reduces the distribution and transmission costs included on each customer's utility bill and will therefore be critical to cost-effective electrification of the building and transportation sectors going forward.

B. Program Administrators' Comments to the 2050 CECP

1. The Program Administrators Stand Ready to Assist in Development and Implementation of the Building Decarbonization Clearinghouse.

The Program Administrators understand the value of providing customers with a single entity that can guide customers through the process of identifying decarbonization opportunities, prioritizing required investments, and accessing the range of incentives designed to facilitate customer adoption of desired measures. We support creation of a Building Decarbonization Clearinghouse and believe that we are uniquely positioned to be the most effective administrators of this role. As already noted, the Program Administrators have developed and implemented nation-leading energy efficiency plans across the Commonwealth for more than a decade since the passage of the Green Communities Act and for 25 years prior to that. Over this period and in connection with our role in managing the distribution system, the Program Administrators have developed deep institutional knowledge, experience, relationships, branding and outreach capabilities, and program infrastructure necessary to deliver energy efficiency and electrification.

We are already building on this strong track record of transformational investments—such as driving the transformation of the lighting market to LED technologies—and on a history of successfully addressing market barriers, with a particular focus on educating and engaging customers, in order to embrace the challenge of achieving climate and equity goals through energy efficiency. The recently passed "Act Driving Clean Energy and Offshore Wind," St. 2022, c. 179, reaffirmed the importance of the Program Administrators' role in delivering energy efficiency and electrification and added new opportunities for combining those efforts with renewable energy

into the next Three-Year Plan. More importantly, our customers are increasingly interested in making energy efficiency and electrification improvements to their homes and we are adapting the program to respond to their needs. For example, one of the Program Administrators is currently developing a proposal to pilot an integrated one-stop-shop offering for building decarbonization for low- and moderate-income households.

Over the long term, the Program Administrators are well-positioned to leverage our existing infrastructure, role in managing the distribution system, and administration of other key distributed generation and electric vehicle programs (*e.g.*, interconnection and net metering, solar and storage incentives, make ready infrastructure, and managed charging) to help the Commonwealth achieve its GHG reduction goals in the most streamlined and cost-efficient way possible. We also have extensive experience in regulatory reporting and timely provision of relevant data. Any entity serving in a clearinghouse role must have demonstrated capacity in reporting to assure program transparency and public confidence. The Program Administrators have consistently provided monthly, quarterly, annual, and three-year term reports to the Department of Public Utilities and the EEAC. Additionally, the Program Administrators have significant branding, marketing, and outreach capabilities developed as part of the program and have increased our community partnership efforts through expansion of our Community First Partnership. This outreach infrastructure could be coordinated with and used to support a parallel *public education campaign and community effort to build momentum for building electrification.*

In sum, the program could be adapted to play a Clearinghouse role with some adjustments to better align the regulatory framework with climate goals and additional funding streams. Adding new administrative layers or unproven delivery mechanisms at this point could create unintended barriers to achieving decarbonization targets at a critical juncture in this journey.

Further, if not carefully coordinated with the Mass Save Program, a new entity that exists in parallel to Mass Save risks creating customer and vendor confusion, potential double-dipping in incentives, inefficient spending, and a reduced customer experience. Finally, given the utility Program Administrators' central role in managing the distribution system, the success of the Building Decarbonization Clearinghouse will be intricately tied to the Program Administrators regardless of what form the Clearinghouse takes. Therefore, it is critical the Program Administrators have an opportunity to inform development of an approach that is as streamlined and cost-effective for customers as possible, and accounts for the nuances of different program requirements as well as implementation experience.

2. *The Program Administrators Continue to Strongly Support External Funding Mechanisms, such as the Clean Heat Standard, Necessary to Exponentially Increase Heat Pump Installation in the Commonwealth.*

A significant level of growth and market penetration will be necessary in the coming years to achieve an exponentially higher number of heat pump conversions per year as envisioned by the CECP and we continue to strongly support efforts to secure the external funding necessary to

ease customer cost burdens. The Program Administrators are working closely with the legislature and the Administration to secure additional federal funding for energy efficiency and electrification under the American Rescue Plan Act, the Infrastructure Investment and Jobs Act, and the Inflation Reduction Act and to reduce customer costs—particularly for low- and moderate-income customers. These efforts are particularly urgent in light of the price increases associated with volatility in the global energy market.

We support the establishment of additional revenue sources to help reduce the burden on electric customers, support achievement of our building decarbonization goals and send appropriate price signals to customers. The 2050 CECP should prioritize the importance of securing additional funding sources to offset customer costs for efficiency and electrification benefits that ultimately benefit all citizens in the Commonwealth.

Development of a Clean Heating Standard should be carefully calibrated and include a straightforward, realistic approach for implementation. Similarly, it is critical to design an approach that is flexible enough to accommodate all end uses. The Program Administrators have significant experience in evaluating the GHG and other benefits of electrification measures and would like to offer input based on our experience designing and delivering these offerings.

3. *Program Evaluation Frameworks are Critical to Decarbonization Efforts and Must be Aligned with Decarbonization Goals*

Program oversight and evaluation frameworks that are designed to ensure appropriate and beneficial use of public funds are key elements of any decarbonization effort. The experience gained through Mass Save can be leveraged to inform future adjustments that will ensure program evaluations and achievements are aligned with the Administration's policy goals on electrification and GHG emissions reductions. As Program Administrators, we look forward to working with the Administration and interested parties to ensure that all customer facing programs utilizing public funds maintain a high level of accountability and are deployed utilizing evaluation frameworks that align with achievement of the Commonwealth's policy goals.

C. Conclusion

The Program Administrators appreciate the opportunity to provide feedback to the EEA regarding the draft 2050 CECP. The Program Administrators respectfully request that the EEA consider the recommendations and issues discussed herein prior to finalizing the 2050 CECP.

Sincerely,

The Massachusetts Program Administrators

Katherine Peters /EL

Katherine Peters
Director, Residential Energy Efficiency
Eversource Energy

Christopher Porter /EL

Christopher Porter
Director, Customer Energy Management
National Grid

Cindy Carroll /EL

Cindy L. Carroll
Vice President, Customer Energy Solutions
Unitil Service Corp.

Hammad Chaudhry /EL

Hammad Chaudhry
Senior Manager, Conservation and Load Management
The Berkshire Gas Company

Kim Dragoo /EL

Kim Dragoo
Senior Manager, Energy Efficiency & Customer Programs
Liberty Utilities

Margaret Downey /EL

Margaret T. Downey
Administrator
Cape Light Compact JPE

MASSACHUSETTS
Rivers Alliance
2343 Massachusetts Ave, Cambridge, MA 02140
617-714-4272 • www.massriversalliance.org

October 21, 2022

Secretary Bethany Card
Undersecretary Judy Chang
Massachusetts Executive Office of Energy and Environmental Affairs
100 Cambridge Street
Suite 1020
Boston, MA 02114

RE: Comments on the Massachusetts 2050 Clean Energy and Climate Plan

Dear Secretary Card and Undersecretary Chang,

Massachusetts Rivers Alliance respectfully submits the following comments on the state's 2050 Clean Energy and Climate Plan. Mass Rivers is a statewide non-profit organization representing 80+ member organizations across the Commonwealth, collectively working to protect and restore Massachusetts' rivers and streams. We are committed to local and regional climate resilience, and advancing nature-based solutions. Our comments below are organized by the plan's sectors.

Natural and Working Lands.
We are pleased to see the 2050 CECP reflect the important role that natural and working lands play in climate adaptation and mitigation, and commit the state to expanding land conservation.

As the 2025/2030 plan notes, wetlands in particular absorb carbon and provide local adaptation benefits by mitigating climate-induced flooding. Human development has both increased impervious cover and destroyed wetlands at an alarming rate - the 2025/2030 CECP plan notes 1,500 acres lost between 1990 and 2005. The state's remaining wetlands have an even greater burden to slow flood waters, absorb precipitation, and host wildlife.

We strongly urge the Executive Office of Energy and Environmental Affairs to strengthen implementation of the Wetlands Protection Act by requiring 100 foot buffer zones around

wetland areas. To meet the urgency of the climate crisis, the state must go further than *investigating approaches to increase statewide protection of wetlands;* the state must require implementation of stronger wetland protection. This will enable wetlands to continue providing the natural climate solutions we have come to rely on, especially important as development pressure increases across Massachusetts, simultaneous with climate change causing more flooding to our state. According to Massachusetts Bureau of Environmental Health, "There was a 71% increase in the amount of precipitation that fell on the heaviest precipitation days from 1958 to 2010, and many drainage systems, bridges, culverts, and sewers were designed using outdated precipitation estimates."[1] A 100 foot buffer zone will enable healthy wetlands to relieve some of this excess burden on grey infrastructure, thus extending its useful life, by soaking up more precipitation.

In addition to preserving wetlands, Mass Rivers reaffirms land conservation in general as an important climate resilience strategy that must be included in the 2050 CECP. Headwaters in particular benefit from conservation because although small, the streams and brooks found in forests feed into larger rivers, carrying important nutrients. Natural lands are highly effective at filtering out pollutants - thus improving water quality - and sequestering carbon.

Mass Rivers requests that EEA provide more specificity in the 2050 CECP regarding which land and water conservation programs the state will allocate federal and state funding to, and what entities will be eligible for that funding. The state should leverage the deep expertise and extensive network of land trusts, watershed groups, and other conservation organizations to serve as strong partners by making them eligible to receive funding, and/or prioritizing project proposals that include such partnerships.

Power Sector.

Mass Rivers commends the state's leadership and commitment to a renewable energy future, and eagerly anticipates continued progress. In its urgency, though, the state must avoid hasty, shortsighted policies that yield significant negative consequences. Hydropower, while technically renewable, is neither "clean" nor "green," and therefore has no place in the 2050 CECP.

Hydropower must not be counted towards the *50TWh of clean electricity used by MA customers*, nor for the *robust pipeline of clean energy projects in 2030,* as described in the Power Sector Key Targets & Metrics. Hydropower reservoirs can actually cause greater greenhouse gas emissions than comparable fossil fuel projects.[2] These emissions include reservoir surface emissions, which occur when dams trap organic material and chemical fertilizers decomposing beneath a

[1] Massachusetts Bureau of Environmental Health. Nd. *Inland Flooding.*

[2] Ilissa Ocko. Environmental Defense Fund. November 15, 2019. *Long considered a "clean" energy source, hydropower can actually be bad for climate.*

reservoir's warm stagnant water, releasing methane - a greenhouse gas 80 times more potent than carbon.[3]

Environmentally, hydropower dams have devastating impacts on wildlife, water quality, water quantity, and the surrounding ecosystem,[4] thus exacerbating local climate vulnerability. Dams block fish passage for species like herring that must swim upstream to spawn, halting their life cycle and disrupting the entire food web. Water impounded behind dams stagnates and warms, increasing the likelihood of cyanobacteria blooms that are harmful to both wildlife and humans. In times of drought, rivers are sometimes unable to flow over or through dam structures, resulting in little to no flow downstream. By contrast, during high flow events, water comes pouring over the dam at such rate and volume that it erodes riverbanks and scours streambeds, making them unsuitable for riparian and aquatic species. When Massachusetts imports hydropower from other states, these impacts are out of sight. But they remain equally inexcusable.

Mass Rivers firmly supports EEA pursuing a renewable energy future for Massachusetts, and urges the agency to only include truly green renewable energy options that improve the Commonwealth's climate resilience by respecting natural resources both here in Massachusetts and beyond our state's borders.

Transportation.
Reducing auto emissions is paramount to achieving the state's climate goals; increasing use of public transit and active transportation modes (e.g., bikes, walking, etc.) is the most efficient way to do so. While the 2050 CECP includes metrics for scaling up the deployment of electric vehicles, it lacks equivalent metrics for scaling up public transit (such as number of new T stops, new commuter rail stations, or improved trip times) and bike/pedestrian infrastructure (such as miles of bike lanes installed, number of ebike rebates awarded, or number of traffic-calming measures taken). There is impressive detail in the 2025/2030 CECP on how the state plans to increase EV charging stations, but there is comparatively little detail on other forms of transportation; the 2050 CECP has the opportunity to provide specific goals and targets for transit and bike/pedestrian mobility. Over-reliance on EVs as the key mechanism to limiting transportation emissions is an ineffective strategy that maintains the status quo of inefficient single-occupancy trips.

While EVs reduce tailpipe emissions, they still rely on 20th-century system of paved gray infrastructure that perpetuates existing environmental harms. As the population continues to grow, an EV-dependent state will need even more paved (and continually repaved) land for roads, parking lots, highways, and driveways. This is not only a highly inefficient use of space,

[3] Josie Garthwaite. Stanford University Earth Matters Magazine. November 2, 2021.. *Methane and Climate Change*
[4] NBC News. November 2, 2014. *Global Boom in Dams Could Mean Biodiversity Bust, Scientists Warn.*

but all of this impervious cover exacerbates pollution from stormwater runoff, further degrading water quality - one of the state's most critical resources. Stormwater is the primary contribution to pollution in Massachusetts rivers, flushing a toxic soup of debris, oil, and chemicals across paved surfaces and into nearby waterways.

State investment in transit, walking, and biking as regular transportation options will reduce the need for more impervious surfaces, thus decreasing commensurate pollutants and dramatically improving water quality in Massachusetts rivers and streams.

Further, it is unacceptable that the 2050 CECP does not include electrifying the commuter rail system. Families living near commuter rail lines are overburdened by a daily onslaught of toxic diesel fumes and deserve better.

Once again, Mass Rivers Alliance commends EEA's commitment to a climate resilient future for the Commonwealth and is eager to assist however possible in achieving these goals. We urge EEA to protect wetlands and natural lands for climate resilience, exclude harmful hydropower from renewable energy plans, and invest in sustainable transportation options so that clean, healthy waterways can serve as our partner in creating a sustainable future for Massachusetts.

Thank you for your consideration of these comments.

Respectfully,

Katharine Lange
Policy Specialist
Massachusetts Rivers Alliance

Mass Audubon

October 21, 2022

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

Re: Mass Audubon Comments on *Draft Clean Energy and Climate Plan for 2050*

Dear Secretary Card,

On behalf of Mass Audubon and our 160,000 members and supporters, I am very pleased to submit our comments on the draft *Clean Energy and Climate Plan for 2050 (2050 CECP)*. Mass Audubon is just over one year into implementation of our Action Agenda, our ambitious five-year strategic plan which knits together interconnected goals for protecting and restoring our natural lands, providing greater access to nature for people and communities historically excluded from it, and driving levels of climate action that achieve our goals for both mitigation and resilience. We are currently broadening and deepening our network of members and supporters and mobilizing these Climate Champions to advocate directly on behalf of this Action Agenda.

We applaud the Baker/Polito administration for their efforts to build the Commonwealth into a world leader on climate action. Massachusetts stands among very few other jurisdictions globally that has legislatively binding goals for climate mitigation that are closely aligned with what science tells us is needed to avoid the worst impacts of climate change. The concept of net-zero GHG emissions is an important tool for communicating that in order to stabilize the climate, major reductions GHG emissions are necessary but no longer enough – we also need to remove additional carbon from the atmosphere. However, it is imperative that the Commonwealth focuses on achieving real and permanent GHG reductions in each sector first and foremost, and not over-rely on the concept carbon removal occurring in other jurisdictions.[1]

The world is watching our efforts to deliver on our climate commitments. It is hard to overstate how important it is for national and global climate action that Massachusetts develop robust, high-integrity climate action plans which are fully aligned with science-based GHG targets. A recent audit by World Resources Institute of countries' climate plans (called Nationally Determined Contributions, or NDCs) to meet the goals of the Paris Agreement finds that these plans, if implemented, would reduce emissions by only 7 percent below 2019 emission levels,

[1] https://sciencebasedtargets.org/blog/science-based-net-zero-targets-less-net-more-zero

208 S. Great Road · Lincoln, MA 01773 · 978-831-9682 · mmanion@massaudubon.org · massaudubon.org

significantly less than the 43 percent reduction from 2019 levels needed to keep 1.5°C within reach.[2]

Comments on Overall Approach to Climate Planning

The level of climate action contemplated in the 2050 CECP has never been implemented before, and there is no single roadmap or pathway to achieving net-zero by 2050. We understand the considerable challenges in planning for and implementing an unprecedented pace of change for our natural and working lands, energy and transportation systems, the built environment, and industrial and waste sectors. Moreover, there are genuine challenges in executing on our decarbonization goals while addressing the Commonwealth's affordability and economic competitiveness challenges, as well as navigating unparalleled turbulence in national and global economic and political conditions.

This said, there are also clear reasons for confidence and optimism that, over the long-term, the Commonwealth will meet its goals. First, in August the U.S. Congress passed Inflation Reduction Act of 2022 (IRA), the most consequential climate law in U.S. history. The IRA will provide a *minimum* of $374 billion in incentives, tax credits, loan guarantees and other financial support for clean energy, energy storage, buildings, transportation, manufacturing and environmental justice, over a ten-year period.[3] Importantly, the IRA also invests in climate smart-forestry, agriculture, and coastal ecosystem restoration as an equal part of the solution set to reaching the U.S. climate goals. And at a time of rising interest rates, the IRA's streamlined approach to getting funds directly to consumer and businesses through point-of-sale rebates, reduces financial barriers for the average household to purchase low-carbon technologies like electric vehicles, heat pumps, and rooftop solar.

By reducing barriers faced by consumers and businesses to finance low-carbon technologies, the IRA provides a massive boost to Massachusetts' efforts to decarbonize, and to our home-grown clean tech industries. However, the 2050 CECP does not include discuss how the Commonwealth will adjust or expand existing programs such as MOR-EV and MassSave incentives for efficiency, weatherization, and heat pumps using IRA funds. Because the timing of IRA's passage did not leave time to analyze its impacts and incorporate this in either CECP, **we recommend that EEA consider updates to both the 2025/2030 and 2050 CECP to show how the IRA will impact sectoral strategies and overall deployment of low-carbon technologies.**

[2] https://www.wri.org/research/state-nationally-determined-contributions-2022

[3] It is very important to note that the value of IRA is an estimate – the law does not establish funding caps on many of the incentives and tax breaks, which ultimately depends on the level of uptake of incentives by consumers and businesses. As such, Credit Suisse has estimated that IRA may actually result in up to $800 billion in climate finance. Source: https://www.theatlantic.com/science/archive/2022/10/inflation-reduction-act-climate-economy/671659/

Equally important is improved marketing of these funding programs – too many opportunities to replace legacy technologies like oil furnaces, gas stoves, and internal combustion vehicles with low-carbon alternatives are lost because consumers are unaware of the scale of support available when it comes time to replace those technologies.

Second, the Commonwealth should provide greater transparency in modeling that supports sectoral planning, **including making all assumptions and sources used public**. Modeling should be state-of-art, reflecting what is actually happening on the ground, especially with respect to cost reductions over time for low-carbon technologies. We now have copious empirical evidence from around the world that strong decarbonization policies help induce rapid pace of improvements in low-carbon technologies, which in turn then reduces the cost of these technologies, and allows for scaling up their deployment. For example, R&D investments combined with strong policy drivers to increase the use of renewable energy set by the U.S., Germany, China, Australia and many individual U.S. states (e.g., Massachusetts, Colorado, California, and New York) helped the energy market to realize massive reductions in capital costs for both offshore wind and solar technology – seventy and ninety percent, respectively—over the last fifteen years.[4] These clean energy sources now outperform fossil fuel power generation on cost in many places in the world.

Treatment of Uncertainty

The 2050 CECP rightfully acknowledges that planning over a long-time horizon for so many complex systems involves a high level of uncertainty. Given the pace of change in technology, markets, and political conditions, **we recommend a more frequent interval for modeling and evaluation of progress towards CECP goals at the sectoral level** – every 5 years is too long an interval given the pace of change in low-carbon technology improvement and deployment, and the risk to meeting net-zero of Modeling and analyses done at more frequent intervals is resource-intensive, but it will more than pay for itself by providing insights on course-corrections to our plan that will reduce overall costs of deployment and keep us nimble in the face of rapid change. At minimum, the Commonwealth should consider more frequent intervals for modeling and evaluating progress in the electric power and light-duty transportation sectors, given their critical importance in achieving 2030 targets and staying reasonably on track for net-zero by 2050. Additional modeling for the NWL sector should occur in the event of

[4] (1) Victor, D.G., Geels, F.W. and Sharpe, S., 2019 Accelerating the Low Carbon Transition: The Case for Stronger, More Targeted and Coordinated International Action and (2) Schilling, M.A., Esmundo, M., Technology S-curves in renewable energy alternatives: Analysis and implications for industry and government. Energy Policy (2009), doi:10.1016/j.enpol.2009.01.004

major disturbances (e.g., forest fires, invasive pests) having material impacts on this sector's carbon removal capacity and overall function.

As noted above, we are seeing transformational change in low-carbon technology cost and deployment when public sector R&D and strong carbon policy combine to shift towards decarbonization. But, a major impediment to building enough political support for ambitious climate action has been overstatement of GHG mitigation costs by influential energy institutions, which often reflect views of legacy oil and gas and utility interests who seek to slow the pace of decarbonization.[5] **The Commonwealth's future modeling and analyses should incorporate and reflect the best available learning curves and costs for low-carbon technologies which are under development, but that are not yet commercially viable or being mass produced.** This includes low-carbon aviation fuels, geothermal energy, green hydrogen, low-carbon steel and cement, and direct air capture. These technologies are the focus of current R&D efforts in the U.S. and elsewhere, as well as policies designed to increase their use as low-carbon strategies. To present an accurate depiction of possible costs to achieve GHG goals, understand distributive impacts on ratepayers and others, analyses must reflect the influence of policy on technological change.

Comments on Sector-Specific Policies, Strategies and Goals/Metrics

Energy Sector

We know that rapid decarbonization of the electric power sector is critical to unlocking the required GHG reductions across the economy, via electrification of energy end-uses in light-duty transportation, building heating and cooling, and certain industrial applications. Mass Audubon strongly supports the decarbonization via scaling up offshore wind and solar at the pace expressed in the 2050 CECP. We also support the transition to new rate designs that promote clean energy while protecting customers from excessive costs.

Mass Audubon also supports siting analyses that consider impacts of building out distribution, transmission and other supporting grid infrastructure on environmental justice communities. We must avoid poor siting decisions in these communities, which have disproportionately borne the worst impacts of our fossil fuel-based energy system -- including exposure to dangerous levels of air pollution, contamination of drinking water, exposure to toxic chemicals, and as a result, residents living closest to fossil fuel plants and infrastructure suffer the highest rates of harmful health outcomes (e.g., asthma, heart attacks, and cancer, among others).

[5]The International Energy Agency (IEA) and U.S. Energy Information Administration (EIA), for example, have repeatedly issued forecasts for renewable energy costs which far overstate actual costs, and subsequently underestimate deployment of these technologies. Source: Mengzhu Xiao, Tobias Junne, Jannik Haas, Martin Klein "Plummeting costs of renewables - Are energy scenarios lagging?" [Energy Strat. Rev. 35 (2021) 1–12/100636] Energy Strategy Reviews, Volume 39, January 2022.

Mass Audubon is particularly concerned about the degree to which the state's current incentive package for solar PV is driving deployment of large, ground-mounted solar installations often at the expense of forests and other natural and working lands. To date, evaluation of existing ground-mounted solar systems studies show that at least 6,000 to 7,000 acres of forest have been cleared for these in the last decade.[6] And the state's own Decarbonization study indicates that reaching solar goals could require up to 200,000 additional acres to host solar systems. **Our view is that the loss of current and future carbon storage and removal from our natural and working lands in order to deploy solar works in direct contradiction to our net-zero goal,** which will require increasing carbon removal from its current level of 7 percent of annual emissions by another 8 percent by 2050.

We believe that it is possible to achieve the CECP's goals for solar deployment while minimizing clearing of forests and other natural lands. Mass Audubon currently is partnering with Harvard Forest on a state-wide study to explore a build-out of solar in line with the CECP goals but featuring higher levels of distributed solar PV systems on rooftops and parking lot canopies, along smaller ground-mount systems located on already impacted lands rather than in high-carbon forests and other greenfields.

There is a precedent for high levels of rooftop solar deployment. In Australia, 25 percent of single-family homes support rooftop solar PV, compared with only 2.5 percent of U.S. homes. As the world leader in deploying distributed rooftop solar, Australia offers some learnings on policies needed to expand the uptake of rooftop solar in Massachusetts.[7] Massachusetts also has high retail electricity rates like Australia, which creates a strong price incentive for homeowners, renters and business owners to adopt rooftop solar. **However, we need reform and streamlining of our relatively complex incentive systems, building codes, and rules for connecting solar to the grid, as well as an approach to speed up local permitting.[8]** According to solar companies working in Massachusetts, these contribute to high 'soft costs' which can make up 40 to 60 percent of overall project costs, thereby making some projects uneconomic and increasing payback periods for others. For addressing issues of system balance from distributed resources like solar, pairing rooftop (or canopy) solar with energy storage is receiving a financial boost from the IRA, which provides an investment tax credit of 30 percent for standalone batteries as long as they're connected to a renewable energy source like solar. [9]

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[6] https://www.massaudubon.org/content/download/41477/1007612/file/Losing-Ground-VI_2020_final.pdf

[7] https://www.greentechmedia.com/articles/read/what-the-us-can-learn-from-australias-roaring-rooftop-solar-market; https://www.nytimes.com/2020/09/29/business/energy-environment/australia-rooftop-solar-coal.html?searchResultPosition=6

[8] The US Department of Energy's NREL developed SolarApp+ to reduce permitting times for residential rooftop solar.

[9] https://www.energysage.com/local-data/storage-rebates-incentives/ma/

Natural and Working Lands

Just as Massachusetts in one of the only states with economy-wide limits on GHG emissions, it is one of the few jurisdictions to include the land sector within the required sectoral emissions goal. We strongly support EEA's recognition that the natural and working lands (NWL) sector be held to a regulatory goal of improvements in net GHG emissions, rather than serve as a source of offsets for emission reductions from energy sectors. **There is simply no time in the remaining global carbon budget to allow delays in emission reductions from any sector through the use of significant offsets from another sector.**

This said, our view is that the 2050 Clean Energy and Climate Plan needs policies that show greater urgency and scale for Natural and Working Lands (NWL). Natural and working lands are invaluable to reaching our ambitious climate goals because they do double-duty on climate: these lands currently remove 7 percent of MA's annual emissions, and they help us be more resilient to climate impacts like extreme heat and growing flood risks. We simply cannot meet our goal of net-zero emissions by 2050 if we continue to lose forests, farms, and other natural lands. **The 2050 CECP needs a specific quantitative goal for NWL carbon removal by 2050**, and then it needs to work backwards to 2030 to understand how much forest needs to be protected by then.

As noted earlier in these comments, we also need to reach our clean energy goals losing the carbon removal and services provided by forests and other NWL. **CECP policies should recognize forests not only for carbon removal but everything they do for the people of the Commonwealth.** The benefits provided to our people from wetlands and forests – from filtering our drinking water, absorbing stormwaters, reducing flood risk, to providing health through recreation and access to nature – are simply irreplaceable. Proposed policies should be designed to compensate for carbon removal but also build in adders for other services to people, such as flood risk reduction, water filtration, recreation, heat island mitigation, and others.

We need a dedicated, permanent source of public funding for land protection and restoration. We fully endorse the plan to expand nature conservation with federal and state funding, state support to municipalities and regional planning agencies. However, Massachusetts is not investing nearly enough in land protection. We should be investing a minimum $75M annually in nature protection and restoration, with a significant portion of these funds dedicated to providing access to nature in those communities of color and low-income that currently lack it. Massachusetts is falling fall short in this regard.

We fully agree that we need to augment public funds with private finance to meet the challenge of preserving sufficient NWL to meet our carbon removal goals. **We urge the Commonwealth to commit to, not just explore, setting a regulatory approach to protecting forests. It's the only way to draw in private investment for protecting them.** What has happened in the energy sector over the last two decades is a great example of how to unlock private investment by setting clear policies that set goals for steady improvement over time. By

first setting well-designed regulatory standards which *required* an increase in clean energy production, we've succeeded in pulling in major private investment in clean energy, which is now a thriving new industry. We cannot reach our goals for NWL and achieve more carbon removal by public funding or voluntary efforts alone. To draw in private investment for nature protection, we need to price losses of NWL carbon in a similar way as we've done for energy (through renewable standards), transportation (through vehicle GHG standards) and buildings (through stretch energy codes).

Finally, we will have a lot to say about the prospects of a regional market approach to generate more carbon removal that can count towards the Commonwealth's net-zero goals. This will not be an easy task, but it is possible to develop a regulatory approach that could draw in private capital investments in natural and working lands. The development of the Regional Greenhouse Gas Initiative offers some key learnings on the process and design of what can be a durable and effective multi-jurisdictional approach to low-cost carbon reduction pathways. To date, however, there has been little transparency to discussions the Commonwealth has engaged in with other states and the US Climate Alliance. **To build the necessary buy-in and support for such an approach, we strongly encourage a public process that genuinely represents stakeholder interests needs to begin soon, and needs full transparency.**

We very much appreciate the opportunity to comment on the 2050 CECP. We are happy to answer any questions you may have: mmanion@massaudubon.org or 978.831.9682.

Respectfully yours,

Michelle Manion
VP of Policy and Advocacy
Mass Audubon

CC: Judy Chang, Undersecretary of Energy and Climate Solutions
Hong-Hanh Chu, Global Warming Solutions Act Program Manager

Comments on the Clean Energy and Climate Plan (CECP) for 2050

Martyn Roetter, October 2022

Summary

The contents of the CECP including its limits and sub limits present very welcome steps and targets to meet the goals of the Commonwealth's Next Generation Roadmap. My comments focus on the need for persistence and flexibility in meeting these targets between now and 2050. They identify major concerns about the plan's chances of success and the obstacles to this success encountered today and to be expected in future. These obstacles include delays to necessary initiatives such as the permitting and siting of sources of clean electricity, and the ongoing campaigns by powerful utilities to seek approval for gas-based solutions that are demonstrably unworkable. These fake solutions will perpetuate and even exacerbate the problems which the CECP is tackling that are the result of pollution generated by our use of hydrocarbon fuels and their impact on Climate Disruption and our health.

My comments also outline messages about the attitudes and perceptions of the realities of our interdependence which must be fostered to mitigate the widespread "Me, I, Mine" individualism rampant among some members of our society and powerful organizations. Emphasis on individualism and individual rights relegating the role of obligations towards our fellow humans because this may require stifling (or worse) conformity is admirable in many circumstances. But it hampers efforts to pursue projects for the common good which critically require extensive and sustained cooperation and searches for reasonable compromises between diverse interests and emphases, among which steps to protect the habitability of Planet Earth deserve the highest priority. The comments emphasize the need to acknowledge the uncertainties we face, and the diversity of circumstances of individuals, families and communities that must be considered. We must be prepared to adjust our actions and modify the CECP over time considering new knowledge we will develop between now and 2050. We must pursue solutions we know hold genuine promise and reject those which science and mountains of evidence already tell us are fake.

Introduction

I greatly appreciate and would like to express my profound thanks to Undersecretary Judy Chang and her team for all the hard work they have put into developing this plan. The plan is seeking to address multiple interrelated, complex, and problematic technical, financial, regulatory, legal and policy issues inherent in the formidable task of meeting the climate challenge – the intensifying Climate Disruption - to ensure a habitable Planet Earth for us and future generations. It must find solutions to alleviate the profound and persistent inequities in our society and economy that have developed and persisted over many generations because of multiple formidable, even intransigent forces and factors. These forces include the ways in which we produce or extract, distribute and use the sources of energy that underpin our economy and our way of life and support the facilities and services we depend on. The outcomes of these issues and the solutions we choose to implement will have profound effects on the most intensely personal aspects of our lives at home, in our places of work and learning and entertainment (which are sometimes also at home in many cases as well as elsewhere in a variety of establishments). They will have lasting and profound consequences for the quality of our neighborhoods and our modes of travel locally, regionally, nationally, and internationally.

Many actors with very different priorities, resources and power bases are seeking to influence the outcome. Some actors represent and are propagating narrow minded special interests, concerned primarily with their near-term futures and profits to the neglect of the equally legitimate needs and hopes of others. Regrettably some actors reflect the toxic polarization and the "Me, I, Mine" individualism in our society which excludes rational debate and consideration of obligations towards others, as well as the search for reasonable compromises. They fail to acknowledge that there are uncertainties and gaps in our knowledge and do not tolerate or respect well-intentioned people of good faith if they arrive at different conclusions. These conclusions should be the starting points for formulating and negotiating reasonable compromises from which everybody receives some benefits, but realistically not everything they might prefer.

Fortunately, other actors are more aware and do bring broader perspectives to bear on what is truly ultimately in their own interest as well as of their fellow citizens and neighbors. They recognize our inherent interdependence. Closed or hermetically sealed communities are not a practical option, especially when it comes to Climate Disruption, despite what survivalists may claim.

Premises and Principles

I would like to present nine statements or premises (shown below) that I hope will find widespread (even if not universal) assent. This list may be incomplete. Some of the statements may encounter strong opposition and dissent. They are designed to form a basis for considering and hopefully agreeing on what is already known to be true in the pursuit of viable solutions, what is plausible but still uncertain and unproven, and what we already can predict with

certainty is either unworkable or will surely play significant roles in future. In any event some set of premises must be established to set the stage for the CECP. Then we will be better prepared if as time goes on it becomes evident that one or more of them is false or incomplete or needs to be modified or updated and possibly replaced. We must be ready to adjust the CECP in response to changes in conditions, technological and other.

The success of the CECP will require both persistence and flexibility sustained over several decades. We must be determined not to lose sight of the ultimate objective, while being willing to adjust details of the CECP's implementation as and if the future unfolds in ways that inevitably we cannot predict accurately in 2022. We can expect that any shortfalls in meeting targets announced in the initial version of CDECP 2050 will be seized upon by the "usual suspects" to attack the purpose and validity of this entire plan. The effectiveness of these attacks can be mitigated by building an ethos of flexibility and an expectation of modifications along the way if new information and knowledge is developed which justifies changes in the details of the plan's implementation.

We have learned a lot in the last five to ten years. There is every reason to believe we will learn a lot more from our experiences and discoveries between now and 2050. We should ensure we are open and able to benefit from these advances. We must not lock ourselves into situations which prevent us from taking advantage of opportunities that will become available by 2035 or 2040 which we cannot foresee, or in 2022 are still subject to considerable uncertainty.

1. The quantity or scale of human-made emissions from our uses of hydrocarbon fuels (overwhelmingly "natural," i.e., found within and extracted from the earth) have reached the point where they are having detectable adverse effects at the planetary level, intensifying Climate Disruption which is leading to an increasing severity and frequency of destructive climate events (droughts, floods, hurricanes),
2. Therefore, we must wean ourselves off these fuels as our sources of energy as much as possible within the next few decades in the sectors of transport, buildings, industrial processes, the generation of electricity, etc.
3. Electricity can replace hydrocarbon fuels that are combusted in these sectors in many applications, but to reduce emissions sufficiently this electricity must itself be generated from sources that are non-emitting.
4. To build an electricity ecosystem that is non-emitting, i.e., a non-polluting or depolluted grid, we must replace the electricity now generated mainly by hydrocarbon fuels in polluting power plants with clean electricity from non-emitting or clean sources, also augmenting total generation capacity to meet growing demands.
5. To the best of our knowledge to achieve a non-polluting grid in future we will have to rely predominantly on variable clean energy sources notably wind power and solar.[1]

[1] I realize that hydropower and controversially nuclear power also fit the bill, but I will not address them further in these comments, although I am more inclined than others to believe that nuclear power has some useful roles it could play in the generation mix.

6. A grid heavily dependent on wind power and solar, which are intermittent, weather-dependent sources of energy, will have to be configured and managed differently from today's grid if it is to be a resilient and reliable source of energy, capable of coping with inherent fluctuations in grid capacity and patterns of demand. Surpluses and deficits in supply may occur for short or relatively long periods because of weather conditions[2]. Energy storage systems will be required so that electricity produced during surpluses of supply can be stored and delivered later to fill shortfalls during periods of deficit.
7. The transition to a clean grid will take time and must be planned in a coordinated manner, while ensuring that the economic foundations of some groups or interests are not removed so abruptly or altered so rapidly that there are no provisions for those who are inevitably affected to transition to different roles whether in a new energy economy, in some other activity.
8. Planning across the entire energy sector to build and transition to a new energy economy much less dependent on combusting hydrocarbon fuels requires coordination both within and between private (energy suppliers and customers) and public sector organizations - regulators and policy makers – breaking down traditional silos, notably between gas and electricity. Several tradeoffs will have to be evaluated carefully and responsibly. For example, how much of the wind power installed and planned should be applied to delivering clean electricity directly to customers and what proportion should sensibly be made available to manufacture green hydrogen, to satisfy potential demands for this gas in applications where it may be the only or the most attractive solution for eliminating their current pollutants[3]?
9. Hydrocarbon fuels, notably natural gas and gasoline will play significant roles for some time to come until the transition is complete, however these roles must decrease inexorably to meet the challenge of Climate Disruption.

Concerns and Obstacles

I would like to highlight two major concerns about our ability to build a clean energy economy as envisioned in the CECP 2050. First, major hydrocarbon fuel interests continue to employ and apply considerable resources to pursue a wide range of delaying and aggressive tactics and exploit well-honed tools of misinformation to impede progress in this direction. As a not insignificant point I object to the use in the CECP presentation of a term the gas utilities have

[2] I will not go into a lengthy discussion here of how the grid will have to change. These changes will involve questions such as the role of energy storage systems, which ones are best, their alternative or complementary locations at utility-scale generation installations or in neighborhoods and buildings, the role of interregional grid access to surplus capacity in another region when there is a regional deficit taking advantage of time-of-day differences in demand patterns and the impact of different weather conditions on the capacity of wind and solar installations located many miles apart, as well as the implications for wholesale and retail pricing of electricity, and the potential of V2G (vehicle to grid) connections when EVs become more popular etc.

[3] Hydrogen for heating buildings does not meet these criteria, since there are well-established electric solutions already in operation around the world, which generate much more heat from a given amount of electricity than hydrogen.

been pushing aggressively in their marketing, namely "fossil-free" alternatives to natural gas. In fact, they propose to replace polluting fossil fuels with polluting "fossil-free" fuels.

Language is important. A word or a phrase can mislead many people who are not familiar with the context or subject matter experts. In this case they may conflate "fossil-free" with "pollution-free" or clean or green because the "fossil-free" fuel is being presented as an alternative to a known pollutant, natural gas. Please use another term such as non-polluting alternatives. This identifier or category would unequivocally exclude the "fossil-free" combustible gases utilities are touting. They are renewable natural gas, which is itself methane that leaks, burns, and pollutes the same as the natural gas to which it is allegedly an alternative, and hydrogen, which while non-polluting when used in a fuel cell is not benign when distributed through leaky gas infrastructure and combusted in air. Hydrogen is a significant greenhouse gas in the atmosphere and highly prone to leaks because of the small size of its molecule. When combusted in air it produces toxic nitrogen oxides (NOx) as well as water. Its use also raises significant safety concerns due its high flammability, especially in residential environments where it is not practical to enforce the strict safety protocols and practices established for good reason in industrial facilities where hydrogen is present.

These facts and extensive supporting evidence from independent sources around the world have been pointed out repeatedly in writing and orally in public forums to gas utilities in Massachusetts as well as to other audiences. However, the gas utilities continue to ignore this evidence. They persist in propagating misinformation and disinformation in their advertising, marketing, and lobbying campaigns. I would be happy to present the mountain of evidence that is available from knowledgeable sources in many countries, independent of the fossil fuel industry, which disqualify the use of "fossil-free" gases as proposed by the gas utilities. This evidence is not merely "preponderant". It establishes the case against them "beyond a shadow of a doubt", based on the laws of thermodynamics, physics and chemistry, the properties of matter and verifiable calculations. It is well within the capabilities of these utilities to carry out these calculations themselves to check and if they wish challenge the results of calculations I and others have performed in the US and abroad.

Second, on the principle that when stuck in a hole it is a good idea to stop digging, it is crazy to continue to propose planning to add new gas connections and install new pipelines now, which gas utilities continue to request. If there are instances when a new gas connection is claimed to be the only way to meet an urgent need, then (a) the validity of this claim should be evaluated independently and transparently with the burden of proof placed on the claimant[4], and (b) if it turns out that an alternative to gas would be more expensive initially or on a net present value basis, which is more likely if a high discount rate is used, financial assistance might be provided

[4] Perhaps for example for a short period (well under 40 years) while grid facilities are being strengthened gas could be delivered to the sites where it is combusted on trucks rather through a new pipeline, avoiding this expensive durable addition to future stranded assets. This alternative interim solution might also include the combination of gas with onsite solar panels and energy storage systems, which could contribute on a more long-lasting basis to post-gas electrification.

to compensate the customer for the higher costs incurred by adopting an alternative today that will contribute to building a better future for all of us later in this century.

We must emphasize incentives and mechanisms to overcome the objections of powerful interests to the prioritization and aggressive pursuit of non-polluting energy alternatives. They may include removing regulatory restrictions that limit the scope of the activities a regulated utility can undertake and facilitating and stimulating efforts to prepare their workforces and companies for new business and employment opportunities as we transform our energy economy. They have large resources and extensive capabilities and expertise. We need their help and cooperation, not active or even tacit resistance. The D.P.U. could be a valuable and essential actor in this regard, although so far it has shown little sign of being on top of this challenge.

One question the D.P.U. and all of us should be asking the gas utilities is stimulated by the references in the CECP to 3.2 GW of offshore wind operating in 2030 and clean energy procurements of 5.6 GW of offshore wind by 2027. National Grid is proposing to use its offshore wind portfolio to manufacture the green hydrogen it will inject into its gas distribution network. How much of the output of this offshore wind portfolio will be applied to the production of hydrogen and how much to the direct delivery of electricity to customers, noting that heat pumps can deliver up to six times more heat than hydrogen for the same amount of electricity[5]? Production of enough hydrogen to replace 20% of the natural gas consumed annually in residential and commercial buildings in the Commonwealth - about 0.38 million tonnes - would absorb some 16 TWh (terawatt hours) of clean electricity[6] or the *entire* output of 3.8 GW of offshore wind, much more than the *excess* output these turbines may generate during periods of surplus supply. In this scenario the decarbonization of the grid or the 100% greening of the electricity delivered directly to customers would become impossible within any conceivable scenario for the capacity of clean sources of electricity that can be installed and the pace of their deployment.

Pragmatism and Other Considerations in Project Evaluation

The CECP necessarily covers a period of decades and presents a lengthy problematic path for achieving a fundamental transformation in our energy economy. There are many uncertainties to be dealt with, which may become clearer in future at different times. This circumstance illustrates the importance of incorporating provisions in this plan's implementation and procedures which acknowledge that not all circumstances can be anticipated or handled with one solution. In some cases, pragmatic solutions will be justified in the interim that deliver some improvement while awaiting the later implementation of a fully net zero solution. The costs of these interim solutions should be accounted for within their foreseeable lifetimes

[5] "Hydrogen for Heating?"
https://www.csrf.ac.uk/blog/hydrogen-for-heating/

[6] This amount is equal to almost one third of the Commonwealth's current total consumption of electricity, without any hydrogen production

which will be much shorter than those of natural gas pipelines. Not every person or group or organization can or should be required to take the same steps in the same sequence at the same times.

At the same today the regulator (D.P.U.) is faced with requests for additional gas connections and infrastructure which include proposals by gas utilities to introduce new gases into the mix, with long term implications for the future of gas, even though there is strong evidence (in my opinion beyond a shadow of a doubt) that they are dead end or fake solutions. While acknowledging uncertainties, we must also accept and act upon certainties, as indicated in the nine premises listed above. The CECP plan and our resources must not be misdirected by hasty decisions to accommodate requests from gas utilities that have not been subject to independent objective review and analysis.

Proposals and projects must be evaluated recognizing their (and our) interdependence. They must not be judged solely on their individual characteristics and first order effects as if they are self-contained. We must evaluate the impact of decisions to approve or reject specific projects considering their long-term implications for the CECP and their wider geographic consequences. For example, the cumulative energy demands of a concentration of existing buildings and those under construction in a neighborhood may reach the limit of the capacity of the grid infrastructure they share, stalling the addition or expansion of other buildings. Moreover, not only may all ratepayers, and perhaps eventually taxpayers, be obliged to shoulder the additional burden created by increases in stranded assets built to serve new gas customers, but pollution from every building affects the outdoor air we all breathe as well as more directly abutting and neighboring buildings and open spaces, especially in dense urban areas. The costs of health problems (respiratory diseases) which the occupants of a gas-fueled building may suffer disproportionately contribute to the total costs of health care. The US is already an outlier (on the high side) of these costs as a percentage of GDP, with outcomes (despite the world leading capabilities and facilities we possess) that for the population as a whole are mediocre - https://www.pgpf.org/blog/2022/07/how-does-the-us-healthcare-system-compare-to-other-countries. We must be careful to balance individual or local needs with collective or group needs so that the choices of a few do not selfishly harm the interests of the many, while the many do not demand that the few are forced to make choices for the good of the many that penalize them with no compensation.

This philosophy also applies to problematic issues around the processes of permitting and siting clean energy sources and new or expanded grid infrastructure that are key to our ability to implement the CECP. If these installations are held up for years or even ultimately blocked, then we will remain dependent on polluting fossil fuels for longer and to a greater degree than the plan calls for, or we can afford if we are serious about coming to grips with Climate Disruption.

Finding pathways in our extraordinarily or even ludicrously litigious society to ensure that permitting clean energy generators is not such a lengthy process or the failure rate so high that it becomes impossible to meet the climate challenge may be the most formidable obstacle confronted by the CECP. From my perspective these obstacles are more likely to be the cause of

failure to meet the emissions limits and sub limits presented in this plan than any technical or financial difficulties or uncertainties that will be encountered.

Technical issues must be addressed, resolved and choices made based on scientific and engineering facts, not "alternative facts". Our financial analyses must be comprehensive and reflect all the benefits and costs of projects. These costs must include externalities, e.g., costs of the health care for people who suffer from the effects of pollution, which are often ignored by a project's proponents since they are not paying for them directly. Moreover, since we are trying to protect and improve the environment of planet Earth for future generations as well as ourselves, we must apply a low discount rate in calculating and comparing the net present values of alternative or competing solutions[7]. Otherwise, the value of any positive impact we are seeking for the sake of our grandchildren and their successors would carry little weight in the evaluation process, which defeats the purpose and violates the spirit behind the CECP.

A discount rate of 7% p.a. means that a dollar in 2038 will only be worth 56 cents when converted to 2022 dollars, whereas it will be worth 92 cents with a rate of 1% p.a. A high discount rate tilts the balance in favor of choices requiring the lowest initial investment which a mature and even obsolescent technology may still offer, although a more expensive, more recently developed and less polluting system may provide significant operational savings every year. Application of a high discount rate that is inappropriate when tackling long term climate issues may delay the approval of solutions based on evolving low or no pollution technologies whose competitiveness compared to traditional solutions will increase as they become more mature. Improvements (reductions) in their cost/performance ratios will be accelerated if their market growth is encouraged and hence benefits from economies of scale and learnings from experience materialize earlier than if market adoption is inhibited by the results of financial analyses based on high discount rates.

Concluding Remarks

I offer these comments in the hope they will help clarify the purpose (the outcome being sought and its underlying moral and other imperatives), as well as the prisms though which we should be viewing the CECP. The details of the plan's content and the steps it prescribes will have to be implemented persistently, patiently, and flexibly - but inexorably - over the next few decades. They must be adaptable over time considering new knowledge and other not perfectly predictable, and even surprising developments to maximize the chances of its ultimate success.

Thank you for the opportunity to offer this written testimony.

Martyn Roetter, D. Phil (Physics) Oxon
144 Beacon Street
Boston, MA 02116

[7] https://blogs.worldbank.org/governance/using-zero-discount-rate-could-help-choose-better-projects-and-help-get-net-zero-carbon

617 216 1988
mroetter@gmail.com

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

249 Lakeside Avenue, Marlborough Massachusetts 01752-4503
www.MassForestAlliance.org | (617) 455 - 9918 | info@MassForestAlliance.org

October 21, 2022

Judy Chang
Undersecretary of Energy and Climate Solutions
Executive Office of Energy and Environmental Affairs
100 Cambridge St, Suite 1020
Boston, MA 02114

Undersecretary Chang:

The Massachusetts Forest Alliance represents forest landowners, foresters, timber harvesters, and forest products companies in Massachusetts. I'm writing with comments regarding EEA's plans for the 2050 Clean Energy and Climate Plan (CECP).

We submitted lengthy and detailed comments to EEA regarding the 2025 and 2030 CECP which we know you've reviewed, and so we won't rehash those comments here. We were pleased that EEA is following the science related to natural climate solutions, and that the 2025/2030 CECP contained the Forest Viability Program to help create long-lasting durable wood products and also emphasized building with local wood, including potential mass timber panels made from local hemlock.

As for the 2050 plan, we don't have extensive comments related to the natural and working lands sector beyond our previous submitted comments. As an aside, we would note something that didn't appear in our 2025/2030 CECP comments - increasingly, durable wood products are being made from smaller and smaller diameter trees, with new sawmill equipment that can effectively saw lumber from trees with a diameter of as little as six inches. This is something that EEA could incentivize through the Forest Viability Program.

We did want to comment on the thermal use of wood in the Buildings sector. It remains unclear what the Clean Heat Commission will recommend and how this will play into EEA's regulatory process for a Clean Heat Standard. We are firm believers that modern wood heat has an important role to play in the state's heating sector as we head towards 2050.

The science is clear that modern wood heat is a decarbonizer. Switching from oil heat to modern wood heat (as is what typically occurs in rural areas of Massachusetts) results in a substantial carbon reduction. MassCEC's GoClean website illustrates the huge carbon reductions compared to fossil fuels. The state's own research in the *Manomet* study found that replacing oil heat with modern wood heat had very significant decarbonization benefits.

This indisputable science is why legislators chose to amend the climate/energy bill in conference committee to keep modern wood heat in the APS. It is why Vermont chose to include wood heat in their own recently-adopted Clean Heat Standard. And it is why EEA should keep modern wood heat in its 2050 plans.

Besides the decarbonization benefits, modern wood heat can also aid the electric grid, as they consume much less electric power compared to heat pumps. We will gradually move to a winter peaking electric grid as most people switch to electric heat. The rural grid will need major upgrades to support electric heat and transportation, which will be very costly to ratepayers. Beyond that, modern wood heat can help smooth those sharp winter peaks on very cold days to support grid reliability and avoid expensive electricity produced by fossil fuel-powered peaker plants. EEA and DOER should consider this benefit when making decisions on the 2050 CECP and the Clean Heat Standard.

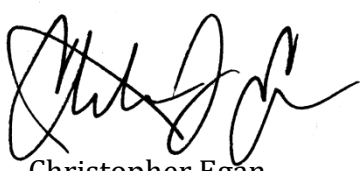
It is important to note that while residential modern wood heat systems such as pellet boilers are certainly very valuable in this regard, commercial modern wood heating systems that heat municipal facilities or businesses (either with pellets or dried wood chips) tend to have a larger impact in terms of peak-smoothing grid reliability and decarbonization, because they are larger systems. Removing commercial modern wood heating systems from APS eligibility, as one gubernatorial candidate has proposed, would be a serious error that would set back the Commonwealth's decarbonization goals. We hope career staff at EEA and DOER will share the science with new political appointees.

In terms of air impacts, the installation of electrostatic precipitators (ESPs) on modern wood heating systems virtually eliminate particulate matter emissions. We will pursue legislation to allow DOER to offer an APS credit multiplier on systems that install an ESP to defray the sizable cost of the ESP and its installation.

We stand ready to discuss this issue further with you as needed. 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

Lynne Man's comments to DOER Oct. 2022

1. Immediately stop the destruction of forests, wetlands and grasslands for solar siting and infrastructure.[1] These lands are a critical part of the climate solution and allowing them to be destroyed is the proverbial "robbing Peter to pay Paul" mentality. While a straight carbon-for-carbon analysis may come out in favor of solar installations, it ignores the many other reasons that forests and wild lands are important, including mitigating the disastrous loss in biodiversity, cooling effects, water absorption and filtration, decreasing air pollution, and for their value to our own species' physical and mental health. Let's work together to find ways to build out all developed lands for renewable energy siting. While this may be financially more expensive, the cost of destroying natural lands will ultimately be more devastating to the Commonwealth, to the country and to the planet.
2. Please distinguish between "conservation" (no development allowed, but timber harvesting is ok) and preservation (leave natural lands to be wild). Both the IPBES and the IRA are committed to preserving 30% of natural lands by 2030, and 50% by 2050. The easiest and least expensive way to do this is to immediately stop allowing timber harvests on public lands. Our public agencies log "for the health and resilience" of forests, for "biodiversity" and for water. They can use their skills and expertise in helping to "manage" private lands (Including privately owned conservation lands) to provide local, sustainable forest products[2]. Public lands belong to the public.
3. Do not use "mitigation" as a substitute for preservation. Whether it's wetlands or forests, humans cannot truly mitigate what nature has created, and it will take decades to centuries for destroyed landscapes to come back. Also, please note, that although young forests may sequester carbon at a faster *rate* than older forests, this does not make up for the larger canopy size of a mature forest, nor is there anywhere close to the amount of carbon stored in a young forest as an older one.[3]
4. Carbon stored in long-lived wood products is only a fraction of the carbon stored in whole trees. Even when a tree is specifically harvested for lumber (which many are not), the majority of the carbon storage is lost to leaves, branches, sawdust, scrap and then subsequent loss from the soil. This also does not account for the fuel used in production of harvesting equipment, actual harvesting transport and the carbon cost of producing those long-lived wood products.

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[1] Kim, Ji Yoon, Dai Koide, Fumiko Ishihama, Taku Kadoya, and Jun Nishihiro. "Current Site Planning of Medium to Large Solar Power Systems Accelerates the Loss of the Remaining Semi-Natural and Agricultural Habitats." *Science of the Total Environment* 779 (July 20, 2021). https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=edselp&AN=S0048969721015436&site=eds-live&scope=site&custid=umaah.

[2] Berlik, Mary M., David B. Kittredge, and David R. Foster. "The Illusion of Preservation: A Global Environmental Argument for the Local Production of Natural Resources." *Journal of Biogeography* 29, no. 10/11 (October 1, 2002): 1557–68.

[3] Stephenson, N. L., A. J. Das, R. Condit, S. E. Russo, P. J. Baker, N. G. Beckman, D. A. Coomes, et al. "Rate of Tree Carbon Accumulation Increases Continuously with Tree Size." *Nature* 507, no. 7490 (March 1, 2014): 90–93. https://doi.org/10.1038/nature12914.

5. When talking about tree planting, please make tree *survival* the more important evaluation metric than the number of trees planted.
6. In attending an in-person presentation in Fitchburg on Oct. 19, there was a great deal of talk about ensuring that we have an adequate workforce for our new technologies. This appeared to be focused primarily on young people currently in school. Please do not forget to include retraining of existing workforce, particularly those in industries that are being phased out (i.e., those in fossil fuel-based industries) or in which the workforce will need to be redirected (i.e., forestry). These people already have many valuable and relevant skills, but will need both convincing and training to make the necessary transition.

Thank you for your careful attention to public comments.

Liberty
465 Sykes Road
Fall River, MA 02720

October 21, 2022

Secretary Bethany A. Card
Executive Office of Energy and Environmental Affairs
100 Cambridge St., Suite 900
Boston, MA | 02114

Dear Secretary Card,

Comments Regarding the Clean Energy and Climate Plan for 2050

On behalf of Liberty Utilities (New England Natural Gas Company) Corp. d/b/a Liberty, a natural gas local distribution company (LDC) serving more than 60,000 customers in nine Southeast Massachusetts communities, including the City of Fall River and nearby towns, thank you for this opportunity to offer comments on the Clean Energy and Climate Plan for 2050 (2050 CECP). Consistent with our comments on the Interim Clean Energy and Climate Plan for 2030 (2030 CECP), Liberty acknowledges the Baker Administration's efforts to put Massachusetts on a path to achieve net-zero greenhouse gas emissions by 2050 and represents years of hard work and commitment on the part of many dedicated public servants and stakeholders.

As part of the Algonquin Power & Utilities Corp. (APUC) family, sustainability is a central pillar of Liberty's business strategies and is woven throughout every aspect of our operations. APUC not only provides regulated water, electricity, and natural gas utility service to over 1.2 million customer connections primarily in North America, APUC also operates a growing portfolio of renewable wind, solar, hydro and thermal power generation facilities representing over 4 GW of renewables in operation and under construction. On that basis, we offer these comments, further detailed below, with respect to the 2050 CECPs initiatives associated with, and Liberty's commitment as a business to, decarbonizing the building sector, deploying renewable energy resources in an equitable and affordable way, and maintaining a safe and reliable distribution system for our customers.

We find that the unique character of the communities we serve gives Liberty particular insight into the customer-facing challenges of decarbonizing the building sector. For example, one-in- five of Liberty's Massachusetts customers qualify as "low income," and forty five percent of Fall River residents live in Environmental Justice block groups. Older buildings and multifamily housing are prevalent. For example, in Fall River only 26% of housing units are single family homes, compared to 76% statewide. As a result, many families don't themselves control the investment decisions around the energy systems which heat their homes. Consequently, Liberty shares the "particular concern" stated in the 2030 CECP that low-income families who currently heat their homes with natural gas may experience "financial hardship" if required to transition to electric heat or could be left behind in the transition to a net-zero energy future. That concern

extends further to the significant moderate-income population in our service territory as well, where median incomes are 35% lower than the statewide average.

The 2050 CECP builds on the great work already underway to decarbonize Massachusetts. Liberty is committed to being part of the process as demonstrated through our own Liberty Net Zero Enablement Plan (NZEP) filed with the Department of Public Utilities (Department) as part of D.P.U. 20-80 and our current request for approval of a renewable natural gas (RNG) contract in D.P.U. 22-32 that would allow residential, commercial, and industrial customers to take advantage of a locally produced landfill natural gas directly connected to our distribution system along with our ongoing support as sponsor of Mass Save. The 2050 CECP takes these actions further and with input from the Clean Heat commission, has defines extensions of the current policies we believe need further examination before becoming the standards for the Commonwealth's energy future. For consideration we have provided comments on the following proposed policy extensions.

- The CECP proposes to "Implement a Clean Heat Standard (CHS) as a regulatory approach to meet buildings emissions sublimits through electrification and energy efficiency." Liberty supports the push to impose building emission sublimits as a catalyst to meeting the 2050 net zero goals and maintains that energy efficiency will play a significant role in those reductions. However, defining that decarbonization would only be achieved through electrification dismisses the analysis completed as part of DPU 20-80 that identified a high electrification scenario will result in the highest cumulative system energy costs for Massachusetts, have the most challenging infrastructure requirements and be most difficult to create equity in the 2040 timeframe. [i] This proposal also negates the work complete by the Massachusetts LDCs to support decarbonizing Massachusetts. Liberty's NZEP was grounded in a portfolio approach of decarbonization pathways that utilized the hybrid electrification coupled with energy efficiency, renewable gases and potentially geothermal. This approach provided us with the most flexibility for our vulnerable customer base to make contributions to meeting the Commonwealth's 2050 net zero climate goals while allowing for customer choice and fuel flexibility. Utilizing these strategies to decarbonize the gas system will not only enable the deepest and fastest pathway to economy-wide decarbonization. Doing so will also help mitigate the risk contemplated in the Roadmap that "those least able to afford converting to a heat pump could be left responsible for increasing energy and infrastructure costs," by enabling many gas customers to continue using existing heating equipment and distribution networks—only more efficiently, and with renewable gases—ensuring costs are not concentrated on those who are least able to afford it.
- The recommended proposal to instruct utilities to conduct coordinated planning for targeted natural gas decommissioning and electric distribution and transmission systems requires careful consideration. Although coordinated planning was not specifically, identified in D.P.U. 20-80, the Department indicated that it will explore strategies to enable the Commonwealth to move into its net-

zero greenhouse gas emissions energy future, while simultaneously safeguarding ratepayer interests and ensuring safe, reliable, and cost-effective natural gas service, all of which we find to be of paramount importance. The opportunity for coordinated planning could positively impact the return on the investments that our customers make in the energy infrastructure today. We look forward to what unfolds through the D.P.U. 20-80 process.

- Liberty agrees the proposed Clean Heat Clearinghouse, finance mechanisms to mobilize private sector investments for buildings pursuing deep decarbonization and comprehensive public education campaign are essential elements to a successful transformation of the Massachusetts building sector. Liberty, along with the other sponsors of Mass Save, have built a considerable infrastructure for delivering energy efficiency programming. This delivery includes comprehensive program marketing designed to build program awareness and drive participation. Liberty asserts that Mass Save sponsors should maintain their role in program delivery and coordinate closely with proposed clearinghouse and educational campaigns. At present we work closely with our local CAP agencies to ensure the services Liberty provides are tailored to the unique needs of the communities we serve, and we strongly believe such partnerships must continue and expand under Liberty's direction as the transition to a decarbonized economy continues.
- Liberty recommends that using the evaluation of the findings from 10-town pilot and future of gas infrastructure for potential broader natural gas delivery policies should be approached with caution. The ten towns in the pilot do not provide a comprehensive representation of Massachusetts gas customers and instead represent a population of environmental activists with unique concerns and characteristics. Five of those towns have been at the forefront of other climate related issues such as the ban on Gas Powered Leaf Blowers (GPLB). Consistent with the findings of independent consultant report presented in D.P.U. 20-80, Liberty is committed to a future in which gas LDCs play a vital role in partnership with the Commonwealth to achieve deep decarbonization equitably, affordably, and effectively. The LDCs are uniquely positioned to assist in this transformation and should contribute to a decarbonized future by helping customers become more energy efficient through building retrofits, advanced energy efficiency technologies, geothermal and district heating, and other strategies to reduce demand; continuing to reduce and eliminate methane emissions from gas networks; and by supplying customers with low-, zero-, and negative-carbon sources of energy, such as RNG from local and regional feedstock, and clean hydrogen.

Thank you for the bold strides EEA has taken in the 2050 CECP, and for the opportunity for Liberty and the natural gas industry to join with you in moving Massachusetts energy policy forward. EEA's vision and actions emphasize the imperative for an equitable, achievable, and affordable transition to a decarbonized economy. Liberty shares these priorities and is committed to advancing innovative technologies and business models to bring our shared objectives to fruition.

Sincerely,

/s/ Tatiana Roc

Tatiana Roc

President Liberty-MA

[i] *Figure 1. Decarbonization scenario results across multiple evaluation criteria, The Role of Gas Distribution Companies in Achieving the Commonwealth's Climate Goals Independent Consultant Report*

Kristina Lauer
12 Morrison Ave. Unit 1
Somerville, MA 02144

October 21, 2022

Executive Office of Energy and Environmental Affairs

To Whom It May Concern:

As a resident of Somerville, MA, I am writing to offer comments on the draft Clean Energy and Climate Plan (CECP) for 2050. For the final draft of the 2050 CECP, I encourage the Executive Office of Energy and Environmental Affairs to do the following:

- **Include policies that show prioritize Natural and Working Lands.** These types of land are invaluable in helping us reach our climate goals because they remove emissions and make us more resilient to disasters such as extreme heat and flooding. We need to commit to a specific quantitative goal for NWL carbon removal by 2050 and make a plan for protecting forests. Over the last decade, we lost over 7,000 acres of forests converted just for development of large, ground-mounted solar projects. Renewable energy is also critical in reaching our climate goals, but this cannot be done at the expense of forests.

- **Recognize the importance of forests.** Forests provide irreplaceable benefits to state residents and to ecosystems. Proposed policies should build in incentives for maintaining the forests that are critical to our well-being, as they are not only key to carbon sequestration, but they are at the center of important ecosystems while providing a much-needed place of respite for city dwellers.

- **Dedicate a permanent source of public funding to land protection and restoration.** Massachusetts needs to invest much more in protecting and restoring lands and natural systems. We need to direct significant funds to increasing access to nature for communities of color and low-income residents, who have borne the brunt of exposures to fossil fuel pollution.

- **Commit to a regulatory approach to protecting forests.** We need to require that forests be protected for the greater good of our state's residents. We need to price losses of NWL carbon similarly to what we have done for energy (renewable standards), transportation (vehicle GHG standards) and buildings (stretch energy codes).

These changes will result in a stronger, more transparent final CECP for 2050. Thank you for your consideration.

Sincerely,

Kristina Lauer

Somerville, MA

HQUS
A subsidiary of Hydro-Québec

October 21, 2022

Via Email: gwsa@mass.gov

Bethany A. Card, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Clean Energy and Climate Plan for 2050 – Public Comments of HQUS

Dear Secretary Card:

H.Q. Energy Services (U.S.) Inc. ("HQUS"), the U.S. subsidiary of Hydro Québec ("HQ") appreciates the opportunity to submit comments on the Commonwealth's Clean Energy and Climate Plan ("CECP") for 2050 in light of the enactment of *An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy*, St. 2021, c. 8 ("2021 Climate Law"). The 2021 Climate Law sets more aggressive greenhouse gas ("GHG") reduction targets than previous climate legislation, requiring economywide reductions of 85 percent below 1990 levels. The 2050 CECP Proposal would set a sublimit for the power sector at 93 percent below 1990 levels. Achieving the targeted level of decarbonization will require a broad and inclusive approach, as relying on only a subset of clean resources, such as wind, solar, and storage, will likely entail excess costs and present reliability challenges. Additional interties between Québec and New England will be needed to access the necessary balancing resources and to optimize the use of clean energy generation. Strong leadership by Massachusetts and broad collaboration with other New England States is required to overcome challenges facing large clean energy infrastructure projects which will deliver significant benefits to the region and the commonwealth.

Introduction

Hydro-Québec operates an extensive electricity system comprised of 62 large scale, and geographically diverse, hydroelectric generating stations which comprises the majority of HQ's generation portfolio, totaling close to 37,000 MW and which is nearly 100% renewable energy. Imports from HQ to New England, that in 2021 represented 12%[1] of New England's annual electricity demand, can displace generation from fossil fuels, provide fuel diversity, and regional energy reliability and security. These hydroelectric facilities are supported by 28 reservoirs with a storage capacity of around 180 TWh. This is an ideal resource that could be made available to neighboring markets to balance their intermittent renewable resources. Hydro-Québec's system includes a transmission network to efficiently and reliably supply domestic demand in Québec and deliver large quantities of electricity to New England.

[1] In 2021 HQ exported 15.8 TWh to New England, which is 12% of the 137 TWh of net load published in the ISO-NE 2022 CELT Report

Hydro-Québec and the New England utilities have had a long partnership in the development of transmission between the two regions. In the 1980s and 1990s, the New England utilities secured long-term energy contracts with Hydro-Québec and coordinated siting and construction with their respective siting boards, which were key to the construction of the Phase I/II HVDC transmission line to Sandy Pond substation. The Phase II line represents one of the largest clean energy sources available to New England, and the project has delivered enormous interregional benefits over the course of its operation. More recently, Massachusetts recognized in its 2025/2030 CECP that additional transmission is necessary to meet the Commonwealth's near-term greenhouse gas ("GHG") reduction targets and that long-term energy contracts with Hydro-Québec are necessary to support construction of new transmission, such as the New England Clean Energy Connect ("NECEC") project.

New transmission is needed to achieve short-term goals

The development of transmission takes significant time. Massachusetts first identified the fact that its then "longer-term need to move to zero-carbon generation" in its 2015 update to the 2020 CECP required the Commonwealth to adopt an official policy to support the construction of additional capacity to import hydroelectricity.[2] The 2020 CECP noted the benefits of extensive, clean, lower cost Canadian hydro resources. This resulted in the enactment of *An Act to Promote Energy Diversity*, St. 2016, c. 188, which called for the first large scale hydroelectricity and transmission procurement since Phase I/II, and ultimately resulting in the procurement of the NECEC project. The experience from NECEC, and similar transmission initiatives from around the country, has shown from conceptual policy to operation, the development of transmission that Massachusetts needs takes nearly a decade.

That longer-term need is now a short-term need. The 2025/2030 CECP recognizes that "[w]hile the NECEC project is a critical component of Massachusetts' ability to achieve its emissions limits, Massachusetts will need additional transmission capacity to deliver additional renewable energy into the market . . . ."[3] New transmission between Québec and New England can also address near-term issues related to fuel security, fuel diversity, and overreliance on natural gas. Massachusetts will need to engage in careful planning and regional coordination in order to achieve decarbonization of the power sector while accommodating the expected load growth due to electrification of the transportation and building sectors.[4] Firm clean energy imports and balancing services from Canada are the least-cost clean energy resource for the region that will be needed to complement and balance large amounts of intermittent sources of power, such as wind and solar.[5]

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[2] 2020 CECP at 30, *available at* https://www.mass.gov/files/documents/2017/01/uo/cecp-for-2020.pdf
[3] 2025/2030 CECP at 65.
[4] *Id.* at 62–63.
[5] Achieving the power sector emissions sublimits may be impossible without additional transmission to Canada. The pathways analysis for the 2025/2030 CECP found that the required solar resources would need space exceeding the total area of available rooftops in the region. *Id.* at 68. Further replacing the energy contracted for under NECEC with solar PV paired with storage would require more than 30,000 acres of land, which may be impractical from a siting perspective. *See id.* at 64.

New transmission with Hydro-Québec can provide medium and long-term solutions as the grid evolves

Over the 2050 planning horizon, as electrification in other sectors increases, New England annual electricity demand and peak load are expected to more than double.[6] As more than 80 percent of electricity consumed in New England will come from renewable resources, intermittent renewable resources will need to be complemented by hydroelectricity imports.[7] Accessing additional hydroelectric resources from Québec will be essential because "the lowest-cost, most reliable grid is built on the most diverse mix of generation sources, shared over the broadest geographical area possible."[8] Hydro-Québec can provide highly dispatchable clean energy generation resources that can supply long-duration reliability services that are needed, because wind resources are expected to experience periods of low wind for as many as 36 hours at a time, and solar has more variable daily and seasonal production.[9]

As offshore wind develops at the forecasted scale, Massachusetts may become an energy exporter during many high generation hours of the year.[10] Additional interties connecting Massachusetts offshore wind with the HQ system will create an opportunity to significantly increase energy exchange with Québec, by creating an additional market for offshore wind sales during periods of high production and low local demand. The ability to access the Hydro-Québec system for two-way trading of electricity between the regions will also enable the optimal use of hydropower and offshore wind resources, reducing curtailments, and thus reducing costs to ratepayers.[11] A 2020 MIT study found that "adding 4 GW of transmission lines between New England and Québec is estimated to lower the costs of a zero-emission power system across New England and Québec by 17-28%" by enabling bidirectional transfers.[12]

Hydro-Québec has available clean energy generation resources capable of providing the controllable, highly dispatchable, and long duration storage characteristics necessary to reliably operate an electricity system predominantly sourced from renewable generation, but additional transmission will be needed at significant scale. Every scenario studied under the Energy Pathways Technical Report contemplated the need for additional transmission ties between New England and Québec to reduce electricity system costs.[13] Fully capturing the value of Hydro-Québec resources will require additional transmission significantly beyond what will be added by NECEC. A minimum of 2.7 GW and a maximum of 4.8 GW in new transmission capacity directly between Québec and Massachusetts would need to be built.[14] Under the "Regional Coordination" pathway, the transmission capacity between Québec and northeastern U.S. (including New York)

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[6] Massachusetts 2050 Decarbonization Roadmap at 55 ("2050 Roadmap").
[7] 2050 Roadmap at 56.
[8] *Id.*
[9] *Id.* at 63.
[10] *Id.* at 65.
[11] *Id.*
[12] E. Dimanchev, J. Hodge, J. Parsons, *Two-Way Trade in Green Electrons: Deep Decarbonization of the Northeastern U.S. and the Role of Canadian Hydropower* at 48, 52 (MIT Center for Energy and Environmental Policy Research, CEEPR WP 2020-003, Feb. 2020).
[13] Energy Pathways at 78.
[14] *Id.*

would be 13.5 GW, and 8.5 GW under the "All Options" pathway.[15] Thus, the Commonwealth's policy portfolio for the power sector and its key targets and metrics should explicitly reflect the need for the development of such transmission in the amounts studied.

Conclusion

Given the history of the development and siting of regional transmission, the development of additional transmission ties to access Hydro-Québec resources needs to be an explicit strategy. The public hearing presentation documents for the proposed 2050 CECP only identifies "Reform regional transmission planning and cost allocation" as its transmission strategy and makes no reference to the specific amounts and types of transmission that would be required.[16] This is not sufficient to plan and develop the transmission necessary given the long lead times. Transmission between Québec and New England provides significant regional benefits and enables achievement of Massachusetts' near and long-term goals. HQ remains committed to work collaboratively on clean energy projects with the New England States and regional utilities as it has in the past. However, the region needs clear leadership from Massachusetts and regional coordination to address actions and challenges which have threatened infrastructure projects in the past.

Simon Bergevin
General Manager
H.Q. Energy Services (U.S.) Inc.

[15] *Id.* at 79.
[16] Presentation: Clean Energy & Climate Plan for 2050 Limit, Sublimits, Goals, & Policies, slide 11, *available at* https://www.mass.gov/doc/2050-cecppublic-hearingpresentationenglish/download

Judy Chang, Undersecretary of Energy
Executive Office of Energy and Environmental Affairs
100 Cambridge St., Suite 900
Boston, MA 02114

October 17, 2022

Dear Undersecretary Chang;

Green Energy Consumers Alliance is a local nonprofit organization working to harness the power of energy consumers to speed the transition to a low-carbon future. We thank the Executive Office of Energy and Environmental Affairs (EEA) for the presentation and public hearings issued in October on the draft Clean Energy and Climate Plan for 2050 (2050 CECP). We appreciate all the hard work that has gone into preparing this roadmap on the heels of the Clean Energy and Climate Plan for 2025 and 2030 and respectfully submit the following recommendations. **The final 2050 CECP must:**

1. **List the expected emissions reductions impact of each proposed strategy.**

The draft 2050 CECP lists several policies to reduce greenhouse gas emissions (GHG) within each sector but fails to delineate how much each will contribute to each sector's GHG emissions reductions. Without that level of granularity, we will not know if we are on track to reach each sector sublimit or which strategies are performing better or worse than expected. The Commonwealth needs a greater level of specificity to monitor progress and course-correct over time.

2. **Require building performance standards for large buildings.**

We support the implementation of Building Performance Reporting for buildings over 20,000 square feet and urge EEA to move one step further and require large buildings across the state to reduce their GHG emissions over time. Boston has such a policy in effect today; a similar statewide policy would complement the Clean Heat Standard that Massachusetts is investigating implementing.

3. **Increase the Clean Energy Standard (CES) to at least 80% by 2030 and 100% by 2035.**

Increasing the rate of clean energy adoption on our electric grid is not only feasible but necessary. Rhode Island recently adopted 100% green electricity by 2033; Massachusetts can do the same, particularly since the Inflation Reduction Act (IRA) provides excellent incentives that will make green power even more affordable. In addition, and quite frankly, increasing the CES to 100% by 2035 will provide a necessary safety net in case progress in other sectors is slowed, for example if consumers fail to adopt heat pumps and electric vehicles (EVs) at the rate outlined in the draft 2050 CECP. (The Commonwealth is already well behind where we should be on both of those metrics.)

4. **Increase pollution monitoring, particularly in environmental justice (EJ) communities.**

With respect to environmental justice, we are glad to see that there will be tracking of where clean energy investments are made. But we also would like to see greater emphasis on tracking progress towards reducing localized air pollution in EJ communities.

5. **Emphasize workforce development in the short term *and* the long term.**

We are glad to see the emphasis on workforce development in the draft 2050 CECP. Every day, more and more people are looking to purchase heat pumps and electric vehicles. It will be impossible to meet the demand unless we bring into the workforce more trained people to perform the work. Progress must be made on this front *this decade* in particular.

6. **Set a goal to reduce total driving, not just stabilize it.**

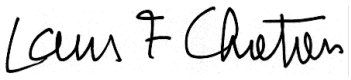
We were glad to see the final Clean Energy and Climate Plan for 2025 and 2030 stress a two-pronged approach to reducing emissions in the transportation sector: simultaneously electrifying vehicles on our roads *and* reducing vehicle-miles-traveled by making alternatives to driving, like walking, biking, and public transit, safer and more accessible. The draft 2050 CECP sets a goal to "stabilize total driving" by 2050; we urge EEA to go further and aim to reduce driving by 2050, as the fewer vehicle miles traveled, the fewer vehicle miles we need to electrify.

7. **Recognize the impact of the game-changing Inflation Reduction Act.**

This plan should explicitly recognize the fact that the federal Inflation Reduction Act (IRA) provides immense resources to households, businesses, states, and municipalities. The Commonwealth should organize itself to maximize the federal funds available by promoting IRA benefits to consumers and establishing capacity within state government itself to harvest IRA resources. For example, the Commonwealth should be working to establish a Massachusetts Green Bank as a counterpart to the national Green Bank, which is funded at $27 billion.

Thank you very much for your consideration of these seven recommendations. We look forward to the final CECP.

Sincerely,



Larry Chretien, Executive Director
Green Energy Consumers Alliance
larry@greenenergyconsumers.org

EVERSOURCE ENERGY

Comments on Draft Clean Energy & Climate Plan 2050 Limits, Sub-limits and Policies

October 21, 2022

Submitted by:

William Akley, President, Gas Business

Craig Hallstrom, President, Regional Electric Operations (MA and CT)

EXECUTIVE SUMMARY

As demonstrated in the draft Clean Energy & Climate Plan for 2050 ("CECP"), the Commonwealth continues to be a forward-thinking state and aggressive climate leader. Eversource applauds the goals set out in the CECP and looks forward to continuing to partner with the Commonwealth in the achievement of its ambitious yet necessary climate goals. The CECP addresses greenhouse gas emissions with sector-by-sector goals and strategies for transportation, buildings, electric power, non-energy and industrial and natural and working lands. Eversource addresses each of the sectors in greater detail below.

Eversource supports the CECP's sublimit for the transportation sector, including increased electrification of transportation. Eversource has already proven to be an electric vehicle-enabler through its ambitious electric vehicle programs and electric vehicle charging infrastructure buildout. Eversource looks forward to continuing to be a key partner in the expansion of the electric vehicle charging market. Additionally, recognizing the current limitations of the electric vehicle market, Eversource is pleased to see the inclusion of hydrogen and bio-fuels in the CECP.

Eversource urges the Executive Office of Energy and Environmental Affairs ("EEA") to consider three key aspects in setting the power sector sublimit. First, given the significant obstacles for the permitting and siting of large-scale projects and infrastructure currently experienced in New England, Eversource encourages EEA to factor in the feasibility and affordability of obtaining the proposed greenhouse gas reductions in the power sector. Additionally, Eversource encourages EEA to establish a strategic plan for overcoming the siting and permitting obstacles prior to setting the final sublimit. Second, with the significant increase in intermittent sources of power proposed in the CECP, there will need to be increased use of energy storage. Eversource encourages EEA to establish additional policies and plans to foster the adoption and inclusion of energy storage. Third, Eversource encourages EEA to conduct further analysis on the financial impacts of no longer utilizing power purchase agreements for large-scale project procurement. In Eversource's experience, power purchase agreements reduce the risk and, resultingly, the cost of a large-scale project.

For the building sector, Eversource recommends increased funding beyond the funding approved in the energy efficiency plans to achieve the ambitious goals for the building sector. Eversource supports the creation of the Clean Heat Clearinghouse and is well-positioned to assist. Additionally, an expansion and evolution of Mass Save could be leveraged to continue building decarbonization. For gas decommissioning, Eversource is concerned with the lack of detail on alternatives and mechanisms to facilitate customer choice and system reliability. Additionally, Eversource is concerned with the system reliability and affordability if full electrification is the only path offered customers. Further, decarbonized gas should be included in the CECP particularly for hard-to-electrify commercial and industrial customers. Eversource would strongly recommend including biogas and hydrogen in any development of a Clean Heat Standard.

As discussed in greater detail below, non-SF6 technology is currently cost-prohibitive and limited in availability. As such, SF6 equipment with a life expectancy of 30 years may continue to be installed over the next several years, in particular to meet the expected growth of the Eversource transmission system. Replacement of SF6 equipment prior to the end of the life-expectancy will result in cost increases and may hinder transmission expansion efforts which are necessary to

achieve the CECP's goals.

With regard to the natural and working lands sector, Eversource acknowledges the important role of trees through carbon sequestration. However, vegetation management is necessary to deliver safe and reliable power. Additionally, Eversource encourages EEA to consider the balancing of carbon sequestration benefits and the need for increased transmission and distribution siting to meet growing load that will result from these important decarbonization targets and policies.

COMMENTS OF EVERSOURCE ENERGY

Eversource Energy ("Eversource" or "Company") provides the following specific comments on the draft 2050 Clean Energy and Climate Plan ("CECP").

Transportation Sector

The CECP sets forth a proposed 2050 greenhouse gas ("GHG") emissions sublimit of 86% below 1990 levels. Eversource is supportive of the proposed GHG sublimit. The strategies outlined in the CECP provide opportunities to continue expanding public charging networks and electrifying transportation. Further, there will need to be an expanded focus on residential charging, including load-shifting strategies and managed charging across customer types. With increased transportation electrification, long-term system planning, resiliency and redundancy will become even more critical. Additionally, the Company appreciates the inclusion of biofuels and hydrogen as part of the solution for hard-to-electrify applications. The inclusion of these fuel types addresses practical considerations around the transition to electrification.

The overall 2050 CECP strategy and sublimit aligns with Eversource's transportation investments and plan to be a continued catalyst for clean energy by promoting electric vehicle ("EV") adoption, investing in EV infrastructure, and developing solutions to strategically deliver an increased electric load while maximizing beneficial grid integration. The Company'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. The Company looks forward to continuing to be a partner in the accomplishment of the Commonwealth's climate goals for the transportation sector.

Power Sector

The CECP proposes a 2050 GHG emission sublimit of 93% below 1990 levels. The clean energy transition necessary to achieve the proposed sublimit will require extraordinary investments in the Power Sector. The CECP sets goals of siting approximately 27GW of solar and 20GW of offshore wind by 2050. These goals represent a quadrupling of solar and a sevenfold increase in offshore wind between 2030 and 2050.

The proposed GHG emissions sublimit, and the target solar and offshore wind goals are aggressive and will require significant progress on the streamlining of the siting and permitting process of electric infrastructure throughout the Commonwealth in order to achieve the scope, scale, and pace of the proposed clean energy transition. For example, given the significant offshore wind goal proposed, the Commonwealth should factor into the establishment of final goals on how the proximity of the Stellwagen Bank National Marine Sanctuary affects the ability to site undersea transmission facilities to deliver power to Boston. Regarding the solar goal, it may be untenable without substantial solar canopy growth, considering the land use and environmental obstacles that are inherent in locating sites and permitting large-scale ground-mounted solar facilities. With the obstacles many clean energy projects currently face in the Commonwealth, and throughout New England, in obtaining the necessary local, state and federal approvals for such projects, particularly large-scale projects, the Commonwealth should more directly factor in the feasibility and affordability of obtaining these emissions reductions in the Power Sector, before establishing a final target, and create a specific plan for how to overcome these challenges.

In addition, the proposed volume of intermittent resources will require a significant buildout of energy storage. There is a need for long-duration storage technological innovation and the CECP is silent on policy measures that would be essential for scaled deployment of new

technologies.

Further, additional clarity is needed on the proposed target to start implementing floating technologies. It is unclear whether this is focused only on offshore wind or whether it includes other technologies. Additionally, the CECP does not provide an explanation for why the appropriate start date is 2031.

The 2050 CECP also proposes a successor to procurements for financing large-scale clean energy projects.[1] However, additional analysis must be undertaken to determine if alternatives to the current Section 83C and Section 83D procurement processes will result in power purchase agreements that are more cost effective than the agreements procured to date. In particular, the focus should be on how agreements procured under alternative methods may affect customer bills. As discussed in the previous offshore wind procurement proceedings under Section 83C, power purchase agreements ("PPAs") executed between distribution companies and developers lower the risk profile for project developers. See D.P.U. 18-76/77/78; D.P.U. 20-16/17/18. For example, a "merchant" cost of capital financing without the involvement of a power purchase agreement, and the firm revenues associated with such agreements, could increase the cost of offshore wind by approximately 15%, which would then result in higher electric bills for customers. As a result, Eversource recommends additional analysis be conducted demonstrating an ability by developers to finance a large clean energy project without a PPA before adopting a new procurement method. Additionally, the analysis should include potential bill impacts on customers.

The Company has 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

[1] For example, the draft plan states that "[b]y 2030, develop successor to procurements for financing large-scale energy projects, such as forward clean energy market."

multiple benefits to customers. Eversource is now preparing for the next tranche of offshore 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. Moreover, the Company currently has pending offshore wind power purchase agreements before the Department in D.P.U. 22-70.

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 offshore wind developers.

Heating and Cooling (Buildings Sector)[2]

The CECP proposes a 2050 Buildings Sector GHG emission sublimit of 93% below 1990 levels. Further, the CECP proposes a 95% below 1990 levels sublimit for residential heating and cooling and an 89% below 1990 level sublimit for commercial heating and cooling. The CECP also sets a Natural Gas Delivery GHG emissions sublimit of 71% below 1990 levels.

Weatherization and electrification of existing building stock, along with highly efficient new construction, remain the primary tactics to reach building sector reductions. The level of

[2] Eversource, as a Program Administrator of the Mass Save program, has significant 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 joint comments submitted by the Commonwealth's energy efficiency Program Administrators, to be submitted separately.

additional reductions to be achieved from 2030 to 2050 are a significant ramp up of achievement. The Company is experienced and deeply committed to providing electric and gas customers with cost-effective energy efficiency and electrification improvements for their homes and businesses. The energy efficiency programs have already transitioned in the 2022-2024 Plan to focus on carbon reduction, building electrification paired with weatherization, and the equitable delivery of energy efficiency services throughout the Commonwealth.

The level of achievement required to meet the 2050 sub-limits will require funding levels beyond the existing approved efficiency plan budgets. The Company is prepared to work with public and private sector partners to identify and leverage additional funding sources to facilitate customer adoption of building weatherization and electrification.

A Clean Heat Clearinghouse is a primary approach recommended in the 2050 CECP and the Company agrees that streamlining and consolidating information and program offerings for customers can help increase adoption of decarbonization measures. Eversource is uniquely well-positioned to leverage its existing robust energy efficiency delivery infrastructure, role in managing the distribution system, and administration of other key distributed generation and electric vehicle programs (*e.g.*, interconnection and net metering) to help the Commonwealth achieve its GHG reduction goals in the most streamlined and cost-effective way possible. The Company supports creation of a Building Decarbonization Clearinghouse and stands ready to assist in its development and implementation. An expansion and evolution of the current Mass Save programs could effectively leverage and build upon the proven success of the energy efficiency delivery infrastructure for continued advancement of building decarbonization.

The CECP contemplates gas decommissioning but does not provide adequate detail on alternatives and mechanisms that will be necessary to facilitate customer choice and system

reliability for building sector needs. The Company believes that having decarbonized options for customer choice will be critical to ensure the emissions reductions between now and 2050 are achieved affordably, reliably and safely. To that end, Eversource supports joint gas and electric coordination and planning to find the best, holistic decarbonized solution for customers.

The Company is very concerned with system reliability and affordability for customers if full electrification is the only path offered to meet the Commonwealth's goals in this sector. Roughly half of the Company's gas throughput goes to commercial and industrial customers and many of these customers have hard to electrify buildings and will require green molecules to serve their thermal needs. The Company believes that by adding decarbonized gas options, such as biogas and renewable hydrogen, the building sector can achieve meaningful emissions reductions at a steady pace. The Company also supports networked geothermal as a very efficient type of electrification that can potentially reduce electric side grid impacts.

As the building sector transition occurs, it is critical to maintain the safe and reliable operating condition of the gas network. There may be unknown and unintended operational effects and mitigation costs associated with any gas system decommissioning and therefore any system decommissioning must be done prudently and carefully.

The CECP also includes a Clean Heat Standard. The Company encourages the EEA to be technology agnostic and examine the entire value chain of emissions and environmental impacts or benefits for all decarbonization technologies. To that end, the Company would strongly recommend including biogas and hydrogen in any development of a Clean Heat Standard.

Lastly, the Company encourages the EEA to include networked geothermal applications in any future strategies. The Company is proud to be piloting the first of its kind networked geothermal system and believe it can offer customers an attractive decarbonization alternative to

traditional air-source heat pumps.

Eversource looks forward to continuing to support the Commonwealth in the transformation of the building sector.

Non-Energy & Industrial Sector

The CECP calls for phasing out hydrofluorocarbons and sulfur hexafluoride ("SF6"). The Company has concerns with the timing of phasing out SF6 because the technology is not yet proven/available. Due to limited commercial availability and prohibitive costs associated with new non-SF6 technology, SF6 filled equipment may continue to be installed at least over the next 3-5 years to support the expected growth of the Eversource electric transmission system and as needed to upgrade obsolete equipment until technology is available to meet our demands. Further, the life expectancy of SF6 equipment is more than 30 years. SF6 filled equipment such as circuit breakers and GIS are expected to have a 40-year life span. All existing and new equipment is expected to remain in service for the full duration of its useful service life as needed to meet the reliability and cost commitments made to the region. Replacement of SF6 filled equipment prior to end of useful life will result in excessive cost and may impact efforts to expand the system as necessary to meet the demands of electrification and interconnection of clean energy resources. Eversource is leading in the industry by pursuing pilots of non-SF6 technology.

Natural & Working Lands

One of the strategies contemplated in the CECP is enhanced restrictions on tree clearing. Additionally, the CECP proposes developing methodologies to quantify net losses associated with carbon sequestration for large-scale land clearing. 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.

Further, to achieve the CECP goals, there will need to be significant electrical infrastructure buildout to support the Commonwealth's ambitious climate goals. As such, the Company recommends streamlining permitting for transmission and distribution facilities necessary to support the CECP goals and strengthening exemptions in regulations for utilities. The Company encourages a careful balancing of clean energy benefits with the net loss of carbon sequestration.

Conclusion

Eversource is committed to continued collaboration with the Commonwealth as it undergoes the important task of achieving its climate 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 in terms of transparency, feasibility, and affordability.

October 21, 2022

FirstLight Power Comments in Response to Massachusetts Draft Clean Energy and Climate Plan for 2050

Company Overview

FirstLight is a leading clean power producer and energy storage company with operating and development assets in New England, Pennsylvania, New Jersey, and New York. Our operating portfolio includes nearly 1.4GW of pumped-hydro storage, battery storage, hydroelectric generation, and solar generation—the largest clean energy generation portfolio operating in New England today. Our mission and vision is to accelerate the decarbonization of the electric grid by owning, operating, and integrating large-scale renewable energy and storage assets to meet the region's growing clean energy needs and to deliver an electric system that is clean, reliable, affordable, and equitable.

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 2050

The proposed Clean Energy and Climate Plan for 2050 (CECP), along with the underlying analysis in the Massachusetts Decarbonization 2050 Roadmap (the Roadmap), provides a strong foundation for climate action that will deliver substantial benefits to Massachusetts residents and communities. FirstLight supports goal of net zero emissions by 2050 and recognizes that the urgency and scale of the changes needed to achieve those targets requires a continued aggressive push for clean energy generation and energy storage. Massachusetts must be aggressive in pushing the full range of solutions, including clean energy supply,

demand-side reductions, flexible storage options, workforce development, and grid infrastructure to deliver reliable, clean power in a just and equitable manner.

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 Roadmap and 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.

The CECP makes the important point that keeping the Commonwealth "on pace" to support Net Zero by 2050 is a near-term as well as a long-term challenge. Policies that accelerate near-term carbon reduction are an important part of the overall strategy. 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 are being deployed currently.

FirstLight's Northfield Mountain (an 1168-megawatt zero-emissions, fast-dispatch, nearly 8-hour duration energy storage asset) provides a clear illustration of what is possible along with the significant additional benefits that could be unlocked with such a time-differentiated compensation signal. While existing pumped hydro currently provides substantial contributions in the wholesale energy market, they could be asked to 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 not 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 could 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

[1] Energyzt, LLC, *Northfield Mountain Pumped Storage: Assessment of Contract Benefits in an Increasingly Renewable Region* (June 2020), 35.
[2] Ibid. 34.

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 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.

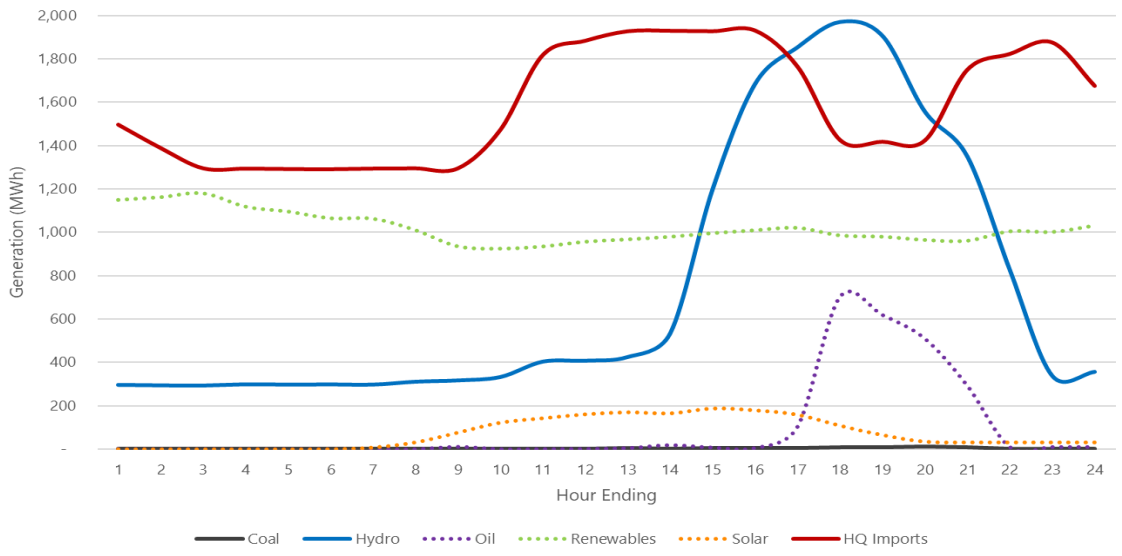
The Massachusetts 2050 Decarbonization Roadmap notes, *"to affordably and reliably operate an electricity grid based on variable renewable generation, a balanced portfolio of clean generation technologies shared across a broad geographical region is need. Together with offshore wind power, the Commonwealth needs a similarly large volume of solar generation….additional energy storage, and several new high-voltage transmission lines…"* [4]

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.

[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*

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 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.

[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.

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 Massachusetts to recognize that successful evolution of the New England grid to achieve state clean energy goals requires changes to assure efficient market exit as much as assuring efficient new market entry by clean resources, 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,

Len Greene
Director, Government & Regulatory Affairs
FirstLight Power
Len.Greene@firstlightpower.com

ELM ENVIRONMENTAL LEAGUE OF MASSACHUSETTS

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

October 20, 2022

RE: EOEEA – Draft 2050 Clean Energy and Climate Plan Recommendations

Dear Secretary Card:

Thank you for the opportunity to comment on the Draft 2050 Clean Energy and Climate Plan. First, ELM wants to acknowledge the significant amount of work that went into the Roadmap analysis and the updated 2025/2030 CECP required by the Next Generation Roadmap Act. We also understand that it is difficult to know what the future holds and so there is a lot of uncertainty planning out to 2050. That said, we believe the plan would benefit from more details and specificity with interim goals/metrics for as many of the policies detailed as possible.

Transportation: As we noted in our comments on the 2025/2030 CECP, we appreciate the changes from the earlier version of that plan to include policies beyond vehicle electrification. We urge you to include more in the 2050 plan, detailing specific incentives and policies to support mode shift, VMT reduction (not stabilization), transit expansion and electrification, and walking and biking, and to develop metrics/interim targets so progress can be tracked, understanding that the plan will need to be updated going forward as new technologies and policies become available/are developed.

Buildings: We strongly support a declining cap on building heat emissions included in the update along with a Clean Heat Standard. We also support the concept of a Clean Heat Clearinghouse. by 2024. We urge EEA to go further than energy reporting and require emissions reductions from large buildings. We also note that the key target "majority of buildings will be low-emission" is quite weak for a 2050 goal and should be strengthened.

15 Court Square
Suite 1000
Boston, MA 02108

www.environmentalleague.org
info@environmentalleague.org
617.742.2553

Electricity Sector: As you know, ELM has been a leading proponent for responsibly developed Offshore Wind. We were pleased to see the target of 20GW of OSW in place by 2050. We continue to recommend a more ambitious Clean Energy Standard and solar development target and inclusion of a clean storage mandate, each of which should become more aggressive the closer we get to 2050. We also suggest including storage in the last bullet related to siting.

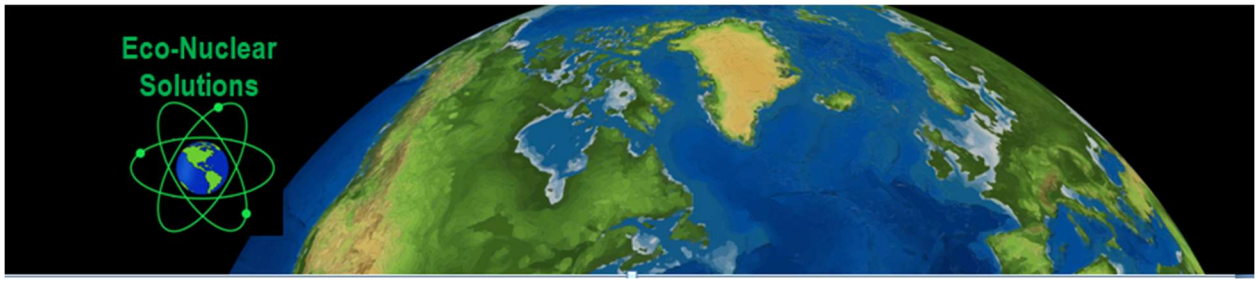
Environmental Justice: We appreciate the inclusion of a section on Environmental Justice in the 2025/2030 CECP. We think there are a few specific ways you can build on that in the 2050 plan. We note that there is no mention of policies that would ensure that low-income ratepayers who cannot afford to electrify are not saddled with more of the bill for gas distribution. We would encourage some policy remedy be considered and included to ensure that low-income residents either are prioritized for home electrification or protected from greatly increased bills. As you know, ELM worked hard to have economic inclusion included in the RFP for OSW procurements and successfully advocated to have language included in the most recent climate bill. We would like to see other green industries follow that lead to the extent possible, particularly where the state will be contracting with developers or vendors. We urge you to include this policy in the 2050 plan along with some targets/metrics. Finally, we recommend that EEA commit to tracking clean energy investments with a specific goal of ensuring that a certain percentage of investments support projects in or that directly benefit environmental justice communities.

Natural and Working Lands: We agree with many of the recommendations in the letter submitted by The Nature Conservancy. In particular, we believe it is important to limit deforestation via regulation or incentivized best practices and we urge EEA to set a limit on emissions from deforestation and degraded wetlands and a target for increased sequestration e.g, via tree planting and healthy soil practices.

Again, thank you again for the opportunity to comment.

Sincerely,

Nancy Goodman
VP for Policy



October 17, 2022
Members of
Massachusetts Executive Office of Energy and Environmental Affairs:

Thank you for your hard work in moving Massachusetts in the direction of a zero-carbon future. This letter is in response to your request for comments on the MA 2050 Clean Energy and Climate Plan.

Eco-Nuclear Solutions is a group of activists who believe nuclear energy is an ecological, safe, cost-effective, grid-ready solution to eliminate carbon emissions and reliably provide for increasing global energy needs. After studying the options available, we have found that wind and solar cannot meet our energy needs alone, even with backup from hydro-electric and/or batteries. We have come to realize that nuclear energy is an essential component of any realistic solution. We ask you to be open to the benefits of nuclear energy which:

- Provides a steady, strong supply of base energy for the grid
- Needs no backup
- Produces no CO_2 as it generates electricity
- Utilizes passive design for superior safety
- Has a safety record superior to wind & solar
- Produces a small volume of waste that is safely sequestered, robustly handled, and can be recycled to further reduce waste
- Reduces Grid complexity
- Can be easily fitted into retired coal plants
- Preserves our forests and landscapes with minimal land requirements

● Can provide abundant electricity globally, to meet escalating demand

Compared with wind and solar, nuclear power requires a much smaller volume of fuel, produces far less waste and, most significantly, occupies far less land. Environmentalists are coming to realize that the land requirements of wind and solar are competing with our cherished principles of land conservation. Nuclear power is the alternative CO_2-free fuel that solves this dilemma.

We request that your office add nuclear power as an important component of the power sector policy portfolio and consider its use in the industrial sector as well.

Sincerely,

Marcia Young,

Westford, MA

 on behalf of Eco-Nuclear Solutions

EcoNuclearSolutions@gmail.com

www.Eco-NuclearSolutions.org

October 21, 2022

[Submitted via Email]

Secretary Bethany A. Card
Executive Office of Energy and Environmental Affairs
100 Cambridge Street
Suite 900
Boston, MA 02114

Subject: Dandelion Energy Written Comments on the Massachusetts Clean Energy and Climate Plan for 2050

Thank you for the opportunity to provide comments to the Office of Energy and Environmental Affairs (EEA) on the Massachusetts Clean Energy and Climate Plan for 2050 (CECP). The geothermal heat pump industry is prepared to scale rapidly to meet growing demand for geothermal heat pumps and building decarbonization, and **Massachusetts should establish strong geothermal heat pump adoption targets through the CECP to spur market transformation.**

<u>Summary of Dandelion Recommendations for the CECP</u>:

1. Massachusetts should set robust geothermal heat pump targets of 130,000 geothermal heat pumps installed by 2030 and 800,000 installed by 2050 in order to meet its building decarbonization goals.

2. The CECP should recommend that Massachusetts extend the MassSave prescriptive rebates for geothermal heat pumps to new construction projects.

3. Massachusetts should provide rebates and incentives based on heating capacity rather than cooling capacity.

Massachusetts Residential Building Decarbonization Requirements

The 2021 Climate Act established requirements for greenhouse gas emissions reductions within Massachusetts, requiring emissions reductions of at least 50% by 2030, at least 75% by 2040, and net-zero (or at least 85%) by 2050.[1] Massachusetts has made only small gains in reducing emissions from the residential sector – with current emissions estimated to have decreased by 10% to 16% from 1990 levels.[2] Massachusetts will therefore need to dramatically decrease emissions in the building sector to meet its 2030, 2040, and 2050 legislated goals.

Massachusetts has over 2.6 million occupied housing units; more than 2 million of those currently utilize natural gas (1.3 million), fuel oil (667,000), or liquid propane (97,000) for space heating.[3] Of the more than 400,000 homes relying on electric heating, many of those currently rely on inefficient and expensive electric resistance heating. To stay on pace to meet the Climate Act targets, Massachusetts will need to decarbonize approximately one million additional residences by 2030, and another one million residences by 2050. This will require decarbonization of more than 75,000 homes per year, every year until 2050. Construction of new homes and buildings will further increase these necessary targets, and Massachusetts should also take further steps to ensure that new construction is decarbonized from the start, rather than requiring more difficult retrofits down the line.

Heat pumps will play a central role in achieving this decarbonization; they operate at two to four times higher efficiencies than fossil fuel heating systems, provide both heating and cooling in a single system, and are already commercially available today. In the first half of 2022 the MassSave utilities supported 6,531 residential heat pump installations, with the majority of these systems providing only partial-home replacements and representing only a fraction of the required pace to meet Massachusetts' climate goals.[4] Massachusetts will need to dramatically scale these installations up to over 75,000 per year, **with a particular focus on whole-home installations**, to meet its emissions reduction targets. **Overall market and contractor capacity to meet the required decarbonization targets is feasible under reasonable growth scenarios – with appropriate funding and policy support from the state, the EEA, and the MassSave utilities.**

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[1] *An Act Creating A Next-Generation Roadmap for Massachusetts Climate Policy*, March 26, 2021; reductions compared to 1990 baseline.
[2] 2019 residential emissions reductions estimated at 10.5% from *Statewide GHG Emissions Level: Proposed 1990 Baseline Update Appendix C*, https://www.mass.gov/lists/massdep-emissions-inventories, and 2018 building reductions of 15.6% from *GHG Emissions and Mitigation Policies*, https://www.mass.gov/info-details/ghg-emissions-and-mitigation-policies
[3] U.S. Census Bureau, American Community Survey, Table DP04 Selected housing Characteristics, 2020, https://data.census.gov/cedsci/table?g=0400000US09,25,36,44&tid=ACSDP5Y2020.DP04
[4] 2022 Heating & Cooling Fall Conference Kickoff, MassSave, October 18, 2022, p. 9.

Background: The Benefits of Geothermal Heating and Cooling Systems

Geothermal heat pump systems have a critical role to play in decarbonizing the building sector and transitioning to an economy run on clean energy, as geothermal is among the **most efficient** ways to heat and cool buildings, according to the U.S. Environmental Protection Agency.[5] Key benefits of geothermal heat pump systems include:

- **Emissions reductions.** Geothermal systems have the potential to reduce carbon emissions from Massachusetts homes by up to 80% as compared to fuel oil systems and 60% as compared to natural gas systems.[6] These emissions reductions will grow over time as Massachusetts continues to decarbonize its electricity generation.

- **Low operating costs.** Geothermal heat pump systems also **offer the lowest operating costs of any heating or cooling technology**. Geothermal customers will typically use 40 to 50% less electricity than an air source heat pump for a similar home, with peak summer and winter loads up to 75% to 80% lower.

- **Electric grid and ratepayer benefits.** Geothermal heat pumps also offer significant electric grid benefits; they increase baseload demand, decrease summer peaks, and don't meaningfully increase winter peaks. A study by the Brattle Group found that fully electrifying New England using geothermal heat pumps would only minimally impact peak demand and leave energy prices unchanged.[7] This is in contrast to technologies like air source heat pumps, which provide electrification benefits, but also increase peak demand and energy prices.

  Analysis conducted for the New York State Climate Action Council models the geothermal heat pump industry growing to represent **23% of all heat pump installations**; further sensitivity analysis found that if geothermal and district heating systems increased to represent 80% of all installed heating systems by 2045 (compared to the 23% baseline), it would yield **$9 billion in avoided electric generation and transmission costs.** This included a 2.8% decrease in annual electric loads and **a 10.8% decrease in peak electric loads**, creating significant savings in avoided electric infrastructure costs.[8]

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[5] "Geothermal Heat Pumps," Energy Star, U.S. Environmental Protection Agency, accessed August 29, 2022, https://www.energystar.gov/products/geothermal_heat_pumps

[6] Savings calculated by Dandelion and available on our website: https://dandelionenergy.com/environmental-impact

[7] Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050, The Brattle Group, p. 30-31, https://energy.ri.gov/sites/g/files/xkgbur741/files/documents/HST/RI-HST-Final-Pathways-Report-5-27-20.pdf

[8] New York State Climate Action Council Draft Scoping Plan, Appendix G, Integration Analysis Technical Supplement, p. 80, December 2021.

The increased baseload demand provided by geothermal heat pumps also generates additional savings for other electric rate-payers – a study by the New York State Energy Research and Development Authority estimated the value of this cost shift benefit **to all ratepayers to be over $7,000** for each single family home electrified with geothermal heat pumps.[9] Geothermal heat pumps increase electric demand without increasing electric peak demand or requiring new electric grid infrastructure. The additional revenues for utilities are significantly greater than the additional costs of the electric generation; for regulated utilities that do not earn profit on electric consumption charges, this surplus is then returned to customers through lower electricity rates for all rate-payers.

Geothermal systems therefore have the added benefit of effectively **underwriting the electric usage of other electric customers and reducing overall costs for all consumers**. This is in contrast to other renewable technologies which can reduce overall grid demand and leave other rate-payers, particularly low- and moderate-income households, footing the infrastructure bill to sustain the grid.

- **Lifecycle costs.** While up-front costs are higher than other electrification alternatives, **geothermal systems provide the lowest lifecycle cost of any heating and cooling decarbonization technology**. The design life of geothermal heat pump equipment is approximately 24 years, and the design life of the ground loop is at least 50 years, with no degradation to thermal efficiency throughout the lifespan of the asset.[10] Some studies have suggested ground loop system life of up to 100 years[11] or greater given the stable characteristics of the underground pipes. Once a geothermal system is installed, the long life of the ground loop, coupled with the efficiency and low operating costs of the heat pump, ultimately provide the most economical decarbonized heating and cooling solution over the long term. The Brattle Group analysis of decarbonization in Rhode Island **identified geothermal systems as nominally the lowest overall cost solution** (uncertainty in future prices could yield similarly low prices for air source heat pumps).[12]

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[9] New Efficiency: New York, Analysis of Residential Heat Pump Potential and Economics, New York State Energy Research and Development Authority, January 2019, p., S-3, https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/NYSERDA/18-44-HeatPump.pdf

[10] Department of Energy, "Geothermal Heat Pumps," accessed August 26, 2022, https://www.energy.gov/energysaver/geothermal-heat-pumps

[11] "Useful Life," National Renewable Energy Laboratory, accessed August 31, 2022, https://www.nrel.gov/analysis/tech-footprint.html

[12] The Brattle Group, p. 40-42.

- **Robust Federal incentives.** The recently passed federal Inflation Reduction Act provides a critical boost to building decarbonization efforts across the country, and Massachusetts can position itself to maximize the benefits of the federal incentives by setting strong state-wide goals that leverage the federal funding. The Inflation Reduction Act increases the residential tax credit to 30% for geothermal heat pump systems and extends the credit through 2034, with a phase down in the final two years. The Inflation Reduction Act also provides $8.8 billion in rebates for energy efficiency and electrification technologies, including geothermal heat pumps – with an estimated $160 million in funds available for Massachusetts residents, particularly low- and moderate-income residents. **These incentives and credits represent an immediate 10% increase in the residential geothermal heat pump market** over the next 12 years, and provide a strong foundation for growth in geothermal installations in Massachusetts. EEA should ensure that Massachusetts applies for the federal rebate funding as soon as the funds are available, and work to align federal rebate programs with existing MassSave programs to streamline delivery and increase consumer uptake.

- **Market and workforce growth.** The geothermal industry has strong potential to scale up to meet aggressive heat pump installation targets under the CECP**.** Workforce analysis conducted for New York projected **that residential decarbonization would generate over 35,000 residential HVAC jobs in the state by 2030.** Since these represent local jobs which cannot be outsourced or exported, they will also generate second-order effects in the local economy, with the salaries and spending of geothermal employees supporting thousands of additional induced jobs in the local community.[13]

  However, under Massachusetts' current licensing requirements, **the availability of licensed workforce professionals remains a persistent challenge that is hampering installations**. Hiring enough qualified, experienced personnel to complete geothermal heat pump installations represents one of the most significant barriers to growth for Dandelion. Dandelion has spent significant effort recruiting licensed sheetmetal workers from within the state, for example, but there simply aren't enough licensed professionals to meet customer demand. Massachusetts will need to strengthen and expand workforce development programs to keep pace with growing demand for heat pump installations.

Given these benefits, geothermal heat pumps represent a key technology for advancing energy affordability and value, supporting the growth of the green economy,

[13] Scaled from New York calculations based on recommended MA targets and adjusted for geothermal and other heat pump labor; for details on the jobs impact of heat pump targets, see: New York Climate Action Council Just Transition Working Group (JTWG), 2021 Jobs Study, p. 76, December 2021, https://climate.ny.gov/-/media/Project/Climate/Files/JTWG-Jobs-Report.ashx

and achieving economy-wide decarbonization without meaningfully increasing peak demand. The geothermal heat pump industry is prepared to scale rapidly to meet growing market demand for geothermal heat pumps, but **Massachusetts should adopt policies to enable rapid growth of the heat pump workforce and establish strong geothermal heat pump adoption targets to spur market transformation.**

1. **Massachusetts should set robust geothermal heat pump targets of 130,000 geothermal heat pumps installed by 2030 and 800,000 installed by 2050 in order to meet its building decarbonization goals.**

Dandelion recommends the EEA review recent analyses from New York and Rhode Island for examples of deployment potential for geothermal heat pumps in residential buildings, and develop deployment targets for Massachusetts that account for geothermal's multifaceted climate and energy savings benefits.

Table 1: Regional Studies and Analysis of Heat Pump Deployment

Housing Units[14]	Example Studies	Geothermal through 2030 (% of all units)	Geothermal through 2050 (% of all units)
NY: 7,400,000	New York CAC Integration Analysis	385,000 (5%)	2,110,000 (29%)
RI: 414,000	Brattle Group - Rhode Island Study	Not assessed	136,900 (33%)
MA: 2,600,000	**Massachusetts: Equivalent Ratio**	130,000 (5%)	754,000 - 858,000 (29% - 33%)

- **New York Climate Action Council Draft Scoping Plan:** This assessment models various scenarios to achieve New York's goals of 40% reduction in emissions by 2030 and 85% reduction by 2050 compared to 1990 levels. Scenarios *S2: Strategic Use of Low-Carbon Fuels, S3: Accelerated Transition Away from Combustion,* and *S4: Beyond 85% Reduction* all model residential and commercial **geothermal heat pump adoption rising to 22-23% of all heating installations by 2035** and continuing at that pace through 2050.[15] This represents over 2.1 million geothermal heat pumps installed by 2050 across New York state. [Note: Scenario 1 included slightly lower heat pump targets and lower geothermal market share, and did not meet New York's emission reductions requirements].

[14] U.S. Census Bureau, American Community Survey, Table DP04 Selected housing Characteristics, 2020, https://data.census.gov/cedsci/table?g=0400000US09,25,36,44&tid=ACSDP5Y2020.DP04

[15] New York Climate Action Council Draft Scoping Plan, Appendix G: Integration Analysis Technical Supplement, Annex 2: Key Drivers and Outputs, December 2021, https://climate.ny.gov/Our-Climate-Act/Draft-Scoping-Plan. See tabs S2_Space Heating-Res, S2_Space Heating-Comm, S3_Space Heating-Res, S3_Space Heating-Comm, and S4_Space Heating-Res, and S4_Space Heating-Comm.

- **The Brattle Group, Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050:** This analysis assessed decarbonization pathways for Rhode Island through 2050. The study models a mixed-fuel pathway to decarbonization utilizing geothermal heat pumps for 33% of all building decarbonization. This represents over 130,000 geothermal heat pumps installed in Rhode Island by 2050. The study also found that the notional scenario of fully electrifying New England using geothermal heat pumps would only minimally impact peak demand and leave energy prices unchanged, in contrast to air source heat pumps which provide decarbonization benefits but also increase peak demand and energy prices.[16]

Modeling for the *Massachusetts Clean Energy and Climate Plan for 2025 and 2030* on decarbonization of the building sector includes over 490,000 cold climate air source heat pumps (ccASHP) installed through 2030, but incorporates a significantly lower rate of geothermal adoption with only 20,000 geothermal heat pumps installed through 2030 (e.g. **approximately 4% of heat pumps are geothermal, much lower than 23% in the NY study referenced above)**. Compared to geothermal systems, these ccASHP will represent approximately 3 gigawatts of additional peak electric demand during the coldest winter nights – precisely when renewable energy supplies will be most challenged.[17]

Based on the emissions reduction, grid efficiency, and cost-saving benefits of geothermal heat pump systems and the significant potential for market growth under supportive state policies, the CECP should set residential **geothermal heat pump goals and targets of 130,000 systems installed by 2030 and 800,000 systems installed by 2050.** These targets will maximize long-term efficiency and cost savings by including a significant role for geothermal heat pumps in building decarbonization. When paired with federal and utility incentives, these targets will enable robust geothermal heat pump growth and maximize long-term cost savings and greenhouse gas emissions reductions.

These targets represent an increase to 14,000 geothermal installations per year from 2026-2030, followed by continued growth up to an average of 33,000 installations per year through 2050. These installations would generate over 2,600 good-paying geothermal jobs across the state by 2030, with significant additional growth in job creation through 2050.[18]

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[16] Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050, The Brattle Group, https://energy.ri.gov/sites/g/files/xkgbur741/files/documents/HST/RI-HST-Final-Pathways-Report-5-27-20.pdf

[17] Dandelion calculations of peak demand for a 1,500 square foot house in New England; geothermal heat pumps peak electric demand of 3.05 kW vs. ccASHP peak demand of 9.24 kW, multiplied by 490,000 ccASHP.

[18] Scaled from New York calculations based on recommended MA targets and adjusted for geothermal and other heat pump labor; for details on the jobs impact of heat pump targets, see: New York Climate Action Council Just Transition Working Group (JTWG), 2021 Jobs Study, p. 81, December 2021, https://climate.ny.gov/-/media/Project/Climate/Files/JTWG-Jobs-Report.ashx

Strong geothermal heat pump adoption targets would also represent a significant step in ensuring that geothermal heating and cooling systems are accessible to low- and moderate-income households. Geothermal heat pumps operate at the highest efficiency and lowest operating cost of all heating and cooling technologies and can offer significant energy savings to residents currently paying a high proportion of their monthly income towards their energy bills. Due to high up-front labor cost for drilling, installation, and design of geothermal systems, however, they are often unaffordable for some households and small businesses, particularly for working class Americans. **The expansion of federal incentives for low- and moderate-income families provides an opportunity to make low-operating cost geothermal systems accessible to all Massachusetts residents**, and the CECP can capitalize on the current federal incentives through strong targets and supportive policies.

2. **<u>The CECP should recommend that Massachusetts extend the MassSave prescriptive rebates for geothermal heat pumps to new construction projects.</u>**

New construction is the optimal time to install a geothermal system to minimize disruption and reduce overall costs, yet builders and developers do not benefit from the long-term operating cost savings from selecting the most efficient equipment. Home buyers often have less visibility into the long-term potential savings during the homebuying process, creating a potential mismatch between short-term incentives for builders and long-term health benefits and cost savings for homeowners. Massachusetts should therefore take additional steps to enable new home construction to maximize the use of electric heat pumps – securing the long-term energy savings for homeowners – and ensure the state does not fall further behind on its building decarbonization goals.

The CECP should recommend that Massachuetts extend the current MassSave geothermal heat pump rebates to the residential new construction program. While the existing whole-home all-electric residential programs incentivize electrification of heating and cooling, extending the prescriptive geothermal rebates would acknowledge the grid benefits of geothermal systems and send an unambiguous message that heat pumps should be the baseline for heating and cooling in any home under construction.

The federal Inflation Reduction Act also increases the tax credits for new construction of energy efficiency homes, with Zero Energy Ready Homes eligible to receive a credit of up to $5,000. These new federal credits provide a valuable incentive for homebuilders, but are often insufficient to fully transition the new construction market to all-electric offerings without additional state-level regulatory or financial incentives. A residential new construction rebate of $15,000 for geothermal heat pumps, when coupled with the federal tax credits, would significantly transform the new construction

market towards all-electric offerings and would set Massachusetts on par with other national leaders in energy efficient residential construction.

States such as New York, Illinois, and Vermont offer full-value prescriptive rebates for geothermal heat pumps in new construction, which provides a strong incentive for builders to electrify new home construction and avoid installation of fossil fuel equipment and new gas infrastructure. Given long-term natural gas price uncertainty and broader policy trends, fossil fuel burning equipment installed today may also need to be replaced before the end of its useful service life. Gas price volatility, gas infrastructure supply constraints, and future building code updates and legislation can all impact the future availability of natural gas, potentially leaving homeowners with the cost burden of a stranded asset in their otherwise modern and efficient home. Decisions made by home builders today will lock-in energy usage for many decades to come, and **extending the prescriptive geothermal heat pump rebate to new construction** would greatly support the electrification of new buildings in Massachusetts while minimizing potential costs and disruption due to future retrofits.

3. **Massachusetts should provide rebates and incentives based on heating capacity rather than cooling capacity.**

The heating and cooling capacity of heat pumps and HVAC systems are measured in “tons,” typically defined as 12,000 BTU/hour of thermal capacity. Most heat pumps and HVAC systems have higher cooling capacity than heating capacity, with systems typically producing about 12,000 BTU/hour of cooling capacity for each 10,000 BTU/hour of heating capacity, though the exact ratio varies across heat pump makes and models. This means that a typical “6 ton” system as measured by cooling capacity is only producing approximately 5 tons worth of true heating capacity.

Massachusetts is a heating dominated climate, with winter heating requiring a significantly greater proportion of overall energy usage than summer cooling – yet the MassSave rebates and incentives currently measure capacity for rebates using cooling tons. Other energy efficiency programs in the region have already transitioned from legacy air conditioner-based programs to heating-based rebates: the New York Clean Heat program transitioned in early 2020, and Long Island transitioned air source heat pump rebates in 2021 and is actively considering doing the same for geothermal rebates. **These transitions typically involve adjustments to per ton rebate amounts to keep overall incentive levels the same** based upon typical cooling-to-heating ratios of current heat pump systems.

As Massachusetts decarbonizes the building sector, the CECP should recommend that MassSave transition rebates to a heating capacity basis to align spending with the true energy savings impact and ensure that the most efficient heating systems are properly incentivized.

About Dandelion Energy:

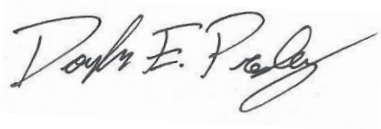
Dandelion Energy is one of the nation's leading providers of home geothermal heating and cooling systems. Our mission is to make geothermal heat pumps so inexpensive and easy to install that we enable a widespread shift from fossil heating to renewables. Dandelion has been operating in the Massachusetts market since mid-2021 following the introduction of enhanced incentives for geothermal heat pumps as part of MassSave. Due to the continued presence of incentives and strong market demand from Massachusetts homeowners, Dandelion has significantly increased its presence in the state and pace of installs in 2022 and beyond.

Dandelion's goal is to bring geothermal to all single family home markets. While we install geothermal systems in homes of all sizes, our typical customer has a 1,500-2,500 square foot home, which we can easily and cost-effectively convert to geothermal using a single 4 or 5 ton heat pump system. Dandelion's software-guided system design and smaller drilling rigs allow us to right-size systems and offer geothermal on smaller lots than what is accessible by traditional geothermal installers.

Conclusion:

Dandelion appreciates the opportunity to comment on the CECP and remains optimistic about the potential of geothermal heat pumps to help Massachusetts meet its climate and economic goals. The geothermal heat pump industry is prepared to scale rapidly to meet growing market demand for geothermal heat pumps, and **Massachusetts should establish strong geothermal heat pump adoption targets to spur market transformation.**

Respectfully submitted,



Doug Presley
Policy and Regulatory Affairs Manager
Dandelion Energy

Exhibit A

clf
conservation law foundation

For a thriving New England

CLF Massachusetts
62 Summer Street
Boston MA 02110
P: 617.350.0990
F: 617.350.4030
www.clf.org

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,

Caitlin Peale Sloan
Interim Vice President for Massachusetts
cpeale@clf.org

Staci Rubin
Senior Attorney
srubin@clf.org

Priya Gandbhir, Staff Attorney
Andrew Yarrows, Legal Fellow
Lisa Gianelly, Senior Fellow

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.

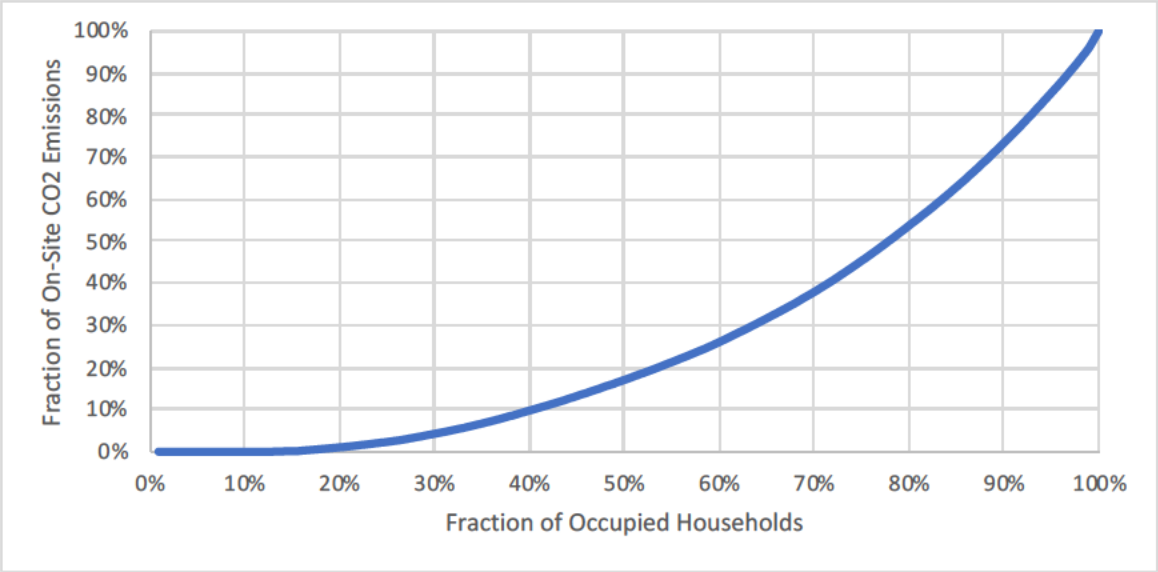
Figures 1 and 2 present the results of this analysis. Each figure shows the cumulative CO_2 emissions from fuel combustion as a function of the cumulative fraction of the stock (housing units or commercial square feet) when the stock is put in the order of increasing emissions intensity. The slopes of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

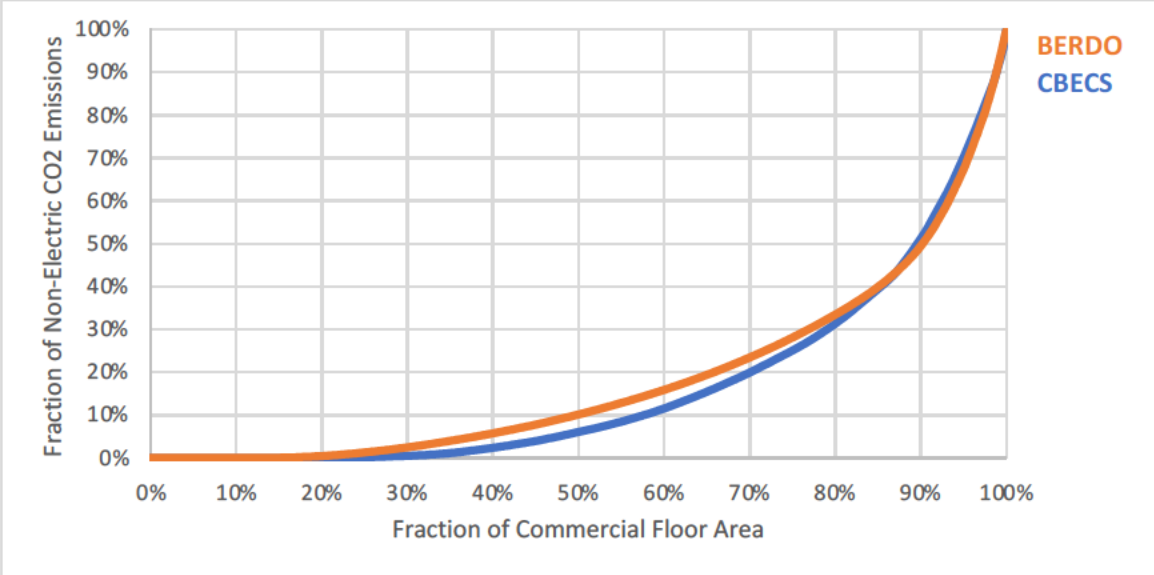
[4] City of Boston. *Building Energy Reporting and Disclosure Ordinance (BERDO)*. Data available at https://data.boston.gov/dataset/building-energy-reporting-and-disclosure-ordinance.

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

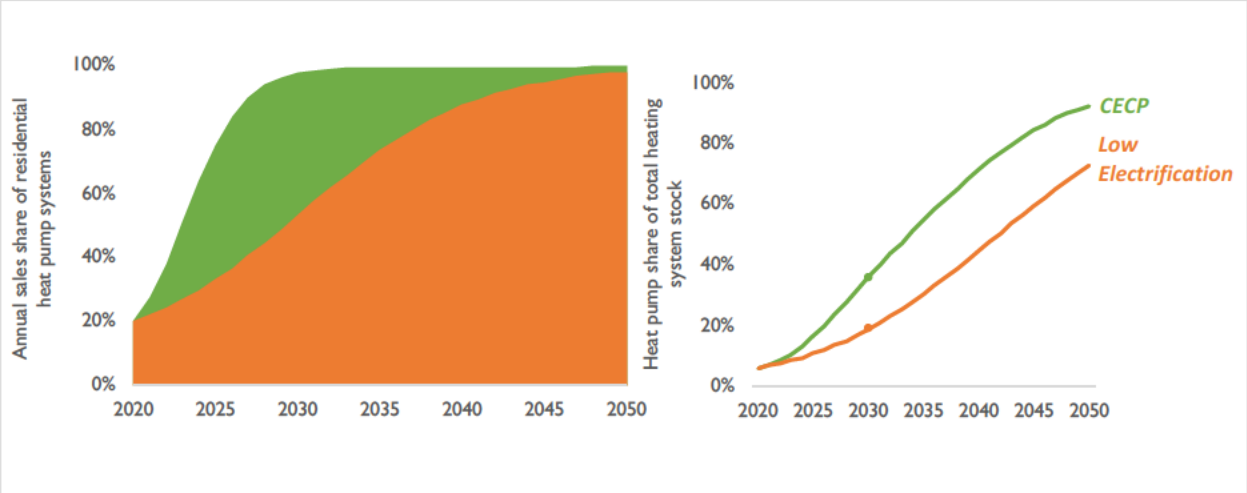
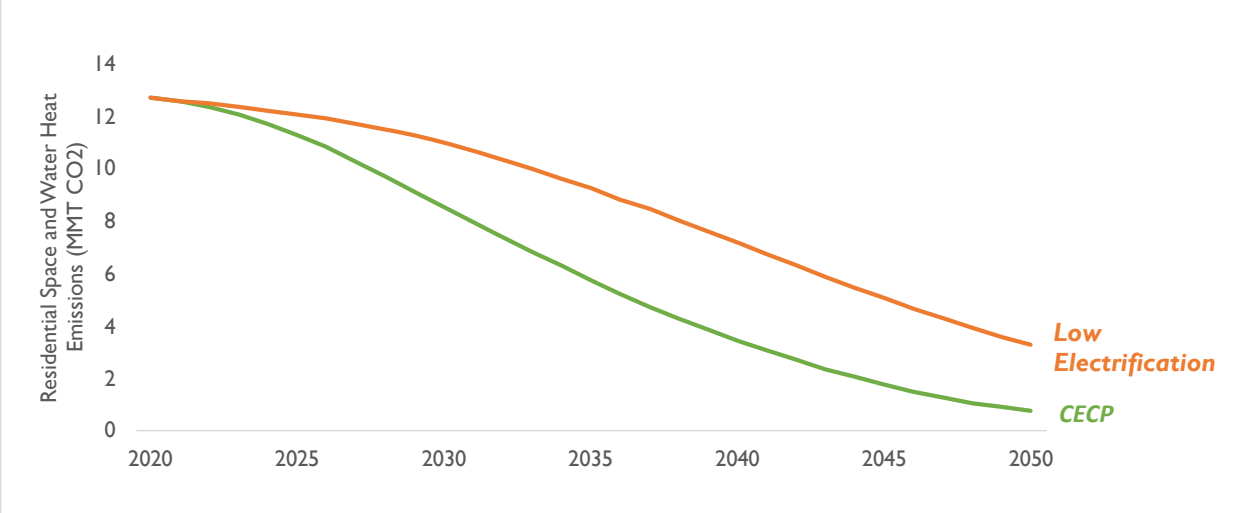


Figure 4 shows the remaining emissions from on-site residential space and water heating in the CECP and low-electrification cases. Note that the low-electrification case emissions in 2050 are 2.5 MMT higher than the CECP case. In order to reduce 2050 residential building sector emissions in the low-electrification 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.

clf
conservation law foundation

For a thriving New England

CLF Massachusetts
62 Summer Street
Boston MA 02110
P: 617.350.0990
F: 617.350.4030
www.clf.org

October 21, 2022

Bethany A. Card, Secretary
Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: **Comments on EEA's proposals for the Clean Energy & Climate Plan for 2050**

Dear Secretary Card:

Conservation Law Foundation ("CLF") appreciates the opportunity to provide comments on the Clean Energy and Climate Plan ("CECP") for 2050.

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 to meet both CLF's mission and the Commonwealth's mandatory net-zero emissions goal by 2050.

It is urgent that EEA take urgent action to ramp down 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 to limit warming to 2 degrees Celsius.[1] As CLF has requested 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

CLF has previously provided extensive comments on sector limits and sub-limits for the 2025/2030 CECP, which are attached to this letter for EEA's convenience and consideration.[2] The 2050 emissions sublimits proposed for 2050 are 86% for transportation, 93% for buildings (residential and commercial), 93% for electricity, and 75% for non-energy and industrial sources.[3] The comments below will focus on those areas which are of particular importance as EEA finalizes the 2050 CECP goals and plan. CLF also endorses the comments submitted today by the Climate Justice Working Group.

Sector-Specific Comments

1. Transportation Sector

- ***Adopt and Maintain Low-Income Fares for the MBTA and RTAs:*** The 2050 CECP should center climate justice in all its policies and efforts, including in the transportation sector. To that end, CLF supports EEA's proposal to prioritize multimodal transportation infrastructure, and further recommends adopting low-income fares for both the MBTA and RTAs. Access to transit is a lifeline for many who have no other means of transportation to reach destinations safely and reliably such as jobs, schools, grocery stores, and healthcare facilities, and will also help the Commonwealth reach its transportation sector emissions reduction goals.

- ***Set Annual Air Pollution Reduction Targets:*** While air pollution comes from various sources, most air pollutants in urban neighborhoods result from local traffic.[4] CLF recommends that the Commonwealth's transportation sector strategy include the identification and reduction of air pollution hotspots and launching air quality monitoring programs for EJ populations that are the most overburdened by air pollution from transportation in the Commonwealth as quickly as possible. After identifying overburdened areas, the Commonwealth should set enforceable annual air pollution improvement targets to ensure that air pollution hotspots achieve significantly improved air quality.

- ***Implement Vehicle Emissions Sales Standards:*** CLF supports EEA's new policy to "Begin to add additional policy incentives to retire old combustion vehicles."[5] In line with this goal, CLF recommends setting clear and enforceable targets in line with the 2022 Climate Bill to ensure that no internal

[2] *See* Exhibit A.
[3] *Clean Energy & Climate Plan for 2050, Limits, Sublimits, Goals & Policie*s: Massachusetts Executive Office of Energy & Environmental Affairs, Public Hearings, at 8 (Oct. 6, 7, and 11, 2022) (hereinafter "2050 CECP Public Hearings") (*Note* estimated annual reductions were 20% for transportation in 2020, 18% for buildings (residential and commercial) in 2020, 54% for electricity in 2020, and 28% for non-energy and industrial sources in 2020).
[4] *Near-Road Air Pollution Pilot Study: Summary Report*, at 7 (2019), UNIVERSITY OF TORONTO FACULTY OF APPLIED SCIENCE AND ENGINEERING, SOUTHERN ONTARIO CENTRE FOR ATMOSPHERIC AEROSOL RESEARCH, https://www.socaar.utoronto.ca/wp-content/uploads/2019/10/SOCAAR-Near-Road-Air-Pollution-Pilot-Study-Summary-Report-Fall-2019-web-Final.pdf.
[5] 2050 CECP Public Hearings, *supra* note 3, at 9.

combustion engine vehicles are sold to any purchaser, public or private, or newly registered, after 2035.[6]

- ***Ensure Electrification of MBTA Buses by 2030 and RTAs and Rail by 2035:*** As mentioned above, CLF supports EEA's proposal to prioritize multimodal transportation infrastructure. As a part of this effort, the 2050 CECP should set clear and enforceable goals for a complete transition to zero-emission buses by the MBTA and other RTAs by no later than 2030. Additionally, the CECP should include complete electrification of rail transportation by 2035. Improvement of multimodal infrastructure should also include improvement and establishment of bus lanes and transit signal priority in congested locations and require consideration of bus lanes and bike access when transportation projects go through the MEPA review process.

- ***Enable Smart Charging Infrastructure and Develop Vehicle to Grid Programs:*** CLF supports EEA's policy to continue building EV charging infrastructure, as well as its new policy to require a commitment to smart charging in EV incentives. As part of this effort, CLF encourages EEA to require utilities to propose alternative rate structures and consumer incentive programs such as time-of-use rates to encourage charging overnight or at other beneficial times. CLF also specifically recommends developing vehicle-to-grid programs for both privately owned vehicles and state fleets.

- ***Create EV Access to High-Occupancy Vehicle Lanes as part of a Congestion Relief Strategy:*** In addition to expanding public transportation to reduce traffic congestion, the 2050 CECP should establish a program allowing EVs access to HOV lanes, in addition to building awareness of existing EV programs and incentives.

- ***Establish Clear Policies to Reduce Disparate Impacts of Biofuels on EJ Populations:*** While CLF supports a Low Carbon Fuel Standard ("LCFS") for transportation fuels, the CECP should specify which fuels qualify. 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 the negative impacts associated with the transportation of biofuels and eliminate potential burdens on EJ populations.

[6] St. 2022, c. 179, § 81(a).

2. Buildings Sector

- ***Ensure and Measure Equitable Participation Rates from EJ Communities:*** The 2050 CECP must center equity and climate justice in the transition to clean heating in the Commonwealth. To do so, the CECP should set annual targets for enrolling low- and moderate-income ratepayers in EJ populations in energy efficiency programs and ensure EJ populations are participating in the transition at comparable rates to other communities in the Commonwealth. The CECP should also direct state funds to this end.

- ***Migrate Mass Save to a Public Administrator Model:*** Mass Save is currently run by utilities throughout the Commonwealth. Other states such as Vermont determined that utility-run energy efficiency plans did not work well for two reasons: (1) the utilities had mixed incentives by having increased profits when they sold more electricity; and (2) it was administratively inefficient for Vermont's utilities to provide programs. The 2050 CECP should migrate Mass Save and other efficiency programs to a public entity to further achieve energy efficiency goals.[7]

- ***Consider subsidies for electrified heating sources and temporarily for electricity rates:*** To ensure a just transition to clean heat, the CECP should direct the Department of Energy Resources to provide education and incentives to electrify low-income customers' homes and, if necessary, subsidize electricity rates for moderate- and low-income customers to offset near-term electricity cost increases.[8]

- ***Set Specific and Measurable Electrification Targets:*** To ensure the Commonwealth is electrifying its buildings sector at a rate capable of reaching the state's GHG emission sublimits, the 2050 CECP should include clear, measurable electrification targets with several benchmarks along the way to assess whether these targets are being met.

- ***Require Reporting of GHG Emissions by Buildings Larger Than 5000 Square Feet:*** For the 2050 CECP to ensure that the greatest emissions reductions are occurring in the least amount of time, CLF recommends that EEA require immediate reporting of GHG emissions by all commercial buildings larger than 5,000 square feet, compared with the 20,000 required by the City of Boston's BERDO 2.0. The CECP should also set interim emission reduction targets for these buildings, requiring them to halve their 2021 emissions by 2030.

[7] *History and Structure*, STATE OF VERMONT PUBLIC UTILITY COMMISSION, https://puc.vermont.gov/energy-efficiency-utility-program/history-and-structure.
[8] Further discussed in a memorandum regarding, *Design of the CECP Policy Approach for Buildings*, prepared by Synapse Energy Economics, Inc. (Feb. 25, 2021).

- ***Phase Out Incentives for Fossil Fuel Heating Systems:*** While the 2050 CECP makes no mention of incentives for fossil fuel heating systems, Mass Save continues to offer Residential Rebates for gas and oil heating systems.[9] To better support the Commonwealth's "dominant building decarbonization strategy"[10] of "electrifying thermal demands,"[11] CLF recommends phasing out these existing rebates for gas and oil heating systems to encourage wide-spread electrification.

- ***Require Gas Utilities and Heating Fuel Providers to Reduce Consumption:*** Under the proposed strategy from the Commission on Clean Heat, MassDEP will develop several regulations to meet emissions limits for residential, commercial, and industrial heating. CLF recommends developing an additional regulation that requires heating fuel providers and gas utilities to reduce fuel consumption to most rapidly meet decarbonization goals.

- ***Incentivize Advanced Controls Heat Pumps and Removal of Fossil Fuel Equipment:*** The 2025/2030 CECP emphasizes the importance of heat pumps as the primary technology to decarbonize.[12] To support this crucial effort, CLF recommends adding incentives to encourage advanced controls of heat pumps and incentivize removing fossil fuel equipment after heat pumps have been installed in the 2050 CECP.

- ***Consider an Emissions Cap on Purchase of Space and Water Heating Systems:*** As the 2050 CECP considers building standards to promote electrification, it specifically states options like a building reporting program and improving the Alternative Energy Portfolio Standard.[13] None of these options create an emissions standard for emissions limits or intensity limit.[14] At this point simply reporting is not enough, and CLF strongly urges the Commonwealth to implement building standards that include emissions caps on the purchase of space and water heating systems.

3. <u>Electricity Sector</u>

- ***Align ISO-NE Actions with Commonwealth Goals:*** The 2025/2030 CECP dedicates an entire strategy to developing and coordinating regional planning and markets, where reforms to these markets are deemed "necessary."[15] This necessity stems from "misalignment" between the current grid and the one needed to achieve New England states' deep decarbonization goals.[16]

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[9] *Residential Rebates and Incentives,* MASS SAVE, https://www.masssave.com/en/saving/residential-rebates/.
[10] *Massachusetts Clean Energy and Climate Plan for 2025 and 2030*, MASSACHUSETTS EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS, at 46 (June 30, 2022) (hereinafter 2025/2030 CECP).
[11] *Id.*
[12] *Id*. at 46-47.
[13] *Id.* at 53.
[14] *Id*.
[15] *Id.* at 66.
[16] *Id.* at 67.

However, the 2050 CECP's solution is missing how the Commonwealth will work with ISO-NE to achieve its goals. CLF recommends that the 2050 CECP include a detailed plan on what the Commonwealth needs from ISO-NE to be satisfied that ISO-NE and the Commonwealth are in alignment toward the Commonwealth's goals. This plan should include a timeline for alignment. Additionally, the 2050 CECP should include how the Commonwealth plans to move toward its decarbonization n goals in the event ISO-NE does not change to align with the Commonwealth's goals.

- ***Properly Account for GHG Emissions from Large Hydro Projects:*** While Massachusetts has helped reduce GHG emissions through the Regional Greenhouse Gas Initiative, further emission reductions are still needed. Some of New England's imported energy is from hydroelectric power, which still emits GHG emissions. The Commonwealth must measure and account for such emissions in its accounting framework in the 2050 CECP.

- ***Include Demand Reduction Strategies:*** The 2025/2030 CECP describes in its pathway analysis on electrification and electric systems that decarbonization will cause evolved electricity use and overall electricity demand to grow.[17] In addressing this issue, it does not include any demand reduction strategies. A wholistic smart plan addressing the evolving electricity sector should include demand reduction strategies.

- ***Support Microgrids/Renewable Energy Cooperatives:*** According to the 2025/2030 CECP the Commonwealth supports advancing policies to reduce the cost of clean energy for low- and moderate-income residents.[18] The 2050 CECP should further this commitment by supporting microgrids and renewable energy cooperatives, which can help provide reliability and make communities more independent.[19]

4. <u>Non-Energy Sectors</u>

- ***Support legislation, amend regulations, and develop additional programs to reduce methane leaks and emissions and set annual emission limits:*** While the 2025/2030 CECP acknowledges that methane is released from natural gas infrastructure and that leaks "are substantial,"[20] EEA merely pointed to existing regulations such as MassDEP's Reducing Methane Emissions from Natural Gas Distribution Mains and Services (310 CMR 7.73).[21] However, regulation 310 CMR 7.73(4) could be amended to require distribution companies to repair gas leaks to achieve zero-emissions. Regulation 310 CMR 7.73(9) could also be amended to establish annual methane limits. The 2050 CECP should support legislation, amend regulations, and implement

[17] *Id.* at 71.
[18] *Id.* at 16.
[19] *How Microgrids Wor*k, DEPT. OF ENERGY (June 17, 2014), https://www.energy.gov/articles/how-microgrids-work
[20] 2025/2030 CECP, *supra* note 10, at 77.
[21] *Id*.

additional programs to reduce methane leaks and retire the gas system infrastructure.

- ***Measure and Monitor Atmospheric Methane Levels:*** The 2025/2030 CECP did not recommend amending regulations to establish annual methane limits for 2025-2030. The 2050 CECP should direct MassDEP to measure and monitor atmospheric methane levels as methane is a powerful GHG gas and is currently being emitted at high-heat waste facilities. These facilities will also continue to emit methane after they are closed due to decaying organic matter.

- ***End attribute market subsidies for high-heat waste facilities:*** The 2025/2030 CECP was an opportunity for EEA to phase out the use of high-heat waste facilities by eliminating attribute markets' subsidies for energy generated through these processes and the seven municipal waste combustors ("MCWs") that are harmful and toxic to residents across the Commonwealth. The 2050 CECP should end attribute market subsidies for MCWs and other high-heat waste facilities.

- ***Phase Out High-Heat Waste Facilities:*** The solid waste sector must be reformed to prohibit and phase out existing high-heat waste facilities. The 2025/2030 CECP made no mention of phasing out high-heat waste facilities. These facilities produce GHG emissions, particulate matter, and ash that harm the public health and environment. The 2050 CECP should acknowledge the role of zero waste practices in conserving energy and ban high-heat waste facilities.

5. <u>Natural and Working Lands</u>

- ***Fund the Healthy Soils Program:*** While the 2025/2030 CECP acknowledges that healthy soil practices prevent carbon losses on agricultural land, EEA did not propose any additional funding to the Massachusetts Coordinated Soil Health Program, which is intended to provide "educational resources and technical and financial assistance to farmers to implement healthy soil practices, such as no- or low-tillage and use of cover crops, that increase carbon storage in our agricultural soils."[22] The Commonwealth also lacks "reliable data on the extent to which healthy soil practices are being implemented on Massachusetts agricultural lands."[23] For 2050, it is imperative that the program is continually funded and more accounting occurs to measure carbon flux on agricultural land.

- ***Clarify which Incentives will exist to help Farmers Adopt and Maintain Farming Practices that Drive Carbon Sequestration:*** Industrial agricultural activities are unsustainable and contribute to soil depletion. EEA should incentivize farmers to implement practices that drive carbon sequestration

[22] *Id*. at 96.
[23] *Id*.

such as integrated pest management, agroecology/agroforestry practices, livestock integration, conservation tillage, etc. While the 2025/2030 CECP acknowledged that farmers are adopting certain practices such as annual cropping systems that combine cover crops and reduce tillage, the preliminary greenhouse gas inventor on Natural and Working Lands reveals that croplands "are emitting 0.3 MMTOC2 per year more than they are sequestering."[24] For 2050, EEA should clarify the incentives that will exist for farmers to engage in the MA Coordinated Soil Health Program to implement healthy soil practices.[25]

- ***Prioritizing Environmental Justice Populations:*** While the 2025/2030 CECP made great strides in protecting natural and working lands with the implementation of the no-net loss policy, EEA could have taken a stronger stance towards protecting natural and working lands and prioritized environmental justice communities. The 2050 CECP should:

    - (1) *Require consultations with environmental justice populations before approving development near natural and working lands within these communities*.
    - (2) *Highlight the critical role wetlands play as storm surge buffers for communities of color and low-income communities*.

- ***Protect more Natural and Working Lands by 2030:*** EEA set a goal of protecting 28% of natural and working lands by 2025 and 30% by 2030. Massachusetts has already protected 27% of natural and working lands.[26] More ambitious goals could be set for 2030, 2040, and 2050 to adequately ensure that natural and working lands are protected and to protect these ecosystems' important carbon capacity storage in the 2050 CECP.

- ***Ensure the Use of Carbon Offsets is Fair:*** EEA must develop a sequestration accounting and marketing framework for 2050 and ensure that the market is diverse, fair, and competitive by lowering barriers for minority-owned businesses.

- ***In-state Carbon Sinks to Offset Emissions Should Be Minimal:*** The use of carbon sinks to offset emissions that are not able to be avoided by 2050 will help Massachusetts reach its climate mandates. The 2050 CECP should ensure that offsets should only be utilized for emissions that are functionally impossible to eliminate, and should primarily be assigned by EEA, with market-based compliance solutions avoided to the extent possible. Offsets should also be verified from in-state carbon sinks.

[24] *Id*. at 90.
[25] *Id*. at 97.
[26] *Losing Ground; Nature's Value – Key Findings*, MASS AUDUBON, https://www.massaudubon.org/our-conservation-work/policy-advocacy/shaping-climate-resilient-communities/publications-community-resources/losing-ground/key-findings.

- ***Ensure carbon sinks are real, verified, and permanent:*** Any carbon sink which is included in the Commonwealth's accounting must be real, verified, and permanent in the 2050 CECP. EEA should ensure that carbon sequestration occurred at the carbon sinks (real), the carbon sinks are "recorded, monitored and tracked by a reputable, impartial entity"[27] (verification), and that the carbon sinks be protected and not deforested or developed over (permanent).

CLF appreciates EEA's commitment to meeting the Commonwealth's GHG emission reduction goals by establishing appropriate sub-limits and accompanying plans for the 2050 CECP. Thank you for your attention to this matter and for your consideration of these comments.

Annika Hellweg
Conservation Law Foundation
62 Summer Street, Boston, MA 02110
Phone: (617) 850-1774
Email: ahellweg@clf.org

Caitlin Peale Sloan
Conservation Law Foundation
62 Summer Street, Boston, MA 02110
Phone: (617) 850-1770
Email: cpeale@clf.org

Anxhela Mile
Conservation Law Foundation
62 Summer Street, Boston, MA 02110
Phone: (617) 850-1736
Email: amile@clf.org

Clare Soria
Conservation Law Foundation
62 Summer Street, Boston, MA 02110
Phone: (617) 350-0990
Email: csoria@clf.org

[27] Elisabeth A. Stanton, Bryndis Woods, *Comments on Massachusetts Decarbonization Roadmap*, Applied Economics Clinic White Paper (April 2020).

October 21, 2022

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

Feedback on Massachusetts Clean Energy and Climate Plan for 2050

Dear Secretary Card,

The Coalition for Renewable Natural Gas (RNG Coalition) submits the following comments for consideration by the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) in developing the Commonwealth's plan to reach net zero emissions across the economy in 2050.[1]

We commend Massachusetts' extensive work in establishing ambitious climate and environmental goals, the recognition that energy regulations and infrastructure must undergo significant changes to achieve those goals, and the thoughtful work by EEA alongside other agencies and stakeholders under the 2030 plan and other parallel initiatives.

RNG Coalition's goal in this filing is to provide context around the long-standing, science-based conclusions regarding the impact of biogas and RNG; aggregate and describe the role of renewable gas as concluded by jurisdictions and organizations leading on climate change policy; and to outline a fact-based role for RNG based on these conclusions. We hope that the following comments from our Coalition will support Massachusetts' efforts in going further in outlining a comprehensive vision for the near- and long-term sustainable production and use of renewable gases as a key tool toward the Commonwealth's climate and other environmental goals.

Sincerely,

/s/

Sam Wade
Director of Public Policy
Coalition for Renewable Natural Gas
1017 L Street #513
Sacramento, CA 95814
(916) 588-3033
sam@rngcoalition.com

[1] https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2050

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Renewable Gas is a Fundamental Part of the Solution to Climate Change

The Role of Renewable Gas in Decarbonization

Renewable gases, including renewable natural gas[2] (RNG) and renewable hydrogen, are an important near-term decarbonization strategy for all applications which currently utilize fossil-derived fuels and, in the long-term, renewable gas use will be necessary in applications that have certain reliability requirements, or which are not well-suited to electrification.[3]

Incorporating the use of renewable gases as part of Massachusetts' climate change mitigation strategy will result in compound benefits through (1) the displacement of anthropogenic carbon dioxide (CO_2) emissions from the combustion of fossil fuels, (2) the critical near-term greenhouse gas (GHG) benefits of increased methane capture and destruction, and (3) additional environmental benefits that result from the improved management of organic waste.

To achieve these outcomes, Massachusetts should target the development of renewable gases in tandem with the other technologies that will be required to fully decarbonize the Commonwealth.[4] RNG should be given significant attention in the near-term, based on both the well-proven technology readiness level of various methods of making RNG today—such as Anerobic Digestion (AD)—and the flexibility provided by RNG's fungibility with all conventional gas applications.

In the mid- to long-term, hydrogen produced from renewable feedstocks such as clean electricity and waste biomass should also be viewed as an essential part of Massachusetts' renewable gas mix. In a similar manner to RNG, waste-biomass-derived hydrogen is poised to contribute to Massachusetts' circular bioeconomy as a pathway for recycling resources which are not suitable for AD. Furthermore, the use of carbon capture and sequestration (CCS) technologies such as geologic storage or biochar will produce negative-GHG outcomes when paired with RNG and hydrogen derived from waste biomass. These technologies will provide a necessary pathway to *remove* emissions from the atmosphere,[5] creating an important pathway to carbon neutrality and, ultimately, carbon negativity.

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[2] Sometimes called biomethane or refined biogas.

[3] Bataille et al., *A Review of Technology and Policy Deep Decarbonization Pathway Options for Making Energy-Intensive Industry Production Consistent with the Paris Agreement.* https://www.sciencedirect.com/science/article/abs/pii/S0959652618307686

[4] Including, for example, end-use electrification and geothermal resources. RNG Coalition does not oppose electrification or deployment of any other low-GHG technology.

[5] Sequestration of the biogenic carbon contained in waste feedstocks from RNG and biomass-derived renewable hydrogen can be a carbon-negative process that removes carbon from the atmosphere. This benefit is separate from the methane destruction potential of RNG, which can lead to additional carbon-negative outcomes on a lifecycle basis relative to existing environmental control baselines.

Over time, these resources can be directed toward the end-uses which are best served by the use of gaseous fuels, serving in tandem with technologies that require time to scale and achieve production cost reductions (e.g., electrolytic hydrogen, heavy duty electric vehicles) or that involve the turnover of long-lived capital stock (e.g., electrification of building space and water heating).

The portion of renewable gas serving Massachusetts' gas system will increase even as total system throughput declines, eventually leading to a smaller gas system which transports only 100% clean fuels[6] to targeted end uses. Given expected declines in gas system throughput, the use of renewable gas need not lead to net pipeline expansion, beyond connecting these new supply sources to existing load.

Further, many long-term studies of decarbonization agree that the use of renewable gases is essential but disagree about which sector will most need RNG to decarbonize in the long run.[7] Because of these facts, in these comments we attempt to articulate a nimble vision of how RNG in Massachusetts can best help with decarbonization in the near-, mid-, and long-terms as shown in Figure 1.

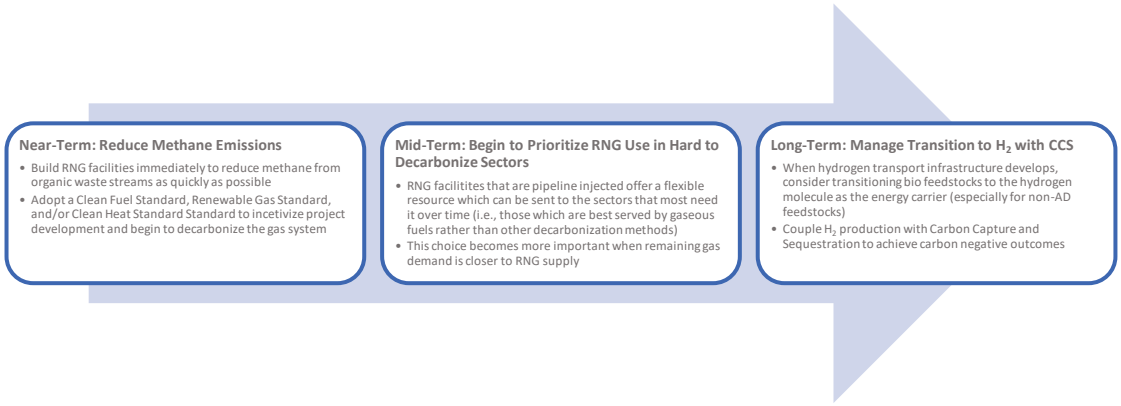

Figure 1. Priorities for RNG Deployment Will Likely (and Should) Shift Over Time

Navigating these complex but necessary changes will require state agencies, utilities, and other stakeholders to fully consider all possible renewable gas end-uses in the near-term, and to develop a framework to determine what end-uses may be most appropriate in the mid- to long-term. As outlined below, based on existing policies and consensus surrounding gas decarbonization strategy in other jurisdictions, we believe that Massachusetts should

[6] https://www.nationalgrid.com/document/146251/download

[7] WRI 2020, Renewable Natural Gas as a Climate Strategy: Guidance for State Policymakers https://static1.squarespace.com/static/53a09c47e4b050b5ad5bf4f5/t/60ad57a35aaa6563fbc3e508/1621972901032/2020_Dec+World+Resources+Institute_Renewable-natural-gas-climate-strategy.pdf

incorporate a Renewable Gas Standard (RGS) or Clean Heat Standard (CHS) as part of a broad gas decarbonization strategy.

Reducing Methane Emissions and Improving Organic Waste Management

Complementary to their role as a method of zero-fossil-carbon energy supply, RNG and other waste-derived resources are unique in their near-term ability to reduce methane—a short-lived climate pollutant that, when assessed over a 20-year timeframe, is up to 80 times as potent as a greenhouse gas as carbon dioxide[8]—and to serve as a catalyst for improving organic waste management practices.

Society's waste streams create significant methane that must be dealt with quickly. Using this methane from organic wastes productively as a resource, rather than flaring it, provides greater impetus toward implementing and improving methane capture and organic waste management systems. The need to target methane emissions immediately as part of any GHG reduction strategy is substantiated by leading organizations focused on climate change mitigation, including the Intergovernmental Panel on Climate Change (IPCC), as described below.

As shown in Figure 2, comparing the International Energy Agency's (IEA) estimated cost of reducing methane emissions through the creation of RNG[9] to the Social Cost of Carbon (SCC) assessed by New York,[10] RNG is likely to be a cost-effective GHG reduction strategy. In this example, New York serves as a helpful comparison for Massachusetts being the only neighboring state with similar diversity in urban and rural areas that has developed a SCC.[11] However, there is reason to believe that New York's SCC estimate may undervalue the benefits of GHG reduction. A recent article published in *Nature* provides a preferred mean estimate of $185 per ton of CO_2, which takes into account recommendations from the National Academies of Sciences, Engineering, and Medicine.[12]

Inclusion of methane reduction benefits in such a calculation is important. Factoring methane capture and destruction into the lifecycle GHG impact shows the true cost-effectiveness of RNG facilities, even using a 100-year GWP. Comparatively, using a 20-year GWP, which is more consistent with the timeframe under which we must reduce GHG emissions to address climate

[8] The Global Warming Potential for non-fossil methane is 27 on a 100-year basis and 80 on a 20-year basis according to the most recent IPCC assessment. See Table 7.15 directly from Chapter 7.6 of the Sixth Assessment Report (Working Group 1: The Physical Science Basis).
https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07.pdf

[9] https://iea.blob.core.windows.net/assets/03aeb10c-c38c-4d10-bcec-de92e9ab815f/Outlook_for_biogas_and_biomethane.pdf

[10] New York estimates that the societal benefit of reducing one ton of carbon dioxide is $125 per ton (lower central discount rate, for a 2020 reduction): https://www.dec.ny.gov/regulations/56552.html

[11] https://costofcarbon.org/states

[12] Rennert et Al, *Comprehensive Evidence Implies a Higher Social Cost of CO_2*
https://www.nature.com/articles/s41586-022-05224-9

change,[13] would further and significantly increase this cost effectiveness given the outsized impact of addressing methane emissions.

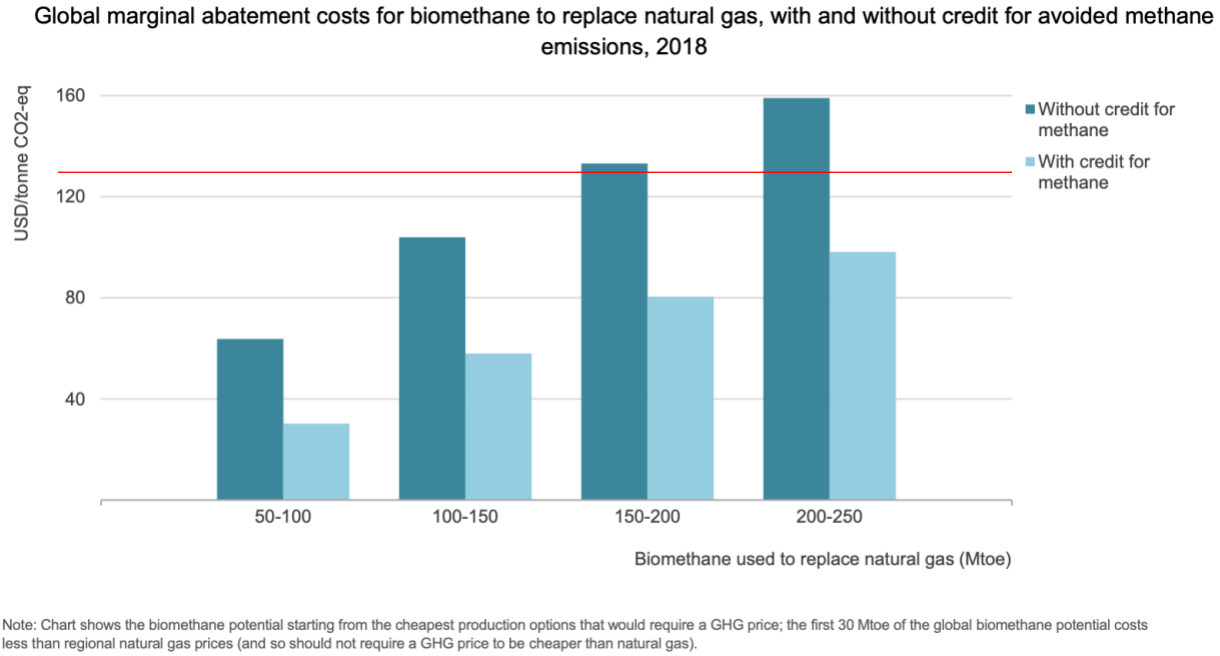

Figure 2. Comparing the IEA's Biomethane Abatement Costs to New York's Social Cost of Carbon (red line), most RNG is cost effective even using 100-year GWPs. Recognizing methane benefits (especially if using 20-year GWP) helps improve cost effectiveness further.

In creating a policy framework designed to improve the GHG performance of the organic waste sector it is important to consider that, globally, municipal solid waste is expected to grow 69% from 2.01 billion metric tons (BT) in 2018 to 3.4 BT in 2050 (around 50% of which is organic waste).[14] Moreover, these trends are underpinned by an expected 25% population increase of 2 billion people between now and 2050.[15] Considering the Commonwealth's ambitious GHG reduction goals, Massachusetts needs to help pioneer the development and commercial deployment of viable technologies to address these challenges.

The Food Recovery Hierarchy developed by the United States Environmental Protection Agency (U.S. EPA), which ranks industrial use—inclusive of conversion to energy through anaerobic digestion—as the 4th highest use after source reduction and repurposing edible food to humans and animals.[16]

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[13] Sam Abernethy and Robert B Jackson, *Global Temperature Goals Should Determine the Time Horizons for Greenhouse Gas Emission Metrics*, 2022 Environ. Res. Lett. 17 024019 https://iopscience.iop.org/article/10.1088/1748-9326/ac4940/pdf

[14] https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

[15] https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html

[16] https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy

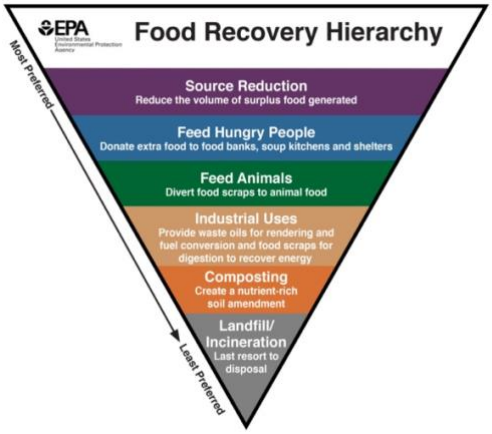

Figure 3. U.S. EPA Food Recovery Hierarchy

RNG production through anaerobic digestion of materials such as food waste, animal manure, and wastewater also yields valuable by-products. After the elimination of pathogens, digested solids can be recycled for productive uses such as animal bedding,[17] and AD converts nutrients into a form more accessible by plants than raw manure, allowing for an effective organic fertilizer.[18] Processing digestate using pyrolysis and other technologies to create biochar is also an option, resulting in a soil amendment which supports plant growth, can eliminate harmful perfluoroalkyl and polyfluoroalkyl substances (PFAS), and can achieve carbon-negative outcomes. Overall, recycling and using the by-products of waste through AD for RNG production processes creates a more environmentally responsible and sustainable circular economy.

Massachusetts should develop a plan with accounts for the benefits of replacing geologic natural gas, utilizing existing natural gas infrastructure, and the long-term need for gaseous thermal resources in certain sectors. Furthermore, stakeholders must be clear as to what policies or strategies will be used to promote methane capture from these sources if RNG is not incented. Simply requiring organic waste aggregators to capture and flare emissions is not a good outcome from a local criteria pollutant perspective, and will not incent methane capture to the fullest extent possible. Studies from both U.S. EPA[19] and the California Air Resources Board (CARB)[20] have shown that pipeline injection of biomethane reduces criteria air pollutants both on site (relative to a case where the biogas is flared or used in most on-site power generation equipment) and on a lifecycle basis (with additional emission reductions possible depending on end use).[21]

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[17] U.S. EPA. *The Benefits of Anaerobic Digestion* (2020, August 18) https://www.epa.gov/agstar/benefits-anaerobic-digestion

[18] Id.

[19] https://nepis.epa.gov/Exe/ZyPDF.cgi/P100QCXZ.PDF?Dockey=P100QCXZ.PDF

[20] https://ww2.arb.ca.gov/sites/default/files/2020-07/dairy-emissions-matrix-113018.pdf

[21] For example, when low-NOx natural gas vehicles displace emissions from diesel vehicles.

As described in further detail below, Massachusetts stakeholders should incorporate a RGS or CHS as part of the Commonwealth's decarbonization strategy. Jurisdictions leading the way[22] on GHG reduction have implemented such programs as part of their strategy for simultaneously decarbonizing the energy and organic waste sectors.

RNG Supply Potential

Based on a 2019 study conducted by ICF which outlines the supply potential for RNG in the United States,[23] we estimate that RNG from AD feedstocks will be able to supply at least 1,425.3 tBtu/year by 2040.[24] Based on U.S. natural gas consumption in 2021, this would cover approximately 30.6% of residential demand, 43.7% of commercial demand, or 17.4% of industrial demand nationally.[25]

Extensive capital stock exists in Massachusetts that is designed to transport and consume gaseous fuels, and which possesses a significant remaining useful life. Conventional natural gas is currently Massachusetts' largest single source of energy, accounting for 31.3% of total energy consumption in the state—including 30% of commercial sector use, 33% of industrial sector use, and 29% of residential use.[26] ICF estimates that Massachusetts' potential to produce RNG from anaerobic digestion sources (landfills, animal manure, wastewater treatment, and food waste) is on the order of 7.2-11.824 tBtu/year.[27] This supply potential could satisfy 10% of residential demand, 11% of commercial demand, or 26% of industrial demand.

Although the RNG industry's focus has traditionally been limited to feedstocks which are well-suited to AD, it is also important to consider the additional potential of RNG produced via gasification of feedstocks such as agricultural residue, forestry and forest product residue, and

[22] Jurisdictions which have historically been leaders in climate and environmental policy—such as California, Oregon, Washington, Canada, and the EU—have policies in place to promote renewable gases as part of their waste management and GHG reduction strategies.

[23] ICF, *Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment.*

https://gasfoundation.org/wp-content/uploads/2019/12/AGF-2019-RNG-Study-Full-Report-FINAL-12-18-19.pdf

[24] Based conservatively on the "High" production scenario, using landfill gas, animal manure, wastewater, and food waste feedstocks.

[25] https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm

[26] EIA estimates Massachusetts' 2020 total energy consumption by type here, 2020 commercial and industrial energy consumption here, and 2020 total natural gas use by sector here. Note that values are approximate due to variations between data sets.

[27] American Gas Foundation, *Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment*, 2019 https://gasfoundation.org/wp-content/uploads/2019/12/AGF-2019-RNG-Study-Full-Report-FINAL-12-18-19.pdf

energy crops. According to the ICF study, New England's gasification feedstocks (excluding MSW) have the potential to add 7.9 tBtu/yr to RNG supply.[28]

Although gasification/pyrolysis feedstocks do not have the benefit of capturing and reducing methane emissions, potential benefits incentivizing the improved management of these feedstock streams deserves additional attention. In California, for example, the recently enacted RNG mandate requires the development of pilot gasification facilities for forestry waste as a wildfire control mechanism. Furthermore, potential energy crops should not be dismissed without additional analysis on a feedstock-by-feedstock basis. Research by the Climate and Applied Forest Research Institute at the State University of New York's College of Environmental Science and Forestry,[29] suggests that feedstocks such as willow can sequester more carbon in the soil than emitted over the plants' lifetime, potentially leading to carbon-negative outcomes even before the employment of CCS. Despite the need for more caution with gasification/pyrolysis feedstocks,[30] if incentivized carefully these resources have the potential to drive numerous environmentally beneficial outcomes throughout Massachusetts' and New England's bioeconomy.

Finally, when determining the total potential for RNG in Massachusetts, DPU should consider using the Commonwealth's population-weighted share of regional RNG resources that could be imported. Massachusetts' gas demand is currently served by pipelines which transport conventional natural gas, extracted in other states, many miles. While some parts of the gas infrastructure are slated to decline, these larger transport arteries will need to be maintained to support fossil natural gas use for some time, and could eventually transport 100% clean fuels as part of a smaller gas system. For example, ICF estimates that nationally, in a "High" production scenario, states east of the Mississippi River[31] could produce 756.1 tBtu/y from AD feedstocks and 582.1 tBtu/y from gasification feedstocks (excluding MSW) in 2040.

Studies and Existing Programs Highlighting Capturing Methane from Organic Wastes Streams with Productive Energy Use as a Key Near-term Climate Strategy

The complementarity of RNG and renewable hydrogen with other decarbonization strategies—such as electrification and energy efficiency—is well-substantiated by climate change mitigation studies and strategies conducted in various states, as well as by leading universities, government entities, and environmental organizations.

[28] In the "High" scenario, representing the middle resource availability case, pg. 20.
[29] http://cafri-ny.org/wp-content/uploads/2021/01/Greenhouse-Gas-Balance-of-Willow.pdf

[30] We understand and appreciate the concerns of environmental groups related to intentionally creating methane through biomass gasification and agree that it is especially important to employ strong lifecycle accounting for such projects to guard against pathways that would produce a high-carbon outcome.

[31] Including the New England, Middle Atlantic, South Atlantic, East North Central, and East South Central regions.

Massachusetts' broader energy and waste decarbonization strategies should include renewable gases in a manner that reflects the most current thinking and best modeling of pathways to reach carbon neutrality by 2050 while also remaining focused on the need to drive substantial near-term GHG reductions. The following are leading examples of studies outlining the role of RNG in economywide decarbonization, all of which substantiate the necessity of including renewable gases in strategies that reach deep GHG cuts.

Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) calls methane capture and recovery from solid waste management "a short-term 'win-win' policy that simultaneously improves air quality and limits climate change."[32] Furthermore, the 2021 IPCC Working Group I report recommends that "strong, rapid, and sustained reductions in CH_4 emissions" should be a first priority for policymakers.[33]

In its most recent approved draft report on GHG mitigation, entitled *Climate Change 2022, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change,*[34] the IPCC states that:

> *"Because some applications (e.g., aviation) are not currently amenable to electrification, it is anticipated that 100% renewable energy systems will need to include alternative fuels such as hydrogen or biofuels."* Page TS-54

> *"Several biomass conversion technologies can generate co-benefits for land and water. Anaerobic digestion of organic wastes (e.g., food waste, manure) produces a nutrient-rich digestate and biogas that can be utilised for heating and cooking or upgraded for use in electricity generation, industrial processes, or as transportation fuel. The digestate is a rich source of nitrogen, phosphorus and other plant nutrients, and its application to farmland returns exported nutrients as well as carbon."* Page 12-102, line 36 (citations removed)

> *"Scaling up bioenergy use will require advanced technologies such as gasification, Fischer-Tropsch processing, hydrothermal liquefaction (HTL), and pyrolysis. These pathways could deliver several final energy carriers starting from multiple feedstocks, including forest biomass, dedicated cellulosic feedstocks, crop residues, and wastes."* Page 6-40, line 7

[32] See page 6-91 of: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_06.pdf

[33] https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf, pg. 27

[34] https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf

> *"Most production routes for biofuels, biochemicals and biogas generate large side streams of concentrated CO_2 which is easily captured, and which could become a source of negative emissions."* Page 11-32, line 12

Environmental Protection Agency

The U.S. EPA has long supported biogas recovery for use as RNG under programs such as the Landfill Methane Outreach Program (LMOP),[35] AgSTAR,[36] and the Renewable Fuel Standard.[37] The LMOP website, for example, notes the benefits of RNG as a resource which utilizes existing infrastructure, supports local economies, provides local air quality benefits compared to fossil fuel resources such as diesel and conventional natural gas, and reduces GHG emissions through methane destruction and fossil fuel displacement. In the agricultural sector AgSTAR has, for more than 20 years, promoted covered lagoons and digesters as the top solutions for manure management.[38] More recently, EPA added Renewable Natural Gas as an explicit opportunity within the Methane Challenge program, noting that, "as a substitute for natural gas, RNG has many end-uses, including in thermal applications, to generate electricity, for vehicle fuel, or as a bio-product feedstock."[39]

Canada

Canada has made several climate commitments backed by concrete plans and policies. They have stated that:

> *"To meet our new 2030 and 2050 net-zero goals, Canada's economy will need to be powered by two equally important energy sources—clean power and clean fuels. Electrification—clean power—provides a near-term pathway for emissions reductions in many sectors including personal transport and the built environment. But clean fuels (low-carbon fuels that typically consist of clean hydrogen, advanced biofuels, liquid synthetic fuels, and renewable natural gas) are expected to play a critical role in 'hard-to-decarbonize' sectors such as industry and medium- and heavy-duty freight.*

[35] https://www.epa.gov/lmop/renewable-natural-gas

[36] https://www.epa.gov/agstar

[37] https://www.epa.gov/renewable-fuel-standard-program

[38] https://www.epa.gov/sites/default/files/2019-09/documents/epa_non-co2_greenhouse_gases_rpt-epa430r19010.pdf

[39] https://www.epa.gov/system/files/documents/2022-05/MC_BMP_TechnicalDocument_2022-05.pdf

Even in a scenario with ambitious electrification, it is estimated that 60 percent or more of national energy demand in 2050 could need to be met with clean fuels to meet a net-zero goal."[40]

In its 2030 Emissions Reduction Plan released on March 29, 2022, the Government of Canada adds that economy-wide strategies to reduce GHG emissions, inclusive of clean fuels and methane emissions reduction, will enable Canada to meet its climate targets in the most flexible and cost-effective way.[41]

Canada also has strong methane emission reduction targets. In November 2021, Canada joined the Global Methane Pledge, which has been signed by over 100 countries, to reduce anthropogenic methane emissions across all sectors by at least 30% below 2020 levels by 2030. The measures outlined in the 2030 Emissions Reduction Plan may result in a reduction in waste-sector GHG emissions of 49% by 2030 against 2005 levels.[42]

European Union

Europe has long supported RNG under the broad Renewable Energy Directive (RED) framework.[43] Recent revisions known as the "Hydrogen and Decarbonized Gas Package"[44] reinforce support for renewable gases as a key greenhouse gas reduction strategy in the context of RED updates and the "Fit for 55"[45] strategy, which is essentially the EU's Scoping Plan analogous process.

Individual European Union member states have very high biomethane blend rates. For example, Denmark's proportion of RNG injected into its system was almost 25% of total demand as of the end of 2021. Denmark hopes to be able to meet 75% of its gas demand from RNG by 2030. By 2034, RNG production is expected to cover all Danish gas consumption on an annual basis.[46]

Russia's recent military aggression against Ukraine has massively disrupted Europe (and the world's) energy system. It has caused hardship due to high energy prices and it has heightened energy security concerns, bringing to the fore the EU's over-dependence on gas, oil, and coal

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[40] Natural Resources Canada, "Clean fuels – fueling the future," 2022. https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/clean-fuels-fueling-the-future/23735

[41] Environment and Climate Change Canada, *2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy* (2022), page 23 (pdf page 25). https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/erp/Canada-2030-Emissions-Reduction-Plan-eng.pdf

[42] Ibid, page 90 (pdf page 92)

[43] https://www.europeanbiogas.eu/renewable-energy-legislation/#:~:text=In%20general%2C%20the%20Directive%20is,border%20trade%20of%20biomethane%20easier

[44] https://ec.europa.eu/commission/presscorner/detail/en/ip_21_6682

[45] https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/

[46] https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/011022-denmark-hikes-proportion-of-biogas-in-grid-to-25-grid-operator

imports from Russia. As a result, on March 8, 2022, the European Commission called for a rapid phase out of Russian fossil fuels and an acceleration of the European Green Deal in its Communication "REPowerEU: Joint European Action for More Affordable, Secure and Sustainable Energy".[47] This action plan calls for Europe achieving 35 billion cubic meters (bcm) of annual RNG production by 2030. The European Biogas Association states that this target represents over 20% of the current EU gas imports from Russia and that by 2050, this potential can triple, growing to well over 100 bcm and covering 30-50% of the future EU gas demand.[48] The EU has also joined the Methane Pledge targeting a 30% reduction by 2030.[49]

International Energy Agency

The International Energy Agency's (IEA) *Net Zero by 2050* report from May 2021 projects that, to reach carbon neutrality, global RNG use needs to increase seven times from 2020 levels by 2030 and over 27 times 2020 levels by 2050, leading to a blend rate in gas networks of above 80%. The report also notes that a key advantage of RNG is ability to "use existing natural gas pipelines and end-user equipment",[50] continuing that "[t]he share of low-carbon gases (hydrogen, biomethane, synthetic methane) in gas distributed to buildings rises from almost zero to 10% by 2030 to above 75% by 2050",[51] and that "[g]overnments should prioritise the co-development of biogas upgrading facilities and biomethane injection sites by 2030, ensuring that particular attention is paid to minimizing fugitive biomethane emissions from the supply chain."[52] These statements surrounding the timeline and trajectory for RNG development and use align with our vision for the future of the RNG industry in Massachusetts and North America.

California

In May 2022 the California Air Resources Board (CARB) released their Draft 2022 Scoping Plan,[53] which outlines the state's pathway to carbon neutrality by 2045—one of the most ambitious GHG reduction targets put forth by any jurisdiction in the world. The plan identifies increasing methane capture at landfills and dairy digesters as a key GHG abatement strategy. Specifically, strategies for the dairy and livestock sector include, "[Installing] state of the art anaerobic digesters that maximize air and water quality protection, [maximizing] biomethane capture,

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[47] https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_3132

[48] https://www.bioenergy-news.com/news/biomethane-will-deliver-20-of-current-eu-gas-imports-from-russia-by-2030/

[49] https://www.state.gov/joint-u-s-eu-statement-on-the-global-methane-pledge/

[50] Id., pg. 78

[51] Id., pg. 146

[52] Id., pg. 112

[53] https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents

and [directing] biomethane to sectors that are hard to decarbonize or as a feedstock for energy".[54] Strategies for reducing methane emissions include, "[maximizing] existing infrastructure and [expanding] it to reduce landfill disposal, with strategies including composting, anaerobic digestion, co-digestion at wastewater treatment plants, and other non-combustion conversion technologies."[55]

California's strategy also includes the use of RNG across different sectors. In the buildings sector, for example, "This transition must include the goal of trimming back the existing gas infrastructure so pockets of gas-fueled residential and commercial buildings do not require ongoing maintenance of the entire limb for gas delivery. Blending low-carbon fuels, such as hydrogen and biomethane, into the pipeline further displaces fossil gas".[56] In the industrial sector, "Decarbonizing industrial facilities depends upon displacing fossil fuel use with a mix of electrification, solar thermal heat, biomethane, low- or zero-carbon hydrogen, and other low-carbon fuels to provide energy for heat and reduce combustion emissions".[57] And finally, in the transportation sector, "In addition to building the production and distribution infrastructure for zero-carbon fuels, the state must continue to support low-carbon liquid fuels during this period of transition and for much harder sectors for ZEV technology such as aviation, locomotives, and marine applications. Biomethane currently displaces fossil fuels in transportation and will largely be needed for hard-to-decarbonize sectors but will likely continue to play a targeted role in some fleets while the transportation sector transitions to ZEVs".[58]

California's Integrated Energy Policy Report (IEPR) is the California Energy Commission's (CEC) leading document aimed at comprehensively addressing the state's evolving energy trends in the context of climate change and other environmental issues. CEC 2021 IEPR Volume III was entitled *Decarbonizing the State's Gas System*.[59] This document recognizes the role renewable gas can play in decarbonization of the gas system and encourages the use of renewable gases to achieve a variety of important environmental benefits. Notably, the report states that "there is increasing awareness that to fully decarbonize the gas system, there is a need for clean fuels or molecules in addition to clean electricity." The hydrogen section of the report also acknowledges that renewable organic waste feedstocks can be used to produce renewable hydrogen in a beneficial manner.

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[54] Id., pg. 214

[55] Id., pg. 216

[56] Id., pg. 197

[57] Id., 192

[58] Id, 179

[59] California Energy Commission, *2021 Integrated Energy Policy Report, Volume III: Decarbonizing the State's Gas System*

https://efiling.energy.ca.gov/GetDocument.aspx?tn=242233

Columbia University

Columbia University's School of International and Public Affairs Center on Global Energy Policy conducted a study[60] focused on the use of the existing gas system in a carbon neutral world. Notably, the authors state that:

> *"[R]etrofitting and otherwise improving the existing pipeline system are not a choice between natural gas and electrification or between fossil fuels and zero-carbon fuels. Rather, these investments in existing infrastructure can support a pathway toward wider storage and delivery of cleaner and increasingly low-carbon gases while lowering the overall cost of the transition and ensuring reliability across the energy system. In the same way that the electric grid allows for increasingly low-carbon electrons to be transported, the natural gas grid should be viewed as a way to enable increasingly low-carbon molecules to be transported."*

World Resources Institute

The role of RNG as a decarbonization strategy was also recently examined by the World Resources Institute, who published a paper illustrating how RNG fills an important niche as part of a broader low-carbon technology portfolio.[61] The authors state that:

> *"RNG has the potential to reduce methane emissions from organic wastes and provide fuel for applications that lack other low-carbon alternatives, such as heavy-duty freight or existing building and industrial heat sources."*
>
> *"The report emphasizes the importance of considering RNG as a complementary fuel in applications where natural gas or other energy sources are currently used. In this way, RNG can be seen as a flexible, low-carbon fuel source that can potentially be deployed in a variety of applications, even as other vital strategies such as electrification are pursued in parallel."*

Furthermore, WRI's analysis *How Methane Emissions Contribute to Climate Change* identifies "improving efficiency [in agricultural production practices, including manure management]",

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[60] Blanton et. Al, *Investing in the US Natural Gas Pipeline System to Support Net-Zero Targets* https://www.energypolicy.columbia.edu/research/report/investing-us-natural-gas-pipeline-system-support-net-zero-targets?utm_source=Center+on+Global+Energy+Policy+Mailing+List&utm_campaign=38d4ab05a7-EMAIL_CAMPAIGN_2019_09_24_06_19_COPY_01&utm_medium=email&utm_term=0_0773077aac-38d4ab05a7-102456873

[61] World Resources Institute, *Renewable Natural Gas as a Climate Strategy: Guidance for State Policymakers.*

https://www.wri.org/publication/renewable-natural-gas-guidance

"separating organics and recycling", and "capturing landfill gas and reducing energy" as key methane abatement strategies. [62]

Modeling of Pathways to Carbon Neutrality

At this time, we believe New York to be the best example of a nearby state which is considering similar changes to its energy delivery system in the context of climate change. The analysis conducted for New York by the consulting firm Energy and Environmental Economics' (E3) in June of 2020 identified switching to low-carbon fuels as one of the four pillars of decarbonization "critical to achieving carbon neutrality" in New York State, with scenarios including an 8-18% pipeline blend of RNG,[63] showing widespread RNG use across sectors. This is consistent with E3's high-electrification scenarios conducted in other jurisdictions, which show significant demand for gaseous fuels remaining in 2050.[64]

The New York City Mayor's Office of Sustainability, in collaboration with Con Edison and National Grid, published a study outlining three pathways by which New York City can achieve carbon neutrality by 2050.[65] All three pathways in the report—including the pathway with highest electrification—outlined the use of renewable gases as an essential part of this goal. Even in the case where it is possible to convert approximately 60% of New York City's building stock to all-electric applications by 2050, this study shows that RNG has a role to play. A key finding applicable to all scenarios was that, "in addition to providing a solution for buildings that do not electrify, a low carbon gas network improves overall system reliability by offering optionality and flexibility within the energy system."[66]

This key framing of the role of RNG in the above New York analyses is consistent with studies conducted for other jurisdictions—including California,[67] Minnesota,[68] Oregon and

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[62] https://www.wri.org/insights/methane-gas-emissions-climate-change

[63] See slide 5 of E3's "New York State Decarbonization Pathways Analysis," presented to the Climate Action Council on June 24, 2020. https://climate.ny.gov/-/media/Project/Climate/Files/2020-06-24-NYS-Decarbonization-Pathways-CAC-Presentation.pdf

[64] For an example from other similar E3 work, see pg. 35 of the California Energy Commission report entitled *The Challenge of Retail Gas in California's Low Carbon Future,* which finds that natural gas in California's residential, commercial, and industrial sectors is still ~1,000 tBtu in 2050 in the high-building-electrification case: https://ww2.energy.ca.gov/2019publications/CEC-500-2019-055/CEC-500-2019-055-F.pdf

[65] New York City Mayor's Office of Sustainability, *Pathways to Carbon-Neutral NYC: Modernize, Reimagine, Reach.* https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/Carbon-Neutral-NYC.pdf

[66] Id., xvii

[67] *Achieving Carbon Neutrality in California.* https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf

[68] Great Plains Institute & Center for Energy and Environment, *Decarbonizing Minnesota's Natural Gas End Uses.* https://e21initiative.org/wp-content/uploads/2021/07/Decarbonizing-NG-End-Uses-Stakeholder-Process-Summary.pdf

Washington,[69] Colorado,[70] and Maryland,[71] among others. Simply put, RNG is a necessary decarbonization strategy, even in high-electrification scenarios.

Building RNG Supply Quickly to Capture Methane from Organic Wastes is More Important in the Near-term than Debating the Sector that is the Long-Run Best Use

We believe the body of literature presented above shows that renewable gas has a clear role within any of Massachusetts' GHG reduction scenarios. However, the same literature also shows that there is diversity of opinion about the best targeted long-term uses of RNG. The RNG industry does not claim to be able to solve the daunting challenge of eliminating all organic waste methane emissions and decarbonizing the entire gas system alone, however, we believe that deciding on the best long-run end use is less important in the near term relative to ensuring that renewable gas represents a key component of Massachusetts' GHG strategy to reduce methane and begin to decarbonize gas supply.

As well stated by the World Resources Institute work referenced above:

> *"The viability of RNG as a decarbonization strategy will vary depending on regional context, and ultimately the role that it plays in decarbonization and how it complements other key strategies may shift over time. However, through careful consideration of the factors included in the preceding discussion, policymakers can explore and identify opportunities for targeted RNG production and use that can meaningfully contribute to GHG reduction goals. Overall, the flexibility of RNG, along with the methane emissions reductions associated with its production, mean that it can play a dynamic and complementary role in decarbonization in the long term."*[72]

Therefore, as summarized above in Figure 1, in the near-term Massachusetts should focus on new policy to deploy RNG quickly. Doing so does not preclude adjustments to its end use as the gas system transition takes place—an effort which will take significant time and require thoughtful infrastructure planning to determine the targeted long-run applications best served by clean gaseous fuels. Our industry remains open minded to those varying possibilities, and we

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[69] *Pacific Northwest Pathways to 2050*. https://www.ethree.com/wp-content/uploads/2018/11/E3_Pacific_Northwest_Pathways_to_2050.pdf

[70] *Colorado GHG Reduction Roadmap Technical Appendix.* https://drive.google.com/file/d/1215j7zfCsgE50msF_ZJt6ZUj0iG7Th3V/view

[71] *Maryland Building Decarbonization Study.* https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Documents/MWG_Buildings%20Ad%20Hoc%20Group/E3%20Maryland%20Building%20Decarbonization%20Study%20-%20Final%20Report.pdf

[72] World Resources Institute, *Renewable Natural Gas as a Climate Strategy: Guidance for State Policymakers. (*See page 37).

https://www.wri.org/publication/renewable-natural-gas-guidance

look forward to working with DPU and other stakeholders as the long-term vision for RNG use in Massachusetts evolves.

Renewable Gas and Clean Heat Standards

In determining which policies and programs are most appropriate, Massachusetts should look to other jurisdictions which have made considerable progress toward similar decarbonization goals. We believe that Tradeable Performance Standards (TPS) have proven to be very effective tools in motivating RNG buildout specifically, and "fuel switching" through clean energy and infrastructure deployment more generally, toward decarbonizing the supply side of the transportation, gas, and electric sectors.

In general, a TPS sets a standard of technology performance but leaves technology choice to the program participants (e.g., clean technology companies and compliance entities). It increases the relative costs of technologies with undesirable GHG performance characteristics and lowers the costs of technologies with desirable GHG characteristics.

Jurisdictions focused on gas sector decarbonization have employed two primary types of policies aimed at incenting clean energy supply and infrastructure. Specific to gas supply only, a Renewable Gas Standard establishes targets for total renewable gas throughput, potentially including both RNG and renewable hydrogen, which increase over time.

Alternatively, a Clean Heat Standard can be used to incentivize clean heat resources more broadly, often including electrification and geothermal infrastructure alongside renewable gases. We believe that employing one of these strategies will be crucial to meeting both near- and long-term decarbonization goals in Massachusetts.

As part of California's gas sector decarbonization strategy, the California Public Utilities Commission (CPUC) voted unanimously to adopt a RGS in early 2022. Establishing a 12.2% procurement mandate for utilities' core gas customers by 2030, with a smaller mid-term target in 2025, this program is also viewed by the state as an important component of their methane reduction and landfill diversion strategies, with the near-term RNG requirement being largely based on potential from organic waste diversion projects.[73]

In addition to reducing methane emissions and replacing fossil-derived natural gas, the program is designed to facilitate the broader environmental benefits of RNG development. This is accomplished by prioritizing facilities which include carbon sequestration to further reduce emissions and achieve carbon negativity; prioritizing facilities which use their waste byproduct to create soil amendments such as a compost and biochar; requiring the buildout of pilot facilities which use wood waste feedstocks in gasification applications to reduce forest fire risk; and prioritizing facilities which use zero or near-zero emission trucks. These provisions

[73] https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-sets-biomethane-targets-for-utilities

exemplify the potential of RNG to contribute to broader environmental goals, including strengthening and circularizing the state's bioeconomy.

In May of 2022, the Minnesota Public Utilities Commission (MPUC) voted unanimously to adopt a carbon intensity (CI) and cost-benefit analysis (CBA) framework pursuant to the *Natural Gas Innovation Act*—a first-of-its-kind Clean Heat Standard in North America.[74] This program allows the state's gas utilities to propose investments in a variety of clean energy resources and infrastructure, including RNG, renewable hydrogen, electrification, geothermal, and energy efficiency, among others. Each resource mix must be compared based on cost-effectiveness, which includes lifecycle CI scoring for RNG and renewable hydrogen. Clean Heat policies such as this are significant because of their ability to incent the full spectrum of resources that are shown to be necessary for gas sector decarbonization. Jurisdictions which have adopted either a RGS or CHS include British Columbia,[75] California, Colorado,[76] Minnesota, New Hampshire,[77] Oregon,[78] and Quebec.[79]

Some stakeholders rightfully acknowledge that the transition away from fossil natural gas—particularly given the potential for electrification of many residential and commercial customers who underly current business models for gas distribution utilities—needs to be conducted deliberately and carefully to avoid an unbalanced system for remaining gas customers. Furthermore, planning for gas sector decarbonization must take into account the time required for fuel-switching, where feasible, as well as the continued need for gaseous fuels in certain applications. It is likely that this transition will require changes in rate design for gas utilities, which deserves deliberate consideration under this proceeding.

Allowing gas utilities to invest broadly in renewable thermal infrastructure such as renewable gas supply (with a goal of ultimately achieving 100% of supply from renewable sources), dedicated hydrogen infrastructure, geothermal energy, and electrification could provide a pathway for the development and maintenance of the spectrum of sustainable energy infrastructure required to serve all of Massachusetts' thermal needs in the future.

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[74] https://www.revisor.mn.gov/bills/text.php?number=SF0421&session=ls92&version=latest&session_number=0&session_year=2021

[75] https://news.gov.bc.ca/releases/2021EMLI0046-001286

[76] https://leg.colorado.gov/sites/default/files/2021a_264_signed.pdf

[77] https://legiscan.com/NH/text/SB424/id/2528713#:~:text=New%20Hampshire%20Senate%20Bill%20424&text=Bill%20Title%3A%20Relative%20to%20renewable%20energy%20and%20natural%20gas.&text=AN%20ACT%20relative%20to%20renewable%20energy%20and%20natural%20gas.&text=This%20bill%20authorizes%20the%20recovery,of%20the%20public%20utilities%20commission.

[78] https://olis.oregonlegislature.gov/liz/2019R1/Measures/Overview/SB98

[79] https://www.legisquebec.gouv.qc.ca/en/pdf/cr/R-6.01,%20R.%204.3.pdf

GHG Accounting Methodologies for Bioenergy

Point Source Accounting vs. Lifecycle Accounting

There are two distinct GHG emission accounting approaches commonly used in regulatory programs for bioenergy today: the "point-source biogenic CO_2 emissions are carbon neutral" approach and the "lifecycle" approach. Programs built on lifecycle analysis are more likely to produce better incentives for biofuels and bioenergy.

When using a point-source approach, GHG emissions from bioenergy are assessed only at the point of use—such as in a home, business, vehicle, power plant, or industrial facility. When determining these point-source GHG emissions, the biogenic carbon dioxide produced from the combustion of a biomass-derived input is often assumed to be counteracted by the carbon dioxide that was recently removed from the atmosphere when the biogenic material was grown, and thus netted out of any final compliance obligation.[80] The use of such a point-source framework is appropriate if it is expected that the upstream emissions (e.g., pipeline leakage) and upstream GHG sinks and avoided emissions (e.g., methane emissions from organic waste) will be accounted for by other jurisdictions under analogous programs.

A lifecycle approach[81] (LCA) accounts for GHG emissions generated from a fuel's production through its end-use—the full life of the fuel.[82] The lifecycle approach for GHG emission accounting for biofuels can also be referred to as a "well-to-wheels" or "full fuel cycle" approach. This approach accounts for all of the GHG emissions produced or avoided from the production, collection and processing, transmission and delivery, and ultimate use of a fuel (including upstream sinks and final point-source emissions).

When determining the lifecycle GHG emissions factor or carbon intensity, the GHG emissions are summed across each stage, and the end user of the fuel is responsible for all emissions. A full lifecycle approach is appropriate if other jurisdictions do not have programs to account for these upstream sources and sinks, or simply if the jurisdiction's goal is to create the proper incentives to reduce global emissions across an entity's entire biofuel or bioenergy supply chain.

Fundamentally, it is appropriate to track biogenic carbon dioxide emissions from use of biomass and biofuels as a line item in any point source emission accounting, and to appropriately "net

[80] For example, the Regional Greenhouse Gas Initiative uses this approach.

[81] Lifecycle analysis is well established as the leading way to holistically compare greenhouse gas abatement options. It is frequently used for bioenergy (inclusive of biofuels), but also has a role in comparing many other types of GHG abatement. The term "life cycle" appears 143 times in the IPCC's *Climate Change 2022, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

[82] https://www.epa.gov/renewable-fuel-standard-program/lifecycle-analysis-greenhouse-gas-emissions-under-renewable-fuel

out" CO_2 biogenic emissions or sinks as a step in any accounting of such fuels. Conversely, it is not appropriate to treat biogenic CO_2 from the use of biomass and biofuels as identical to CO_2 from fossil fuels (thus ignoring the upstream sink as the biogenic material is grown).

With this in mind, analyses of RNG, hydrogen, and other energy resources under consideration by the Commonwealth should rely on proven LCA tools, such as the Greenhouse gases, Regulated Emissions, and Energy use in Technologies Model (GREET) from Argonne National Labs, that are supported by more than 25 years[83] of research and peer review.[84] Similarly, the Commonwealth's broader jurisdiction-level GHG accounting system should treat CO_2 emissions from waste-derived bioenergy as carbon neutral at the point of combustion, consistent with established principles.

Renewable Gas Creates Green Jobs and Provides a "Just Transition" for the Gas Sector Workforce

Ensuring a just transition away from traditional energy sources and industries should be an important consideration for Massachusetts and has been identified as a key concern for workers and community voices participating in the DPU 20-80 process. Indeed, it is likely that many of the technologies considered by the Commonwealth will lead to the eventual obsolescence of some existing oil and gas *extraction* infrastructure as fossil fuel use declines. However, stakeholders must consider how certain necessary components of the state's GHG reduction strategy, such as renewable gas and liquid biofuels, will support the long-term use of a subset of the existing *distribution* infrastructure and associated jobs in a beneficial manner, in addition to the important opportunity to promote high-quality manufacturing jobs in Massachusetts from emerging technologies.

The process of decarbonizing all sectors which currently utilize fossil natural gas will involve increasing renewable gas supply while systematically pruning portions of the gas system subject to electrification. From an employment standpoint, the utility gas industry currently provides well-paying union jobs for skilled workers across Massachusetts. Therefore, it is important to consider apprenticeship opportunities and high-road pathways to green jobs provided by renewable gases, which in turn will advance the state's goals of broadening access to middle-class jobs while resolutely addressing the climate crisis.

While gas industry jobs have historically fallen under the fossil fuel industry umbrella, those which are retained will become green jobs as the pipeline system transitions to a clean fuel system and RNG methane capture projects begin to employ this skilled labor. With this in mind, Massachusetts should study which portions of the pipeline are expected to be needed for renewable gas delivery over different timeframes, and should map employment expectations and gaps accordingly.

[83] https://www.epa.gov/system/files/documents/2022-03/biofuel-ghg-model-workshop-biofuel-lifecycle-analysis-greet-model-2022-03-01.pdf
[84] https://greet.es.anl.gov/

RNG Coalition best understands the employment benefits at the RNG facilities themselves. For example, Massachusetts should move forward with organic waste recycling mandates, which would necessitate new facilities to process the additional quantities of organic waste, stimulating employment in the sustainable waste management and industrial building construction industries, among others. For comparison, California is projected to create 11,700 permanent jobs based at more than 80 new or expanded compost or anaerobic digestion facilities based on CalRecycle's organic waste recycling goals.[85]

The RNG industry currently has more RNG plants under construction or substantial development than in existence. Therefore, RNG contribution to jobs and the economy will inevitably increase. This represents an important opportunity for employment in Massachusetts given that RNG jobs are high paying, the vast majority of which fall well above the national average personal income. In 2021, the RNG industry contributed 22,600 Jobs and $2.6B in GDP to the U.S. economy, and could contribute 200,000 jobs by 2030 if the U.S. is on track to achieve carbon neutrality by 2050. Every $1 million spent on RNG production in 2021 created approximately 12 jobs.[86]

Conclusion

Based on extensive research, modeling, and experience from existing policies aimed at achieving carbon neutrality, RNG has demonstrated it can play a key role in reaching deep decarbonization goals in Massachusetts and globally.

To achieve methane reductions, RNG should be generally incentivized for use in any application to displace fossil fuels in the near-term, including those which may ultimately be electrified. There remains such a large demand for conventional fuels, and the RNG industry is still so nascent, that there is no need to determine the ultimate end use of the sustainable RNG resources immediately. In the long-term, renewable gases should be targeted toward applications that are not suitable for electrification. With this framework in mind, we urge the DPU to work with stakeholders in developing a strategy which sends a clear signal about Massachusetts' vision for the use of renewable gases.

Our industry stands ready to deploy renewable gas technologies which will reduce methane emissions, displace fossil fuel supply, improve organic waste management, produce useful soil amendments, and ultimately sequester carbon in Massachusetts. We commend the DPU, Massachusetts' agencies, and all stakeholders for your significant work throughout this process and look forward to continued collaboration toward the state's GHG reduction goals.

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[85] https://www.nrdc.org/sites/default/files/green-jobs-ca-recycling-report.pdf

[86] https://static1.squarespace.com/static/53a09c47e4b050b5ad5bf4f5/t/61ba25c889b4fb7566404e6c/1639589328432/RNG+Jobs+Study.pdf

Via Electronic Email and Online Portal

October 21, 2022

Honorable Beth Card, 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 2050

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

Thank you for the opportunity to comment on the slides regarding the Clean Energy and Climate Plan (CECP) for 2050 and for holding public hearings. We write as members of the Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC) Climate Justice Working Group (CJWG). We are committed to ensuring that the Commonwealth is on target to achieve 2050 greenhouse (GHG) emission reductions while also ensuring targeted benefits to environmental justice (EJ) populations and other historically marginalized communities.

It is urgent that EEA take immediate action to prevent GHG emissions in the Commonwealth. According to the IPCC's 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 the CJWG has previously stated, 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 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 jeopardizing the health of the Commonwealth's EJ populations.

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

[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.

group and within the IAC, we have discussed at length the importance of prioritizing and anchoring the work in equity and justice, of supporting a people-centered approach to policy making, program design and implementation, and of taking a holistic approach to achieving climate goals, net zero by 2050, and overall GWSA and Roadmap Law compliance. We urge the Executive Office of Energy and Environmental Affairs (EEA) to acknowledge up front and early the Commonwealth's commitment to ensuring environmental benefits for EJ populations as we work toward our greenhouse gas emissions reduction targets for 2025 and 2030. We offer the following general comments and sector-specific comments.

General Comments

- ***Establish a minimum percent of 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. The Commonwealth must commit to allocating a specific percent of funds for climate, clean energy, affordable and sustainable housing, clean water, and other investments to EJ populations in an amount that exceeds the proportion of the Commonwealth that is designated as EJ populations (currently 41% of census block groups). The state should establish a new, representative advisory body or leverage the EJ Council to help guide funding allocations. Barriers to program participation and technology adoption that prevent EJ populations from benefiting from the clean energy transition can be addressed, in part, through innovative approaches to financing and cross-sector collaboration, but the process will necessarily be iterative.

- ***Prioritize and anchor equity and justice throughout the CECP.*** 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 burden and cost while prioritizing climate, environmental, energy, and health benefits to such populations. We also encourage you to prioritize analysis of cumulative impacts, while reducing burdens and increasing benefits to environmental justice populations. We recommend a section of the CECP dedicated to equity and climate justice and references to EJ populations and EJ principles throughout the entire document.

- ***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 that includes

translation and interpretation opportunities and communicating in plain language. The interests of people impacted first and worst by the climate crisis and most at risk of pollution, displacement, energy burden, and unaffordable costs must be represented and influential in the Commonwealth's net zero work.

- ***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 affordable, habitable, and healthy.

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. With the GWSA's GHG emissions reduction targets, we similarly need air quality improvement targets so that by 2050 (and much sooner) there are no air pollution hotspots or health inequities as a result of exposure to air pollution by Massachusetts' most vulnerable residents.

- ***Add A Specific Strategy to Address Equity in Public Transit.*** There needs to be more emphasis focused on investments in public transportation and electric commuter rail. First, transit buses and school buses should be required to be electrified by 2035. The Massachusetts Bay Transportation Authority ("MBTA") should commit to electrification of all commuter rail lines by 2035 and prioritize electrification of routes passing through environmental justice populations. Electrifying the commuter rail will help meet the Commonwealth's climate goals, reduce harmful air pollution in neighborhoods along the routes, and allow the MBTA to run faster and more reliable trains. System reliability and performance are central to retaining rider confidence and promoting mode shift. It is crucial that technology used for commuter rail electrification supports rapid, reliable, and frequent all-day transit service. 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 many co-benefits for public health beyond reducing congestion and reducing single occupancy vehicle trips.

- *Maintain and expand transit*: We need more frequent bus and train service so that people with multiple transportation options choose public transit over cars. To achieve this goal, we must fund and implement an MBTA Bus Network Redesign process that meets these goals. We must also fund and implement expanded transit service on Regional Transit Authorities ("RTAs").
- *Electrify our buses and trains*: Prioritize public transit bus electrification on routes that serve EJ populations. Electrify our commuter rail with priority for the Fairmount Line and Newburyport/Rockport Line through Lynn as these two routes primarily serve environmental justice populations. This strategy also requires funding upgrades to bus maintenance facilities to support electric bus maintenance and charging.
- *Achieve equitable fare policies*: The MBTA and RTAs should adopt low-income fares and consider free fares on bus routes serving EJ populations. 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.

- ***Consider 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. In addition to expanding housing production near public transportation stops, the CECP should include policies that expand affordable housing near MBTA and RTA transit nodes to prevent displacement and help long-term residents remain in their rental housing following transportation improvements.

- ***Ensure electric vehicle charging stations are distributed equitably.*** With the expansion of charging stations, the CECP should ensure that they are located in EJ populations as well as rural communities to ensure the equitable distribution of environmental benefits.

- ***Encourage reuse and recycling of electric vehicle batteries.*** The CECP should require programs to encourage reuse and recycling of batteries to eliminate the unnecessary mining of components for new electric vehicle batteries and to prevent burning and burial of battery parts.

II. Electricity Sector

- ***Change how the Commonwealth makes decisions about energy siting.*** 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.

- ***Ensure that offshore wind development includes meaningful Tribal participation.*** Tribes and Indigenous Peoples should be provided with the resources necessary to meaningfully participate in offshore wind processes and benefit from job opportunities.

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

III. Buildings Sector

- ***Focus Mass Save on pre-electrification, weatherization, and electrification and diversify and develop the 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 recommend explicit plans for program development that helps all households access heat pumps and other clean heat technologies.
    - Mass Save should set annual targets for enrollment of low- and moderate-income ratepayers, renters, and schools 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 EJ customers.
    - 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.

IV. Non-Energy & Industrial

- ***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.[2] 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.[3] 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.

- ***Expand resources for waste ban enforcement.*** The Commonwealth has strong waste ban laws and regulations. The CECP should include a commitment that the Massachusetts Department of Environmental Protection has sufficient staff to conduct waste ban compliance and enforcement.[4]

V. 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 providing many existing public health benefits in the face of development plans 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

[2] *See* https://www.no-burn.org/wp-content/uploads/CR-Technical-Assessment_June-2020.pdf at 11.
[3] *See* https://www.no-burn.org/wp-content/uploads/CR-Technical-Assessment_June-2020.pdf at 8.
[4] *See* The-Need-To-Enforce_-Waste-Ban-Regulations-in-Massachusetts-9.7.22-2.pdf (publicinterestnetwork.org).

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 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."[5]

VI. Conclusion

The 2050 CECP will establish an important framework to guide decarbonization in the Commonwealth. 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.

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

For questions about these comments, please contact Staci Rubin (srubin@clf.org) and Dr. Gaurab Basu (gbasu@challiance.org), CJWG co-chairs.

Thank you,

GWSA IAC Climate Justice Working Group Members:

Sofia Owen, Staff Attorney and Director of Environmental Justice Legal Services, **Alternatives for Community & Environment**
Paulina Casasola, Climate Justice Organizer, **Clean Water Action**
Cindy Luppi, New England Director, **Clean Water Action**
Gaurab Basu, MD, MPH, Co-director **CHA Center for Health Equity Education & Advocacy**
Sabrina Davis, Organizer, **Coalition for Social Justice**
Staci Rubin, Vice President, Environmental Justice, **Conservation Law Foundation**
María Belén Power, Associate Executive Director, **GreenRoots**
Karl Claire Muller, Movement Building Director, **Unitarian Universalist Mass Action Network**

Cc: Rishi Reddi, Director of Environmental Justice, Executive Office of Energy and Environmental Affairs
Deneen Simpson, Director of Environmental Justice, Department of Environmental Protection

4675 MacArthur Court, Suite 800
Newport Beach, CA 92660

www.cleanenergyfuels.com

Brett G. Barry
Senior Policy Advisor
(562) 522-7427
bbarry@cleanenergyfuels.com

October 21, 2022

Secretary Bethany A. Card
Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Comments Regarding the Proposed Clean Energy and Climate Plan

Madame Secretary,

Clean Energy (CE) is North America's largest provider of renewable natural gas (RNG) transportation fuel. We have a network of over 550 refueling stations, including three in Massachusetts with more in the process of being built. Our customers include fleets such as UPS, LAMetro, NYMTA, Logan International Airport, Waste Management, and Amazon.

The Clean Energy and Climate Plan (CECP) appropriately identifies the medium and heavy-duty vehicle sector as a main target for tackling emissions: "Medium- and heavy-duty vehicles represent less than 10% of the vehicles on the road, but they are responsible for about 40% of total GHG emissions." It also correctly acknowledges that heavy-duty vehicle applications are a hard to electrify sector. The plan must address this issue in a more detailed manner.

CE respectfully requests support in the CECP for RNG powered vehicles in the medium and heavy-duty sector at least until electric powered vehicles are equal to RNG powered vehicles in:

- ✓ **Range**
- ✓ **Payload**
- ✓ **Refueling time**
- ✓ **GHG emission reductions; and**
- ✓ **Cost**

Without this support the CECP will be defaulting to diesel for the foreseeable future. Even under the most aggressive electrification scenarios, projections still have a sizeable number of diesel trucks on the road in the year 2050. Why not replace these trucks with clean biofuels today?

RNG powered trucks are certified by CARB to reduce NOx emissions by at least 90 percent compared to the current federal standard and virtually eliminate particulate matter emissions. Additionally, CARB has certified RNG fuel, under their Low Carbon Fuel Standard, as a carbon net negative fuel. RNG sold into the California

market had a weighted carbon intensity value of -33.36 g/CO2e/MJ for 2021. We are very proud of this LESS THAN ZERO designation.

A ZEV-Only Approach is a Risky Gamble

Today, heavy-duty ZEVs are largely limited to demonstration projects and extremely limited in availability. They are significantly constrained by a range of roughly 150 miles or less[1]. This substantial barrier to viability is further compounded by recharging times that can exceed three hours[2]. While there are some fleets which operate localized short haul routes, which ZEVs could successfully handle, the vast majority of regional and interstate operations will require longer range and faster refueling capabilities than ZEVs can currently provide. Oregon Trucking Association President Jana Jarvis recently stated, "*Then you think about having to stop and recharge — if there was a charging infrastructure and if there was enough grid capacity. And both of those are questions today. You start thinking about doing that every couple hundred miles and you realize the inefficiencies the trucking industry would be subject to by conversion to electric vehicles.*[3]"

These significant performance restrictions in turn require, in most cases, two electric trucks to replace the work of one diesel. This key factor appears to be ignored in cost-comparisons and emission comparisons, but has significant implications. This reality makes the cost of replacing a single diesel truck with electric power at around $1 million whereas an RNG powered Class 8 truck can be purchased for approximately $200,000 depending on its configuration. In a November 2021 interview, Daimler Truck CEO, Martin Daum stated, "*The first truth is, in heavy duty commercial vehicles you need such a huge amount of energy, meaning you need such large batteries, that such a truck always will cost significantly more than a combustion engine powered truck*."[4]

In a 2017 article, Jason Morgan of Fleet Equipment Magazine wrote, "…*Tesla unveiled its electric Class 8 truck, dubbed the Semi. Fully loaded, the Tesla Semi consumes less than two kilowatt-hours of energy per mile and is capable of 500 miles of range at GVW and highway speed…*[5]" But it is now 2022, five years later, and orders for these trucks have not been filled.

The lack of heavy-duty EV adoption is further illustrated by California's HVIP program. This program has provided over half a billion dollars of vouchers specifically for electric powered trucks, but 97 percent of those vouchers have not been redeemed.[6] As the EV industry works to navigate significant hurdles, low NOx RNG powered trucks are being deployed.

Providing Relief Today

Studies and projections provide value, but real-world evidence is the most solid basis for sound policy making. Low NOx trucks powered by RNG are being deployed today by America's leading fleets and providing significant air quality and climate benefits now. Earlier this year, Amazon deployed its 1,000th RNG powered

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[1] https://www.electrive.com/2022/01/07/kenworth-presents-first-class-8-electric-truck/#:~:text=The%20vehicle%20is%20equipped%20with,at%20up%20to%20120%20kW.

[2] https://www.fleetequipmentmag.com/kenworth-class-8-battery-electric-t680e-available-order/

[3] M. Samayoa, OPB.org, Zero emissions trucks could be soon be required in Oregon (Nov. 15, 2021); https://www.opb.org/article/2021/11/15/zero-emissions-trucks-could-soon-be-required-in-oregon/

[4] Meghana Kandra, "Diamler CEO Talks About Advancements in Heavy Electric Duty Truck", https://www.cnbc.com/2021/11/12/too-risky-to-not-use-battery-and-hydrogen-tech-daimler-truck-ceo.html, November 13th, 2021.

[5] https://www.fleetequipmentmag.com/tesla-semi-electric-class-8-truck/

[6] Impact - Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project | California HVIP, May 15, 2022

truck and continues to grow its fleet. UPS is in the process of purchasing 6,000 new natural gas trucks and has signed an agreement to purchase 250-million-gallon equivalents of RNG.[7] But it is not just major fleets, many smaller fleet operators have also begun the transition to this carbon negative fuel.

Low NOx RNG powered trucks not only provide a solution for the transportation sector but also support methane capture from agricultural waste streams, a key RNG feedstock, which is essential to addressing climate change. Earlier this year the Millenkamp Dairy, one of the largest dairies in the country, with around 100,000 head of cattle, entered into an agreement to build a methane capture digester which will produce approximately five-million-gallon equivalents of NEGATIVE carbon intensity RNG annually.

Providing a Safety Net for Electrification Efforts

Residents, especially those in environmental justice communities, need relief from poor air quality now. A study prepared by Ramboll U.S. Consulting, Inc. found that "*Expanded implementation of zero-emission and Low NOx vehicles, coupled with increased introduction of renewable liquid and gaseous fuels, can deliver earlier and more cost-effective benefits than a zero-emission vehicle (ZEV) only approach*."[8] Low NOx trucks, powered by RNG, have a similar range (1,000+ miles) and refueling time (5 to 7 minutes) as their diesel counterparts positioning them as the perfect alternative where electrification is not feasible. Their inclusion in the plan is a critical safety net and will provide improved air quality sooner to those living in neighborhoods with heavy truck traffic.

Conclusion

For all of the above reasons, **we request support in the CECP for RNG powered vehicles in the medium and heavy-duty sector until electric powered vehicles are equal to RNG powered vehicles in terms of performance and GHG emission reductions.** Given the stakes, please provide support for proven solutions that can provide results today.

Sincerely,

Brett Barry
Senior Policy Advisor
Clean Energy

[7] https://about.ups.com/sg/en/our-stories/innovation-driven/renewable-natural-gas-is-an-important-part-of-ups-strategy-to-in.html
[8] Multi-Technology Pathways to Achieve California's Air Quality and Greenhouse Gas Goals, Ramboll U.S. Consulting Inc., February 1, 2021.

My name is BRIAN CAMPBELL and I live in CHELMSFORD, and I am strongly OPPOSED to 2025 and 2030 CECP – Clean Energy and Climate Plan, as it DOES NOT support, "war footing – an emergency", bottom-line, Massachusetts needs to support MORE ENERGY PRODUCTION and LNG EXPORTS TO EUROPE 2022! New England needs to expand Pipeline Capacity and KEEP OLD and BUILD NEW NUCLEAR POWER capacity by Expanding CES-E – Clean Energy Standard (Existing) & CES – Clean Energy Standard! Nuclear Power Provides 3400 MW to the ISO-NE GRID, of a 14000 MW average load, yet this blatant Anti-Nuclear CECP mentions "nuclear", ONCE on Page #40 and Solar 42 times.

"We are on a war footing – an emergency," Energy Secretary Jennifer Granholm declared at the CERA energy conference in March 9, 2022, Houston, TX, "We have to responsibly increase short-term supply where we can right now to stabilize the market and to minimize harm to American families." Addressing oil executives in the audience, Granholm told them: "I hope your investors are saying these words to you as well: In this moment of crisis, we need more supply right now, we need oil and gas production to rise to meet current demand." https://www.energy.gov/articles/secretary-granholm-ceraweek-keynote-luncheon-and-11-fireside-chat-sp-globals-dan-yergin

2021-12-13-ISO New England can meet winter power demand 'if the weather is mild,' grid operator warns. Gordon van Welie CEO ISO New England can meet winter power demand 'if the weather is mild,' grid operator warns, But it also warned that this winter more than 3,700 MW of gas-fired generation resources are "at risk of being unable to get fuel when needed." **3,700 MW = PREmature Closed, VT Yankee + Pilgrim NUCLEAR + Brayton Point COAL. So Let's build more pipeline capacity to ensure reliable e-power because we New Englanders LOVE paying #3 HIGHEST $$$ ERATE in usa and HATE Reliable NUCLEAR POWER? 2025 and 2030 CECP – Clean Energy and Climate Plan will Raise these already high energy prices, higher with more emissions, and less reliable electricity, leading to rolling blackouts.**
>>https://www.masslive.com/news/2021/07/massachusetts-ranked-3rd-most-energy-expensive-state-new-england-states-all-make-the-top-15.html

From CECP-"2020s include a balanced clean energy portfolio anchored by significant offshore wind resources, more interstate transmission, widespread electrification of transportation and building heat, and reducing costs by taking action at the point of replacement for equipment, infrastructure, and systems that use fossil fuels". A portfolio anchored by significant offshore wind resources, WILL require significant amounts of new Gas peaker electrical generation to backup unreliable offshore wind resources. BONUS>>Offshore Wind Plans Will Drive Up Electricity Prices And Require 'Massive Industrialization Of The Oceans'

2022-09-13--https://www.utilitydive.com/news/ferc-new-england-iso-winter-conference/631703/
A decade after FERC tried to tackle New England gas issues, concerns remain and solutions are uncertain-"We're going into this winter basically crossing our fingers and hoping," James Danly, Federal Energy Regulatory Commission commissioner, said. The ISO published its Future Grid Reliability Study in July, and modeled a variety of decarbonization scenarios in 2040. The report concluded those approaches **"may require a significant amount of gas or stored fuels to support variable resources."** The region "needs to be careful not to retire needed, existing infrastructure, until we are sure it is not needed," van Welie said. "And that's not what we're doing at the moment. We're retiring infrastructure on the hope that new infrastructure will be replacing it." "We're going into this winter basically crossing our fingers and hoping," FERC Commission James Danly saidThe reserve margin on the ISO New England system may need to increase from about 15% to 300% by 2040 in some scenarios, as more renewables are added and dispatchable generation is retired to meet state clean energy goals, according to a July 29 report from the grid operator.
The first phase of the ISO's Future Grid Reliability Study models a variety of decarbonization scenarios in 2040 and concludes they "may require a significant amount of gas or stored fuels to

support variable resources." A scenario where reliability criteria are met using only solar, wind and storage, would challenge the transmission system and require "an outsized amount of land or offshore areas" for wind and solar farms, the report found.

From CECP-"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." 60,000 acres of land in Massachusetts, is a large land footprint in a small state. Solar panels are subsidized by ITC for installing Cheap, because of, Uyghur slave labor from Xinjiang China, Solar Panels. Significant amounts of new Gas peaker electrical generation to backup unreliable Solar Panels & WIND. When Clean Energy Is Powered by Dirty Labor. Most solar panels come from China, and using them to fuel a clean energy transition risks reliance on Uyghur slave labor in Xinjiang. As CECP promotes more unreliable Renewable Energy, more "**Celebrations" of NEW GAS electrical generation will be necessary. "State Representative Randy Hunt (R-Sandwich) said "It's ironic that we have to build a fossil fuel plant to make our renewable energy grid more robust," he said. The new unit helps to fill the gaps in those systems and has become even more vital as the Plymouth nuclear plant has been shuttered.>**https://www.capenews.net/sandwich/news/officials-gather-to-mark-the-completion-of-canal-3/article_20f661be-ee23-50d6-bbf5-9ef062ccc471.html. 2019 Premature closure of Pilgrim Nuclear, eliminated 62% of Massachusetts Clean Electrical Generation. What is the Goal of CECP? Emission reduction DOES NOT SEEM TO BE THE GOAL!
The Goal seems to be Outsourcing Electrical Generation to foreign governments such as Unreliable Hydro-Quebec? 2021-11-CMP Company stops work on $1B transmission line after Maine vote https://www.wbur.org/news/2021/11/19/maine-hydro-power-line-massachusetts A utility company is suspending construction on a $1 billion power line at the request of Maine's governor after she certified election results Friday in which residents firmly opposed the project. Democratic Gov. Janet Mills had urged leaders of the New England Clean Energy Connect Transmission LLC to stop construction on the 145-mile (233-kilometer) project until legal challenges are resolved.
Bottom line. When people find out the true environmental and economic costs of Renewable Energy Projects, for Massachusetts, you will be voted out of office. When people find the true environmental and economic costs of Nuclear Power, Massachusetts will build Nuclear Power. CHINA#1 Has>> China's Climate Goals Hinge on a $440 Billion Nuclear Build-out. **China is planning at least 150 new reactors in the next 15 years, more than the rest of the world has built in the past 35. Perhaps, IMPORTING superior race and civilization technology, CHINA#1 Nuclear Technology, is the REAL solution Massachusetts is counting on to reduce emissions? Just as IMPORTING CHINA#1 superior Rail technology is critical to revitalizing the MBTA Subway trains?** https://www.masstransitmag.com/rail/vehicles/news/21258233/ma-despite-delays-frustrations-springfieldbased-crrc-promises-faster-pace-on-new-mbta-subway-cars

Sincerely,

Brian Campbell

References:

- https://doomberg.substack.com/p/new-england-is-an-energy-crisis-waiting?s=r
- https://www.utilitydive.com/news/iso-new-england-can-meet-winter-power-demand-if-the-weather-is-mild-grid/611385/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202021-12-13%20Utility%20Dive%20Newsletter%20%5Bissue:38565%5D&utm_term=Utility%20Dive
- Offshore Wind Plans Will Drive Up Electricity Prices And Require 'Massive Industrialization Of The Oceans'

- When Clean Energy Is Powered by Dirty Labor. Most solar panels come from China, and using them to fuel a clean energy transition risks reliance on Uyghur slave labor in Xinjiang. https://foreignpolicy.com/2021/04/12/clean-energy-china-xinjiang-uyghur-labor/
- Company stops work on $1B transmission line after Maine vote https://www.wbur.org/news/2021/11/19/maine-hydro-power-line-massachusetts
- https://www.bloomberg.com/news/features/2021-11-02/china-climate-goals-hinge-on-440-billion-nuclear-power-plan-to-rival-u-s
- https://www.masslive.com/news/2021/07/massachusetts-ranked-3rd-most-energy-expensive-state-new-england-states-all-make-the-top-15.html
- https://www.energy.gov/articles/secretary-granholm-ceraweek-keynote-luncheon-and-11-fireside-chat-sp-globals-dan-yergin
- The Texas blackouts were caused by an epic government failure
- https://www.energy.gov/sites/prod/files/2020/01/f70/Guide%20to%20the%20Federal%20Investment%20Tax%20Credit%20for%20Commercial%20Solar%20PV.pdf
- https://www.capenews.net/sandwich/news/officials-gather-to-mark-the-completion-of-canal-3/article_20f661be-ee23-50d6-bbf5-9ef062ccc471.html
- https://www.wbur.org/news/2021/11/19/maine-hydro-power-line-massachusetts
- China's Climate Goals Hinge on a $440 Billion Nuclear Buildout.
- https://www.masstransitmag.com/rail/vehicles/news/21258233/ma-despite-delays-frustrations-springfieldbased-crrc-promises-faster-pace-on-new-mbta-subway-cars
- https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2025-and-2030
- https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8
- https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download
- https://www.utilitydive.com/news/ferc-new-england-iso-winter-conference/631703/
- "may require a significant amount of gas or stored fuels to support variable resources."
- https://www.wbur.org/news/2021/11/19/maine-hydro-power-line-massachusetts

October 21, 2022

Massachusetts Department of Environmental Protection
1 Winter Street
Boston, MA 02108

Re: DEP Clean Energy and Climate Plan

To Whom It May Concern:

On behalf of Bradford White Corporation (BWC), thank you for the opportunity to comment on the Massachusetts Department of Environmental Protection's (DEP) proposed Clean Energy and Climate Plan (CECP).

BWC is an American-owned, full-line, leading manufacturer of residential, commercial, and industrial products for water heating, space heating, combination heating, and water storage. A significant number of Massachusetts' individuals, families, and job providers rely on our products for their hot water and space heating needs.

We appreciate the DEP's efforts to reduce greenhouse gas (GHG) emissions and are proud to have made significant investments in products that provide substantial energy conservation and environmental benefits, such as Ultra Low NOx boilers and water heaters, as well as electric heat pump water heaters. As a testament to our efforts, we have been recognized as an ENERGY STAR® Partner of the Year for the past three consecutive years.

While the DEP considers measures to decarbonize various sectors of the Commonwealth, BWC suggests that efforts are made to make clean energy generation throughout Massachusetts a priority. The CECP currently proposes that these efforts be made in parallel with measures that are designed to reduce GHG emissions from the building sector. However, according to the United States Energy Information Administration, over 75-percent of the Commonwealth's electricity is currently produced from natural gas-fired generation.

Without first ensuring the vast majority of electric generation in the Commonwealth is sourced from renewable energy, electrifying buildings will lead to more GHG being generated to meet increased electrical demands. As such, decarbonizing buildings in a manner suggested by the current CECP, without a robust clean energy grid to support these efforts, has the potential to negatively impact those in the Commonwealth.

The CECP also calls for the majority of all buildings in Massachusetts to be heated and cooled by electric heat pumps by 2050. Aside from the concerns with overall cleanliness of the electric grid described above, BWC cautions DEP to consider the potential challenges and expenses that will be faced by individuals, families, and job providers in converting existing buildings that presently rely on gas-fired boilers and/or water heaters for heat and hot water.

Many buildings may not have sufficient electric capacity to easily facilitate a transition of this kind. In these installations, fuel switching would likely involve an electrical panel upgrade, which can cost a home or building owner thousands of dollars. Increasing the electrical capacity for a building may also be an issue for utility providers as they may not have the necessary capacity to accommodate the installation. In these cases, the utility may have to undergo equipment upgrades and would likely charge the home or building owner a substantial fee to rectify this issue.

Policies that would compel fuel switching may also present issues with an electrical connection and wiring not being present at a home or building's desired, or required, installation location for an electric heat pump. This may require both a plumber and electrician to complete the project safely and efficiently, or prompt a change in the install location for the product. Either option represents significant, additional, time and resource costs to home and building owners to complete the install.

Likely compounding the complications with fuel switching in existing buildings described above is the nature of emergency replacements in the space and water heating industries. In our experience, over 80-percent of our products that are installed are done in emergency situations where the existing compliance has reached the end of its useful life and must be replaced immediately to restore vital heat and hot water service. For this reason, fuel switching may be unreasonable for home and building owners as they would be without these services while trade professionals and utility providers navigate the challenges described above. We encourage DEP to carefully consider these realities as they continue the process of finalizing the CECP.

BWC appreciates DEP's attention to workforce development of heat pump products as part of the CECP. In our experience, lack of familiarity with heat pump technology among trades professionals has been a significant barrier to market penetration for these types of products. Furthermore, the skilled trades industry in Massachusetts, and throughout the United States, is in

need of younger workers. According to industry data, the age of 53-percent of skilled-trade workers is 45 or older, with nearly 20-percent being between the ages of 55 and 64. The average age of a master plumber is 58-years old[1]. We are hopeful that the workforce development initiatives described in the CECP will help the Commonwealth to address the problem of skilled tradespeople retiring without qualified, younger workers, being available to take their place.

In addition, while the DEP intends to work closely with labor unions to assist in this training, we also encourage the Department to also include product manufacturers in this process. Manufacturers have unique insight into their products functionality and capabilities. This allows us to provide useful information to skilled trades professionals that will allow them to more effectively install and maintain heat pump products. We would look forward to closely working with DEP on this portion of the CECP and appeal to the Department to utilize manufacturers as a resource in formulating their GHG reduction strategies.

Thank you very much for your consideration of our concerns. Once again, BWC recommends DEP prioritize measures within the CECP to ensure the plan does not inadvertently increase GHG emissions in the Commonwealth. Additionally, we urge the Department to evaluate the challenges that face individuals, families, and job providers who would be compelled to engage in fuel switching their heating and hot water appliances as the regulatory process moves forward.

In the meantime, please do not hesitate to contact me directly if you have any questions or would like any additional information.

Sincerely,

Bradford White Corporation

Eric Truskoski
Senior Director of Government and Regulatory Affairs

Cc: R. Wolfer; B. Ahee

[1]Plumber Magazine, *The Future of Plumbing and Drain Cleaning*, November 7, 2018.

Advancing the Clean Energy Future

Acadia Center

198 Tremont Street, Suite 415
Boston, MA 02111
617.742.0054
acadiacenter.org

October 21, 2022

Bethany A. Card, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 1020
Boston, MA 02114

Re: Clean Energy & Climate Plan for 2050: Limits, Sublimits, Goals, & Policies

Dear Secretary Card:

Acadia Center appreciates the opportunity to provide comments on the Clean Energy & Climate Plan (CECP) for 2050. Acadia Center is a non-profit research and advocacy organization committed to advancing the clean energy future. Our organization tackles complex problems, identifies clear recommendations for reforms, and advocates for policy changes that support a low-carbon economy across the Northeast.

Acadia Center has provided several sets of comments during the CECP process, both individually and as part of a coalition. Developing comments for this specific proposal has proven difficult, as all that is available is a 23-slide presentation, with only a fraction of the slides containing new information. Acadia Center applauds the work that has been performed so far in developing the 2025 and 2030 CECP. We acknowledge that the Executive Office of Energy and Environmental Affairs (EEA) is under a strict statutory deadline of January 1st, 2023 to develop 2050 emissions limits and sublimits, as well as a comprehensive plan to achieve those limits. However, without more information on the 2050 proposal, we fear the Commonwealth's 2050 plan will suffer from less-than-optimal stakeholder involvement. One of our organization's chief complaints during the 2025 and 2030 CECP process was that modeling results were only available when the final report was released. The appendices in said CECP were also significantly less detailed than the Massachusetts 2050 Decarbonization Roadmap, limiting the ability of stakeholders to evaluate critical assumptions underpinning the modeling used to inform the 2025 and 2030 CECP policy recommendations. This process suffers from the same concerns, though even more extreme. Acadia Center offers the following comments on the currently available information and information, which we urge EEA to include in the final plan.

Massachusetts is Still Letting Flawed Assumptions Get in the Way of Impartial Analysis

Detailed modeling information is not included with the slide deck for the 2050 CECP. Therefore, we assume that the framework will be the same as the 2025 and 2030 CECP. When reviewing the conclusions of the 2025 and 2030 CECP modeling effort, which ultimately inform the report's policy recommendations, it's important to note that the modeling continues to rely on flawed, outdated assumptions that are much too favorable to natural gas and biofuels. These flawed assumptions stem from the Massachusetts Greenhouse Gas Inventory and continue to be repeated – both in the CECP modeling and the D.P.U. Docket 20-80 (Future of Gas) modeling as Acadia Center described in more detail here. These problematic assumptions include:

- **Dramatically underestimating the GHG impacts of methane leaks from the gas system in Massachusetts.** A recent study from Harvard estimated that gas leaks in the Boston metro are *six times* worse than estimates from the Massachusetts Department of Environmental Protection (DEP) and U.S. Environmental Protection Agency (EPA).[1] Based on the limited information provided in the 2050 CECP presentation, it does appear that EEA has updated the natural gas leak emission accounting methodology. However, without more information on the accounting changes implemented and the overarching impacts of these accounting changes, Acadia Center still has serious concerns that the methodology is underestimating gas leaks in the Commonwealth by a significant margin.
- **Using an outdated global warming potential (GWP) value for methane and failing to consider methane emissions on the 20-year timescale that is most relevant to the state's net zero emissions goal.** Simply switching to the most recent 20-year GWP, as New York State has done, would alone increase the estimated GHG damage from methane leaks *over three-fold*.[2]
- **Not accounting for out-of-state GHG emissions from the production and transmission of both fossil fuels and biofuels ultimately consumed in-state.** After updating to a 20-year GWP and accounting for out-of-state emissions, New York State found that the GHG emissions associated with using natural gas are 84% higher than the state had previously estimated.[3]
- **Making the blanket assumption that all biofuels (including 'renewable natural gas' and biodiesel) are GHG-neutral.** Ignoring lifecycle emissions associated with biofuels dramatically overestimates the potential role for these fuels as we move towards net zero emissions.[4]

The 2025 and 2030 CECP made it clear that one of the central debates in building sector decarbonization over the next decade will be around whether the Commonwealth should embrace full electrification of building heating or partial electrification of building heating via "hybrid" systems that rely on a combination of electricity and fossil fuel- or biofuel-based heating systems. Using 2025 and 2030 CECP modeling assumptions, buildings served by hybrid heating systems would generate about half of their heat from an electric air-source heat pump (ASHP) and half of their heat from a fossil fuel- or biofuel-powered boiler or furnace.

As it stands, the 2050 CECP modeling is biased in favor of hybrid heating and against full electrification because of the flawed assumptions described above. Hybrid heating pathways looks a lot better when you're underestimating gas leaks and assuming combustion of biofuels results in zero GHG emissions. As such, the findings of the CECP that

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[1] Sargent et al., 2021 "Majority of US Urban Natural Gas Emissions Unaccounted for in Inventories." https://www.pnas.org/doi/10.1073/pnas.2105804118

[2] The IPCC 4th Assessment Report 100-year GWP for methane of 25 used in the CECP analysis is over 3.36 times lower than the more appropriate IPCC 4th Assessment Report 20-year GWP for methane of 84.

[3] New York State Department of Environment Conservation 2021 Statewide GHG Emissions Report, Appendix A, Table A1, page 17. https://www.dec.ny.gov/docs/administration_pdf/ghgsumrpt21.pdf

[4] Emily Grubert, 2021. "At Scale, Renewable Natural Gas Systems Could be Climate Intensive: The Influence of Methane Feedstock and Leakage Rates." https://iopscience.iop.org/article/10.1088/1748-9326/ab9335

hybrid heating as a first-choice option would be a reasonable pathway for the Commonwealth must be taken with a large grain of salt.

The 2050 CECP slide deck notes that the methodology for natural gas distribution and service emission accounting has recently been changed by the EPA.[5] The Non-Energy & Industrial Sector slide lists the natural gas delivery sublimit for 2030 as 0.4 MMTCO2e.[6] It also notes that the new accounting methodology places the "2030 emission values" at 0.7 MMTCO2e.[7] The 2050 target is then listed as 0.5 MMTCO2e.[8] This section is exceptionally confusing and raises several questions. Does "2030 values are now estimated at 0.7 MMTCO2e" mean that the projected "business as usual" emissions from the gas distribution system in 2030 are 0.7 MMTCO2e or does it mean that the new 2030 natural gas delivery sublimit is 0.7 MMTCO2e? If 0.7 MMTCO2e is the new 2030 sublimit, why is 0.4 MMTCO2e still listed on the slide as the 2030 sublimit? If the 2030 sublimit target is in fact 0.4 MMTCO2e, as it's presented on the slide, why is the 2050 sublimit of 0.5 MMTCO2e *higher* than the 2030 sublimit? Based on the information presented, Acadia Center is struggling to understand why the 2050 gas leaks sublimit would be less aggressive than the 2030 sublimit.

It should be noted that a policy recommendation in the available 2050 CECP information is "to consider whether changes are needed to the inventory conventions/guiding principles for greenhouse gas emission accounting methodologies for biobased and synthetic fuel combustion emissions."[9] While this change would be welcome, it would come after this report is completed and undermine the proposed policies that rely on the fuels in question. Additionally, these potential changes do not address wide-scale problems with the Massachusetts GHG Inventory, such as the undercount of methane leaks. The accounting errors that Acadia Center identifies above must be made before the issuance of final policy recommendations for these concepts to be taken seriously.

The Buildings Policy Recommendations Are Based Upon Flawed Information and Lack Critical Details

The 2025 and 2030 CECP examined six clean heat scenarios: Reference, Clean Fuels, Hybrid, Phased, High Electrification, and Full Electrification. The 2025 and 2030 CECP recommends the Commonwealth embrace the "Phased" scenario, which involves the "[r]apid adoption of both partial- and whole-home heat pump systems but allows for hybrid fossil-fuel and electric heat pump systems in the 2020s and then whole home retrofits thereafter."[10] The Commonwealth opted for this approach because it believed the scenario "presents both long-term and near-term benefits over other building decarbonization approaches analyzed."

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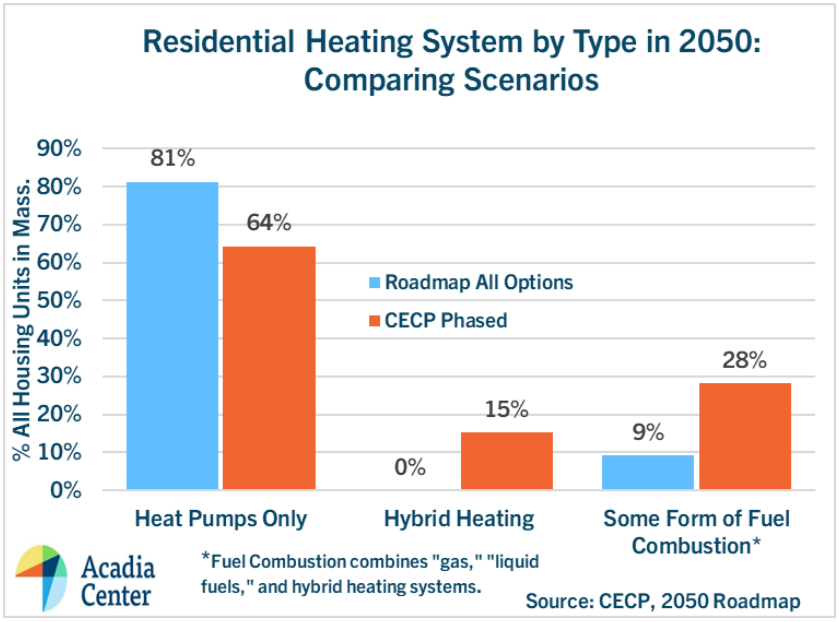
[5] 2050 CECP Presentation Slides, at 7. https://www.mass.gov/doc/2050-cecppublic-hearingpresentationenglish/download.
[6] *Id*, at 12.
[7] *Id.*
[8] *Id.*
[9] *Id*, at 15.
[10] CECP for 2025 and 2030, at 26.

The 2050 CECP slide deck makes no mention of what scenario it is utilizing. Therefore, Acadia Center is assuming that the Commonwealth is continuing to recommend the "Phased" scenario and have the outputs from this scenario inform policy recommendations. As we outline below, this approach is flawed.

The CECP is Less Ambitious than the Massachusetts Roadmap When It Comes to Full Electrification of Buildings by 2050

One of the main narratives of the 2025 and 2030 CECP report is that the "Phased" Scenario, which emphasizes deployment of hybrid heating systems over the next eight years, and beyond, is the best path for the Commonwealth. By 2050, the CECP Phased Scenario calls for about 64% of Massachusetts homes to rely solely on heat pumps for space heating by 2030, 15% to rely on hybrid heating systems, and a combined 13% of homes to rely strictly on "gas" or "liquid fuels" heating systems.[11] In summary, under the CECP Phased Scenario, about 28% of homes in 2050 still rely on some type of fuel combustion to provide space heating.



This is a significant departure from the most cost-effective "All Options" Scenario in the Massachusetts 2050 Decarbonization Roadmap ("Roadmap"), which calls for about 81% of homes in the Commonwealth to rely solely on heat pumps for space heating by 2050, with only about 9% of homes combusting any type of fuel for space heating by 2050.[12] **In other words, the CECP's Phased Scenario, in comparison to the Roadmap's All Options Scenario, envisions about 20% fewer homes heated solely by heat pumps in 2050 and about *3 times more* homes combusting some type of fuel to provide space heating in 2050.**

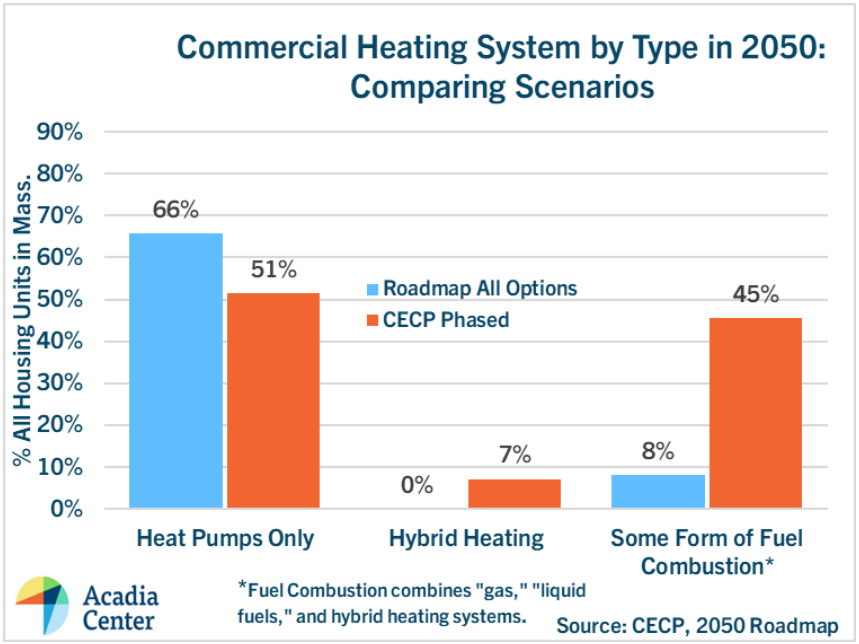
[11] See Figure A.6 on page 13 of CECP for 2025 and 2030 Appendix A: Technical Pathways Modeling. Note: Percentages estimated by Acadia Center based on precise graph measurements. Exact numbers not provided in CECP. This note applies to all footnotes below referencing CECP or Roadmap percentages. Additionally, the graphs in the CECP do not specify what type of "gas" or "liquid fuels" they are referring to – they could be referring to fossil fuels, biofuels, or some mix of the two.

[12] See Figure 3 on page 12 of Massachusetts 2050 Decarbonization Roadmap Building Sectors Report.

In 2050, the CECP Phased Scenario even calls for *new sales* of residential heating systems that combust fuels. In 2050, approximately 16% of *newly sold* residential heating systems are hybrid, 3% solely rely on "gas", and 2% solely rely on "liquid fuels". [13]

The CECP Phased Scenario is also much less bullish on long-term full electrification of commercial buildings when compared to the Roadmap All Options Scenario.

The CECP Phased Scenario calls for about 51% of Massachusetts commercial buildings to rely solely on heat pumps for space heating by 2050, 7% to rely on a hybrid heating system, and a combined 38% to rely strictly on "gas" or "liquid fuels" heating systems.[14] In other words, about 45% of commercial buildings in 2050 still rely on some type of fuel combustion to provide space heating.



This is in stark contrast to the Roadmap's All Options Scenario, which calls for about 66% of commercial buildings in the Commonwealth to rely solely on heat pumps for space heating by 2050, with only 8% relying on any form of fuel combustion to provide space heating.[15] In other words, the CECP's Phased Scenario, in comparison to the Roadmap's All Options Scenario, envisions about 22% less commercial buildings heated solely by heat pumps in 2050 and *about 5.6 times* as many commercial buildings combusting some form of fuel to provide space heating in 2050. In the Phased Scenario, about *75% of commercial space heating final energy demand is still provided via the combustion of "pipeline gas" or "liquid fuels"*[16], compared to about 15% in the Roadmap All Options Scenario.[17]

If the 2050 CECP is truly embracing the Phased Scenario as the preferred pathway forward and building policy recommendations around this scenario, EEA should address, in detail, why it has chosen to embark on a pathway that is such stark contrast to the Roadmap's All Options scenario, which was determined to be the most cost-effective

[13] See Figure A.6 on page 13 of CECP for 2025 and 2030 Appendix A: Technical Pathways Modeling.
[14] See Figure A.7 on page 14 of CECP for 2025 and 2030 Appendix A: Technical Pathways Modeling.
[15] See Figure 4 on page 13 of Massachusetts 2050 Decarbonization Roadmap Building Sectors Report.
[16] See Figure A.6 on page 13 of CECP for 2025 and 2030 Appendix A: Technical Pathways Modeling.
[17] See Figure 4 on page 13 of Massachusetts 2050 Decarbonization Roadmap Building Sectors Report.

pathway to 2050 decarbonization in the Commonwealth less than two years ago. This detailed explanation simply has not been provided to date.

If the Commonwealth Pursues a Clean Heat Standard, It Should Be Based upon Sound Modeling

A critical component of the Commonwealth's effort to decarbonize buildings is the creation of a Clean Heat Standard. Acadia Center believes that a well-designed Clean Heat Standard could serve as an incredibly effective tool in this effort. However, some elements surrounding the current discussion give our organization pause. In a report prepared for EEA, the Regulatory Assistance Project noted that the Low Carbon Fuel Standard relies primarily on Argonne National Lab's GREET model to compare life cycle emissions.[18] The report notes that systems like GREET could be used to help assign life cycle emissions for a Clean Heat Standard here in Massachusetts.[19] Acadia Center has major concerns about the GREET model, particularly as it relates to underestimating the life cycle GHG impacts of biofuels, and will follow up with specifics at a later date. Our organization cautions EEA to develop a system that utilizes proper methane accounting to ensure the success of the Clean Heat Standard. Further, a Clean Heat Standard alone is not a panacea. It must be paired with comprehensive planning, including the organized transition of the Commonwealth's natural gas system.

Transportation Policy is Too Short on Detail and Focuses Too Heavily on Electric Vehicles

The transition from gas vehicles to electric vehicles is a critical policy shift that will help support the Commonwealth's decarbonized transportation future. However, far too often this policy tool is prioritized at the expense of other options for addressing GHG emissions in the transportation sector. The available information from the 2050 CECP appears to repeat this mistake, with the majority of policy proposals designed to develop the necessary infrastructure for electric vehicle adoption. Mode-shifting, such as switching from a personal vehicle to public transit, a bike or e-bike, or walking, is given short shrift.

A reduction in vehicles-miles-traveled (VMT) must be an explicit part of any transportation future for the Commonwealth. Mode-shifting (combined with smart, transit-oriented housing policy) is one of the most straightforward methods to reduce VMT. While public transit expansion can be costly (though certainly worth the investment), other options, like increasing walkability or bikeability, often simply require creativity. The 2050 CECP currently proposes to stabilize driving levels through residents having access to alternatives to personal vehicles for transportation. This proposal is in line with the 2025 and 2030 CECP, which proposed 2025 and 2030 VMT per household targets of 20.8 million and 20.4 million, respectively.[20] Said figures are a modest reduction from the 2015 historical figure of 21.0 million.[21] Many stakeholders, including Acadia Center, raised concerns that these targets were

[18] Appendices to the Clean Energy and Climate Plan for 2025 and 2030, at 46. https://www.mass.gov/doc/appendices-to-the-clean-energy-and-climate-plan-for-2025-and-2030/download.
[19] Id, at 51.
[20] Id, at 158.
[21] Id.

too conservative and urged the Commonwealth to focus on stronger targets. However, given the relatively short time period and the time that transportation transformation can take, EEA's conservative estimates are understandable. To carry the stabilization policy forward to 2050 shows a startling lack of vision. Between now and 2050 Massachusetts can and must do as much as possible to reduce VMT.

Mode-shifting must be an explicit policy priority for the Commonwealth, and the 2050 CECP must embrace it. Embracing a strategy that explicitly pursues mode-shifting will not only help meet our Commonwealth's greenhouse gas requirements, but also improve the quality of life in Massachusetts by reducing congestion, improving public health, reducing road fatalities, and, if done properly, lowering costs for consumers. It also should be noted that direct reductions in VMT through mode-shifting will ease the strain on the electric grid as we move toward an electrified transportation system. Currently, the only policies relative to mode-shifting listed in the 2050 CECP are to extend a current policy of "[p]rioritiz[ing] multimodal transportation infrastructure."[22] This vague proposal is insufficient, as it reflects an extension of the status quo. Ensuring that residents have safe, reliable, and affordable access to different modes of transportation is the most direct way to dramatically bring down VMT.

Key Targets & Metrics for 2050 Lack Precise Data

One of the most important components of the 2050 CECP slide deck is the "Key Targets & Metrics" section. As the name implies, this section is meant to outline the milestones by which the Commonwealth will judge success in each of the sectors. The 2025 and 2030 CECP section includes specific targets. For example, the transportation sector is targeting 200,000 passenger EVs on the road and 15,000 public charging stations by 2025.[23] The buildings sector aims for deep weatherization in 20% of the building stock by 2030 and electric heating in around one million residences by 2030.[24] Though additional details are needed with these targets, such as the type of charger and expected locations, they at least provide a specific figure.

The 2050 metrics and targets are significantly less precise. In fact, it is difficult to even call them metrics. Instead, they include vague statements of goals like "[s]ufficient public EV charging infrastructure in place" and "[m]ajority of buildings will be low-emitting."[25] Without additional detail, these targets are nearly impossible to evaluate. This lack of specificity raises unanswered questions for the Key Targets & Metrics in each of the sectors, including the following:

- What does "sufficient public EV charging infrastructure in place" mean? How much public EV charging is needed? What level of charging speed? Where?
- What percentage or range of percentages of all passenger vehicles on the road are expected to be electric?

[22] CECP slide deck, at 9.
[23] Id.
[24] Id, at 10.
[25] Id, at 9, 10.

- What does "majority of all buildings are heated and cooled by electric heat pumps" mean? Is that closer to 51% or 99%? Are these buildings hybrid or all-electric?
- How is "low-emitting" defined?
- How much renewable natural gas or hydrogen will be utilized for home heating? How much geothermal will be utilized for home heating?
- What is the emissions target for natural and working lands? It is currently blank.
- What specific actions will be taken to implement new regional transmission and wholesale marketing reforms aimed at 2031?

Acadia Center appreciates the opportunity to submit these comments. We hope to continue to work together to develop a 2050 Clean Energy and Climate Plan that is as strong as possible. If you have any questions or concerns, please do not hesitate to reach out.

Sincerely,

Kyle T. Murray
Senior Advocate and Massachusetts Program Director
ACADIA CENTER
15 Court Square, Suite 1000
Boston, MA 02108
617-742-0054 x106
kmurray@acadiacenter.org

October 21, 2022

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

RE: A Better City's Comments on the 2050 Clean Energy and Climate Plan

Dear Secretary Card and Undersecretary Chang:

On behalf of our 130 member businesses and institutions, thank you for your leadership in developing the 2050 Clean Energy and Climate Plan (2050 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, but achievable climate goals.

A Better City is honored to sit on the Global Warming Solutions Act Implementation Advisory Committee (IAC), and to co-chair the Transportation Working Group and serve on the Buildings Sector Working Group. A Better City staff have reviewed the publicly available CECP presentation in both the IAC meeting and in subsequent CECP hearings. The enclosed comments, which are high-level in nature given the lack of available detail in the CECP presentation, focus primarily on the CECP transportation and buildings sector strategies and include additional comments for consideration regarding natural and working lands, power, and cross-cutting themes. All comments are informed by A Better City's participation on the IAC and ongoing collaboration with the business community.

In summary, A Better City offers the following recommendations to strengthen the 2050 CECP as the Baker Administration considers final changes before the end of December deadline:

Transportation Sector Policies: A Better City urges the Administration to clarify and strengthen the proposed transit-oriented policies and to explicitly affirm the need for further investment in public transit throughout the Commonwealth. The current 2050 CECP approach continues to prioritize zero emission vehicles (ZEVs) over the improvement and expansion of public transit, representing a missed opportunity to maximize co-benefits that will create a more vibrant, equitable, and connected Commonwealth for all. Beyond prioritizing investment in public transit, the 2050 CECP should be sure to provide support for commercial fleets and Light Electric Vehicles (LEVs), consider the advancement of smart roadway pricing strategies through a partnership with federal government, and include employer-focused efforts, among other suggestions.

Buildings Sector Policies: A Better City recommends prioritizing deep weatherization as a pre-requisite to building electrification (with sufficient incorporation of digital technologies like Building Automation Systems) and committing to the completion of a study of the projected increase in electricity demand by load zone to inform strategic and sequenced electrification of the building and transportation sectors. A Better City supports the 2050 CECP's intent to develop a Clean Heat Clearinghouse, establish a climate financing mechanism to spur building decarbonization, and to conduct a public education campaign for building electrification.

Natural & Working Lands (NWL) Policies: A Better City recommends establishing baseline data for existing tree canopy and associated tree canopy loss. For privately owned tree canopy, A Better City urges the Administration to explore partnership opportunities around incentivizing tree canopy protection, maintenance, and expansion on privately owned land *first,* before considering regulatory approaches to limit deforestation. We recommend establishing a Developer Focus Group or Private Landowners Task Force to better understand existing governance, financing, and implementation structures for tree canopy maintenance on privately owned NWL. We also recommend the Administration consider how to prioritize low-canopied environmental justice communities for tree planting efforts.

Power Sector Policies: A Better City recommends the Administration include more emphasis and commitment to grid reliability alongside electrification, which will be essential in ensuring a safe transition to a decarbonized economy that avoids power failure. We recommend looking into innovative grid resilience solutions like virtual aggregation of distributed energy resources with flexible load in times of peak load strain on the grid, like in heat emergencies. We also support the ongoing need to ensure equitable energy siting of our energy infrastructure. A Better City recommends that in addition to enabling community-informed processes for equitable energy siting, that the Administration also coordinate these efforts across the anticipated Grid Modernization Council and Transmission Working Group established by the 2022 Climate Act.

Cross-Cutting & Enabling Policies: A Better City recommends exploring opportunities for equitable workforce development in Building Automation Systems (BAS), in forestry and other NWL-relevant workforce opportunities, and in the transportation sector. We suggest looking into Boston's recently established PowerCorps program for equitable workforce development and considering opportunities to replicate such a program within MassCEC. A Better City also recommends considering the establishment of a statewide Resilience Commission to fill gaps in climate leadership. As mentioned previously, A Better City also strongly urges the Administration to include the recommendations of the Climate Justice Working Group, and to commit to sector-specific and cross-cutting climate justice priorities.

The Commonwealth must take bold action now to achieve our climate goals and to create the equitable 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
A Better City

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
Oliver Sellers-Garcia, Boston Green New Deal Director, City of Boston

ATTACHMENT A: DETAILED COMMENTS ON PROPOSED TRANSPORTATION SECTOR POLICIES

Summary

In addition to our comments on the 2025/2030 CECP, our transportation recommendations for the 2050 CECP are included below. Overall, A Better City appreciates the extension of several key policies to achieve our emissions reduction targets, including the electrification of transit fleets, prioritization of multimodal transportation infrastructure, and expansion of transit-oriented housing development. However, more detail is needed to clarify and strengthen these and other policies—and further investment in public transit is still needed to balance the disproportionate focus on zero emission vehicles (ZEVs). As Governor Baker's own Commission on the Future of Transportation report emphasized, "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 2050 CECP 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. Beyond prioritizing investment in public transit, the CECP should be sure to provide support for commercial fleets and Light Electric Vehicles (LEVs), consider the advancement of smart roadway pricing strategies through a partnership with federal government, and include employer-focused efforts, among other suggestions.

Extension of Current Policy

- **Implementation of Advanced Clean Cars 2 and Advanced Clean Truck Standards which will require manufacturers to increase the number of zero-emission vehicles on the road.** A Better City appreciates the Commonwealth's leadership in pursuing the implementation of these programs, which have the potential to transform the market for clean vehicles.
    - **A Better City supports the implementation of the Advanced Clean Cars 2 and Advanced Clean Truck Standards.**

- **Build charging infrastructure, including a network of public fast charging stations sufficient to serve the needs of a fully electrified fleet, as well as support for charging at homes and workplaces.** A Better City appreciates the intent of the policy to build out the charging infrastructure needed to facilitate a widespread transition to ZEVs. Charging infrastructure should be designed to accommodate multiple forms of electric vehicles, including smaller-scale Light Electric Vehicles (LEVs) like 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 a range of EVs, including LEVs, and prioritize equitable access to charging infrastructure, including in environmental justice communities.**

- **Continue to expand housing production near public transportation stops.** A Better City recognizes the importance of policies and initiatives like the MBTA Communities & Housing Choice Program that have the potential to catalyze transit-oriented development across the region. However, successful transit-

oriented development quite literally cannot happen without the availability of safe, reliable, frequent, and affordable transit service.

  - **A Better City recommends coupling any future transit-oriented development strategies with substantial investments in the MBTA and regional transit agencies (RTAs) to improve and expand transit service throughout the Commonwealth. See new policy below for additional recommendations regarding public transit.**

- **Prioritize multimodal transportation infrastructure.** A Better City assumes that multimodal transportation infrastructure includes commuter rail, rail transit, roadways and rights of way to accommodate bus lanes, bike lanes, pedestrian paths, complete streets, stops and stations, and supports including power, communications, signals, lighting, signage, maintenance, maintenance facilities, etc. It may be instructive to consider the Mobility as a Service (MaaS) approach which combines access to various modes of transportation and related services into a single, comprehensive, and on-demand mobility platform.
  - **A Better City supports the prioritization of broadly defined transportation infrastructure to provide sustainable, accessible mobility for all residents, including transit-dependent riders and residents of environmental justice communities.**

- **MassDOT and the MBTA will continue to work to meet the goals for electrification of transit outlined in the Climate Bill and detailed in MBTA Rail Vision.** A Better City appreciates the general commitment to meeting the electrification goals outlined in the recently enacted Climate Acts of 2021 and 2022, as well as the MBTA Rail Vision. However, "work to meet" as indicated in the 2050 CECP does not convey the urgency necessary to meet or exceed the electrification targets as expediently as possible.
  - **A Better City recommends clearly articulating the various targets that are embedded in this policy, including specific electrification timelines and deadlines by mode, as well as a commitment to system-wide carbon neutrality.**

- **Expand EV incentives until the upfront cost of electric vehicles reaches upfront cost-parity with internal combustion equivalents.** A Better City appreciates the intent of this policy and encourages the Commonwealth to ensure that future incentives be available for commercial fleets. Additionally, incentives should be available to support the purchase of LEVs including e-bikes, e-cargo delivery bikes, e-cargo family bikes, and e-mopeds, which can help encourage mode-shift from single occupancy vehicles.
  - **A Better City recommends ensuring that future incentives include options for commercial fleets as well as LEVs for both personal and commercial use.**

<u>New Policy</u>

- **Begin to add additional policy incentives to retire old combustion vehicles.**
  - No specific comment.
- **Require commitment to smart charging as part of all EV incentives by 2031.**
  - No specific comment.
- **Adopt fuels policies to promote clean biofuels and hydrogen in difficult to electrify sectors such as aviation, marine and long-haul trucking.**
  - No specific comment.

Additional Policies for Consideration

- **Modernize, expand, and improve public transit throughout the Commonwealth**: A Better City urges the Commonwealth to set a clear goal for modernizing, expanding, and improving public transit, in addition to the previously discussed commitment to decarbonize the transit system. The CECP should declare that additional resources for the MBTA and RTAs are necessary in the short and long term. Additionally, the CECP should include the assessment of more affordable fare products on the Commuter Rail as well as the establishment of an MTBA low-income fare program (which enjoys broad public support across the state) to encourage ridership, support low-income communities, and encourage equitable economic growth.

- **Advance smart roadway pricing strategies through a partnership with federal government:** 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 price the use of roads and bridges more accurately 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. MassDOT could apply in 2022 to the federal Value Pricing Pilot Program (VPPP) at the U.S. Department of Transportation Federal Highway Administration to evaluate the potential road pricing strategies to reduce traffic volumes, improve driver behavior, increase transit ridership, and address air quality concerns. The Congestion Relief Program, a competitive grant program created by the 2021 Bipartisan Infrastructure Law, could provide an additional funding opportunity.

- **Include employer-focused efforts:** Employer-led efforts to encourage alternatives to single occupancy commutes should be a 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 and perform a critical accountability function to ensure TDM outcomes are being achieved. A Better City recommends renewed cooperation between the state and TMAs, which are uniquely positioned to advance and track employer-led efforts to coordinate the use of active transportation, connector shuttles, and ferries to complement public transit and to encourage sustainable commuter trips.

ATTACHMENT B: DETAILED COMMENTS ON PROPOSED BUILDINGS SECTOR POLICIES

Summary

In addition to the comments provided for the 2025/2030 Clean Energy and Climate Plan, A Better City makes the following comments and recommendations to the 2050 Clean Energy and Climate Plan's policy portfolio for the buildings sector, as presented at public hearings in October 2022. In summary, we recommend that deep weatherization be prioritized as a pre-requisite to building electrification (with sufficient incorporation of digital technologies like Building Automation Systems), and that the State conduct a study of the projected increase in electricity demand by load zone to inform strategic and sequenced electrification of the building and transportation sectors. A Better City supports the CECP intent to develop a Clean Heat Clearinghouse, establish a climate financing mechanism to spur building decarbonization, and to conduct a public education campaign for building electrification.

Extension of Current Policy

- **Implement a Clean Heat Standard (CHS) as a regulatory approach to meet buildings emissions sublimits through electrification and energy efficiency:** A Better City continues to be concerned that there is not enough emphasis on prioritizing, incentivizing, and implementing deep weatherization opportunities *first*, prior to the consideration of electrified buildings. Deep weatherization and deep energy retrofits are the most important transformation within the buildings sector to ensure that electrification is successful, affordable, and expediently done. We therefore urge the Administration to clarify that deep weatherization will be a pre-requisite to heat pumps and other electrification efforts in buildings, to help reduce strain on the grid and lower electricity costs for rate payers as buildings decarbonize. We also want to highlight the role of digital technologies, like Buildings Automation Systems, in complementing deep weatherization. Building Automation Systems (BAS), provide greater flexibility in building operations by developing setpoints and optimizing for energy efficiency by space and occupancy at different times of the day. We therefore recommend expanding opportunities for digital technologies that support BAS and the associated equitable workforce development required to train a BAS-fluent workforce. Finally, A Better City also recommends including specific opportunities to leverage Mass Save for deep energy retrofits and weatherization in commercial and industrial (C&I) buildings, in partnership with the newly formed Commercial & Industrial Working Group for the Energy Efficiency Advisory Council.
    - **A Better City recommends that deep weatherization be prioritized as a pre-requisite to building electrification within the 2050 CECP, and that digital technologies like Building Automation Systems be included as complementary approaches to deep weatherization to ensure the greatest energy efficiencies in the operation and decarbonization of our buildings. A Better City also recommends considering specific opportunities to leverage Mass Save for deep energy retrofits and weatherization in commercial and industrial (C&I) buildings.**

- **Instruct utilities to conduct coordinated planning for targeted natural gas decommissioning and electric distribution and transmission systems:** As mentioned in previous comments, A Better City supports the coordinated planning of a comprehensive energy transition approach. As both buildings and transportation sectors transition to electricity, we suggest a study be conducted to understand the resulting increase in electricity demand by load zone and sub load zone over time, in conjunction with understanding the current capacity of the grid by load zone and sub load zone. This would help to understand what areas have the capacity for electrification now, and what areas will require additional capacity before pursuing electrification. Conducting a study on electric capacity by load zone would help to sequence the electrification of buildings and transportation based on current and new electrical capacity, to ensure that the increasing demand is safely and strategically managed, and grid failure is avoided.
    - **A Better City recommends the 2050 CECP include a study of the projected increase in electricity demand from electrified buildings and transportation by load zone and sub load zone, alongside**

the current electrical capacity of each load zone and sub load zone. Such a study would help to ensure electrification is sequenced appropriately and safely by load zone. We recommend this study be done in coordination with the newly established Grid Modernization Council and Transmission Working Group, as per the 2022 Climate Act.

- **Develop a Clean Heat Clearinghouse as a center point of contact for customers for all clean energy solutions (e.g., deep weatherization and energy efficiency measures, solar, heat pumps, EV charging, storage):** A Better City supports the development of a Clean Heat Clearinghouse as a one-stop-shop for clean energy solutions. As there are already many leading programs and experts for clean energy solutions, it is essential to build upon these resources and existing expertise, as opposed to reinventing the wheel. We have also noticed that many resource hubs offer robust residential clean energy solutions but lack the same resources for large commercial and industrial buildings, whose emissions reduction potential is the greatest. We recommend ensuring resources for all buildings are provided.
    - **A Better City supports the development of a Clean Heat Clearinghouse, provided that it can help to build and expand upon existing resources and expertise. We also recommend expanding resource offerings for large commercial and industrial buildings, some of the largest emitters in the state, as many existing resource hubs tend to focus primarily on residential clean energy solutions.**

- **Establish climate finance mechanisms to de-risk and mobilize private sector investments for buildings pursuing deep decarbonization:** A Better City supports the establishment of a finance mechanism like a climate or green bank in Massachusetts to help spur deep decarbonization of existing buildings. We suggest connecting with the Boston Green Ribbon Commission and their efforts to establish a two-year pilot for a MA/Boston Climate Bank to help fund equitable decarbonization of the built environment. This effort is intended to help equitably fund compliance with Boston's BERDO 2.0 and similar building decarbonization policies and is being jointly pursued by the Green Ribbon Commission, City of Boston, MassCEC, Bank of America, and others. We also suggest leveraging federal funding opportunities like the Inflation Reduction Act for seed funding. Finally, we recommend considering what governance structures will be needed to equitably, transparently, and effectively administer and govern the disbursement of funds over time (e.g. there currently is no existing governance structure that could allocate climate resilience funds at a regional scale, for example, across jurisdictions within the Commonwealth – please see our "climate leadership" recommendations below).
    - **A Better City supports the establishment of a finance mechanism and recommends connecting with the Boston Green Ribbon Commission and considering how to leverage federal funding opportunities like the Inflation Reduction Act for seed funding. We also recommend considering what governance structures will be needed to equitably, transparently, and effectively administer and govern the disbursement of funds over time.**

- **Conduct a comprehensive public education campaign and implement community-level engagement to build momentum for building electrification:** A Better City supports the implementation of a public education campaign to build momentum for building electrification. We recommend the campaign include all building types.
    - **A Better City supports the implementation of a public education campaign for building electrification and urges the Administration to consider additional staff capacity to help provide technical assistance to stakeholders engaged in the public education campaign as well as building owners seeking to decarbonize their building portfolios.**

ATTACHMENT C: COMMENTS ON PROPOSED NATURAL & WORKING LANDS (NWL) POLICIES

Summary

In addition to our comments on the 2025/2030 CECP, our recommendations for the 2050 CECP are included below. A Better City remains concerned that there is not sufficient emphasis on establishing baseline data for existing tree canopy and associated tree canopy loss on both public and private land, nor is there sufficient emphasis on a need to partner and coordinate with private landowners on NWL solutions (given that the majority of existing NWL in Massachusetts are privately owned). We also urge the Administration to consider how to prioritize tree equity in low-canopied environmental justice communities for tree planting efforts, and how to partner with private landowners, land trusts, community-based organizations, and the business community on NWL solutions for privately owned land. A Better City urges the Administration to explore partnership opportunities around incentivizing tree canopy protection, maintenance, and expansion on privately owned land *first,* before considering regulatory approaches to limit deforestation. We recommend establishing a Developer Focus Group or Private Landowners Task Force, similar to what Boston did while gathering input for the 20-Year Urban Forest Plan, to better understand existing governance, financing, and implementation structures for tree canopy maintenance on privately owned NWL.

Extension of Current Policy

- **Expand NWL conservation with federal and state funding, state support to municipalities and Regional Planning Associations (RPAs), and options to channel private investments to NWL conservation**: While we agree that more private investments are needed in NWL conservation, we are concerned that the 2050 CECP policies presented do not do enough to consider how to track, manage and steward, and fund NWL conservation on privately owned land, *in partnership* with large private institutional landholders. Given that over 60% of Boston's existing tree canopy is held on privately owned land, and that the majority of our statewide NWL are in private ownership – it would be helpful to empower solutions that partner with large institutional and private landowners across the state on tree canopy data, preservation, maintenance, and expansion on private land. Finally, we recommend considering releasing a Request for Information on what is needed for tree planting on privately owned land as in the case of Boston's efforts around private tree canopy, and how such initiatives may build upon the leadership of land trusts and private land conservation groups in the Commonwealth. It will be especially important to explore public-private partnerships, incentive programs, and collaborative opportunities with private landowners first, *before* considering regulatory pathways like tree protection ordinances that would encroach on private land management (see more under "explore regulatory pathways to limit deforestation," below).
    - **A Better City recommends that the 2050 CECP track tree canopy coverage data over time on both public and privately owned land and partner with large institutional and private landowners on solutions for NWL. We also recommend launching a RFI for tree planting and maintenance on privately owned land, like with Boston's recently released RFI, to help build partnership with private landowners, land trusts, and relevant stakeholders on long-term private tree canopy stewardship and maintenance.**

- **Encourage local tree supply and expand planting efforts to more state partners (e.g. NGOs, schools, youth groups):** As mentioned above, we are concerned that there is not enough baseline data or coordination with private landowners and institutional landowners on NWL solutions, in addition to proposed efforts on public lands and with state partners. A Better City supports and appreciates the earlier CECP commitments to expanding new tree canopy coverage and climate-smart forestry, as well as the expansion of the 2050 CECP's intent to encourage local tree supply and planting efforts. However, we are concerned that there is not enough emphasis on *existing* tree canopy maintenance and stewardship in addition to local tree supply, nor on the workforce required to maintain a healthy tree canopy throughout the state. With new trees in Boston seeing mortality rates of around 40% in early years of planting, and with the threat of land conversion from

development across the state, we urge the Administration to consider how to better protect, preserve, and maintain existing forest canopy in partnership with private landowners. We recommend prioritizing the maintenance of existing tree canopy clusters when possible, which are more effective in delivering climate and community resilience co-benefits than individual plantings of trees. Additionally, we are concerned that there is not sufficient emphasis on improving tree equity across the Commonwealth's communities and ensuring that our lowest canopied neighborhoods are prioritized first in new planting opportunities. Finally, we urge the State to consider the workforce required to maintain and steward tree canopy in perpetuity, and to pursue training programs for forestry similar to the PowerCorps model in Boston, alongside the ongoing support of land trusts and private land conservation organizations.

  - **A Better City recommends establishing baseline data and targets for protecting and maintaining existing tree canopy on both public and private land, as well as targets for improved tree equity that prioritize low-canopied environmental justice neighborhoods whenever possible. Finally, we recommend establishing statewide programs to support equitable workforce development in forestry to help build the workforce required for ongoing maintenance and stewardship of healthy tree canopies.**

- **Develop methodologies for quantifying GHG emissions implications of large-scale land clearing and potential options for mitigation:** A Better City remains concerned that there is no stated intent to track carbon sequestration or carbon removals associated with baseline tree canopy and/or expanded tree canopy in NWL over time. Before developing methodologies for quantifying the GHG implications of large-scale land clearing, we believe that it will be important to establish existing tree canopy and associated GHG emissions data *first*, to help establish baselines for existing tree canopy, as well as rates of tree canopy loss on different land typologies throughout the state. Without these baselines, the State will not be able to track progress or the effectiveness of mitigation options for land clearing. In particular, we are curious how the NWL sector targets and metrics for mitigation of land clearing will relate to privately owned land, particularly institutional land. It would be helpful to empower solutions that partner with large institutional and private landowners across the state on tree canopy data, preservation, maintenance, and expansion on private land whenever possible.
  - **A Better City recommends that the 2050 CECP establish baseline tree canopy coverage and tree canopy loss data on both public and privately owned land, prior to the consideration of mitigation options for land clearing, and empower NWL solutions that partner with private and institutional landowners across the state.**

<u>New Policy</u>

- **Explore regulatory pathways to limit deforestation:** As mentioned above, A Better City is concerned that the 2050 CECP does not place enough emphasis on partnership and collaborative opportunities with private landowners on tree canopy maintenance, expansion, and the avoidance of tree canopy loss. Within Boston's 20-Year Urban Forest Plan development process, A Better City sat on the Community Advisory Board as a Collaborating Partner, and also worked with the City to hold a Developer Focus Group, which was facilitated by a consultant and allowed private landowners and developers to share their comments on tree protection ordinances and similar policies intended to protect tree canopy from deforestation. In the Developer Focus Group and throughout meetings with private landowners, there were a lot of concerns voiced about the unintended consequences that tree protection ordinances may have on stalling affordable housing development. Additionally, with new tree planting mortality as high as 40% in Boston, with new tree plantings dying in many cases from threats beyond the landowner's control (e.g. from drought, gas leaks, storm/wind damage, etc.) – we are concerned about considerations of regulatory pathways for limiting deforestation, before empowering landowners with the information and staff capacity needed to sufficiently maintain and steward tree canopy long-term.

- **A Better City recommends the State release a 20-Year Forest Plan, including considerations for expanded tree equity and public-private partnerships, *before* considering any regulatory frameworks to limit deforestation. In particular, we recommend establishing a Developer Focus Group or Private Landowners Task Force at the state-level to help establish baseline data, governance structures, and financing gaps in private tree canopy, and to help inform opportunities for incentivizing better stewardship and expansion of tree canopy on privately owned land.**

Additional Policies for Consideration

- **Incorporate climate and community resilience co-benefits within NWL targets:** 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. 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.

- **Prioritizing environmental justice and historically disinvested communities in our nature-based solutions and ensuring tree equity:** We appreciate the addition of 2050 CECP targets looking to permanently conserve 40% of Massachusetts land and water and to add at least 64,000 acres of new and riparian trees by 2050. As mentioned previously, we are concerned that there is no mention of tree equity in the NWL targets for 2050. 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 communities like Springfield 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. We recommend following the 20-Year Urban Forest Plan model 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.

- **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 clear targets, metrics, or best practices 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. A Better City suggests including the targets and metrics for carbon sequestration from the 2050 Decarbonization Roadmap Study within the 2050 CECP itself, as well as the establishment of a Carbon Sequestration Task Force. Since the initial ideation of a Carbon Sequestration Task Force was intended to work across state agencies only, we recommend either expanding representation of the Task Force to include stakeholders with expertise in carbon removals like A Better City's membership, or to establish a parallel Carbon Sequestration Working Group that would partner with the Task Force. 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.

ATTACHMENT D: COMMENTS ON PROPOSED POWER SECTOR POLICIES

Summary

In addition to our 2025/2030 CECP comments, A Better City offers additional considerations below for the power sector. We recommend the Administration include more emphasis and commitment to grid reliability and affordability alongside electrification, which will be essential in ensuring a safe transition that avoids power failure. We recommend looking into innovative grid resilience solutions like virtual aggregation of distributed energy resources with flexible load in times of peak load strain on the grid (like in heat emergencies). We also support the ongoing need to ensure equitable energy siting of our energy infrastructure. A Better City recommends that in addition to enabling community-informed processes for equitable energy siting, that the Administration also coordinate these efforts across the anticipated Grid Modernization Council and Transmission Working Group.

Extension of Current Policy

- **Modernize electric distribution system infrastructure to facilitate electrification and other decarbonization strategies:** 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 (long-duration and largescale storage, as well as building-specific), and peak demand management with distributed energy generation resources to ensure the grid's peak demands are reduced as much as possible. We recommend looking into opportunities for scaling up distributed energy generation during peak load events in Massachusetts, assessing lessons learned from California. 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 2050 CECP include strategies and incentives for programs like microgrids, storage, and peak demand management to ensure grid resiliency. We also recommend ensuring that the 2050 CECP encourage critical electric grid infrastructure upgrades to be resilient to the impacts of climate change, including extreme heat.**

- **Ensure that siting for solar, offshore wind, transmission, and distribution infrastructure consider the impact on EJ communities:** A Better City supports the need to ensure equitable energy siting that also keeps pace with demand. While we appreciate that the 2022 Climate Act establishes an anticipated Grid Modernization Council and Transmission Working Group, we urge the Administration to convene these groups, in partnership with utilities, businesses, and environmental justice community stakeholders, as soon as possible. Additionally, we continue to hear from our membership about delays in interconnection for needed renewable energy projects, and we also urge the Administration to consider opportunities to expedite and streamline the interconnection process for renewable energy projects that are already in development.
    - **A Better City recommends convening the Grid Modernization Council and Transmission Working Group as soon as possible, and ensuring that both groups work with businesses, utilities, and environmental justice communities in the expedient and equitable siting of needed energy infrastructure.**

ATTACHMENT E: CROSS-CUTTING & ENABLING POLICIES

Summary

A Better City appreciates the addition of cross-cutting and enabling policies into the 2050 CECP. We recommend exploring opportunities for equitable workforce development in Building Automation Systems (BAS), in forestry and other NWL-relevant workforce opportunities, and in the transportation sector. We suggest looking into Boston's recently established PowerCorps program for equitable workforce development and considering opportunities to replicate such a program within MassCEC. A Better City also recommends considering the establishment of a statewide Resilience Commission to fill gaps in climate leadership. Finally, as in our previous comment letters, we urge the Administration to include the recommendations of the Climate Justice Working Group, and to commit to sector-specific climate justice goals within each sector of the CECP, in addition to committing to cross-cutting climate justice priorities across all sectors of the CECP.

- **Workforce Development**: As mentioned above, we believe that significant equitable workforce development is needed to complement deep weatherization and decarbonization of existing buildings through digital technologies like Buildings Automation Systems (BAS), as well as within our forestry and maintenance of tree canopy on both private and public lands. There are also significant opportunities within the transportation sector, in which workforce development could help to fill needed positions within the MBTA and regional transportation agencies, as well as anticipated positions to come with the decarbonization and modernization of our transportation systems.
    - **A Better City supports the focus on equitable workforce development opportunities as a cross-cutting priority of the 2050 CECP and suggests looking into Boston's PowerCorps model for equitable workforce development at the state-level.**

- **Climate Leadership - Establishing a Statewide Resilience Commission:** We remain concerned that there is not a sufficient governance structure at the state-level to coordinate and lead climate and community resilience efforts across jurisdictions. While we appreciate the leadership and transformative successes of the Municipal Vulnerability Program (MVP), we are concerned that this does not go far enough to ensure the strategic, coordinated, and *regional* approaches to resilience that will be needed to fortify the very infrastructure needed to achieve our emissions reduction goals, including our transit system and electric grid. Since much of our critical infrastructure is cross-jurisdictional, and as we anticipate multiple opportunities to leverage federal funding in addition to a possible MA Climate Bank, we strongly recommend the establishment of a statewide Resilience Commission to help govern, implement, and finance needed regional climate and community resilience initiatives.
    - **A Better City recommends establishing a statewide Resilience Commission to help govern, implement, and finance regional climate and community resilience initiatives and lead opportunities to leverage federal funding.**

- **Environmental Justice (EJ) and a Just Transition:** A Better City recommends revisiting the cross-sector climate justice priorities put forward by the IAC's Climate Justice Working Group and including climate justice commitments in each sector detailed in the CECP. We also recommend including overarching CECP recommendations on the equitable funding and financing of a transition to a decarbonized economy, including but not limited to 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. As suggested above, we recommend connecting with the Boston Green Ribbon Commission on their two-year pilot project for a MA/Boston Climate Bank. Finally, we suggest the CECP consider equitable climate governance commitments that can help govern, implement, and finance our climate solutions over time. We appreciate the recent establishment of a state-level Environmental Justice Council as mandated by the Climate Act of 2021 and are eager to hear more details

about the incorporation of the Council's recommendations into the 2050 CECP. Specifying and affirming equitable climate governance, implementation, and financing commitments in the 2050 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 inclusion of recommendations from the recently established Environmental Justice Council into the 2050 CECP itself.**