Comments on 2050 Emissions Limit, submitted by April 10, 2020, 5pm

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Name (First)	Name (Last)	Affiliation (town or organization)	Please provide feedback on the proposed structure of the Massachusetts net-zero greenhouse gas emissions limit for 2050.
Kate	Albrecht	citizen of Plainfield	Thank you for your work. To be realistic for our grandchildren we really need to set a faster time table. We all know this, its just plain difficult. Biomass burning and trash incineration are not acceptable forms of emitting carbon into our atmosphere for the purpose of electrical generation or "getting rid of" our trash. Bio mass on a very limited NOT worthy of infrastructure investments. Forestry needs to be done VERY wisely and skillfully. NOT with bottom line cost outweighing rebuilding our forest ecosystems, to be both great carbon sequesterers, sources of sustainably harvested wood, supporting biologically diverse wildlife, fish, flora and fauna, recreational activities including hiking, boating, canoeing, fishing, hunting. We don't need to reinvent the entire wheel! with a path forward as well for the Commonwealth and landowners. https://www.esf.edu/nativepeoples/people.htm SUNY Center for NAtive Peoples and the environment. https://www.mtewood.com/SustainableForestry Menominee Tribal Enterprises I respect the very hardwork and knowledge of the State forest employees, I just really urge us all to open our eyes and hearts to ALL the available knowledge to move us forward in a wise way.
Dorothy	Anderson	FRRACS Weymouth	Environmental justice must be a keystone of our work to get to net-zero, All electric transportation and net zero affordable housing, plus safe and green schools and work places. Carbon pricing if it protects moderate and low income families. No biomass. It is bad for the air and causes asthma and heart disease. Municipal light plants must be part of the equation.
Timothy	Austin	South Hadley	To Whom it May Concern: I am writing with feedback on the proposed structure of the Massachusetts net-zero greenhouse gas emissions limit for 2050. I'm sure much of the discussion of this plan will be focused on renewable energy solutions and constructing sustainable buildings. While these things are important, attention should also be paid to preserving forested land in our state. The more we are able to keep forests intact, especially the ones that contain the oldest trees, the more carbon we will be able to pull from the atmosphere. Preserving forests is one especially powerful way that we can reduce the impacts of climate change, and move closer to net-zero greenhouse gas emissions. Please consider this important piece of the puzzle. While there are many other benefits forests provide to us, their role in fighting climate change cannot be ignored. Thank you. Sincerely, Tim Austin

Deborah	Axner	Somerville	• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions.• Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts.• Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
Glen	Ayers	Greenfield	While the 2050 GHG goal should be zero carbon emissions, and not net-zero, the next 10-years are even more important, since the amount and severity of climate change has a long lag period and what we do today is more important than what we do tomorrow or 30-years from now. Thus it is critically important to set a 2050 goal of greater than a 100% reduction, since the 1990 "baseline" is an arbitrary benchmark that while useful for reference, should not be the absolute goal. We actually need to achieve negative emissions, not just reductions compared to the 1990 levels. As such, setting the 2030 reduction target should be even more ambitious. Based on the failure to meet the 2020 target, the Commonwealth needs to obviously do much more and do it faster. The past 12-years have shown us that the low-hanging fruit is easy to pick, but the next 10-years of reduction will be more than twice as hard, and it will continue to get ever harder to reduce the remaining emissions as the easiest and cheapest reductions are eliminated. We need to start taking this much more seriously than we have up to now. A good start for the 2030 target would be a 75% reduction, which is the bare minimum of what is required, and which leaves the most difficult and expensive reductions to be done over a longer time period, which is what it is going to take. Otherwise, we will not have the time or ability to develop the new technologies that will be required, nor will there be any incentive to develop them when the reductions are left for some future generation to address. Replacing all ICE cars with electric vehicles within 10-years is completely doable and would result in a 75% reduction. Replacing all wood and fossil fuel heating with zero-emission tech would is also doable. Eliminating tax-incentives and subsidies for deforestation and forest degradation would also result in a significant reduction in GHG emissions, on the order of 75% over the decade. It is probably too late to avert catastrophe, but as long as we can make an effort we should at least make it as good as we can. Everything we can do, as soon as possible, will not be enough, but it is all that we can do with the time we have left. 75% reduction by 2030 and negative reduction by 2050. To do otherwise is not sustainable or responsible, to this or future generations. Thanks for taking my comments seriously. This is an EMERGENCY. We need to act like it.

Maiyim	Baron	Brookline. Elders Climate Action - Massachusetts Chapter	I agree with these points and urge you to consider them: • Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. *Extend the comment period in the current unusual circumstances. Thank you for your consideration.
Carolyn	Barthel	Mendon	Massachusetts needs to update its 2030 and 2050 goals from the 2008 Global Warming Solutions Act in order to be more in alignment with the latest science:• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts.• Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.

Michaela	Bevillard	Lowell resident	Hello, First of all, I think public comments should be made visible to all ASAP, like on a forum. This is very much siloed. While this plan seems to encourage people to drive energy-efficient/electric cars, there will still be plenty of SUVs on the road. According to a summary analysis of a report by the International Energy Agency, SUVs are the second biggest cause of the rise of global CO2E in the past decade, right behind the power sector. The Guardian summarized that if SUV drivers were a nation, they'd rank 7th for carbon emissions in the world. So with that in mind, what kind of actions will we be taking? Will there be incentives for citizens to purchase electric cars and/or use public transportation? Can there be increases taxes on SUVs imported to MA dealerships, which will deter the number of SUVs available, and the taxes could offset the CO2E they'll release and/or fund the incentives previously mentioned. Will MA also help lead the charge on the auto industry to innovate or reform? There is a historic precedence for continued rollbacks of emission standards for carmakers. It seems rather difficult for us to work for decarbonization while industries like the automotive industry to keep producing products that don't align and negatively affect our efforts. It seems undue that the responsibility for emissions falls wholly on the consumers (both industry and individuals) to work for net 0 CO2 emissions while producers have little to no onus, such as the fossil fuel indistry to land clearing.
Judith	Black	Sustainable Marblehead, 350MASS	Given that many sectors must meet stringent new standards, suggest that they be acknowledged and a plan for each design and acted on as immediately as possible:New Structures- We must have net zero stretch codes going forward.Old Buildings- Support to strengthen their envelopes and windows, and transition their heating systems to electric/air source heat pumps, ground-source heat pumps, geothermal, solar on roofs.....Transportation-Draconian measures are needed which would eliminate personal vehicles, including diesel trucks and busses- except for emergencies, and a deep and wide broadening of zero-emission mass transit options. It is important to remember how much-imbedded carbon there is in new vehicles, and so a transition from personal (even if they are electric) to mass transit is important. Airline travel must be curtailed for all except the most important journies.Extreme tourism should be a thing of the past unless you get places as Greta got to the US.The US government must subsidize train travel. It is insane that it is cheaper to fly (emitting hideous gasses) than take a train.Improved bicycle infrastructure. If we build it, the bikers will come.Phasing out of plastics. They require oil and are toxic often to the product they hold and always to dispose of.We need strong goals to meet every 5 years, which will require help, incentives, and support from the government. 2050 is too late for a de-carbonization. The planet will no longer be livable by then. We need to aim for 2040 with strong action taking place immediately.Finally, we the people, need to feel that this transition brings us to a new way of living that is modest, kind to our host planet, ad primarily local, with community gardens, small shops, and local industry taking on the roles that multinationals have had for many decades. There model of growing ingredients in one place, transporting them for manufacture, packaging them, then transporting again is completely counter to sustainability.
Laurie	Boosahda	Deerfield Energy Committee	The governor's plan is a positive first step. However we cannot reach zero omissions without having people recognize where the carbon emissions come from in our daily actions. The most universal way to do this is through carbon pricing. All the companies out there know that this is on the horizon. It does not make sense to stall any longer. We need to take into account small businesses and low income households but it can be done. Please be bold and make MA a leader towards a habitable planet for our children.

Barthold	Bouricius	Montague	Please don't let this be the road ti too little to late. Current scientific research tells us that we have less than 10 years to drastically change our policies that impact climate change if we are to avoid catastrophic results. Most politicians, as we have seen with with Covid 19 pandemic, do not respond to the science until the worst obvious results are upon us. Epidemiologists have been warning of this sort of pandemic for decades, but too little research funding followed by much too late preparation has been the political response. I fear the same is happening with a hugely greater threat to the very survival of civilization is now looming. The forests of the earth have been shown annually to be removing roughly 25% of the man made CO2 from the atmosphere, with the oceans and few remaining undisturbed grasslands and small portion of properly farmed agricultural land removing another 40%, but this combined sink comes nowhere near removing it all, so carbon dioxide keeps rapidly accumulating in the atmosphere. It is critical that not only stop adding CO2 to the atmosphere, but that we use proforestation to remove much more of the atmospheric carbon dioxide than is now the case. This means increasing the amount of carbon being removed and stored in the trees, roots and soil of our forests, by placing a moratorium on logging on public lands. Here is a link to a peer reviewed article on this subject: https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full
Tim	Brainerd	Sustainable Framingham	#1 OppositionPlease do not consider 'biomass' in any form as a renewable energy source. Any scientist will tell you it is like burning coal. Better the biomass be used as compost. (I'm sure that there are folks with wood chips, damaged lumber, yard waste, brush clearings who would like to sell it to an energy producer. Their short-term private gain would be a large long-term cost to all human beings...and cost the state more down the road.)#2 HopeI hope that tentative targets will be posted by July 2020, even if the current administration has to qualify them by saying that research is ongoing. Targets allow all concerned to see a path to be managed, not just hoped for. And, regarding the research efforts, i trust the various state agencies will subject them to peer reviews; otherwise I fear the reviews will be under the auspices of private interests. Make the green house gas targets aggressive: 60-80% reduced by 2030 at the latest.#3 Environmental Justice Here I worry about the many human beings subjected to all manner of air contaminants, water toxicity, and more severe and erratic weather. As a society, we need to see people in West Roxbury, Weymouth Landing, and parts of every large city in the Commonwealth as more than factors of production and units of consumption. Gas pipelines and compressors for overseas sales are the antithesis of a 'commonwealth'. Smoke stacks, dumps, brown fields, and gas/diesel vehicles hit inner city folks in the lungs much more than in Swampscott, Wellesley, and upscale suburbs. (One Boston teaching hospital pulmonary doctor said that electric vehicles and (increased) rapid transit would generate a huge savings on ER visits and hospitalizations for COPD, asthma, and many cardiac conditions.) Tainted children will be slower learners, even in the best of school systems.

Marc	Breslow	Climate XChange	SENDING WITH GRAPHS VIA EMAIL Massachusetts Decarbonization Roadmap: Comments from Massachusetts Campaign for a Clean Energy Future https://www.mass.gov/forms/comments-on-emissions-limit-for-2050 Dear Secretary Theoharides: We thank the Baker Administration for committing to reach net zero greenhouse gas emissions by 2050. The International Panel on Climate Change states that this target is necessary to stabilize the planet's climate and protect ourselves from devastating results from the climate crisis. We also thank the administration for the extensive planning process it is going through for how to get to the 2050 mandate and an interim goal for 2030. The signers of this letter appreciate the opportunity to submit comments on the Commonwealth's Determination of Statewide Emissions Limit for 2050 - "Net-Zero Determination." Below are our comments on the targets for 2030 and 2050, and the set of policies necessary to get us to those targets. 2018 projections will not get us to the 2030 or 2050 goals: EEA's latest set of public projections, made in December 2018 to the Implementation Advisory Committee (IAC), would get Massachusetts only to a 35% reduction in emissions in 2030 and a 47% cut by 2050. This compares, for example, to the latest IPCC goal of 45% below global 2010 emissions by 2030, and to Governor Baker's call for net zero emissions in 2050. We realize that EEA is doing further projections since December 2018, with additional policies, but none are yet publicly available. To get to net zero by 2050, on a straight line from the present the state must cut emissions by approximately 50% by 2030, including any offsets. Given that much of the world will have difficulty achieving the IPCC's 45% target, Massachusetts should be a leader and set its target for 2030 substantially above 50%. The Administration's policy scenarios and modeling should include the most ambitious possible 2030 goal. 2019 IAC policies inadequate for 2030 goal without carbon pricing: Given the state of the science on the climate crisis, it is critical that we achieve not only the 2050 target but also the shorter-term target for 2030. The inventory of policies put out by the IAC in August of 2019 are unlikely to get us to a 50% reduction by 2030, because most of them are long-term in their impacts. These include, for example, further extension of building codes, promoting alternatives to driving, "integrate transportation and land use planning," and "ensure Massachusetts' electricity distribution system is 2050-compliant." The IAC inventory includes carbon pricing in three places - for buildings (Policy #1, "mandatory emission reductions," pages 2 and 7), transportation (Policy #3, "price transportation externalities," pages 6 and 30), and economy-wide ("Regional/State/Federal and economy-wide", page 31). All three of these policies must be fully considered and included in the modeling for the GWSA targets. TCI will not get us to 2030 target: The Transportation and Climate Initiative (TCI), based on the strongest scenario modeled, with a 25% reduction in transportation emissions, will only yield us an additional 3% decrease in economy-wide emissions by 2030 (federal fuel efficiency standards, which make up 19% of TCI's reductions in transportation, are already in the 2018 projection). Thus, carbon pricing extended to the buildings sector and economy-wide must be implemented in the near future if we are to reach the 2030 target. Protection of low and moderate income people: Carbon pricing policy must ensure that low and moderate income people who are the most impacted by climate change come out financially ahead. This will require both targeted infrastructure investments that help these communities transition to low-carbon energy sources and income-based rebates to offset cost increases due to carbon pricing. Spending the revenues: Billions of dollars will be needed to pay for the improvements in buildings and transportation needed to cut emissions sharply. Carbon pricing, from RGGI, TCI, and buildings can yield over $1 billion a year in revenues, as shown in the table below. It is also sufficient to provide a high level of funding for Environmental Justice (EJ) populations. To help all members of society transition to cleaner options, at least 40% of investment funds should be directed to projects that enable low and moderate income people and Environmental Justice populations to reduce greenhouse gas emissions. Carbon pricing sectors Annual revenue $ millions RGGI $90 TCI (20% vs 25% cut in emissions) $150 to $590 Buildings - rising from $20 to $40 per ton $330 3 sectors $570 to $1,010 To EJ populations at 40% of total funding $230 to $400 Health and other co-benefits: A recent study by coalition member Climate XChange showed that in California's cap-and-trade program the public health and GHG reduction benefits of the investments made with the funds raised were almost five times the cost of the programs. We would urge EEA to fully model these health benefits in looking at the benefit-cost of its climate change programs, along with other co-benefits such as increases in employment. Thank you for the opportunity to comment on the Commonwealth's net-zero determination and plans for its 2030 limit. We look forward to further dialogue on these critical issues for the Commonwealth and the future of the planet. Sincerely, Allandale Coalition, Alliance for Business Leadership, Arlington Street Church, Boston (Rev. Fred Small, Minister for Climate Justice), Citizens Climate Lobby-Massachusetts, Clean Water Action, Climate XChange (Marc Breslow, Policy & Research Director), Healthy-Kids.info (Ellie Goldberg), HealthLink, League of Women Voters of Massachusetts (Judy Zaunbrecher, Co-President), Massachusetts Interfaith Power and Light (Jim Naill, President), Mothers Out Front-Massachusetts, Our Climate (Eben Bein, New England Field Coordinator), Sustainable Marblehead, Western Massachusetts CAN

Carolyn	Britt	Ipswich Planning Board	I think the limits should be as restrictive as possible, requiring net zero by 2050, with limited options for what factors are allowed for the carbon offsets. Such offsets should be in MA, and can include tangible absorption of carbon by land and plant, not just reduction of carbon by human uses.Sitting on the town Planning Board and speaking with developers, their architects, and engineers is appalling. The level of misinformation and disinterest in electrification, renewable energy, and net zero building is very low. When I ask them what they are doing to implement some of the necessary changes, their responses are very off-hand. We need to make clear as soon as possible that these issues are critical and must be considered.The state taking a strong stance on our goals over the next decades is a key way to convey the urgency. We are in a climate emergency.Thank you.
Justin	Brown	Boston	Dear Governor Baker & EEA Secretary Theoharides: I urge the Commonwealth to adopt the following reduction targets for greenhouse gas emissions: 60% or more by 2030 and 100% by 2050. While this is in line with the science most recently outlined by the IPCC, I fully expect that the next report by that group will indicate that government must move even faster. Furthermore, all plans to reduce emissions but be done through the lens of climate justice: putting those communities who bear the overwhelming burden of environmental pollution at the forefront. These communities are typically communities of color, low-income communities, and those who have the least access to policy-making power. These communities must be a part of the planning and execution of strategies to move the Commonwealth away from fossil fuels and towards safe and healthy renewable energy. Thank you. Sincerely, Justin Brown Boston
Jessica	Brown	Boston	I think we need to reduce emissions by 100% well before 2050. Eastern MA is particularly vulnerable to the effects of climate change, and we're already feeling them (e.g. deer ticks living throughout all four seasons, more unpredictable/uncharacteristic weather, etc.). There are so many steps to reduce our carbon footprint as a state that we are not taking at the moment, such as powering all public buildings (schools, recreational centers, various offices/department buildings) with renewable energy, and halting the construction of all new fossil fuel infrastructure (the Weymouth compressor station, most notably). MA needs to do better for its residents, particularly those of color, low-income status, and other identities that make them more vulnerable to the climate crisis. The current plan is not ambitious enough.

Zola	Bruner	Fort River Elementary School	To Whom it May Concern, I have a few thoughts about the proposal for the net-zero green house gas emissions limit for 2050. I am guessing that your plan will be focused on renewable energy and constructing sustainable building. Those things are important but I think that you should also redirect some attention to keep Massachusetts forests intact and healthy. I think that by keeping our forests healthy, it will fight against climate change as well as make a positive impact on our climate. I would love it you would put more thought into that side things and make a plan so that our goal of net-zero greenhouse gas emissions will be met. Thank you so much, Zola
Walt	Burnham	Montague	Now is not the time (if ever) to follow an industry detailed plan to "manage" Massachusetts forests. The premise that we have the luxury of experimenting with accepted models is questionable. Carbon sequestration is best achieved by leaving the forests to evolve & mature on their own. The benefits of a hands off policy are already well documented. Massachusetts should be proud to have the largest contiguous untouched forest in the U.S. The takeaway should be an inspiration for other states to follow its lead and stop decimating their forests for what is sadly industry greed. Shade, wildlife-the cleaning & filtering mechanisms that complement aquifers-are all rewards to share we should be grateful for. I implore the State authority to listen to the "other" side-the wildlife, the trees, the streams, doing just fine for us on their own, without any "management." Thank you.
Sue	Butler, RN, MSN, PhD	Cambridge, Mothers Out Front, Sierra Club	It is imperative that we adopt the maximum efficiency, zero emissions approach to energy. It is PAST TOO LATE. We must get our entire economy off carbon and onto renewables urgently! NOW! Make this happen sooner, Best wishes, Sue Butler

Rolf	Cachat-Schilling		I have edited cutting-edge research from USA, China and Germany for 30 years on ecology, forest ecology, soil ecology and resource management. I am a published research author on soil ecology, forest ecology, and Native Northeastern American plant conservation. There is simple logical process that reveals why the "cut for carbon" model is a hoax: 1. Cutting trees and removing that material from any forest reduces the biomass of that piece of forest. 2. All biomass removed from a forest eventually releases its carbon, either rapidly or slowly, because only wood that rots in a forest is recaptured through the closed microbiological carbon cycle. 3. All biomass removed from a forest is attached to carbon released through vehicles and processes that are integral attachments of the removal process. 4. All exposed forest soils are subject to microbial die-off, which is integrally attached to the release of carbon and methane, plus nitrogen and sulfuric acid precursors. 5. Forest microbiological communities are adapted to shade and exposure harms them, reducing their ability to sequester carbon. 6. The rapid growth of young trees as carbon sinks is offset by their small size and total leaf surface area. The math of the "lumber lobby" is bad. An ancient tree, despite its slower total growth in height, comprises many times more surface area than equivalent footprint area of young trees, and it does so more efficiently because of its root network and symbiotic cooperation with other established old trees through fungal-mediated networks. 7. Ancient trees protect younger trees through fungal and inter-species networks. 8. The carbon gained by young trees growing where ancient trees have been cut is offset by the carbon lost by cutting that tree and its decomposition or conversion into products. 9. The inefficiency of processing wood products, shipping them, and distributing goods cancels most of, or even exceeds, the gains made by regrowth.
Gino	Carlucci	Sherborn	I suggest 2 somewhat related initiatives that I believe could have a significant impact on reducing GHG emissions. First, I think we should promote the use of autonomous vehicles in a manner that encourages a movement away from the current ownership model to one of "using it when needed" similar to current car-sharing services. This will facilitate the repurposing of space currently wasted for parking (cars that spend 90%+ of their time unused) into more productive uses for residences, offices, stores, restaurants, etc. In addition to encouraging density needed to allow transit (supplemented by, and not replaced by, autonomous vehicles) to efficiently serve our transportation needs, it also permits existing green fields to continue sequestering carbon, replenishing aquifers, serving as habitat, etc. rather than be developed and increasing sprawl. Secondly, Massachusetts should do its part to encourage a high-speed rail system that can reduce or eliminate airplane travel between cities that are 500-600 miles apart and reserving it for long-haul flights. That also will have a significant impact on reducing GHG emissions. Thank you for the opportunity to comment. -- Gino Carlucci

Nishant	Carr	Amherst	Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. In addition, pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts.Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
Vanessa	CazhoGarcia	Fort river elementary	I think that we should have a plan to get to net zero emissions because I think that they need to be working with the forest people bill that is going around.Right know the plan of Massachusetts net-zero is very unorganized because they haven't had a plan that they have evidence for that it will work.We need to think of plan for this to work out.
Rochelle	Chambless	Chelmsford	Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. *Extend the comment period in the current unusual circumstances. Thank you, Rochelle Chambless
Molly	Chapman	Faith Communities Environmental Network	A key goal for us here on Cape Cod!
Richard	Chase	Commissioner, Princeton Municipal Light Department	I support the goal of the Massachusetts net-zero program. This must include Municipal Light Plants so everyone does their share. The Muni's will need significant time to meet these goals due to existing long term contracts.

Andrea	Chasen	I am a commissioner on the Longmeadow Conservation Commission and I serve as chair of the Longmeadow Energy and Sustainability Committee	There are numerous ways we can achieve the GHG reductions : 1. Keep and promote large old forest growth and use the 2009 Forest Future Visioning Project recommendations; 2.Develop incentives for local zoning boards to use climate change factors for development proposals : too many of these development projects tear down trees and growth areas and replace them with impervious building materials and asphalt, with no regard to the impact on GHG; 3. Develop high speed rail systems to better connect the western part of the state with the eastern part, which would significantly reduce vehicle traffic which accounts for almost 40% of GHG in the state; 4: Create a comprehensive program to reduce reliance on fossil fuel and support communities trying to limit expansion of fossil fuel delivery systems; 5. Heavily educate municipalities on net zero emission construction and financially support projects that use cutting edge technology to reach net zero emissions.
Downing	Cless	Arlington	While I applaud Governor Baker's commitment to net-zero greenhouse gas emissions by 2050, I look forward to swift and bold actions toward making this happen--as soon as the current crisis abates. Furthermore, I would add that climate change is escalating at an alarming rate, much faster than even recently predicted by climate scientists. Therefore, actions are going to need to be even more immediate and bigger, so that we reach net-zero sooner than 2050--probably by 2035.
Deane	Coady	Brookline mothers out front chapter	• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.D138

Deborah	Cohen	Elders' Climate Action	Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. *Extend the comment period in the current unusual circumstances.
Mary Lou	Conca		Our forests are crucial for drawing carbon out of the atmosphere. It is simple communication n sense to preserve and leave them intact. If people continue to drive, contributing to air pollution-then why would anyone destroy forests which help us to breathe better????
anni	crofut	Housatonic	Please be aggressive in moving towards setting and enforcing strict standards for lowering the carbon output in MA. - Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. - Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. - Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
Susan	Crofut		Go for it!
Peter	Curtis	Ashfield, MA	It is essential that every effort be taken to reduce/ eliminate as much GHG emissions as is doable. This is an absolute must. The time for kicking this can is long past.2050 is a target much too far down the road. The time is yesterday.No more gas line development. This was never a *bridge* fuel. It only provides a one way trip to methane pollution. The DPU has been no friend to anyone but the frackers. They have completely sided with the gas industry at the expense of the people and the planet we live on.Enact legislation that encourages on site solar production.Enact legislation that encourages electric transportation both public and private.Forget the politics--- It's the people, stupid!Don't make this forum just for show. Show us you mean to listen and take action now, not 30 years from now.Very concerned and most truly yours,Peter T. Curtis*** ***** Rd.Ashfield, MA. 01330********@gmail.com413 *** ****

Hilary	Davis	HAMILTON	According to the MIT-created modeling (https://www.climateinteractive.org/tools/en-roads/) CARBON PRICING is the most effective method of reducing carbon emissions quickly. A carbon fee and REBATE could be an effective strategy to include now that we are in a recession so that average households are not penalized by that fee. However, without a carbon price I don't think it will be possible for MA to meet its net-zero goals. I believe politicians have been hesitant to adopt a carbon fee because they believe it will be politically deleterious (an unwanted tax). However this is short-sighted and needs to be countered with data, education. Millennials and younger--the voters of the future and beyond--understand that they will be living with the effects of climate change and want the boldest legislation possible. We are willing to make bold changes to our lifestyles and to the way government structures its budget. As a member of the millennial voting block I want to see smart, bold climate legislation -- carbon pricing!
Michael	DeLuca		Net-zero should happen earlier than 2050. It should happen by 2030, to have any hope of actually contributing to the curbing of global climate collapse. Also, please add language to prohibit the destruction of Massachusetts' forests, which are critically important carbon sinks and among the largest and healthiest in the entire US.
Ida	DelVecchio	Quincy	I don't understand how one can blatently and dangerously ignore the science on the carbon emitting pollutants released by the burning of bio fuels and wood products. Makes me think that some "big boys" have financial stake in this game. The should be criminally charged. It's time to end corporate capitalism!!!!!
Denis	Dettling Kalthofer	Medford	Hello Governor Baker and the task force for Net-Zero emissions,Thank you for undertaking this very necessary program.I have been working on the climate change issue for a number of years and am familiar with what can be done. Here are my suggestions:1. Do not back-burner this important program. I know we are all dealing with the immediate emergency of the corona virus. However, this is one crisis of potentially many related to dense population and intense resource use - factors that are also driving climate change. Additionally, the long term weather forecasts are predicting a season high in hurricanes, tropical storms and tornadoes.2. Give priority to making the natural gas distributors fix the thousands of gas leaks in Massachusetts. Natural gas (methane) is many times worse as a green house gas than C02.3. Ramp up the percentage of electricity that must come from real renewable sources like wind and solar, not incineration - which contributes to C02 and other polutants.4. Push healthy soils legislation and limit new home building. Land must be preserved for farming over new condo development.5. Make sure that new gasoline taxes are offset by prebates for those with low incomes. The wealthy can afford new taxes but poor working people cannot.6. Improve public transportation, especially between cities and towns. This would help greatly in getting people out of their cars.Thank you.
Sharon	deVos	Mothers Out Front	Thank you for committing to eliminate greenhouse gas emissions by 2050.To meet that goal we must set emission goals for 2030 at least by 50%, and by 75% by 2040. Our state must commit to economy-wide carbon pricing across the building and transportation sectors. We need to take action now to achieve a 38% emission reduction in the transportation sector by 2030, and we must get to net zero by setting a statewide limit on emissions from heating of buildings. It is critical that Massachusetts carbon pricing policy will address the impact on low and moderate income people by providing rebates. We have to meet these goals to protect our children and children around the world will have a live able world in the future. I look forward to seeing these necessary goals met.

William	Diamond	Northampton	I appreciate the Baker administration's goal of eliminating greenhouse gas emissions by 2050. However, the administration's strategy for doing this is not sufficient for reaching this goal. Here are some thoughts on how this might be done. First, there must be intermediary targets. Probably it would be best to have a target for every 5 years. At the very least, there should be targets for 2025, 2030, and 2040. Second, carbon pricing is a necessary step in this process. By itself, it will not be sufficient to reach the carbon reduction targets. But a fair "fee and rebate" program, that reduces the cost to low-income people in the state, will fund infrastructure initiatives and reduce carbon use. Some of the revenues from the carbon fee should be invested in clean energy and mass transportation. This will have several benefits: "green" jobs, cleaner air, and less clogged highways. Thank you for your time and trouble. William Diamond *** ****** Street Northampton, MA 01060
Jaiden	DiBenedetto	AMHERST	I think its a good structure already and that i think it will work
Susan	Donaldson		80% reduction by 2050 is simply not in line with the science. We need more, sooner. Massacusetts is a technologically advanced state, we have money and resources, we have an educated electorate, and we are not reliant on heavy industry or fossil fuel extraction for our economy. We should be in the forefront of emissions reductions. As the the cornoavirus, acting sooner, and putting more stringent measures in place earlier, will result in less harm and fewer costs later. Why are we not being a model for the USA? One can argue that what's done in Massachusetts is only a small part of what needs to happen worldwide, and therefore makes little difference. but again--as with the virus, each individual's effort, or each small state's effort, adds up to our joint outcome. We are all in this together; each needs to do whatever we can.

Stephen	Donnelly	Easthampton	Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.

Michael	Duclos	Energy Efficiency Associates, LLC	Comments on Emission Limit for 2050Michael Duclos - 4/10/2020Thank you for the opportunity to provide comments. I believe placing the main focus on setting a 2050 emissions limit is ill advised, it may have already done irreparable damage, and may continue to do far more harm than good. 2050 is so distant in the future there is no present day accountability or deliverables, many of us will be long dead, none of the responsible parties will be in office and politics typically results in near term issues being addressed first. So I see placing the major focus on a 2050 goal as secondary. Pick a number between a 80% to 100% CO2e reduction, and move on to the real issue, to actually doing what is needed immediately. What I think is needed immediately is to move as quickly as possible, using the best climate science that is currently available, to set a firm goal for 2030 and concurrently create a plan, draft regulations, create incentives, initiate marketing education and strategies and other mechanisms to move the market no later than December 2020. This means we only will have lost all of 2020. We stand to lose much more time by serializing analysis and planning processes that should have occurred shortly after the GWSA was enacted. I find it incredibly disappointing the GWSA was enacted in 2008 and we do not yet have a 2030 goal, with a detailed plan with 5 year milestones out to 2050 in place, and everyone - government, public, and private enterprise - on-board and organized and working to deliver the necessary results. The UN Emissions Gap Report 2019 Executive Summary is clear: https://wedocs.unep.org/bitstream/handle/20.500.11822/30798/EGR19ESEN.pdf?sequence=1&isAllowed=y Because we did not act decisively by 2010 (two years after the GWSA was enacted) we are now faced with the prospect of achieving a 7.6% decrease in CO2e each year, staring in 2020, to have a reasonable probability of holding to a 1.5C temperature increase. So let's see what that looks like using Table 2 from DEP "State Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection Update - July 2016" which has GHG Emissions in MTTCO2e of 94.4 in 1990, and a 2020 Projection of 25% Reduction form 1990 or 70.8. subtracting 7.6% of the total for each year results in: 2020=70.8, 2021=65.4, 2022=60.4, 2023=55.9, 2024=51.6, 2025=47.7, 2026=44.1, 2027=40.7, 2028=37.6, 2029=34.8 and 2030=32.1. - See table and spreadsheet below for clarity. So I'd offer our 2030 goal should be a 55% decrease from the 2020 emissions level, or a 66% reduction from 1990. So 66% from 1990 should be the goal, as long as we are on track to reduce emissions by 7.6% starting in 2020. If we fail to meet that goal, we must accelerate the reduction in succeeding years because the additional CO2e emissions in will be warming the planet for longer. Also, consider that if Mass is to meet the 2020 goal of 25% reduction (the CORVID-19 crisis is providing some unexpected help) we should thoughtfully assess how we achieved, or failed to achieve that goal. It appears to me the approach for the 2020 goal was to use the simplest, lowest cost, most politically expedient methods available, since the 80% by 2050 goal was so distant in the future there will be no accountability for failing to establish a firm foundation by 2020 for success in 2050. For example, I believe the single largest GHG reduction measure was simply displacing coal fired electricity generation with natural gas. Was fugitive emissions from the natural gas included in those calculations ? But far more importantly, can we afford to have that much natural gas generation in the 'emissions budget' in 2050 and still meet an 80% (or greater) reduction goal ? It is my opinion we should be attempting to envision what appears necessary for the end goal in 2050, and set intermediate goals every 5 years that create a foundation for success in 2050. Of course we will need to make mid-course corrections as we proceed down this path, but in my experience planning and executing projects, it is important to be open and realistic about where we are, where we need to be and when, and how we manage to get there. Thank you for the opportunity to comment on the 2050 Roadmap. Best Regards,Michael Duclos* ****** Road Stow, MA ****@ieee.org 978-***-**** 2020 Limit - 25% Reduction 70.8 1990 Baseline 94.4 Ratio - Checks 25% reduction 0.75 1990 94.4% per year 0.0762020 70.82021 1 65.42022 2 60.42023 3 55.92024 4 51.62025 5 47.72026 6 44.12027 7 40.72028 8 37.62029 9 34.82030 10 32.1Reduction 2020 to 2030 0.55Reduction 1990 to 2030 0.66
Leslie	Dwight	Deerfield	We need 100% reduction!

Christina	Eckert	Boxford	April 10, 2020Attn: EEARe: Statewide Emissions Limit for 2050In setting the statewide limits on carbon emissions for 2050, it is imperative that we as a Commonwealth aim for the most ambitious limit; not simply net-zero emissions, but net-negative greenhouse gas emissions.First, it is near impossible to measure how much carbon can be removed from the air, whether through trees or manmade processes. The only number that we can control is how much carbon we emit into the air. We simply need to reduce that number as much as possible.For this reason, we need to aim for a goal of 90% below the 1990 level.If we reach our goal of 90%, the worst - and best -- thing that can happen is that carbon capture more than compensates for the remaining 10%, and we achieve net-negative emissions. That scenario hurts no one, while the opposite - net positive emissions - will continue to lead to an increase in global temperature. In other words, we have nothing to lose and everything to gain by keeping the emissions level low.Further, an ambitious goal like 90% may spark investment in clean energy technologies which can be applied in Massachusetts as well as other states and countries. "Necessity is the mother of invention;" if we make it necessary to turn to clean energy technologies, we will likely see advances that we can only imagine today.Massachusetts is well suited to be a leader in the climate crisis. Let's lead. When other states and countries follow, we will be leaving a greener planet to our children and grandchildren.Thank you,Christina EckertCandidate for State Rep, 2nd Essex District
Matthew	Emond	East boston	Carbon tax
Lisa	Enzer	Montague	Please take the following comments under consideration in your deliberations: Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts in dense residential areas. Increased use of solar power for homes needs to be subsidized. Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild,". Thank you, Lisa Enzer
WILLIAM	FACEY		Why 2050? Isn't the need immediate? We know how well our trees help sequester carbon. To keep cutting our Fish and Wildlife forest is insane! This must be stopped or we will never meet our deadlines (appropriately named). Why is the land in Hardwick being logged off? This must stop!

Jennifer	Falcon	Worcester	Hello, Please consider clearing land as little as possible. Also we should not be burning trash. This does not mean exporting it, it means reducing. That will be a great challenge. People have become accustomed to throwing huge amounts of single use items in the trash, (or on the ground). Everywhere you look there's cups with lids and plastic straws, plastic floss toothpicks, stryofoam plates, water bottles, (but not soda bottles, those get picked up!) Even the government contributes. All the new sidewalk ramps with yellow texture are put in with plastic covers so they don't get cement on them while it drys. This is left on and slowly comes apart with shreds blowing in the wind until they come off. The contractors tell me it's the city's responsibility to take it off. So the city should be picking it up, or if this isn't true the city should complain to the contractors. Cardboard covers would be degradable though. Putting it in the trash is not much better though. We've got to switch from plastic and find ways to reduce and reuse. The bottle bill didn't pass because companies tried to make it look like a tax rather than a deposit. You're going to have to get brave and stand up. You'll also have to take in things like used electronics and find ways to reuse parts, but even better would be to force companies to make them better quality and easier to repair. Be brave and stand up. Thank you, Jenn Falcon
Howard	Feinstein	lexington	We can do hard things! We need to shift to clean energy. FAST. Of all the states, Massachusetts should be leading the charge. We have a unique set of natural resources and human potential.
Roslyn	Feldberg	Brookline	Please see e-mail to gwsa@mass.gov
David	Fillingham	JCAN	I believe we can and should accelerate the date 2050 by 10-15 years. Climate change does not wait and we set an example for some states. Also electricity generation in Massachusetts, 70% uses natural gas, which is not renewable and is shameful. We need to swith to solar and wind energy. I can be reached at 617 ***-****

Diane	Fine	Stoughton	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Diane Fine
Mary	Fischer	Brandeis University, Manager of Sustainability Programs	2050 is too late. All of the science is telling us we have to be carbon negative, not just neutral. We should be leading on this. The GWSA target is out of date; let's lead on this instead of comply with a bare minimum required by an out-of-date policy!
Gail	Fleischaker		Logging releases carbon. Stop all commercial logging in our state forests until there is a full carbon accounting for these actions.
Jeremiah	Fowler	Kansas City	EPA-HQ-OAR-2017-0757 I'd appreciate that the EPA continues to monitor gas and oil companies. I have bore witness to companies who disperse improperly even with the risk. Without someone watching them the dispersals will increase. Please leave the act intact!

Adele	Franks	Climate Action Now, Western Mass	To Gov Baker, Sec'y Theoharides and EOEEA Staff: While we applaud Gov Baker's commitment to Net Zero GHG pollution by 2050, we do not believe this goal goes far enough as it still allows an unacceptable amount of emissions if they are offset by other means. The latest science requires us to reach ZERO emissions by 2050, and a 60% emissions reduction by 2030 in order to have a meaningful impact on climate disruption. We ask that the Roadmap project alter its goals accordingly and thereby demonstrate leadership to other states that may fear bold action. We also urge the Roadmap project to eliminate biomass burning from consideration as a carbon-neutral power source, as biomass burning contributes pollution of several kinds to our atmosphere and neighboring communities, and encourages the destruction of trees. In addition, we would like to see the Roadmap project include Municipal Light Plants in its purview, and prioritize Environmental Justice communities when developing policies to move us towards Zero emissions by 2050. Thank you for giving our concerns serious consideration. Sincerely, Adele Franks on behalf of Climate Action Now, Western Mass
Susanne	Fuchs		Good morning, I am part of Extinction Rebellion Massachusetts (XR). First, I am grateful that the Draft Letter of Determination acknowledges the urgency of the climate crisis. Extinction Rebellion demands carbon net zero by 2025 or sooner. So, thinking about 2050: by then, we must have reduced greenhouse gas emissions to 100% below 1990 levels-and pursue negative emissions to the degree possible! I believe there should be expanded opportunities for public input and assemblies of citizens to help create policies to make these reductions happen. All policies need to prioritize the most vulnerable people and establish Indigenous sovereignty; establish reparations and remediation led by and for Black people, Indigenous people, people of color and poor communities for years of environmental injustice; establish legal rights for ecosystems to thrive and regenerate in perpetuity; and repair the effects of ongoing ecocide to prevent extinction of humanity and all species, in order to maintain a livable, just planet for all. Business as usual is over in many ways. After we survived COVID 19, you may find people more willing to make necessary changes to avert future emergencies that will be created by climate change. Let's try to return to a better normal! Safety and well being for older, younger, and future generations. Many thanks, Susanne Fuchs Extinction Rebellion MA

Janine	Galbicsek		I am alarmed at the prospect of losing old growth forests! Humans cannot replace what is natural and expect a positive outcome for the planet's flora and fauna. If it isn't good for the earth it's not good for the human species either. We as an intelligent species must realize that energy and economy can no longer be our priority over the ecological health of the world that has provided us with everything we've needed to survive and thrive. Below are bullet points that are important to note. -- we need pro-forestation = net gain in forest, as in absolutely zero loss + regain the losses of the last three years and continue to increase! -- we need to stop cutting any/all old growth, full stop! Because the bigger older trees sequester more carbon. -- stop pretending that "the science" isn't clear or "the data" isn't available - it's been established consistently over more than a decade __ follow the recommendations from the Harvard Forest/Smithsonian study for clustered development -- create/invent alternative financial rewards for maintaining and preserving forests intact as "ecosystem services" that contribute to the general welfare and health of everyone (in MA and beyond) __ do not count wood fuels/biomass as an efficient or positive/good energy fuel -- do not trade forest for solar -- forests help clean water -- find another way that people who have made their incomes (and profits) from harvesting lumber and wood products to contribute to the economy (retooling, re-purposing their assets) -- instead of operating on the principle of creating sneaky ways that they can continue to abuse the forest and unfairly use class/money privilege to buy state legislation favorable to their personal interests rather than the public good Thank you for your time and attention in this critical matter.

Isabella	Gambill	Boston	April 10, 2020 Dear Governor Baker, Lieutenant Governor Polito, and Secretary Theoharides: Thank you for your leadership in committing the Commonwealth to achieving net zero emissions by 2050, and for giving stakeholders, like the businesses that we represent, the opportunity to pr+D192ovide additional comments on your drafted letter of determination. A Better City represents nearly 130 member businesses, spanning the commercial real estate, banking, insurance, legal, healthcare, higher education, telecommunications, and energy sectors. On behalf of our diverse and expansive membership, A Better City writes in support of your commitment to achieve net zero by 2050. A Better City would also like to offer comments on several items relevant to the letter of determination: 1) interim targets; 2) direct emissions reductions vs. offsets; and 3) stakeholder engagement and incentives. INTERIM TARGETS In order to reach net zero by 2050, the Commonwealth must establish a rigorous and pragmatic roadmap to achieve deep emissions reductions over the next ten, twenty, and thirty years. Therefore, in establishing interim targets, A Better City recommends that emphasis be placed on setting economy-wide interim targets and ensuring consistency in defining and enforcing net zero across jurisdictions, including in the City of Boston, City of Cambridge, and others. The City of Boston's interim target of 50% emissions reduction from 1990 levels by 2030, as committed in the 2019 Climate Action Plan Update, will be an extremely heavy lift for the commercial sector and for large buildings. In alignment with internationally established science-based targets, A Better City recommends that the administration commit to an interim target of at most 50% emissions reduction from 1990 levels by 2030, that is applied economy-wide with rigorous engagement by relevant stakeholders to determine compliance pathways and sector-specific targets. DIRECT EMISSIONS VS. OFFSETS It may be particularly difficult to achieve 100% direct emissions reductions in certain sectors, including large buildings that are in operation 24/7 such as hospitals, labs, and data centers. Therefore, the definition of "net zero emissions" must sufficiently allow for the use of offsets. A Better City urges the administration to include in following definition of net zero emissions: "A level of state-wide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided however, that in no event shall the level of emissions be greater than a level that is 80% below that level." Setting the initial threshold at 80% will allow for up to 20% of emissions reductions to be achieved through offsets. More must be done to understand realistic and pragmatic ways to actualize direct emissions reductions-setting an 85% or 90% threshold at this time is not feasible. The 80% direct emissions reduction requirement under net zero by 2050 could be adjusted over time and increased as more technology and emissions-reduction opportunities become available. For example, there could be compliance mechanisms designed in which options like offsets and Renewable Energy Credits (RECs) are only available if deep emissions reductions measures are also being performed in parallel. Additionally, market-based compliance mechanisms like economy-wide carbon pricing should be researched and explored as possible policy measures to implement moving forward. STAKEHOLDER ENGAGEMENT, INCENTIVES, AND DISTRICT-LEVEL SOLUTIONS For our business sector to comply with statewide emissions reductions targets, considerable resources will need to be invested upfront to achieve successful long-term decarbonization. A Better City encourages the administration to develop incentive structures for decarbonization that are equitable across all sectors-and to actively engage with business stakeholders at every step of the way. Moreover, A Better City urges the Commonwealth to invest in critical infrastructure upgrades at the district-level, as no individual business or business sector can tackle this challenge alone. Complex, systematic challenges-from building a cleaner transportation system to developing a cleaner grid-will benefit from robust stakeholder engagement and participation. A Better City and its membership look forward to working collaboratively with the administration on a variety of critical aspects, including sector-specific targets, decarbonization of large buildings, carbon offsets best practices, models for climate financing and incentive structures, and emissions reduction solutions. Thank you for your vision and leadership. Sincerely, Richard A. Dimino President and CEO A Better City

Susan	Garrett		Please protect our existing forests in Massachusetts. Please stop allowing logging in our state-owned forests and promote the establishment of new forests (not single species tree plantations). Large, intact, undisturbed forests sequester large amounts of carbon. Cutting trees results in the loss of that trees' ability to sequester carbon and also releases more carbon. In order to reach our goals of net-zero emissions, we need to consider the importance of our forests in storing and removing carbon from the environment. Reducing fuel emissions will be difficult and we need every tool available to reach our goals. Current estimates are that our existing forests remove about a quarter of the carbon humans add to the atmosphere. They are doing their job of ameliorating climate change, we need to do our job by protecting this important aspect of carbon sequestration. Also, I am concerned that biomass is included in the roadmap. Initially, it may have seemed useful, but in fact it is not carbon neutral and destroys the trees we need for carbon storage. Also, the timetable should be more ambitious for achieving net zero addition of carbon. The use of carbon sequestration from our forests would help achieve the goal sooner and involves no cost or hardship for the commonwealth. More recent science shows that forest need far less "managing" than was formerly believed. Intact, unmanaged forests are healthier and store more carbon the older they are.

Rachel "Raven"	Geiger	WRENTHAM	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Raven
Stephanie	Gelfan	Amherst	To keep carbon in our atmosphere, we need to preserve as many trees as possible, especially, but not limited to old growth forests. We need to increase protected forests, both by stopping all logging on publicly held land and giving incentives for privately held land to be kept as forest without human "management. All burning, of trash and especially woody biomass should be removed from the APS and RPS. Just like all the logging that has been done on public lands, this subsidizing of these carbon-emitting fuels is in direct opposition to the goals of the GWSA of reducing carbon emissions.
Kristin	Gilzean		We need to do MORE. Massachusetts should be the leaders in fighting climate change! It's past time to step it up.

Anna	Goldman, MD		I am a physician and a mother. It is absolutely essential that we stop producing greenhouse gases by 2050, not just reduce. Climate change is the single greatest threat to human health.
Frederick	Green	Cambridge; 350mass	Structurally the road map outline seems fine. The huge task at hand will be selling the necessary steps to the public. The implications of changes obligated in working towards decarbonization are huge. As part of the integrated "plan" public announcements and "advertizing" should be started now or very soon. Gaining acceptance of the many changes anticipated in achieving carbon neutrality will be enormous. As an example of resistance to reducing carbon emissions, even among the legislators (those who should be in the know), there is no agreement on bills that would move us significantly towards the imperatives of the Global Warming Solutions Act. Pricing carbon, probably the most well understood and efficient way to start reducing greenhouse gas emissions, has been repeatedly rejected by our legislature. And how about the public? How does this plan to deal with this resistance? Legislators, industries, businesses and the public must be informed and be seen as important contributors to shaping the "pathway."

David	Greenberg		I appreciate your recognition of the urgency of the climate crisis. I would hope that we can be back to 1990 levels considerably sooner than 2050. Climate scientists are now saying that things look worse than they originally thought; 2025 would be much better goal. Furthermore, when planning on reducing emissions, special consideration must be given to populations and communities that have born the brunt of environmental degradation: indigenous people, people of color and poor communities. Regarding biomass in the APS and the RPS, woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. Furthermore, pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. I would also ask for a moratorium on commercial logging in the forests owned by the people of Massachusetts. Globally, trees absorb 30 % of all the carbon in the atmosphere. The older the tree, the more carbon it stores, so we must protect these trees. We must immediately embark on a massive program to convert sources of electric generation to renewable sources, insulate our homes and heat them with mini-splits, transition our gas cars to electric, and build advanced high-speed regional transportation systems. Plans to implement emissions reductions cannot adhere to business as usual, but rather should strive to build a sustainable world that is our only chance for survival.
Orian	Greene	Green Maynard	I fully support the proposed Massachusetts structure for net-zero greenhouse gas emissions limit for 2050. Anything less dooms the planet.
Laura	Haight	Partnership for Policy Integrity	Attaining the Commonwealth's goal of achieving net-zero greenhouse gas emissions by 2050 will only be possible by taking immediate near-term measures to reduce GHG emissions and protect and restore forests and other natural carbon sinks. The IPCC 1.5 report identified a pathway to net zero emissions (Pathway 1) that relies heavily on forests to draw down and sequester atmospheric carbon, rather than expensive technologies that have not been proven to work at scale, like biomass energy with carbon capture and storage. Pathway 1 calls for significant reductions in carbon emissions both from fossil fuels and from forest biomass energy and a massive investment in non-biomass renewable energy. PFPI urges MA to adopt a goal of at least 90% emissions reductions by 2050 and to offset any remaining emissions through the protection and restoration of natural carbon sinks. With more than 3 million acres of forests, 20% of which are state-owned lands, access to off-shore wind, and some of the most generous renewable energy incentives in the nation, MA is in a strong position to follow Pathway 1 and rely on natural carbon sinks to offset any remaining emissions that cannot be avoided. As an immediate first step, we urge MA to stop subsidizing wood-burning heat and energy through the state's renewable energy programs and to stop allowing logging on state-owned lands. Money saved from these measures should be directed to energy efficiency, energy storage, low and zero-emission renewable energy, and restoring and expanding natural forests. The sooner that MA adopts these measures, the more likely it can attain its net zero goal without overshooting the 2050 deadline.

Lisa	Hall	Florence MA	Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Because these are carbon emitting fuels, including them is in direct opposition to the goals of the GWSA to reduce carbon emissions. Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted. While many households have economic reasons for using these energy sources, a plan should be made and incorporated into the Roadmap to support these households in making the transition to non-carbon emitting energy sources. Regarding forest protections: Our forests are crucial for drawing carbon out of the atmosphere. Recent research clearly indicates that forests sequester the most carbon when left alone and not "managed", as was previously understood. Therefore, the Roadmap needs to emphasize immediately increasing unmanaged and natural forests, beginning with all state owned and conserved lands, and giving them permanent protection from resource development and extraction. The Roadmap also needs to include a plan for incentives for private land owners to take the legal step of making their lands "forever wild" where all active management is precluded and nature prevails.
Grace	Hall	First Parish Cambridge Environmental Justice Task Force	Moving faster now will save us more pain and anguish down the road. With that in mind, I would like to suggest that it is feasible and actually necessary that we: Reduce greenhouses hases by 60% by 2030 Reach 100% reduction in human-caused emissions by 2050 Prioritize Environmental Justice communities. In order to achieve those goals, it is necessary to omit biomass as a source of carbon-neutral power since it is not. We also must include municipal light plants in the Clean Energy Standards since they emit about 14% of our energy emissions. Thank you for your consideration of my suggestions. Sincerely, Grace Hall

Ralph	Halpern	Sharon	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Ralph Halpern Sharon, MA

Mark	Hart		Rigorous carbon pricing is absolutely necessary to reach our goal. I am unimpressed with a goal of zero emissions by 2050 if the legislature does not have the courage to propose laws with teeth in them and to ask something of citizens in this fight. For example, it is extremely unwise to put off dealing with home eating until 2030, the most difficult nut to crack, if you are serious about the 2050 goal. Start in 2021 with a universal carbon price. Anything less is irresponsible, if you understand the threat, just as anything less than social distancing is irresponsible if you understand the threat of COVID 19. With a carbon fee and dividend program carbon pricing could begin very quickly, because there is no need for a complex bureaucratic system to administer the standards. I favor a system of carbon fee and dividend over cap and trade because it is more transparent, simple, requires more from citizens, is less onerous on businesses, requires less bureaucracy and paperwork, and is able to provide a dividend to low and middle income people to eliminate or lessen the impact of rising prices. The promise in the Senate proposal to spend money in low income communities is a vastly inferior way to protect low income families. It would also be a net creator of jobs. H2810 is an excellent bill to do this for the state. It provide revenue for green infrastructure, more than I believe cap and trade would provide, and the expense to transition local and state government to clean energy will take a lot of money. The TUE should give H2810 a favorable vote immediately and move it forward.
Joseph	Hazlip	Fort River School	Greetings, Hello, I am a student at fort river. I think we need to include trees much more in this structure. Trees have a cooling effect on global warming, and this could be very important in what you are trying to do. You need to take side with the trees in this one, trust me.
Bob	Higgins-Steele	Truro Climate Action Committee, Truro Energy Committee	Kudos to the Baker Administration for committing to an elimination of greenhouse gas emissions by 2050, as the IPPC recommends Implement H.2810 Carbon Pricing Bill and the TCI. The state needs the money, citizens need disincentives as well as incentives in the climate arena There should be a moratorium on school building for schools in the design pipeline The Massachusetts School Building Authority should adopt Net Zero Emission building standards now for all school buildings in the planning stage to facilitate reaching state goals Enact S.2477 in its entirety: We need a state-wide limit on emissions from heating buildings especially an opt-in NetZero Stretch Code in 2021, or preferably a state wide Net Zero Code. If not municipalities should initiate town-specific home rules petition for a NetZero stretch code. Any carbon pricing, gas taxes etc should be means-tested to provide rebates to low and moderate income people. Rebates should offset eligible families cost of living increases. Thank You

Hattie	Holabird	Amherst	Dear Mass Gov, I am writing this to you today because I believe strongly about saving Massachusetts trees. Trees give us oxygen to breathe and keep us alive. And the more trees that we have the more clear oxygen.
Kursten	Holabird	amherst	I love the ideas about sharing car rides and taking public transportation. Eventhough gas is the cheapest it has been in years, it is still so important to minimize emissions for the sake of our environment.
MICHAEL	HOLT	TRURO	Thanks for the positive climate action steps you're taking! I find the idea that our emissions must equal our sequestration to be confusing, for these reasons: does sequestration include that which is already occurring naturally, or through human efforts that took place before 2020? My understanding of the IPCC's 2018 recommendations is that any emissions above the 1990 level must be offset by new, human-initiated sequestration measures. So you should specify that pre-existing carbon capture doesn't count. Furthermore, attempting to set carbon goals within my own small town of Truro, I've had to recognize that, as Greta Thunberg points out, the IPCC recommendations of 50% reduction by 2030 and net-zero by 2050 assume that there will soon be large-scale mechanical sequestration technology coming online across the globe, and that is not a safe assumption to make. And those recommendations do not factor in the need for climate equity: because we in the industrialized world have contributed most of humanity's emissions, we must cut carbon faster than those in the developing world, to buy them time to make changes that are harder for them than for us. Finally, I believe that since 2018, global scientific consensus has emerged that net-zero by 2050 is too late to keep global heating below 1.5C degrees. Therefore, I suggest updating the goal to net-zero by 2040. I'm pushing for that in Truro. Also, I think it's important that action and planning happen simultaneously. Of course, careful long-range planning is important. We also need bold action now, so that the long range goal doesn't get harder (and costlier) to achieve each year. Early completion of popular carbon-cutting projects will also create public buy-in and momentum. So pick something big and do it, even if the project choice must be somewhat intuitive. In Truro, citizens are working on a rational 20-year plan, but also starting a campaign to eliminate all our oil-fired building heating systems within about two years. Why that? It feels right! Other comments: 1. I support State provisions in S.2477 for an opt-in NetZero Stretch Code in 2021, or even better, a state-wide Net Zero Code. 2. I support H.2810 3. Carbon pricing should be means-tested to provide rebates to low- and moderate-income people. Rebates should offset eligible families cost of living increases. 4. A percentage of revenues from carbon pricing should be invested in clean energy and transportation, accelerating the transition to a green economy. Direct at least 40% of investment funds to projects that enable low- and moderate-income people to reduce GHGs. Thanks very much! Michael

Ellen	Hopman	Belchertown	I have watched as forests are decimated to make way for houses and solar arrays. This is a terrible waste - we need the trees as carbon sinks in a time of global warming. And we need trees to stay in place! Further, the idea of burning the wood only adds to the global warming crisis - more carbon in the air and less trees to hold the carbon. Major land owners like Cowls, Jones, should be compensated TO KEEP THEIR FORESTED LAND AS FOREST. They don't seem to think about the environment, they just want to make a profit. It would benefit everyone to keep their vast forest holdings AS FOREST so we might as well pay them and other land owners to do the right thing. Solar arrays belong along roads, on median strips, in parking lots, on municipal buildings and polluted wastelands. NOT IN FORESTS!
Carole	Horowitz	Climate Action Now - Farms, Forests and Food Systems Committee	The Farms, Forests, and Food Systems Committee of Climate Action Now believes the 2050 Roadmap target for net-zero emissions is not nearly ambitious enough. The scientific consensus is that we must achieve a net zero addition of CO2 to the atmosphere in the next ten years! It seems highly unlikely that all fossil fuel emissions will be eliminated within the next ten years. Therefore, in addition to doing everything it can to lower emissions, the Commonwealth must also maximize carbon sequestration - drawing down carbon from the atmosphere into the soil through regenerative agricultural practices, forest protection, and forest regeneration. Forests currently remove about a quarter of the CO2 humans add to the atmosphere. Allowing existing forests to grow back and reach their ecological potential is an effective, immediate, and low-cost way to draw down and store carbon. When we cut down forests we not only eliminate their ability to sequester carbon, we release carbon previously stored in those forests into the atmosphere. Therefore, in order to maximize carbon storage the Commonwealth must protect Massachusetts' existing state-owned forests by stopping logging and resource extraction. It must also put forward policies that promote the growth of new forests as well as offering incentives for private land to be kept "forever wild." Finally, biomass must not be included in the Roadmap because it is not carbon neutral, and it destroys the trees needed for carbon sequestration.

Kathy	Hulin	Franklin	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. +D93Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Kathy Hulin

Rebecca	Hull	Amherst, MA	I would like to offer comments for the goals of the 2008 Massachusetts Global Warming Solutions Act (GWSA). As far as your roadmap for reaching the stated goal, please consider the following: Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and therefore discouraged in Massachusetts. Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development (including disallowance of forest management practices, which are not constructive to this end), and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. Thank you for your efforts. Rebecca Hull Amherst, MA

Jason	Kahn	Amherst	Dear Sir or Madam, I am writing to you to voice my opinion on the Massachusetts Decarbonization Roadmap and it's part in the Global Warming Solutions Act (GWSA). It's now 2020 and there is a mere 30 years left to meet the goal of 80% reduction of the states greenhouse gas emissions. Thinking low-tech solutions and focusing on things that are easily achieved by not doing things that put these gasses in the atmosphere. Both the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS) subsidize the burning of trash and woody biomass. Since these practices contribute to greenhouse gas emissions and are therefore in direct opposition of the goals of the GSWA. By removing the subsidy we lower the greenhouse gasses associated with them. It is that simple. Also to be considered in this vein is the practice of residential wood burning. Pellet stoves, cordwood and wood chip burning might be time honored, I myself cut, hauled and split 5 cords of wood a year for 21 years. I enjoyed the wonderful heat it produced, but realize that it came at a price that I passed on to my neighbors near and far. That money, time and effort would have better been expended installing rooftop solar panels. The carbon emitted by residential wood burning should be counted in our emission goals and therefore be discouraged as a practice. Lastly, keeping our forests standing is the best use of public land in the commonwealth. Trees play a crucial role in removing carbon from the atmosphere and providing us with oxygen. As a whole the state forests in Massachusetts pull substantial amounts of carbon from the air. We need to end logging on public land in the commonwealth. We also need to expand public land in the commonwealth. These forest reserves will enhance our ability to remove atmospheric carbon. We also need to provide incentives to private landowners that encourage them to preserve their lands as "forever wild". Where no active management would be allowed. Please consider these comments when making decisions about the "Roadmap" Sincerely, Jason Kahn Amherst, MA 413 *** ****

Gloria	Kegeles		• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. It is a subterfuge to not count biomass as a net carbon emitter. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating many more reserves on our public lands, and giving them PERMANENT, irreversible protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. We need to immediately stop the commercial logging on our public lands because every forest that is thinned, logged, clear-cut, or otherwise "managed" by removing trees, becomes a net reducer of carbon sequestration for the entire planet, not just from losing trees but also from disturbing the soil which then releases carbon into the atmosphere. Mass.'s temperate forests are one of the few places on the globe which are currently sequestering proportionately large amounts of carbon, and because ours are not all thinned out or clearcut yet, they are less susceptible to forest fire. (Think of starting a campfire: you leave space between the twigs and kindling to enable the fire to catch. Think of an undisturbed wild forest: There's less air between trees that fires need in order to burn optimally, and more moisture retained throughout the forest to mitigate fires.) Therefore, we must immediately place a moratorium on commercial logging on our state lands in order to have any chance of reaching the net-zero CO2 emissions limit for 2050 -- but 2050 is actually too late, this must be accomplished much sooner in order to stop irreversible, runaway climate crisis which will happen in less than 10 years, meaning by 2030, at our current rate of emissions. Logged forests simply cannot be "fixed" the way shutting a coal power plant can; regrowth is much too late, meaning wood is not a renewable resource. THIS IS AN EMERGENCY, JUST LIKE THE PANDEMIC, an existential threat to all life on the planet. And just like the pandemic, climate change is invisible except when a disaster strikes or if you live in the exponentially greater warming at the equator or poles. Waiting AT ALL is a recipe for chaos and death. Forests cannot be replaced in less than 10 years. LISTEN TO THE CLIMATE SCIENTISTS!!!!! -- just like we've been forced to listen to the medical experts instead of the president concerning the pandemic. Sitting on a long study is negligent. Action is imperative now.

Michael	Kellett	RESTORE: The North Woods	I am commenting on behalf of RESTORE: The North Woods, a regional nonprofit organization based in Massachusetts. We have members across the state. We urge EOEEA to address the following concerns in taking action to meet the 2050 greenhouse gas emissions goals in the Massachusetts Global Warming Solutions Act (GWSA). • Biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. In addition, we urge EOEEA to extend the public comment period for this process by another 30 days at least. Most people are unaware that the process is even happening and will not have the opportunity to review or comment on the "Roadmap" to the 2050 emissions limit.
Claire	Kennedy	Fort River	I think the net-zero greenhouse gas emissions limit for 2050 it a very good idea but there are some flaws in the plan. A very important thing that ties onto this net-zero emissions plain it is trees are what provide us with clean air. If we keep cutting them down we will start loosing clean air I think the save the mass forest campaign and this one should merge because they are both at about clean air. Although the Saving the Massachusetts forests campaign is also about the animals that live in the forests i think they should come together. These are my thoughts on the net-zero greenhouse gas emissions.
Stephanie Jo	Kent	Belchertown	http://www.reflexivity.us/wp/2020/04/open-letter-on-proforestation-to-the-massachusetts-executive-office-of-energy-and-environmental-affairs/ My open letter including the public comments I wish to submit here (at 4:08pm, Friday April 10, 2020) is at the above url. I have also emailed a copy to GWSA@mass.gov thank you kindly, steph Stephanie Jo Kent, Belchertown *******@gmail.com

Ken and Ethel	Kipen	Ashfield MA	We fully agree with the following three points: Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
Anya	Klepacki		These are my comments on Massachusetts emissions limits: Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be REMOVED from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. Point source air pollution will be too high to be acceptable, and especially with the asthma rates in cities in Massachusetts being what they are, despite our beautiful natural surroundings. Also true waste "biomass" will be used up too quickly, resulting in the cutting of trees when what we need to do is preserve trees already growing and planting more as the science shows the age of the tree greatly impacts the amount of carbon sequestration. This is fact. Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is lightly managed, with little to no deforesting allowed, and perhaps only management for invasives eating the state, such as oriental bittersweet and multiflora rose. We also need monetary incentives for native plant sanctuary building, for people turning significant parts of their private land into biodiverse native plant sanctuaries, as it has been proven that native insects can consume significantly more of the plant matter from the native plants they have coevolved with, over invasives. Without the full amount of bioavailability of photosynthesized energy in native plants accessible (if natives get crowded out by invasives), the base of the food web becomes destabilized and we will see the chain reaction widespread wildlife struggle against starvation, the encroachment of wildlife into developed areas out of desperation, and the decline of essential pollinators that keep us able to grow our own food. In a strict cost benefit analysis, this is a no brainer to ensure the survival of the world we depend on.

Stella	Ko		I would like to see our timeline moved up. I think we need to treat the climate crisis as an emergency. I think the coronavirus has taught us that we are ill-prepared. We must do better for our children's future.
Pat	Konecky	Egremont MA	Dear Governor Baker and Secretary Theoharides, I applaud your efforts to continue and expand our state's efforts to curb carbon emissions. Please consider the following: We need to push for 100% renewable energy by 2040 with aggressive interim goals such as a 60% reduction by 2030. Now is the time to grow our solar power and businesses that support renewables such as off-shore wind components. Increase incentives and RPI requirements for renewables. Woody biomass burning should not be considered part of our Renewable Portfolio Standard as it releases carbon pollution and damages our carbon sequestering forests. Environmental justice considerations should be an integral part of this effort to restructure our energy supply. End subsidies and new infrastructure allowances for oil and gas. Please don't dedicate taxpayer dollars to these polluting carbon emitting businesses. Thank you for your consideration, Pat Konecky Egremont MA

Bernard	Kosicki	Chelmsford resident	I applaud the administration's attempt to plan beyond the GWSA original legislation. -I support the Maximum Allowable Emission Level at 2050 be 90% below the 1990 level of the three choices offered on the Massachusetts Decarbonization Website. -Roadmap legislation is also in process in the House (Meschino Roadmap and Barrett Net-Zero S2500) which would put into law a planning effort which is very similar to the Administration initiative. The administration should do whatever is possible to encourage that these bills get to the House floor for vote by July. A legislation-enabled effort will be much more persistent than even the worthy Administration initiative. -In the 2050 planning effort, it is important to realize that the ultimate goal is not that Massachusetts become carbon neutral- but rather that this happen while at the same time the actions that Mass takes also encourages other states to take similar action. Toward that end, Mass should strongly prioritize effective physical actions it can take inside its own borders- such as building its own renewable production and carbon capture storage facilities- and only at much lower priority rely on other states to furnish these services to Mass. The scale of facilities needed is huge and every state must first take the initiative to build its own infrastructure using its own resources to the maximum amount possible before buying resources from other states. -The current picture seems to be that Massachusetts will have to rely on carbon capture and storage to meet net zero by 2050. This technology is not proven in scale yet. The state should strongly sponsor R&D to develop and prove some forms of CCS. Massachusetts has a strong R&D culture and can greatly enhance this technology for use in other places also.

Andee	Krasner	Mothers Out Front	To Whom It May Concern: Science requires a faster timeline to decarbonize our Commonwealth. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution needs to be reduced by 60% or more by 2030. We encourage the administration to plan for a 100% reduction by 2050 in human-caused pollution across MA through massively ramping up our renewable energy infrastructure, which will have the additional benefits of creating significant numbers of regional jobs and cleaning up our air and water. We need zero pollution. We need more than just a net-zero emission target, but a 100% reduction in pollution. We need to replace all fossil fuels with renewable energy sources. We need to start building all new buildings efficiently and fossil fuel free, prioritizing affordable housing because it is healthier for occupants, more comfortable, and safer during extreme weather events. Highly efficient buildings are less expensive for residents. The administration should support a net zero stretch code so that leader communities can start this work immediately. If required, carbon pricing can support Massachusetts reaching our goal of 60% emission reduction in 2030 and a 100% reduction of climate change causing pollution by 2050. Transportation The Transportation Climate Initiative, coupled with other Administration efforts focused on the transportation sector, may get us to a 38% pollution reduction by 2030, however, we will need to do more than implement carbon pricing. Furthermore, carbon pricing policy must address the impact on low and moderate income people by providing rebates, with these rebates weighted to be larger for low income people. Low and moderate income people should get rebates that cover their projected increases in cost of living due to carbon price. These solutions are good for our wallets, our communities, and our health. They also ensure a livable climate for the next generation. Sincerely, Andee Krasner

Miriam	Kurland	Goshen	We need to become much more aggressive in stopping climate change and reach much higher percentages by 2030. Climate change is happening much more quickly than scientists had originally thought. The impacts so far will cause exponential increases in the speed. We must stop our fossil fuel usage by 90% by 2030, as reports are saying that if we are not successful by that time, there will be little hope of ever getting it under control. If the leadership were willing, we could replace fossil fuels with clean and renewable energy like roof top solar, ocean wind, geothermal and small, local hydro. We could change farming practices to build carbon in the soils by using no-till regenerative farming techniques that will make richer and healthier soils while sequestering much more carbon. We could stop cutting commercial logging in our state forests and replace wood products with fast growing hemp and bamboo. We could encourage edible lawns with nutrient rich no till methods. Several countries in Europe, South America and Africa are already doing these things. If we don't change our behaviors and policies drastically by 2030, we will be facing disaster after disaster soon and leaving no future for our children and grandchildren. We will consider our leaders criminals if they aren't willing to immediately set in motion aggressive actions to tackle this emergency.
mike and miriam	kurland	williamsburg	We need to move faster than 2050 for the goals. By 2030 we need to be much closer to 80% clean energy only to meet all our needs. Clean energy incentives should be only for roof top/field/road solar (no trees cut), wind (no tree cut), possibly small local hydro (no huge or long distance hydro) and geothermal. Biomass, nuclear and other hazardous energy sources should be omitted. We should immediately stop all new fossil fuel infrastructure projects and work towards putting affordable solar panels or wind turbines on every roof/yard in the state. We need to stop commercial logging on public lands and cease any large energy projects that increase the need for tree cutting. We need to give incentives and encouragement for community supported energy systems. If we are truly interested in stopping climate change and reverse the destruction that our government has implemented with the for profit energy systems in place, we need to be bold enough to make these huge changes. .We need an open and transparent process with sincere engagement. Thank you
mike and miriam	kurland	williamsburg	• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. *all timelines need to be made so that we can accomplish at least 80% clean, renewable energy in all sources and activities by 2035 and 65% by 2030. If we wait longer, enormous irreversible climate change problems are at high risk of occuring. Thank you. .

Robert	Kvaal	Lexington Minuteman Indivisible	Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
david j.	lafond	Holyoke	i am concerned about some details in the roadmap as follows: Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. i sincerely hope that the above three critical issues are addressed as state above. Doing otherwise is counter to the intent & goals of substantial net reduction of carbon emissions by 2050. Allowing such loopholes in the plan such as burning woody or trash biomass & not counting emissions from residential wood burning is antithetical to what we are trying to do here & makes no sense. Thank you for your consideration.
Elizabeth	Landman	Lexington (HEAT Hancock Church)	Yes, we must get to net-zero emissions but please aim for 2030. This may not occur but it should be our goal. The longer we delay in restructuring the environmental hazards and defeating pollution, the more sickness and suffering we see in our world. Let us be leaders in this battle against the foe of pollution.
Diane	Lauber Doherty	Westford	I will be very short, and to the point. PLEASE - do stick to the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, and really prioritize support for Environmental Justice communities. Thank you!!

Caren	Lee	Franklin, MA.	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Caren Lee

Richard	Lent	STOW	• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
Richard	Lent	STOW	I support the 2050 goal of net zero greenhouse gas (GHG) emissions as stated in the Letter of Determination released by the EEA on February 26, 2020. I also applaud the Secretary for undertaking a science-based roadmap planning process similar to the process required by the 2050 Roadmp bill (H.3983), which is currently before the House Ways and Means Committee. I also believe it is critical that the net zero goal, the roadmap process, and related processes for developing, implementing, and assessing climate action plans be codified in appropriate legislation, such as H.3983.
Maggie	Leonard	Fort River Elementary	I am writing with feedback on the Massachusetts net-zero greenhouse gas limit for 2050. I just wanted to let you know that you have not come up with a plan on how to get net-zero renewable energy. I think that this is a very important part of getting no emissions and that you might want to make a plan if you want this to go far. Sincerely, Maggie Leonard

Anna	Leslie	Somerville	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030 below the 1990 levels. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. Please prioritize climate justice and equitable investment.1. Plans to address climate change often leave out those who are on the frontlines of climate change: communities of color, low-income communities, and other environmental justice communities. We need to include these communities in all conversations and decision making about climate plans, allowing them to define the issues and outcomes they need, and to follow their lead in calls to action. We encourage you to listen to the comments made by Environmental Justice groups and people who come from Environmental Justice communities. 2. Please prioritize impacted communities when it comes to supporting a democratic participation in climate solutions, and direct public money to provide public goods such as clean all-electric public transportation, Net Zero affordable housing, and access to safe and green schools and workplaces. Please prioritize Environmental Justice communities when making funding decisions. 3. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. A screening tool for deciding policy should use a clear & transparent scorecard that weights equity higher. Science requires a faster timeline to decarbonize our Commonwealth.1. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution needs to be reduced by 60% or more by 2030 (Find this information here). We encourage the administration to plan for a 100% reduction by 2050 in human-caused pollution across MA through massively ramping up our renewable energy infrastructure, which will have the additional benefits of creating significant numbers of regional jobs and cleaning up our air and water. The commonwealth, providing significant leadership in implementing climate change solutions will not only show other states and the federal government the way forward, but will also prove that these solutions are good for our wallets, our communities, and our health. We need zero pollution.1. We need more than just a Net Zero emission target, but a 100% reduction in pollution. This means in addition to making our buildings and transportation more efficient, we need to replace all fossil fuels with renewable energy resources. 2. We need to start building all new buildings efficiently and fossil fuel free, prioritizing affordable housing because it is healthier for occupants, more comfortable, and safer during extreme weather events. The administration should support a net zero stretch code so that leader communities can start this work immediately. If required, carbon pricing can support Massachusetts reaching our goal of 60% emission reduction in 2030 and a 100% reduction of climate change causing pollution by 2050. 1. The Transportation Climate Initiative, coupled with other Administration efforts focused on the transportation sector, may get us to a 38% pollution reduction by 2030, however, we will need to do more than implement carbon pricing. Furthermore, carbon pricing policy must address the impact on low and moderate income people by providing rebates, with these rebates weighted to be larger for low income people. Low and moderate income people should get rebates that cover their projected increases in cost of living due to carbon price. MCAN has two more priorities that are specific to the cities and towns that we work with: Biomass cannot be a part of the decarbonization of our Commonwealth. 1. Biomass incineration releases carbon pollution, particulate matter, and leads to deforestation. People who live near biomass plants are at a higher risk of asthma and other respiratory and heart diseases. Biomass should not be considered a carbon free or carbon neutral power source. When planning a Net Zero Commonwealth, Municipal Light Plant communities need to be included. 1. MLP cities and towns make up 14% of the state's energy use. If we solely focus on National Grid and EverSource we will not be able to hit 50% clean renewable energy by 2030. More information on MLP towns can be found on our Municipal Light Plant Report Card. MLPs need to be included in the Renewable Portfolio Standard and the Clean Energy Standard. Please ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change.

Gary	Levine	Longmeadow,MA	I wish to make following comments concerning the Massachusetts Decarbonization Roadmap Plan. We need proforestation = net gain in forest, as in absolutely zero loss + regain the losses of the last three years and more! We need to stop cutting any/all old growth, full stop! -- the bigger older trees sequester more carbon. We need to stop pretending that "the science" isn't clear or "the data" isn't available - it's been established consistently over more than a decade We should follow the recommendations from the Harvard Forest/Smithsonian study for clustered development Let us create/invent alternative financial rewards for maintaining and preserving forests intact as "ecosystem services" that contribute to the general welfare and health of everyone (in MA and beyond) do not count wood fuels as a positive energy transition Let's not trade forest for solar Let's find another way that people who have made their incomes (and profits) from harvesting lumber and wood products to contribute to the economy (retooling, repurposing their assets) -- instead of operating on the principle of creating sneaky ways that they can continue to abuse the forest and unfairly use class/money privilege to buy state legislation favorable to their personal interests rather than the public good. I apologize for the condensed form of my comments. Thank you for your time.
Mary	Link	Ashfield	It is essential that we aim to achieve net-zero greenhouse gas emissions. I am grateful to live in Massachusetts where we are taking strides in the right direction. Given the remarkable healing of the environment we are seeing during the COVID 19 pandemic - due to decreased pollution during this time, may we take that as inspiration to increase our goals here in MA? Aim for net-zero BEFORE 2050? We need more incentives for solar and other green/renewable technologies - for businesses, municipalities, and homes. Can we encourage more working from home, more telecommuting to continue after the virus has passed? Can we support biodiesel - both production, and incentives for converting autos and home heat systems for its use? Can we postpone tree cutting/harvesting in all state forests for at least 10 years - to allow the trees to sequester more carbon until we have been able to reduce our carbon footprint to a sustainable level? Can we offer more ways for renters to decrease their energy use, increase their conservation and efficiency? Can we continue to beat the federal EPA standards - especially now as the president has gutted those standards, to our detriment? Can we force the gas companies to repair the thousands of leaks in their pipelines that are spewing methane in Boston and other MA cities? Can we require NO MORE new fossil fuel pipelines in MA? Can we pressure ISO New England to transition away from fossil fuels, close the Bow, NH coal plant, and shift to renewable sources of energy? Like the COVID 19 pandemic, climate change is a global emergency. We must do all these things (above) and more. Thank you for doing all you can to help MA be a leader in turning it around.

bridgit	litchfield	belchertown	Dear Leaders, I'm delighted with your proposals to drastically reduce greenhouse gas emissions in MA to net-zero by 2050. It's the only sane, responsible thing to do. I totally support making and enacting laws that incorporate the following 3 topics currently most familiar to me. Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. I'm even in favor of green burials and human remains liquification, which is being tried in Seattle area, becoming legal and widely available! Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. As a former wood burner, I know it's hard to give up what seems like the perfect back up to power outages and may meet the most resistance among stakeholders. Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. Sincerely, Bridgit Litchfield
Rema	Loeb		Human life may not even exist on this planet by 2050. The time to change our collective behavior is NOW.. Hundreds of climate scientists are telling us this. They are frustrated, in tears, mourning the destruction of our only home, NO more cutting old growth trees on state lands. NO more wood biomass. NO more giving in to logging or fossil fuel interests. Do you think this is difficult? Try living on a planet that will no longer sustain human life. Act now or apologize to your grandchildren and mine for finishing off their future. What part of Climate Crisis do you not understand? No more fracked gas pipelines, no more coal trains, no sacrificed trees for solar panels, and NO more logging on OUR state land.

Roger	Luckmann	Elders Climate Action Massachusetts	Comments from Elders Climate Action MA on Massachusetts Decarbonization Goals Elders Climate Action Massachusetts is fully supportive of the 2050 goal of net zero greenhouse gas (GHG) emissions as stated in the draft Letter of Determination released by the EEA on February 26, 2020. We also applaud the Secretary for undertaking a science-based roadmap planning process similar to the process required by the 2050 Roadmp bill (H.3983), which is currently before the House Ways and Means Committee. However, we also believe it is critical that the net zero goal, the roadmap process, and related processes for developing, implementing, and assessing climate action plans be codified in appropriate legislation, such as H.3983. Without such legislative support the entire climate mitigation effort of the current administration could be substantially diminished or even undone by future administrations. In addition to requiring net zero GHG by 2050 and a roadmap process, H.3983 also requires: Setting minimum GHG emission targets for 2030 (50% reduction of 1990 emissions) and 2040 (75% reduction) and requires that these targets be set in 2020 to ensure that mitigation plans aim to achieve these interim, long-term goals. An annual implementation assessment report that includes an assessment of the effectiveness of the emission mitigation regulations. An update of the climate action plan every 30 months. Regulations for implementing the 2020 climate action plan be promulgated within 12 months of the publication of the plan. That Municipal Light Plants be regulated along with the other utilities in the electric power sector. The power to levy a fee on top GHG emitters to support all these requirements ensures adequate financial support to meet these requirements. The administration's 2050 Roadmap planning process lines up well with that of the 2050 Roadmap bill By enacting legislation to ensure the process will continue and by incorporating the additional requirements outlined above, the state will ensure it achieves its climate change mitigation goals.
Priscilla	Lynch		The evaluation of forests and carbon is woefully insufficient and negligent. The carbon benefits for intact forests are not provided in this presentation. Is is negligent for the state to not have this information and not to have gathered it for the guidance of the Global Warming Solutions Act, which was initiated in 2008 and this is 2020. There is.a great deal of information available on the benefits of Proforestation and should be included in any assessment.

John	MacDougall		• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the Global Warming Solutions Act (GWSA) to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.

Lea	MacNider	north Attleboro	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies.We respectfully request that you ensu re that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Lea MacNider

Michele	Marantz	Longmeadow Pipeline Awareness Group	Members of the Longmeadow Pipeline Awareness Group have worked for years to block the proposed construction of an industrial gas facility and high-powered pipeline in our town. As part of our resistance, we have educated ourselves about health issues associated with fossil fuel use and have joined with the Springfield Climate Justice Coalition to promote clean air in our community, as Springfield is the 'Asthma Capital of the World'--and Longmeadow is its neighbor. Without a forest management component to the state's Decarbonization Roadmap, concerned residents are likely to be stuck with the current protocol that encourages the razing of state forests for the wood pellet industry. Wood is not a renewable resource--and current proposals that call for subsidizing this industry under that category are absurd. Hardwood trees take 100 years to grow to maturity--that is, if the growth isn't hampered by invasive species. In addition, when a tree is cut down, an entire eco-system goes with it. Funding the expansion of deforestation will encourage the construction of bio-mass incinerators that will further pollute our air and threaten our health. As an alternative, we need to educate Massachusetts communities about how they can reduce fossil fuel consumption through net zero emission construction of municipal and privately owned buildings as well as the promotion of electric vehicles, walking, and biking. How can our state possibly meet the mandates of the Global Warming Solutions Act until and unless we adopt aggressive moves toward renewable energy? Why are we acting as if we have the luxury of waiting to adopt a 100% Renewable Policy? Why does our DPU persist in rubber-stamping projects that promote reliance on fossil fuels, a source of energy that is destructive to our climate, our health, and our safety? It's 2020. We need to stop basing our energy decisions using standards developed in the previous century.
Steven	Marantz	Longmeadow Energy and Sustainability Committee	First and foremost, putting a price on carbon would be the best way for the Commonwealth to reduce our greenhouse gas emissions. I encourage our officials to look at he example of British Columbia that has had a price on carbon since 2008. Emissions reduced and economic growth improved. The key is returning the fee on carbon back to the people. British Columbia does it through tax returns, but legislation in Massachusetts (currently bottled up in the TUE committee) provides for direct rebates to citizens (hence carbon fee and rebate). Estimates are that the majority of Massachusetts residents would actually come out ahead under the proposed legislation thus allaying fears of economic hardship for low income citizens. Secondly, I would urge officials not to consider wood a renewable resource and an offset for other greenhouse gas emissions. Deforestation is a real threat and given the negative environmental impacts of such activities,wood should be taken off the table as an option .The particulates in the emissions of wood burning facilities should alone be enough to remove wood as an option in this plan. This list of negatives is long and the thought of our tax dollars actually subsidizing this industry is truly horrific. Large scale wood burning for power production makes a mockery of this proposed structure for net zero emissions by 2050.

Vincent	Maraventano	Massachusetts Interfaith Power & Light, Inc.	Massachusetts should adopt a 2050 emissions limit of net zero greenhouse gas emissions, defined as: "A level of statewide greenhouse gas emissions that is achieved when anthropogenic GHG emissions are balanced by the amount of anthropogenic GHG removals stored annually by, or attributable to the Commonwealth of Massachusetts." Massachusetts should commit to economy-wide carbon pricing. Our state cannot achieve a 50% reduction in GHGs by 2030 unless we commit to carbon pricing across the transportation and the building sectors. The Transportation Climate Initiative, (TCI) coupled with other Administration efforts focused on the transportation sector, may get us to a 38% emission reduction by 2030, but we will need carbon pricing to make the deeper reductions necessary. Carbon pricing policy must address the impact on low- and moderate-income people by providing rebates, weighted to be larger than any resulting cost increases for low-income people, and equal to any increases for moderate-income people. A percentage of revenues from carbon pricing should be invested in clean energy and transportation, to accelerate the transition to a green economy. To help all members of society transition to cleaner options, at least 50% of investment funds should be directed to projects that ameliorate the past and future damage to environmental justice communities. Additional comments have been submitted attached to an email on behalf of MassIPL, and other faith organizations.
Fergus	Marshall		In order to attain the goals set in the global warming solutions act there are some very important steps that need to be taken. Removing biomass from the alternative portfolio standard and the renewable portfolio standard is critical due to the high carbon omissions of these fuels. Also subsidies for appliances that use these fuels should be totally eliminated. Also the burning of trash should be eliminated due to the high pollution levels especially fine particulates. Shifting the forest management paradigm. In the Harvard forest study, Smithsonian studies 2013 intact forests are best at sequestering and storing carbon. Our forests are crucial for drawing carbon out of the atmosphere. We must keep our forests intact especially at this time when we are trying to meet these goals of net zero by 2050. Our north east forests are some of the most diverse productive forests in the nation and to keep them that way we need to practice Pro forestation which allows forests to naturally regulate themselves. This is what forests have been doing for millions of years, they don't need our management. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forest by creating more reserves on our public lands and giving them permanent protection from the resource extraction and develop and giving equal public incentives for private land that is kept forever wild where are all active management is precluded and nature prevails.

Diane	Martin	Cambridge	I support 100% pollution and greenhouse gas reduction by 2050. Current science reveals that to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas pollution by 60% or more by 2030. - Get to a 100% reduction in human-caused pollution by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities. I am disappointed that the state has not done a better job in moving towards its own goals of greenhouse gas reduction up to this point. The Governor is not doing enough to prepare Massachusetts for our warming world and share the burden with all developed, first world economies.
christopher	Matera	Massachusetts Forest Watch	Dear Governor Baker, Cutting more forests and burning more wood will do the exact opposite of what we need to be doing. Burning wood is even worse than burning fossil fuels for greenhouse gas emissions, and forests are our only real hope of pulling C)2 out of the atmosphere. 1. Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. 2. Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. 3. Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. Sincerely Chris Matera, PE

Pamela	Matsuda-Dunn	Easrhampton, MA 01027	First, thank you to Baker Administration for committing to eliminating greenhouse gas emissions by 2050. The International Panel on Climate Change states that eliminating emission by 2050 IS A MUST. We are in a crisis, yes, as big and ultimately bigger than CoVid19. Unfortunately, the strategy laid out in the Baker Administration's 2018 plan and the August 22, 2019 Policy Recommendations put before the Implementation Advisory Committee, will not get us to net zero by 2050. WE DESPERATELY NEED ACTION NOW. ● Massachusetts must set emission goals for 2030 and 2040. It is not possible to reach net zero by 2050 without a 50% reduction by 2030 and a 75% reduction by 2040. ● Massachusetts must commit to economy-wide carbon pricing. We cannot get to 50% emission reduction in 2030 unless we commit to carbon pricing across the transportation and the building sectors. The Transportation Climate Initiative, coupled with other Administration efforts focuses on the transportation sector. We will need to reduce our emissions further. ● Our only chance to get to net zero is if we also set a state-wide limit on emissions from the heating of buildings as well as take action on transportation emissions. ● We can't get to net zero without a carbon price tax. I am calling upon the Baker Administration to maintain the health of Massachusetts' economy and that of the world climate by committing to economy-wide carbon pricing. ● Carbon pricing policy must have a social justice aspect that addresses the impact on low and moderate income people by providing rebates, with rebates weighted to be larger for low income people. Low and moderate income people need rebates that cover their projected increases in cost of living due to carbon price. ● A percentage of revenues from carbon price should be invested in clean energy and transportation, to accelerate the transition to a green economy. To help all members of society transition to cleaner options, at least 40% of investment funds should be directed to projects that enable low and moderate income people to reduce greenhouse gas emissions.

Dorothy	McIver	Greenfield, MA	Residential wood burning- The use of pellets, cord wood and wood chips which all emit a significant amount of carbon that needs to be counted, should not be supported in MA Forest Protection-Our forests need to be protected as they are crucial for carbon sequestration. Therefore we need to increase the amount of natural forests we protect by the following measures. 1.create more reserves on public land, with permanent protection from development and extraction of resources. 2. give equal public incentives for private land that is kept in its natural wild state, with no active management and where nature prevails. Biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Both woody biomass burning and trash burning should be removed from the APS and RPS. The goals of the GWSA are to reduce carbon emissions which will not be realized by subsidizing these carbon emitting fuels.
Susan	Millinger	Shutesbury	I support the proposed Decarbonization Roadmap. I urge that it set high goals for what should be accomplished by 2050: what about gross, not net, emissions better than 90% below 1990 levels? Alternatively, might not the goal of net emissions 90% below the 1990 level by met sooner than 2050; say by 2030 or 2035? The climate crisis in which we find ourselves is indeed serious; we need to make haste to reach the lowest possible levels of greenhouse gas emissions in order to keep the rise in global mean temperature as low as we can.
Tergel	Molom		Great webinar! I learned a lot about what you guys do, your implementation pathways, and policies. The most interesting part was when Benjamin showed four possible scenarios/sensitivity analyses. From your well-gathered data regarding the transformation of how buildings are heated, it looks like everything will go electric. Given that around 75 percent of Massachusetts is forest, is there a way to use that to generate electricity? Perhaps that is something you guys could look into.
Nancy	Morgan		Please please please do not let the Covid crisis stop aggressive climate work. We need stringent carbon pricing yesterday. We also need to reduce pollution and carbon emissions in any possible. All strategies must be used. This climate catastrophe is far worse than the Covid crisis-even with the Covid crisis being a disaster in itself.

Paul	Moss		• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
Sharon	Moulton	Northampton	Thank you for realizing the necessity of a roadmap for getting to the GWSA emissions limit by 2050. The latest science indicates that time is running out and the the most significant drops in emissions need to occur as quickly as possible. Planning for an emissions drop that is closer to 60% than to 50% is needed. Plans for rapid, steep reductions in emissions need to include economy-wide carbon pollution pricing such as that described in H.2810. The consideration of climate justice factors, which include weighted cash payments to low and moderate income households to offset increased costs and green infrastructure spending with emphasis on where it serves the greatest need, is crucial in any planning. There is also a need to ensure that energy produced from burning biomass is neither incentivized in any way nor counted as "renewable". Studying how carbon sinking in soil, wetlands and forests can be maximized needs to be done and its results need to be an important part of the roadmap. Thank you for your time, Sharon M. Moulton *** *****Rd #*** Leeds, MA 01053 (Leeds is a part of Northampton)

Ellen	Moyer		We need to get real about climate change and carbon emissions. Bottom line: we need to stop burning things - any things - and we need to protect trees. Accordingly: • Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. A roadmap that does not incorporate these realities is bound to fail and be a mere sham. Sincerely, Ellen Moyer, Ph.D., P.E.
Diane	Nassif	Petersham	We need to reduce our greenhouse gas pollution by 60% or more by 2030, and get to a 100% reduction in human-caused pollution by 2050. We need to direct public money to provide public goods such as clean all-electric public transportation, Net Zero affordable housing, and access to safe and green schools and workplaces. Please prioritize Environmental Justice communities when making funding decisions. We need to massively ramp up our renewable energy infrastructure, which will have the additional benefits of creating significant numbers of regional jobs and cleaning up our air and water. We need a 100% reduction in pollution. We need to start building all new buildings efficiently and fossil fuel free, prioritizing affordable housing because it is healthier for occupants, more comfortable, and safer during extreme weather events. We will need to do more than implement carbon pricing. Low and moderate income people should get rebates that cover their projected increases in cost of living due to carbon price. Biomass should not be considered a carbon free or carbon neutral power source. Municipal Light Plants need to be included in the Renewable Portfolio Standard and the Clean Energy Standard.

Dave	Newbold	Boston resident	I applaud the state for establishing a framework for measuring our progress towards a zero-carbon society. As the IPCC 2018 report suggests, we have an urgent need to make substantial reductions by 2030. I think we should show innovation leadership by aiming for a 60% reduction in 2030 and to become completely carbon negative by 2050; we should engage in a friendly competition with California to achieve the most per capita carbon sequestration/storage. I would hope that while making this transition we do everything possible to remediate and help the frontline communities who have borne the brunt of fossil fuel pollution and infrastructure. We should also be vigilant to avoid any new particulate pollution from biomass combustion facilities. Thank you for your attention, Dave Newbold Boston, MA
Nina	Andrews	Rainbow warrior	*** that

Shannon and Heath	Nisbett	Franklin, MA	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Shannon and Heath Nisbett
Don	Ogden	The Enviro Show	I note in the section titled: "Current Research Effort" that "Analysis supporting the roadmap will examine.... the role the Commonwealth's natural and working lands can play in decreasing greenhouse gas emissions." We on The Enviro Show have been advocating for years that our public forests should be off limits to commercial logging and treated as our parks are so that trees and undisturbed soils can do the critical work of carbon capture rather than being cut down and end up being CO2 emitters. This is critical to any plan intended to reach net-zero greenhouse gas emissions.

Don	Ogden	The Enviro Show	I have a few concerns to share: 1) As you should know, the UN Intergovernmental Panel on Climate Change has given us only a ten year window for global warming to be kept to a maximum of 1.5C, beyond which even half a degree will significantly worsen the risks of drought, floods, extreme heat and poverty for hundreds of millions of people. With this alarm sounding so loudly it seems setting 2050 as a benchmark for reaching net-zero greenhouse gas emissions is far too late. We must engage in an all out effort to reach our emissions goal by 2030 before natural feedback loops make our efforts moot. 2) To realistically achieve net-zero greenhouse gas emissions the Commonwealth must also address carbon capture. Given no economically viable technology for capturing CO2 emissions is presently available the state is obliged to consider the ever present natural solution provided by our state lands. Trees and the soil that sustains them sequester vast amounts of CO2 at no great expense to the state. However, at this time Massachusetts actually encourages and enables commercial logging on state lands (thus creating CO2 emissions) thereby eliminating one of the only viable carbon capture capabilities available. This policy must end if we are to truly reach our goal of net-zero emissions.
Don	Ogden	The Enviro Show	Our forests are critically important drawing carbon out of the atmosphere. We must increase carbon storage by increasing the acreage of protected natural forests by creating more true reserves on our public lands, not so-called reserves that are cut again after 10 years. Our public forests must have permanent protection from resource extraction and development. Likewise, Massachusetts must give equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.

EDWARD	OLMSTEAD		I thank the Baker Administration for stepping forward to set a Roadmap to net zero emissions by 2050 in keeping with the urgent recommendations of the U.N. International Panel on Climate Change. I appreciate the opportunity to submit comments on the Emissions Limits for 2050 via the Executive Office of Energy and Environmental Affairs GWSA link. I am very concerned that interim goals in the current plan are not clearly articulated nor specific enough to reach that 2050 goal. The Roadmap, in order to get to net zero emissions by 2050, needs to include interim goals of 50% reduction by 2030 and 75% by 2040 at a minimum. Concerted efforts to move forward should begin as soon as possible. Interim goals need to be articulated in order to set targets and provide measurement points to assess the effectiveness of the efforts and the methods. The lack of specific goals is also of concern to me because without a strong start as soon as possible, the remainder of the goals become even harder to attain. Additionally, the longer we wait to take steps the more expensive they become, and the fewer options remain for attaining them. The IPCC strongly endorses carbon-pricing as the most effective method to reduce greenhouse gas emissions. Without carbon-pricing, the goal of net-zero by 2050 is put in serious jeopardy. Carbon-pricing, relevantly, provides incentives and funds to reduce carbon emissions and does so across all sectors. Therefore, I urge that it be incorporated in the Roadmap. The heating of buildings provides some of the most difficult issues related attaining net-zero emissions. These issues should be addressed now simultaneously with efforts across all sectors. The longer we put off solutions, especially difficult solutions, the more expensive and difficult the goals become. Kicking the can down the road is almost always the result of an illusion that what we can't solve now we will better be able to face later. When one gets to later, the problem is stubbornly still there and, often, worse. Heating of buildings needs to be addressed quickly. Right now, carbon pollution is disproportionately taxing the resources and health of certain communities. Carbon-based industry has not taken responsibility for the negative consequences of the widespread use of their products even though the information on those consequences has been available for years. The industry essentially decided to off-load those costs to the public. A carbon fee returned to the public in an equitable way would help provide the resources proportionately to people and businesses most effected by past pollution and most burdened in the task of transitioning to a green economy. Finally, I urge that the Roadmap clearly delineate revenues from a price on carbon to be invested in clean energy, heating, and transportation. While this is not an employment bill, I strongly encourage that the Roadmap specify green infrastructure projects that prioritize job creation and continuity for workers unemployed or at risk of losing employment when such prioritization is in keeping with the overall net-zero goals. Thank you for your consideration of these thoughts.

Kevin	O'Reilly	Beverly	Thank you for the commitment to net zero greenhouse gas emissions by 2050. We need both parties to commit to stopping climate change. However, you will need carbon pricing in order to achieve the gaol of net-zero. Please include carbon ricing, with rebates to help working and middle class families with increased energy prices. Now is the time to implement carbon pricing, while energy prices are low! Thank you, Kevin O'Reilly
Gail	Page	Woburn	I can't speak strongly enough about the need to keep all fossil fuels in the ground and move to 100% clean energy: wind, solar, and geothermal. Nuclear energy is not an option due to the extreme and long-lasting health dangers of radioactive waste. Biomass is not an option, because although it is a renewable resource, burning it releases carbon into the atmosphere, and cutting down forests destroys potent natural carbon sequestration systems. Fossil fuels release carbon and methane (a far worse green house gas than carbon in a 20 year timeframe) into the atmosphere. IN addition, well drilling and pipeline leaks and explosions destroy ecosystems, pollute water, devastate the environment (watch the movie Gasland to see what fracking has done), damage property, and kill animals and people. The dangers of COVID-19 were not immediately visible. But over time it became clear that when urgent, bold action was not taken, the damage was far greater than it would have been if decisive and potent steps were taken immediately. I hope we have learned from this pandemic. Unlike for a virus, the damage caused by the galloping climate crisis will not stop on its own. Science tells us we need to act TODAY to avert devastation of life on earth and destruction of human civilization as we know it. You are our leaders. We depend upon you to heed the call.
Alan	Papscun	Stockbridge	Forty years ago - 40 years! - I started to design my first passive solar house, moving in 1982. Three years ago I added rooftop solar to my current home which provides nearly 100% of my electric use. We need to protect our forest preserves which help sequester carbon! Any thought of cutting trees for energy usage is INSANE! We cannot afford to bring on line any additional carbon emissions. I wholeheartedly support every effort to embrace clean, non-carbon energy development for all new projects. We need clean, renewable energy, nothing but!

Vikram	Patil		With the spread of the novel coronavirus making people practise social distancing I'm curious how this will affect the plans of Massachusets net-zero greenhouse gas emissions limit for 2050. Right now I feel with most industries shut down and people avoiding travel and staying at home, this is definitely reducing greenhouse gas emissions and helping with climate change. But we must unnderstand that this virus isn't going to disappear anywhere in the near future. While travel restrictions become less stringent and people resume normal life, people are still going to practise social distancing for at least a year since the consequences of this are evident to everyone. As people practise social distancing, they are going to be hesitant to use public transport. If people start preferring private modes of transport over, using the bus line or metro, then I feel the cost of this is going to be tremendous and the greenhouse gas emissions will exponentially increase with this. How do you think we can cope up with this while keeping in mind our plans for 2050?
Vikram	Patil		I am very curious of how the novel coronavirus pandemic will play in the Massachusetts net-zero greenhouse gas emissions limit for 2050. People right now are practising social distancing and are at home. Most industries are closed and people are avoiding non-essential travel. When we look at this, we actually realise how good this is for the environment as the amount of greenhouse gas emissions are reduced considerably. However, at the same time, this virus is not disappearing anytime soon and naturally, knowing the consequences, people are going to be maintaining social distancing. When rules change and become less stringent and when normal life resumes, people are going to be hesitant to take public means of transport like the bus line and metro. They would start using private means of transport to avoid the chance of catching this or any such flu. This might be a good practise for hygiene, but when you think about it that millions of more vehicles are going to be on the road and the drastic increase in greenhouse gases, then this would take a serious toll on our climate and become a hurdle for future plans and goals. How can take action on this issue?

Caitlin	Peale Sloan	Conservation Law Foundation	Dear Secretary Theoharides, Please accept the following comments by Conservation Law Foundation ("CLF") in response to the Department of Energy and Environmental Affairs ("EEA)'s February 26, 2020 request for comment regarding the Governor's commitment to achieving net-zero greenhouse gas emissions by 2050. Founded in 1966, CLF is a non-profit, member-supported organization that protects New England's environment for the benefit of all people and future generations. CLF uses the law, science, and markets to create solutions that preserve and restore our natural resources, build healthy and resilient communities, and sustain a vibrant economy. Energy issues and greenhouse gas mitigation are central to that mission, and CLF is engaged in numerous efforts to move the New England region toward a net zero emission future. CLF's comments and recommendations, explained in detail in the full comments submitted by email, are summarized as follows: • Massachusetts should commit to at least a 90 percent greenhouse gas emission reduction by 2050. For many years, Massachusetts has led the nation in environmental protection. However, in recent years the Commonwealth has fallen behind. It is time that Massachusetts joins several other states and leads the nation with a commitment to reduce greenhouse gas emissions by at least 90 percent by 2050. • The final determination must include a clear definition for and regulations of allowable emission sinks for netting. The department must be clear on what qualifies as a sink, whether offsets are included, and on acceptable locations for land-use and other sinks. It must also be clearly defined for which sectors or technologies netting can be applied, and no netting should be applied to reach 2030 and 2040 targets. • Modeling tools should include modeling of sub-state level effects and advanced technologies. Modeling is necessary at the smallest geographic scale possible to evaluate energy supply and demand distinctions as well as impacts to demographic populations to achieve an accurate representation of the challenges and advantages expected in our decarbonization process. • Roadmap planning must center climate justice. We urge you to integrate equity within the modeling of the Roadmap study as well as the development of the Clean Energy and Climate Plan to ensure that the transition to net zero addresses existing inequities. To this end, we recommend that you consider the framework proposed by the GWSA Implementation Advisory Committee (IAC) Climate Justice Working Group. We support the group's February 24, 2020 recommendations to the GWSA IAC, including that the "climate crisis, species loss, pollution, and predatory capitalism have placed increased pressures on our natural and built environment, often leaving the most marginalized communities, especially people of color, low-income residents, and English isolated residents, to bear the worst of the burden of environmental pollution." The Commonwealth will not succeed in achieving net zero emissions without ensuring emission reductions in all communities. CLF appreciates the opportunity to comment and looks forward to further collaboration with the EEA on this important work. Sincerely, Conservation Law Foundation By its Attorney Caitlin Peale Sloan
Scout	Perry	Brighton	Hello, I think this is a great start to improve Emissions limits in Massachusetts. I do have some concerns. First, I believe that woody biomass burning and trash burning should be removed from the APS and the RPS. This sort of burning produces emissions as well and flies in the face of the the goals of the GWSA to reduce carbon emissions. My second concern is that Pellets, cordwood and wood chips also emit carbon when burned. I think that this sort of residential wood burning should be counted and discouraged in Massachusetts. Finally, while it's great to focus on reducing emissions, we should also take this opportunity to use nature to further reduce carbon in the atmosphere. We should be increasing the acreage of protected natural forest by creating more reserves on public lands and we should ensure permanent protection from resource extraction and development in such spaces. Also, we should give public incentives for private land that is kept "forever wild," where active management of the space is stopped so the natural growth can contain more carbon. Thank you, Scout

Cammy	Peterson	MAPC/MSGA	I have submitted a joint comment letter on behalf of a number of housing and climate organizations to the gwsa@mass.gov email address. If you have any questions, or did not receive the email (sent 4/10 around 4pm), please let me know. Thank you, and hope you're all well!
Lou	Peugh	Florence	Dear Governor Baker, I appreciate your administration's commitment to achieving net zero emissions by 2050. However, I am concerned by the lack of specific goals for 2025, 2030, 2040, etc. Interim goals are needed to assess the effectiveness of specific actions and adjust when necessary. I am also concerned about the lack of carbon pricing in the roadmap. The United Nations' IPCC Report states we cannot achieve significant reductions without using carbon pricing as part of the strategy. I urge you to consider these ideas as you and your team finalize the decarbonization roadmap. Sincerely, Lou Peugh
Claudia	Phillips	Leverett resident	Emission limits are very important, but wood fired power plants are definitely not the way to go. They cause two problems; increase carbon emissions in the process of burning, and decrease carbon sequestration by cutting down trees. Intact forests are the best known way to sequester carbon, therefore any actions which lead to loss of forests, for either a source of power or for further development, will have a severe negative impact on climate change. The most important step in addressing climate change is to leave standing as many mixed growth forests as possible. I would like my grandchildren to have a future. Please be sure to address this issue!
John	Prince	350 MA Allston-Brighton	I write to respectfully request that you ensure for the Commonwealth of Massachusetts that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050 while prioritizing support for Environmental Justice communities. Best regards, John Prince
Eli	Raczynski	Shutesbury	Please, I urge you, for the good of all humans and beings of this planet, make the emissions reduce by 100% sooner than 2050. Make it 2030! The past weeks have shown us that the world can change on a massive scale in moments. We have a chance now to build a better world as quickly as we need to. Think of your children and grandchildren. Isn't the ability to live in health and wealth in cooperation with the earth and each other what you want for them? If so, zero emissions by 2030 is what you must demand. Thank you.

Patricia	Ramsey	Amherst	Testimony Regarding the Global Warming Solutions Act Roadmap Submitted by Patricia G. Ramsey, ** ***** Drive, Amherst, MA 01002, 413-***-**** I commend Governor Baker for committing to reducing greenhouse gas emissions to net zero by 2050, as the International Panel on Climate Change (IPCC) states that we absolutely must do in order to forestall or mitigate the most disastrous consequences of climate change. However, I am concerned about the timeline, the scope, and equity of the current plan as described below: ● In terms of timing, the current timeline and strategy laid out in the Baker Administration's 2018 plan and the August 22, 2019 Policy Recommendations will not get us to net zero by 2050. To achieve net zero by 2050, we must set emission reduction goals of 50% reduction by 2030 and 75% by 2040. ● I understand the need for careful planning, but we cannot wait to conclude a long planning process before beginning to implement strategies for making steep reductions in carbon emissions immediately. As we have seen across different countries during the current pandemic, early and proactive actions have saved lives and money; whereas delays have caused thousands of deaths and severe financial meltdowns. Likewise, by delaying actions to mitigate climate change, we are setting ourselves up for a bleak and economically ruinous future. ● According to most scientific reports, including the IPCC analysis, we can't get to net zero emissions without putting a price on carbon, and we call upon the Baker Administration to commit to an economy-wide carbon pricing and rebate plan. For example, the Transportation Climate Initiative (TCI), coupled with other Administration efforts focused on the transportation sector, may get us to a 38% emission reduction by 2030, but that will not be enough to keep us on track for zero emissions in 2050. ● Any carbon pricing policy must protect low- and moderate-income people by ensuring that they receive rebates that more than cover any increase in cost of living due to carbon pricing. ● A percentage of revenues from carbon price should be invested in clean energy sources, public transportation, and infrastructure to accelerate the transition to a net zero green economy. To help all members of society transition to cleaner options, at least 40% of these investment funds should be directed to projects in low-income communities. • I urge the GWSA committee to carefully read the well-vetted carbon pricing and rebate bill: H2810 An Act to Promote Green Infrastructure and Reduce Carbon Change. It is currently being reviewed by the TUE in the MA House and, if passed by the MA Legislature, it can be implemented immediately. Alternatively, the GWSA could incorporate the strategies specified in H2810. Either way, the provisions of H2810 can be implemented immediately and are an important first step in achieving net zero greenhouse gas emissions in a way that is equitable and healthy for our citizens and the MA economy. • The revenue raised by the provisions of H2810 will also support the MA post-pandemic economic recovery. First, it will provide much needed money to individuals in the form of rebates. Second, by funding green infrastructure projects, it will bring money and jobs into communities. • The deaths, disruptions, and economic fall-out caused by corona virus are a preview of what our lives will be like as effects of climate change unfold. We must learn from the pandemic and suspend business as usual, think way outside of the box, and move with wisdom and alacrity if we are to avoid these devastating consequences. Thank you for your attention and consideration of these concerns. Patricia G. Ramsey Amherst, MA 01002
Timothy	Riker		The net-zero greenhouse gas emissions limit needs to be more aggressive and set earlier targets. Non-essential workers should be encouraged to continue to work remotely whenever possible and fossil fuel energy and transportation needs to be rapidly scaled down. Furthermore, reforestation without any reduction to current forests needs to be in the plan.
Rachel	Riverwood	Shelburne Falls	Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. c) Limiting tree felling on private property and done by utility companies and towns. d) Finally, something should be done about the bittersweet vines killing trees across our highways.

Gabriel	Robinson	Gabriel Robinson	I'm writing to urge you to remove woody biomass and burning and trash burning from the Alternative Portfolio Standard and the Renewable Portfolio Standard. These are carbon-emitting fuels; subsidizing them goes against the entire point of the whole Act. I am also writing to urge you to add stronger protections for forests to the Act. If we are to get serious about drawing down carbon from the atmosphere, we need to create more protected natural forests. We should do this by setting aside more reserves of forested public lands, to permanently protect them from development and resource extraction, and by creating public incentives to make private land "forever wild," given over to natural processes which, left undisturbed by humans, pull great amounts of carbon from the atmosphere. Thank you.
Jodi	Rodar	Pelham	The 2050 target for net-zero emissions is not nearly ambitious enough because the scientific consensus is that we must achieve a net zero addition of CO2 to the atmosphere in the next ten years. Clearly, it will be impossible to eliminate all fossil fuel emissions within the next ten years. Therefore, we must also make use of carbon sequestration - drawing down carbon from the atmosphere into the soil through regenerative agricultural practices as well as forest protection and regeneration. Forests currently remove about a quarter of the CO2 humans add to the atmosphere, keeping climate change from getting even worse. Therefore we urge you to protect Massachusetts' existing forests, including stopping the logging of our state-owned forests, and promote the establishment of new forests. Allowing existing forests to grow back and reach their ecological potential is an effective, immediate, and low-cost way to draw down and store carbon. Large, intact, undisturbed forests maximize carbon sequestration. When we cut down forests we not only eliminate their ability to sequester carbon, we release carbon previously stored in those forests into the atmosphere. Finally, biomass must not be included in the roadmap because 1) it's not carbon neutral, and 2) it destroys the trees needed for carbon sequestration. Thank you for your time and consideration of this important issue. Sincerely, Dr. Jodi Rodar

Adrie	Rose	Northampton	I am writing as a tax paying citizen living in Northampton, MA, and also as a member of the Western MA chapter of Extinction Rebellion. Aligned with Extinction Rebellion's first demand, I am grateful that the Draft Letter of Determination acknowledges the urgency of the climate crisis. Reflecting Extinction Rebellion's second demand, I know that to respond to that emergency we need to be carbon net zero by 2025 or sooner. Within the framework of the request for comments, we absolutely believe that by 2050 we must have reduced greenhouse gas emissions to 100% below 1990 levels-and pursue negative emissions to the degree possible. In line with XR's third demand, there should be expanded opportunities for public input and assemblies of citizens to not only respond to but help create policies to make these reductions happen. In line with XR's fourth demand, reconfiguring our state's infrastructure to reduce emissions should prioritize the most vulnerable people and establish indigenous sovereignty; establish reparations and remediation led by and for Black people, Indigenous people, people of color and poor communities for years of environmental injustice; establish legal rights for ecosystems to thrive and regenerate in perpetuity; and repair the effects of ongoing ecocide to prevent extinction of humanity and all species, in order to maintain a livable, just planet for all. Beyond this specific comment period, we must acknowledge that COVID-19 is reshaping our state's communities, economy, and relationship to the natural world. We may survive this more willing to make the necessary changes to avert future emergencies that will be created and compounded by climate change. Plans to implement emissions reductions should not adhere to our old ways of life but should consider the world we need to build in their place. Thank you very much, Adrie

Henry	Rose	DALTON, Member of Conservation Commission.	Combating climate change and reducing carbon emissions must remain important, despite the current coronavirus and economic crisis. Climate catastrophe, though less perceptible than viral pneumonia, threatens to be an even more devastating world problem than the current pandemic. I urge you to make the following changes in the proposed net-zero greenhouse gas emissions limits for 2050 in our state. • Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. Thank you for taking my comments.
Cheryl	Rose	Dalton, MA. , Green Committee Member, Conservation Commission Chair	Please learn a lesson from our COVID 19 experience. When we have an opportunity to prepare for a crisis, take it. We don't have 'forever' to address the climate crisis that is already here and on track to get horribly worse. MA is not on track to meet our GWSA goals. It's time to listen to science and stop looking away from the inconvenient truth. We need to get off fossil fuels and stop incentivizing burning. • Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.
Rich	Rosenberry	Holliston	Massachusetts needs to set its sites higher than ONLY net-zero by 2050. Maybe net-zero by 2045 and THEN 100% renewable by 2050? Thirty years is a long time and a 30-year plan will no doubt be modified at some point along the way, but let's keep our eyes on the prize: our carbon footprint needs to be zero if we are to keep our planet from warming more than 2 degrees C.

Shaina	Sadai		These comments are in regards to the setting of the 2050 greenhouse gas emissions (GHG) limit. Reliance on fossil fuels, and particularly natural gas, must drop dramatically over the next 10 years, while simultaneously scaling up renewable energy. As part of this process the construction and expansion of fossil fuel infrastructure in the state must cease.These tasks must be done with a keen understanding of environmental justice and with the input of frontline communities who will be most impacted by the detrimental changes to the earth system brought about by anthropogenic climate change. As we know the IPCC Special Report on Global Warming of 1.5C advised that in order to limit global average surface air temperature increases to 1.5C above pre-industrial levels by the end of this century we must reduce greenhouse gas emissions dramatically by 2030 and reach at least net-zero emissions by 2050. This is imperative for human health and wellbeing as well as the health and wellbeing of animals and ecosystems. Several years have passed since the release of this report and the UN Emissions Gap report from late 2019 showed that since reductions have not occured since the 2018 publication of the Special Report that we now need a greater than 7% drop in emissions per year globally to stay on track for the 2030 targets. With setting the long term goal of reductions for 2050 I urge you to set a strong goal of reaching true zero emissions by that time instead of relying on the arguably weaker goal of net-zero emissions. Negative emissions technologies have major drawbacks including being untested and unproven at scale, but one of their greatest risks is a false sense of security that comes with promising to draw down emissions at a later date. I would like to cite the Center for International Environmental Law's 2019 report on negative emissions technologies which can be found at the link below. Particularly relevant to discussions happening in the Commonwealth are the parts of Chapter 5 discussing bioenergy: https://www.ciel.org/reports/fuel-to-the-fire-how-geoengineering-threatens-to-entrench-fossil-fuels-and-accelerate-the-climate-crisis-feb-2019/ Setting the strongest possible goal- that of true zero greenhouse gas emissions, as soon as possible, but at least by 2050, is imperative. This is especially true as we are at a time when national and global action is failing. States and local communities, such as Massachusetts, have been the main avenues of emissions reductions action in recent years. Massachusetts has accomplished great reductions under the GWSA and we can continue to be leaders in the fight for a just and equitable future by setting and achieving the strongest goal possible. I believe we have the capability to achieve zero emissions by 2050, now we just need to have the will. ~Shaina Sadai PhD Candidate Geosciences, UMass Amherst

Michael	Sales	Elders Climate Action - Massachusetts Chapter	I encourage the State to adopt a 90% GHG reduction target by 2050. I believe that this is achievable IF AND ONLY IF there is a high social response to ou pro-healthy atmosphere efforts. And I believe that garnering true public support is and will be our greatest hurdle. For example, The State's population is bombarded incessantly with pro-carbon emission propaganda and outright lies. Looking at the transportation sector alone, many hundreds of ads appear daily supporting the purchase of GHG emitting vehicles in every conceivable media outlet. In my opinion (and I AM NOT SPEAKING FOR ELDERS CLIMATE ACTION IN THIS STATEMENT), these ads should be banned or halted as soon as possible. Ditto for ads encouraging people to purchase gasoline. The externalities of gasoline (and petroleum production more generally) are incredibly expensive. With the deep economic decline sparked by the Coronavirus crisis, oil prices have plummeted. Every single time this has happened previously, the automobile manufacturers have responded with bigger and bigger automobiles and many members of the public have eagerly embraced higher carbon-based energy consumption in every conceivable form. The functional ignorance or disregard of many/most consumers regarding the dynamics of climate change must be shifted to arrive at the kind of understanding of how and why the threat posed by climate change is every bit as ominous as that created by the current pandemic. (And, of course, there is a relationship between pandemics and climate change.). Message, messaging and messenger can move these unconcerned and denialist attitudes. Message involves the nature of the persuasive approach and argument needed to arouse attention and turn it into intention and action. Messaging refers to the range of media platforms and strategies used to communicate the persuasive message. And the messenger(s) are the leaders whose communicative skills and commitment to the change cannot be denied or repudiated. These are some of the elements of what it will take to achieve the high social response necessary to support a 90% reduction in GHG by 2050.

James	Satterthwaite	Reading, MA	Thank you for inviting public comment. In accordance with the best advice available from climate scientists, I urge the government of the Commonwealth to take decisive action to reduce greenhouse gas emissions by 60% before 2030 and by 100% before 2050. In particular, I urge the Commonwealth to require that Municipal Light Plants (MLPs) be subject to the same emissions standards as Investor Owned Utilities (IOUs). I am a resident of Reading, home of the largest MLP in the Commonwealth. We enjoy excellent service and low rates from the Reading Municipal Light Department (RMLD). However, I am very dissatisfied that the energy that comes out of the electric outlets in my house is dirtier (with respect to Renewable Energy Certificates) than the energy used by my friends in neighboring towns who receive their electricity through National Grid or Eversource. I am confident that the RMLD, as a not-for-profit entity, can deliver energy as clean as IOU energy at rates a little lower than IOU rates; but naturally they are unlikely to do so unless required to do so by the regulatory authorities. The math is simple. MLPs account for about 14% of the energy used in Massachusetts. The Commonwealth can't get to zero emissions unless that 14% gets to zero emissions, and that 14% will not get to zero emissions unless the MLPs start now to follow Commonwealth-mandated standards like those that apply to the IOUs. Thank you very much!
Keith	Schnebly	Arlington	Are there provisions in the Net Zero plan to allow for current planning and action towards Net Negative like some progressive municipalities and even corporations are targeting even now.

Susan	Sheridan	Franklin, MA	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Susan Sheridan

Stephen	Shick	First Parish Climate Action Team, Lexington	Thank you for doing this crucial work to help Massachusetts reduce greenhouse admissions by 80% by 2050. In considering this complex issues I would ask you: 1) not to allow the subsidization of burning woody biomass. This would be in direct counterpoint to the goal. 2) to expand and protect our public forest to increase the state's carbon storage capacity and further incentivize the opportunities to make land "forever wild." 3) explore ways to incentivize the reduction of residential burning of wood and wood products. One of the principles of my faith is "to promote and affirm the interdependence of all life of which we are a part." The climate change crisis, as the Covid-19 pandemic, calls us to take bold and creative actions to live in harmony with all life, not as oppressors. Thanks you for your work, may it move us into a carbon free future for our children. Stephen Shick
janet	sinclair	Concerned Citizens of Franklin County	Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.

Stephanie	Sloman		Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Stephanie Sloman

Anne Louise	smallen	Northampton MA	The 2050 target for net-zero emissions is a step in the right direction bu not nearly ambitious enough because the scientific consensus is that we must achieve a net zero addition of CO2 to the atmosphere in the next ten years. Clearly, it will be impossible to eliminate all fossil fuel emissions within the next ten years. Therefore, we must also make better use of carbon sequestration. Forests currently remove about a quarter of the CO2 humans add to the atmosphere, keeping climate change from getting even worse. I urge you to protect Massachusetts' existing forests, including stopping the logging of our state-owned forests, and promote the establishment of new forests. Allowing existing forests to grow back and reach their ecological potential is an effective, immediate, and low-cost way to draw down and store carbon. Large, intact, undisturbed forests maximize carbon sequestration. When we cut down forests we not only eliminate their ability to sequester carbon, we release carbon previously stored in those forests into the atmosphere. Finally, biomass must not be included in the roadmap because 1) it's not carbon neutral, and 2) it destroys the trees needed for carbon sequestration. Thank you Anne-Louise Smallen
Mandy	Smith	Lexington	I applaud the Baker Administration for committing to the elimination of the Commonwealth's greenhouse gas emissions by 2050-an absolutely requirement if we are to avoid total global catastrophe. Unfortunately, I believe the strategy laid out in the administration's 2019 plan is insufficient to achieve that goal. To ensure the state actually meets the 2050 targets, the Commonwealth needs to commit to interim targets for 2030 and 2040. There is no way we will be able to summon the political will to eliminate greenhouse gas emissions by 2050 if we do not have mandatory interim targets. Even more concerning, the Roadmap as currently conceived is just not comprehensive enough to successfully meet the 2050 target of zero emissions. In addition to the Transportation Climate Initiatives and the administration's other proposed efforts, the state must institute a state-wide limit on emissions from the heating of buildings. We simply will not be able to get to net zero without reining in building emissions. Massachusetts also must commit to economy-wide carbon pricing. Further, any carbon pricing policy must address the impact on low and moderate income residents by offsetting any projected cost of living increases. To ensure a dedicated revenue stream for clean energy and transportation infrastructure, a percentage of revenues from carbon pricing should be set aside for that purpose, with at least 40% targeted at projects that help low and moderate income residents reduce their emissions. Finally, I want to urge the Baker administration to accelerate this planning process. We need action now, not more years of planning.

Peter	Smith	Newton	Add better support for municipalities and Chambers of Commerce to promote the Mass Save Small Business Energy Saving Program. • Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. Thank You, Peter Smith
Eric	Smith	Town of Athol	I support the work you are doing at the State level on this initiative to move towards a net-zero greenhouse gas emissions for 2050. I believe it would greatly assist municipalities, including where I work here in the Town of Athol, to develop a Climate Action Plan, that could work towards a similar goal being implemented at the municipal level. Thank you for the opportunity to comment on this important initiative. I look forward to learning more when we get past this COVID-19 State of Emergency. Sincerely, Eric Eric R. Smith, AICP Director of Planning and Development Town of Athol *** **** Street Athol, MA 01331 (978) ***-**** ext. *** *******@townofathol.org

Marilyn Ray	Smith	Brookline	Thank you for the opportunity to comment on EOEEA's proposed strategies to ensure reduction of greenhouse gas emissions by at least 80% by 2050 and achieve net-zero emissions. I recommend 3 significant changes: 1. Remove the burning of woody biomass and trash from the APS and the RPS. Subsidizing these fuels that emit carbon directly conflicts with the goals of the GWSA. 2. Include the combustion of pellets, cordwood, and wood chips in the carbon counts. Their combustion results in significant carbon emissions, and should therefore be discouraged. 3. Design the regulatory structure to optimize carbon storage by increasing the acreage of protected natural forests (a) by creating more forest reserves on public lands by giving these reserves permanent protection from resource extraction and development; and (b) by giving public incentives to encourage owners of private land to put conservation restrictions that will ensure that their land is kept forever wild, where active management is precluded. There is a false narrative that wood is a source of renewable energy. Trees take nutrients from the soil, civilization's most precious resource. When trees are burned, the nutrients taken from the soil are dispersed, and rarely go back to the soil. Any tree harvesting should be as a source of building materials, not combustion. Any waste wood should be composted and returned to the earth for future generations of trees -- and people. Marilyn Ray Smith, Member, Emerald Necklace Conservancy & Brookline GreenSpace Alliance
Marilyn Ray	Smith	Brookline	Thank you for the opportunity to comment on EOEEA's proposed strategies to reduce greenhouse cases by 89% by 2050 and to achieve net zero emissions. I have 3 significant comments; 1. Remove the burning of woody biomass and trash from the APS and RPS, as they emit carbon in direct conflict with the goals of the GWSA. 2. Include the combustion of pellets, cord wood, and trash in the carbon counts, to discourage their use as fuel. 3. Optimize carbon storage by increasing the acreage of protected forests by (a) creating more reserves on our public lands and (b) by giving incentives to private owners to put conservation restrictions on their land to keep it forever wild, where active management is precluded. Thank you, Marilyn Ray Smith Member, Emerald Necklace Conservancy Brookline GreenSpace Alliance

JOHN	SPENCE	JP	Burning wood and trash produces increased Green House Gas emissions and is therefore contrary to the Global Warming Solutions Act. It's true these are not fossil fuels, but the key issue is that using this field does contribute to increased carbon emissions. Should not be part of APS and RPS. Similarly residential use of wood for fireplaces, pellets stoves and burning wood chips produces carbon emissions, as well as significant particulate pollution. This should be regulated. It is vital that we have more trees, in urban areas and rural. They suck up carbon and in hot weather produce cooling effects, very important in urban hot spots - which in even small areas - playing fields with artificial turf - can be detected easily because they are so much hotter than nearby areas with mature trees.
Sue	Stafford	Mothers Out Front	Healthy soil will be a critical piece of the roadmap. All farmers in MA should be encouraged to adopt regenerative agriculture practices. the practices will lead to a significant increase in carbon uptake. The Healthy Soils bills currently before the legislature should be approved asap! Here's why: Agriculture is the only sector that has the ability to transform from a net emitter of CO2 (producing almost 10% of U.S. emissions) to a net reducer of CO2. If the world's agricultural land were managed so that it were to gain soil carbon rather than lose it, an annual increase of only 0.4% soil organic carbon would effectively offset 20-35% of global anthropogenic greenhouse gas emissions. Farms employing Healthy Soils Practices are seeing soil carbon levels increase from a baseline of 1-2% up to 5-8% in as little as ten years, which add up to 25 to 60 tons of carbon per acre.
Susan	Starkey	Yarmouth Port	We must not rest on our laurels; MA can be much more of a leader and a risk taker, stepping up to the REALITIES we are so reluctant to face about the dangers of letting our planet warm up to and beyond 1.5c. Please set more aggressive Goals for 2030 and 2040 (I can't say what % is aggressive enough, maybe 50% by 2030 and 80% by 2040)? If we want our children and grandchildren to be able to live in Boston or along the South Shore and Cape Cod (where I live) we must plan for a livable coastline and this will take many courageous actions and commitments. We need you to engage the citizenry at all levels, especially those most impacted by the decisions our law makers are crafting. Thank you for all you do and let's double down on our collective and courageous efforts. Sincerely, Susan Starkey Yarmouth Port, MA 02675
Daphne T	Stevens		The planet will continue deteriorating as we are distracted by COVID-19. When the fog of disease burns off, the enormous destruction will suddenly be in everyone's sights but so many will be debilated by the recent horrors, in mourning, destitute and desperate that they will be unable to act. Now is the time for massachusetts to make major changes to our greenhouse gas emissions. We need to show other states the way.
Daphne T	Stevens		As a climate activist for over half my life, I'm 76, we can not get swept up by COVID-19. From my reading about ttipping points, 2050 is too late. We need to aim for 2030. I'm all for this plan as long as we move up the schedule.

Sarah	Stewart	Watertown	I am writing in to comment on the Massachusetts Executive Office of Energy and Environmental Affairs' (EOEEA) planning process "to identify cost-effective and equitable strategies to ensure Massachusetts reduces greenhouse gas emissions by at least 80% by 2050 and achieve net-zero emissions." Firstly, regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. Secondly, regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. Finally, regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. Please accept my comments with thoughtfulness. Sincerely, Sarah Stewart

Ed	Stockman	Regeneration Massachusetts	Regeneration Massachusetts *** **** Street Plainfield, MA 01070 On behalf of our 6500 Massachusetts Facebook followers, Regeneration Massachusetts appreciates the opportunity to submit comments on the Emissions Reduction Planning Effort. Regeneration Massachusetts (RM) is the statewide voice of organic regenerative agriculture. Through education and advocacy RM informs farmers, gardeners, legislators and consumers about regenerative agricultural practices that create healthy soil and food while reversing climate change through carbon sequestration in healthy soil. The American industrial food system contributes 30 to 50% of the greenhouse gas (GHG) emissions released in the U.S. To significantly reduce carbon emissions, it is necessary to assess the food system activities in the Commonwealth to ascertain the role agriculture and our food system plays in the release of GHG emissions. The U.S. industrial food system includes seed production, all aspects of crop cultivation and harvest including the production of agrochemicals, packaging, processing (processed foods, drying, refrigeration, freezing, canning, etc.), transportation and distribution, wholesale storage, retail storage and home use. Each of these links in the chain of the American industrial food system is energy intensive and releases varying amounts of GHG. Regeneration agriculture also includes forest management. Trees are essential carbon sinks that sequester carbon in soil and store carbon in their biomass. Careful forest management will help mitigate future climate change impacts. All logging on state managed land needs to stop and allow trees to help mitigate the inevitable impacts of climate change. Regeneration agriculture is our best hope for reversing climate change. Regeneration Massachusetts is not only focused on mitigating climate change we are also concerned about the existing levels of carbon in the atmosphere. The amount of carbon now in the atmosphere will generate future climate change impacts. Regeneration agricultural practices, if implemented, will remove atmospheric carbon through the chemical processes involved in photosynthesis. Green plants are our best hope for mitigating and reversing climate change. Green plants can capture carbon (photosynthesis) and through root exudates deposit those carbon compounds in surrounding soil to be sequestered. The significant reduction in the burning of fossil fuels is paramount to mitigating climate change. But to effectively develop a strategy to reduce GHG emissions a detailed assessment of the negative influences from the U.S. industrial food system is essential. Respectfully submitted, Ed Stockman, M.S., Agrobiologist Cofounder Regeneration Massachusetts

J. William	Stubblefield	Wendell	The inhabitants of planet Earth face an existential CLIMATE EMERGENCY already well advanced and getting worse all the time. We have seen an exponential increase in the concentration of greenhouse gases in the atmosphere since the Industrial Revolution. We are now well up on the hockey stick curve in much the same position we now are with the CoVid 19 pandemic, but with far more dangerous consequences. We are already in the red zone well past the levels that would ensure a livable future. Not only must we reduce GHG emissions to zero and do so in the fastest possible manner, we must also pull vast quantities of GHGs out of the atmosphere with equal alacrity. Available measurements show an annual average for 2019 of more the 411 ppm of CO2 (only 1 of several GHGs), and we need to get down to 350 ppm as soon as possible. This requires dropping anthropogenic emissions to zero and boosting natural sinks to the maximal achievable level. Even then, we likely face a much degraded future. I am, therefore, profoundly disappointed by inadequacy of the Roadmap 2050 goals to do our morally responsible part to mitigate the global disaster we have all helped to create. We have to get to net negative emissions well before 2050. As a starting point, I suggest we set a goal of at least 110% below 1990 levels by 2050. This will require dramatic and immediate cuts and rapid elimination of all fossil fuel use, including immediate divestment of all funds from fossil fuel activities, an immediate end to all fossil fuel subsidies, new subsidies to electrify all energy use to renewable sources across all sectors (electricity generation, transportation, space heating, manufacturing.) There is no time to waste! We must also attend to carbon capture and storage. This will require a dramatic and immediate program of land use changes designed to maximize the natural carbon sinks at our disposal, including dramatically reducing logging, especially on public lands, changing zoning regulations to protect what natural lands we have, stop subsidizing solar voltaic installations that involve usurping farm or forest land, programs to increase carbon capture and storage on agricultural land, and many other changes as well. Let's get to work! Massachusetts has been a leader in embracing genuine action to address our common climate emergency, and we should continue on this noble path. We now know that we must do even more than the we thought back in 2008 when the GWSA was passed. I beg you to set more realistic goals to save out future! J. William Stubblefield, PhD
brennan	summers	Fortriver School	We should do this quicker than 2050 because thats a long way away and it might be too late by then to even to anything.

Julie	Sutherland	Bellingham	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Julie D. Sutherland

Sue	Swanson	Bedford Mothers Out Front	As a grandmother, a person of faith, and an active member of Mothers Out Front, I am deeply concerned about the future of our Commonwealth--the health of its residents, the quality of its air, water and soil, and the economic well-being of all its citizens, especially those who are at the margins. The GWSA offers us a Roadmap to solutions for all these concerns! We must accelerate our progress toward reducing emissions caused by the use of fossil fuels in all sectors. Progress has been made, especially in the electric sector, but much more is needed across the board. The GWSA mandates an reduction in GHG emissions 80% by 2050 at the latest. Recent scientific studies have shown that this is not enough: we need to aim for 100% reduction as early as possible in order to mitigate the effects of several climate change on our health, our economy and our future. As we are seeing during this Covid-19 pandemic crisis, the most vulnerable amongst us are often the homeless, those who are underemployed or working for minimum wages, and many people of color. These are the people who will most benefit from mitigation and adaptation measures, but we all stand to benefit because we are all in this together! Bold action now will cost money, but this is like an insurance policy, only we KNOW that this crisis will come, so it is more like a pre-payment plan. You are in unique position to protect our health and our future climate while creating opportunities for new business and jobs in sustainable, renewable energy creation, transportation, and even construction. Please create a Roadmap to 2050 that is equitable and ambitious--that helps the vulnerable now and creates a just and livable society for all of us into the future. Thank-you!
Sonja	Tengblad	Mothers Out Front	We are stopping everything so that my son's grandpa can experience another year. Can we do the same so my son can one day experience being a grandpa? We are not doing enough. We need to do all we can.
Mary	Thomas	Wendell, MA	• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails.

Paul	van Linden Tol	DC 37 (AFSCME) Climate Justice Committee, 125 Barclay St. NY, NY	As a citizen of the North East, I petition you not to pass H4377 or S2372 in their current forms, but to amend them to recognize the ongoing importance of nuclear power. we urge you to include nuclear power among the sources of clean energy eligible for support in Massachusetts law, particularly in the pending legislative measures H4377 and S2372. Preserving nuclear power in Massachusetts and New England is crucial to progress on decarbonization in the region including New York, and can be done at a much lower cost than can procurements of other renewable sources. Respectfully yours, Paul van Linden Tol
Elizabeth	Vernon	Cambridge	• Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions. • Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts. • Regarding forest protection: Our forests are crucial for drawing carbon out of the atmosphere. We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests by a) creating more reserves on our public lands, and giving them permanent protection from resource extraction and development, and b) giving equal public incentives for private land that is kept "forever wild," where all active management is precluded and nature prevails. Thank you for your work in moving this bill forward. It is critically important to our future.

Jonathan	von Ranson	Wendell MA	EOEA friends, The crucial role of wild lands in maintaining the conditions for life on the planet can not be overstated. Wilderness is so essential in global ecosystem stability, it must not only be maintained, it must be extended. This in the interest of carbon sequestration and the climate, of course - but not incidentally also wildlife - meaning living things from microbial life and mycorrhizal fungi to wood beetles to deer and moose and oaks and pines that clean the water, transpire it, build and hold the soil, replenish the oxygen, etc. In the interest of net zero greenhouse gas emissions in particular, the activities and products of forestland should be defended as strongly as possible against commercial exploitation. Cheap, exploitively priced fuel works against the "zero"goal, so I suggest Massachusetts institute a tax that kicks in to provide a bottom price for established energy commodities like gasoline and fuel oil, wood pellets and possibly even cordwood*. Given that the market is going to partly determine outcomes, the cost of driving a vehicle should discourage its use, and the cost of heating a home should encourage smaller homes and businesses, or, alternatively, greater densities or reduced temperatures in existing populated, heated spaces. This is obviously a time to move in the direction of sacrifice, relinquishment, downsizing! *Regarding cordwood, in a good woodstove the net energy output of this often local fuel may be higher than some of the more processed (e.g., dried, packaged, warehoused and transported) alternatives like pellets. Possibly making it one of the more efficient heating alternatives. Thank you for this initiative, and chance to comment.
AP Environmental Science	Wakefield High School	Wakefield Memorial High School	We believe that the plan for reaching net-zero greenhouse gas emissions for 2050 should encompass social, environmental, and economic issues. The current plan released by Governor Baker is solid in encompassing all of these issues. One of the most important issues that must be addressed in this plan for reducing emissions is to encourage citizens to decrease their personal car use. Current research shows that reducing personal car use also benefits human health as it decreases sound pollution and the use of fossil fuels such as gasoline. To achieve this goal, Massachusetts must continue to improve their public transportation system. While it is great that the state has invested money into the public transportation systems, there are still improvements that need to be made to public transportation in more suburban areas. For example, my town of Wakefield does not have a robust public bus system, so many people in my town still need to drive out of town, and drive to train stations. Even this small change can go a long way to continue reducing emissions. Another idea mentioned in Charlie Baker's address that I believe needs to be paid attention to is the improvement of job resources and access to education throughout Massachusetts. When people are able to get jobs or go to school in a place that is close to their home, they will spend less time traveling each day, which will also contribute to reducing emissions. The easiest way to reduce emissions is to start on a citizen level and build up to nationwide programs. Another way Massachusetts can set an example for other states is to switch over all of their public buildings and operations to run on renewable energy sources. By switching over governmental buildings to renewable sources of energy, the government is setting an example for both citizens and other states to begin using these forms of energy. Since governmental and public buildings make up a large percentage of buildings throughout Massachusetts, having that many buildings that rely on renewable energy would greatly contribute to reducing emissions. As Massachusetts only makes up around 1 percent of the country's emissions, Massachusetts must be the state that inspires other states to make a change. The only way to do so is by leading by example. I hope you consider taking all of these factors into account when drafting your final plan.

AP Environmental Science	Wakefield High School	Wakefield Memorial High School (MA)	Based on the proposed structure of the Massachusetts net-zero greenhouse gas emissions limit for 2050, one piece that could be added to the structure to help achieve this goal would be to have checkpoint percent reductions of carbon emissions from the 1990 level along the way to the at least 80 percent reduction in 2050. For example, by 2030 the percent reduction could be set to between 25 and 35, and by 2040 the percent reduction could be set to between 50 and 60. Having checkpoints could help to get closer to the goal of an 80 percent reduction of carbon emissions from the 1990 level by 2050. Another element that could be added to the proposed structure of the Massachusetts net-zero greenhouse gas emissions limit for 2050 is a carbon tax throughout Massachusetts in the near future. Implementing a carbon tax would encourage the people of Massachusetts to be more open to options of cleaner energy sources such as solar, wind, or hydroelectric power for their homes or in purchasing new cars, instead of using fossil fuels as much that give off carbon. This carbon tax would also encourage larger businesses that emit lots of carbon to look into alternatives as well to fossil fuels, which could reduce carbon emissions on a larger scale. Another potential benefit of a carbon tax implemented throughout the state of Massachusetts would be to encourage people to use forms of transportation that do not involve carbon emissions more frequently if they choose to not switch their energy source for their home, or even if they do choose to switch their energy source. For instance, walking and biking to nearby locations would likely increase within the state, which would help address reducing carbon emissions in the transition process.
AP Enviornmental Science	Wakefield High School	Wakefield Memorial High School (MA)	In order to reach the proposed structure of the Massachusetts net-zero greenhouse gas emissions limit for 2050, there would have to be an increase in the usage of renewable energy and independence from fossil fuels. Using renewable energy sources allows for there to be less carbon emissions, but there would have to be a large number of users. The people included in this are the general public and companies. A huge issue would be taking away gasoline and diesel powered cars from the streets. There are certain people that refuse to drive anything that is not a huge truck or sports car. Whether it is for attention or they just like the car, people will not be willing to sacrifice something they connect with. But these vehicles are causing an issue larger than someone not getting attention from a loud vehicle. Purely electric cars may not be the coolest looking or sounding vehicles, but they are great for the environment. If an Electric Vehicle is made at a renewable energy powered factory then is charged at a renewable energy powered charging station, there is a minimized carbon footprint. There are businessmen within the industry that gain large profits from nonrenewable energy sources such as coal, oil and natural gas. If there were to be any sudden stop or decrease in production of these, this would create dramatic drops within the economy and for the personal profit of these business leaders. With this, it will be difficult to reduce the production of such sources, making it difficult to end the harm they cause within the environment. If the some sort of framework for the proposed structure of the Massachusetts net-zero greenhouse gas emissions limit for 2050 is not put into place, then there could be serious consequences that will eventually lead to catastrophic environmental problems. Some of these problems include rising sea levels which lead to inland flooding and erosion, landslides, wildfires, as well as an increase in severe weather patterns. It is possible that these catastrophes may occur regardless of whether or not net-zero greenhouse gas emission structures are put into place, so efforts need to be taken in order to combat the effects. Certain measures could include building reservoirs and seawalls to account for the flooding, or more resources to combat fires or other extremes that may occur.

Ap Envirmental Science	Wakefield High School	Wakefield Memorial High School	We are the generation that will see the effects of climate change. I want to live my life free from being afraid of drastic temperature changes, uninhabitable parts of the world, extinct species, droughts, famines, and mass migrations caused by people fleeing uncontrollable weather. Climate change causes extreme weather that damages homes, kills people, and hurts the economy. There's a possibility for 14 natural hazards that could affect the Commonwealth of Massachusetts and there's extreme and dangerous weather changes on it way. We should continue risk assessment to identify potential hazards and analyze the consequences if a hazard occurs. We must act now to ensure my generation can grow up in a safe world free from fears that previous generations didn't have to worry about. We must continue the plans for net-zero greenhouse gas emissions limit for 2050. Although the details of the plans have not been finalized, certain parts of these plans are better than others. For example, although nuclear energy is a better option to fossil fuels in terms of carbon emissions, Massachusetts should not be investing money into more nuclear power plants. The 3.3 billion dollars the state has invested into clearer energy sources is a good thing, but this money should be spent on actual clean energy, not on nuclear energy. Nuclear energy produces nuclear waste that is radioactive and can harm our children, drinking water, and land. In conclusion, the future is dependent on how we make changes to stop these greenhouse gas emissions from getting worse. Our net-zero plan would be greatly beneficial and even we could see small positive changes to our lives. The biggest impact that will be seen will be in the future and will be worth it. We need to reverse the climate change damage that has been done and prevent any more. If we reduce all of our emissions to 0% by 2050 then we most likely won't have to worry about global warming anymore. It would help out with a lot of today's problems.Once we get to that point, we can start focusing on bigger projects and improving society.
AP Environmental Science	Wakefield High School	Wakefield Memorial High School (MA)	I would suggest that in order to achieve the carbon number that is desired people should receive economic incentives. The Global Warming Solutions Act brought in alternative measures that proved to be pretty effective, now change can further be achieved with economically affordable alternatives. Governor Baker has made it clear that his goal is to reduce emissions by 80%. This goal is quintessential in order to reduce emissions with the support of the state to help improve aspects like public health and environmental justice. The state should especially take the incentives as a method as people will be unwilling to change their routines. Though conservatives do not make up as a large of a population in Massachusetts as other states, people will still care more about their own lives than the environment, unfortunately. The positives of less carbon emissions and how they will be achieved should be promoted in order to make people more willing to adapt to the inevitable changes of achieving zero emissions. Massachusetts is already seen as a power in terms of their use of clean energy sources. The use of clean energy sources needs to take priority in order for the state to grow.The state should take into account the many young people who care thoroughly about the future of our planet, that we will be living in for far longer than those making legislation on the topic. Young people's opinions should be taken seriously as, we, a lot of the time are some of the only part of the population who are willing to take the changes to achieve zero emissions. These changes will be hard to implement in the lives of the older population, who will most likely be unreceptive to the changes. Furthermore, it should be emphasized to everyone that this goal is put in place in order to create a better life for children that will have to deal with the repercussions in the future. Many people do not always realize just how much their actions today affect the children of tomorrow, who will live in much bleeker place in the future if change is not made now.

AP Environmental Science	Wakefield Memorial High School	Wakefield Memorial High School (MA)	The effects of climate change are already becoming apparent and should be seen as the biggest issue facing modern society. In an effort to stop these issues, Massachusetts has been making great strides to curb their emissions. As a state, Massachusetts has already greatly decreased its emissions since 1990, and we can do so much more. Looking into renewable energy (including nuclear energy), we could continue to lead the world in sustainable living. They wanted to lower emissions by 25% by 2020. Massachusetts is already 80% below the 1990's nationwide emissions and hopes to decrease even more by 2050. If the state is going to be realistic, solar energy may not be the most effective way to produce energy. Instead, wind and nuclear energy could be our best bets. Wind power could be very effective if put on our coastlines. Along these same lines, nuclear energy is also a great resource. A lot of people are scared, but nuclear accidents are far and few between, and they make millions of times more when compared to fossil fuels. By the year 2050, the hope is to have as least carbon emissions as possible. This means things such as electric cars, solar panels, and more. This means forces vehicles to become cleaner, for instance, or encouraging utilities to switch from polluting fuels like coal to cleaner sources like wind or solar. As a government, the implementation of a carbon tax may be the only way in which we can start to move away from fossil fuels. We have told people for decades that they will be affected by climate change, but even the thought of losing their homes and lives is not making any difference. With a carbon tax, there would be a monetary reason for people to change their ways, not just a humanitarian one.
AP Environmental Science	Wakefield Memorial High School	Wakefield Memorial High School (MA)	The earth as we know it is in a serious plight. There is a one in 20 chance that humanity will keep the Earth from warming to two degrees celsius. After warming two degrees, the world's tropical reefs will go extinct, sea-levels will rise meters, and the Persian Gulf will be abandoned. A warming of three degrees will result in the loss of most coastal cities. The consequences get even more severe from there. Climate change is a slow moving process, and we most likely won't live to see the horrors of it. However, this does not mean it isn't our problem. Leaving our problem for the future generations to face is extremely immoral and wrong. Future generations may not even know what Antarctica is. Coastal cities will become submerged. The goal to save the planet and our future generations is to lower the total worldwide carbon emissions down to 0% by 2050. If we cannot reach this goal, it will be too late to reverse the effects of hundreds of years of carbon emissions. However, we cannot just illegalize all use of fossil fuels. We need to be able to transition and cut emissions overtime rather than simply cutting all use overnight. All of us are well aware that this is simply not possible.. We can start this process by lowering the amount of gas used to heat houses, and to drive every day. If individuals are driving themselves every day everywhere, then that is not eco friendly at all, and they should probably start thinking about taking transit. Over time, we must increase regulations on fossil fuel not enough so that the population gets angry, but not little enough that it doesn't have any positive effect on the planet. Massachusetts is currently one of the most, if not the most, fuel efficient and eco friendly states throughout the country, but we are still responsible for 3% of carbon emissions throughout the country and about 1.2% of worldwide carbon emissions. The Commonwealth of Massachusetts is establishing a Resilient MA Action Team (RMAAT), which will work with SHMCAP to install a five step plan for hazard migration and climate adaptation actions. Their mission statement is to reduce statewide loss of life and protect natural resources. We hope that Massachusetts, as well as the other 49 states that make up this country, will aggressively pursue safer long term alternatives, to eventually live in an emission free country.

Donald	Walker		80 % reduction of greenhouse gases by 2050 is too low a target. Even if 100% were achieved by 2050, the deleterious effects would continue for decades or centuries. The sooner reductions are achieved the less the effects will be. We need much bolder objectives in a much more accelerated time line.
SUSAN	WALTNER	WILLIAMSBURG	If we want to be serious and honest about reducing emissions: 1. Woody biomass and trash burning should be removed from the APS and the RPS as they contradict the goals of the GWSA to reduce emission. 2. Pellets, cordwood, and chips significantly emit carbon. These should be discouraged in our state. 3. We need to increase the acreage of protected natural forests by creating more preserves on public land, and provide incentives for private landowners to protect and preserve their forests and keep them unmanaged and let nature prevail. These 3 items are crucial to truly attaining net-zero emissions. Our future generations are in trouble; we can help if we have the will. I believe most of us do have the will.
Edward	Ward		It seems obvious that using biomass for energy is not helpful for dealing with climate change. The emissions are bad and unnecessary. We have alternate, cleaner methods for producing energy. even though I don't like nuclear energy, I see it as preferable to biomass.
Nicholas	Warren	Northampton	Many thanks to the Baker administration for its clear commitment to reducing CO2 emissions to net zero in the Commonwealth. Unfortunately, we feel that the plan, as currently proposed, is not yet adequate to reach net zero emissions by 2050. We feel it is necessary to set hard reduction goals to be met by 2030 (50%) and 2040 (75%) and to commit to carbon pricing for the entire state economy The TCI will, if properly implemented, make a big dent in our emissions, but it appears that we will not be able to meet any of the above percentage goals without addressing home heating and promoting the use of heat pumps. The intent and goals of the plan are admirable, and crucially necessary if we are to reduce the effects of global warming. While we feel that carbon pricing is a basic part of the solution, we also feel that the approach should be structured to create rebates for citizens who do not have the financial means to pay for the increased price of energy. We also would like to see a portion of the carbon revenues directed towards development of clean energy sources in the Commonwealth Thanks you Nicholas Warren
Laurie	Weinstein, Ph.D.	Hinsdale	Forest clearing will greatly accelerate greenhouse gas emissions. Stretches of forest actually sequester carbon and protect our air; by cutting down these forests, the carbon that is sequestered will then be released (if the logs are burned, think exponential emissions), resulting in even greater greenhouse emissions. If you want cleaner air, make solar laws less restrictive. Do not let power companies regulate solar access and costs. We all need to work together for a cleaner climate.
Sarah	White		I don't think these goals are aggressive enough. I hope that we take stronger action to curb emissions. Thank you.
Nicole	Whitten	Ipswich	Thank you Governor Baker and Massachusetts for taking the lead on Global Warming action. This is what our nation's youth deserve and no less!

Ann	Willever	Norfolk	Dear Governor Baker and Secretary Kathleen A. Theoharides, In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more by 2030. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction. While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction. The best available current science shows that in order to avoid the worst impacts of climate change, we need to: - Reduce greenhouse gas emissions by 60% or more by 2030. - Get to a 100% reduction in human-caused emissions by 2050. - Prioritize Environmental Justice communities. - Not consider biomass a carbon-neutral power source. - Include municipal light plants in the Clean Energy Standard. - Include carbon pricing, an important solution that must consider Environmental Justice communities Furthermore, our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most. Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning and should be removed from the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS). A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity. Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies. We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change. Sincerely, Ann Willever
Susan	Worgaftik		Thank you for reaffirming that by 2050 the Commonwealth should meet or exceed the 1990 emissions. I would hope that as part of this plan, there would be incentives to have us not only meet that goal but do so 10 or perhaps 15 years early and not just maintain that level but continue to decrease emissions as we move forward. Thank you for your attention to this matter. The more that we can do now, the less we will have to do as time moves forward.

Peter	Wulkan	Montague	Scientists believe we need to get to net-zero much sooner than 2050. Equally important, we need intermediate limits set as well. I hope the proposed structure can be modified to include these two ideas. Thank you.
Mary	Yardley	Lexington Global Warming Coalition	I fully support the goal of reaching 100% net zero emissions by 2050 if not sooner as we are in a climate crisis. I also fully support including interim goals to ensure we meet our 100% goal by 2050.

April 10, 2020

VIA ELECTRONIC MAIL

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
Email: gwsa@mass.gov

RE: Sierra Club Comments on Draft Determination of Statewide Emissions Limit for 2050

To Whom It May Concern:

On behalf of its more than 25,000 members in Massachusetts, the Sierra Club respectfully submits the following comments in response to the Executive Office of Energy and Environmental Affairs' (EEA) February 26, 2020 Request for Comments on the Draft Determination of Statewide Emissions Limit for 2050.

Founded in 1892, the Sierra Club is the nation's oldest grassroots environmental organization with approximately 3.8 million members and supporters in all 50 states. The Sierra Club's mission involves advocating for ambitious and just climate solutions, including reductions in greenhouse gas (GHG) emissions across all sectors, a transition to 100 percent clean energy, and an increase in energy efficiency.

The Sierra Club applauds the Commonwealth's aim to pursue an aggressive GHG emissions reduction target for 2050 under the Global Warming Solutions Act (GWSA), and concurs with the Secretary's conclusions that climate change poses a grave threat to the citizens of the Commonwealth and that life-threatening impacts caused by climate change are already underway.[1] In light of these realities, Massachusetts must set a goal of at least net zero and ideally net negative emissions by 2050 to mitigate this "climate emergency."[2] Sierra Club further urges the Commonwealth to commit this year to achieving 100% clean energy by 2040 and at least a 50% emissions reduction below 1990 levels by 2030.

Massachusetts should consider a commitment to go beyond net zero by 2050, as net negative emissions will ultimately be necessary to keep global warming in check. While net zero is the target suggested by the IPCC to limit global warming to a rise of 1.5°C above pre-

[1] Executive Office of Energy and Environmental Affairs, Draft Determination of Emissions Limit for 2050, February 26, 2020.
[2] In November 2019, 11,258 scientists from across the globe declared a climate emergency. William J. Ripple, et al., World Scientists' Warning of a Climate Emergency, BioScience, Volume 70, Issue 1, January 2020, Pages 8–12.

industrial levels, the IPCC's projections include a range of uncertainty as to how severe climate impacts will be,[3] and its past projections have consistently underestimated climate impacts.[4] Indeed, a comparison of past IPCC predictions against 22 years of weather data found that the IPCC consistently underestimated the intensity of global warming in each of its four major reports released since 1990.[5] Further, the IPCC has determined that it will be necessary to obtain net negative emissions at some point during the 21st century to compensate for residual long-lived non-CO2 GHG emissions and to cancel out build-up of earlier CO2 emissions to ensure that warming stays or returns below 1.5°C.[6] Massachusetts should minimize the use of offsets and focus on absolute emissions reduction, saving offsets to achieve net negative emissions and to compensate for residual long-lived non-CO2 GHGs and earlier built up CO2 emissions.

While the 2050 target is a crucial guidepost, Massachusetts must also focus on interim targets, since earlier emissions reductions lead to a higher chance of keeping global warming in check.[7] The pathways modeled by the IPCC show that clear emission reductions are required by 2030 in order to limit global warming to 1.5°C.[8] Every year of a postponed GHG emissions peak means that deeper and faster cuts will be required later.[9] Further, future climate-related risks depend on the rate, peak, and duration of global warming.[10] Risks are larger in a scenario in which warming reaches a high peak and later declines, than in a scenario in which global warming gradually stabilizes.[11] Given this urgency, and the Supreme Judicial Court's finding that the GWSA requires subsequent emissions limits to be implemented at the expiration of the 2020 limit,[12] the Commonwealth must act to set interim limits this year.

Other states have already begun to set ambitious emissions reduction targets. New York has a net zero emissions by 2050 target, with a commitment to ensure absolute emissions are

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[3] *See e.g.*, Joeri Rogelj, *et al*., IPCC, Global Warming of 1.5°C, an IPCC Special Report, Chapter 2: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development, 2018, p. 95, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf. ("IPCC Special Report, Chapter 2: Mitigation Pathways").

[4] Keynyn Brysse, *et al*., Climate change prediction: Erring on the side of least drama?, October 5, 2012, https://www.sciencedirect.com/science/article/abs/pii/S0959378012001215; David Spratt & Ian Dunlop, What Lies Beneath: The Understatement of Existential Climate Risk, Breakthrough - National Centre for Climate Restoration, August 2018, https://www.researchgate.net/publication/328413289_what_lies_beneath_the_understatement_of_existential_climate_risk.

[5] Keynyn Brysse, *et al*., Climate change prediction: Erring on the side of least drama?

[6] IPCC Special Report, Chapter 2: Mitigation Pathways, p. 116.

[7] *Id.*, p. 95 (finding that lower GHG emissions in 2030 lead to a higher chance of keeping peak warming to 1.5°C.).

[8] IPCC, Summary for Policymakers, Global Warming of 1.5°C, An IPCC Special Report, 2018, p. 18, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf. ("IPCC, Summary for Policymakers").

[9] United Nations Environment Programme, Emissions Gap Report 2019, Executive Summary, at V, https://wedocs.unep.org/bitstream/handle/20.500.11822/30798/EGR19ESEN.pdf?sequence=13.

[10] IPCC, Summary for Policymakers, p. 5.

[11] *Id.*

[12] *New England Power Generators Ass'n, Inc. v. Dep't of Envtl. Prot*., 480 Mass. 398, 411 (2018) ("We conclude that the Legislature did not intend to render § 3 (d) meaningless after December 31, 2020. Rather, the department was expected and required to promulgate new regulations at that time, based on updated information, to ensure that the future Statewide limits for 2030, 2040, and 2050 will be met.")

reduced to 85% below 1990 levels.[13] In addition, Hawaii has committed to go net zero by 2045,[14] Nevada has committed to reduce absolute emissions to zero or near-zero by 2050,[15] and D.C. has committed to go net zero by 2050.[16] For 2040 targets, New York and Connecticut have already committed to 100% carbon-free electricity by 2040, while California, Washington, Hawaii, and New Mexico have committed to 100% carbon-free electricity by 2045.[17] For 2030 targets, California has set a goal of 40% emissions reduction below 1990 levels,[18] Maine has set a goal of 45% below 1990 levels,[19] Vermont has set a goal of 50% below 1990 levels by 2028,[20] and D.C. has set a goal of 50% below 2006 levels by 2032.[21] Massachusetts must join these states in enacting ambitious reductions and leading the climate fight.

Reaching emissions reduction targets will require coordinated action across sectors to achieve GHG reductions and energy efficiency. The Implementation Advisory Council has proposed several recommendations to achieve emissions reductions;[22] Massachusetts should take immediate steps to implement these recommendations. In particular, the Commonwealth should focus on:

1. Building electrification. Massachusetts must phase out gas from buildings by requiring all-electric new construction, a process the Commonwealth could begin immediately by accelerating the development of a net zero stretch building code. Massachusetts must also open a proceeding to plan for a managed retirement of the existing gas system in a just and equitable manner, ensuring environmental justice and labor impacts are mitigated.

2. Reduction of transportation emissions. Massachusetts should develop a plan for reducing emissions from the transportation sector by promoting electric vehicle adoption through incentives and charging infrastructure deployment, participating in the regional program developed through the Transportation and Climate Initiative (TCI), and supporting strategies to reduce vehicle miles traveled.

3. Carbon-free electricity generation. Massachusetts should open a proceeding to evaluate the need to extricate its distribution utilities from the ISO New England

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[13] National Conference of State Legislatures, Greenhouse Gas Emissions Reduction Targets and Market-based Policies, updated January 10, 2020, https://www.ncsl.org/research/energy/greenhouse-gas-emissions-reduction-targets-and-market-based-policies.aspx. ("NCSL, Greenhouse Gas Emissions Reduction Targets").
[14] *Id.*
[15] *Id.*
[16] District of Columbia Department of Energy & Environment, Clean Energy DC: The District of Columbia Climate and Energy Action Plan, August 2018, p. v, https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/Clean%20Energy%20DC%20-%20Full%20Report_0.pdf. ("Clean Energy DC: Climate and Energy Action Plan").
[17] Lori Bird & Tyler Clevenger, World Resources Institute, 2019 Was a Watershed Year for Clean Energy Commitments from U.S. States and Utilities, December 20, 2019, https://www.wri.org/blog/2019/12/2019-was-watershed-year-clean-energy-commitments-us-states-and-utilities.
[18] NCSL, Greenhouse Gas Emissions Reduction Targets.
[19] *Id.*
[20] *Id.*
[21] Clean Energy DC: Climate and Energy Action Plan, p. v.
[22] IAC Policy Recommendations, August 22 2019, https://www.mass.gov/doc/master-policy-list/download.

Forward Capacity Market (FCM), which is incompatible with achievement of the Commonwealth's clean energy goals and harmful to Commonwealth electric customers. In addition, the Commonwealth should direct the DPU and the Energy Facility Siting Board to emphasize not only price and stability of supply, but also safety, fairness, and reduction in greenhouse gas emissions in their decision-making.

These actions will benefit the Commonwealth beyond reduction of GHG emissions, leading to an increase in jobs and economic growth, and avoiding harm to consumers from stranded gas system assets. For example, TCI adoption is projected to stimulate an increase in jobs, gross domestic product, and disposable personal income.[23] Likewise, a recent study in California indicated that retirement of the gas system will create over 100,000 full-time equivalent jobs in the state, even after accounting for losses in the fossil fuel industry.[24] Further, planning now for retirement of the gas system will allow the Commonwealth to mitigate the risk of stranded assets and the resulting financial harm to ratepayers.[25]

Sierra Club urges Massachusetts to lead the climate fight, setting aggressive emissions reduction targets and implementing immediate changes to reduce GHG emissions. Such action is necessary to protect the citizens and natural resources of the Commonwealth and to avoid further life-threatening climate impacts.

Respectfully submitted,

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[23] Transportation & Climate Initiative, Executive Summary: Evaluating the Potential Environmental and Economic Benefits and Costs of a Cap and Invest Program for Transportation Emissions in the TCI Region, https://www.transportationandclimate.org/sites/default/files/TCI%20Modeling-Results-Summary_12.17.2019.pdf.
[24] Betony Jones, *et al*., California Building Decarbonization: Workforce Needs and Recommendations, November 2019.
[25] Andy Bilich, *et al*., Environmental Defense Fund, Managing the Transition: Proactive Solutions for Stranded Gas Asset Risk in California (2019), https://www.edf.org/sites/default/files/documents/Managing_the_Transition_new.pdf.

Comments on Emission Limit for 2050

Michael Duclos – 4/10/2020

Thank you for the opportunity to provide comments.

I believe placing the main focus on setting a 2050 emissions limit is ill advised, it may have already done irreparable damage, and may continue to do far more harm than good.

2050 is so distant in the future there is no present day accountability or deliverables, many of us will be long dead, none of the responsible parties will be in office and politics typically results in near term issues being addressed first.

So I see placing the major focus on a 2050 goal as secondary. Pick a number between a 80% to 100% CO2e reduction, and move on to the real issue, to actually doing what is needed immediately.

What I think is needed immediately is to move as quickly as possible, using the best climate science that is currently available, to set a firm goal for 2030 and concurrently create a plan, draft regulations, create incentives, initiate marketing education and strategies and other mechanisms to move the market no later than December 2020.

This means we only will have lost all of 2020. We stand to lose much more time by serializing analysis and planning processes that should have occurred shortly after the GWSA was enacted. I find it incredibly disappointing the GWSA was enacted in 2008 and we do not yet have a 2030 goal, with a detailed plan with 5 year milestones out to 2050 in place, and everyone - government, public, and private enterprise - on-board and organized and working to deliver the necessary results.

The UN Emissions Gap Report 2019 Executive Summary is clear:
https://wedocs.unep.org/bitstream/handle/20.500.11822/30798/EGR19ESEN.pdf?sequence=1&isAllowed=y

Because we did not act decisively by 2010 (two years after the GWSA was enacted) we are now faced with the prospect of achieving a 7.6% decrease in CO2e each year, staring in 2020, to have a reasonable probability of holding to a 1.5C temperature increase.

So let's see what that looks like using Table 2 from DEP "State Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection Update – July 2016" which has GHG Emissions in MTTCO2e of 94.4 in 1990, and a 2020 Projection of 25% Reduction form 1990 or 70.8. subtracting 7.6% of the total for each year results in: 2020=70.8, 2021=65.4, 2022=60.4, 2023=55.9, 2024=51.6, 2025=47.7, 2026=44.1, 2027=40.7, 2028=37.6, 2029=34.8 and 2030=32.1. – See table and spreadsheet below for clarity.

So I'd offer our 2030 goal should be a 55% decrease from the 2020 emissions level, or a 66% reduction from 1990. So 66% from 1990 should be the goal, as long as we are on track to reduce emissions by 7.6% starting in 2020. If we fail to meet that goal, we must accelerate the reduction in succeeding years because the additional CO2e emissions in will be warming the planet for longer.

Also, consider that if Mass is to meet the 2020 goal of 25% reduction (the CORVID-19 crisis is providing some unexpected help) we should thoughtfully assess how we achieved, or failed to achieve that goal. It appears to me the approach for the 2020 goal was to use the simplest, lowest cost, most politically expedient methods available, since the 80% by 2050 goal was so distant in the future there will be no accountability for failing to establish a firm foundation by 2020 for success in 2050.

For example, I believe the single largest GHG reduction measure was simply displacing coal fired electricity generation with natural gas. Was fugitive emissions from the natural gas included in those calculations ?

But far more importantly, can we afford to have that much natural gas generation in the 'emissions budget' in 2050 and still meet an 80% (or greater) reduction goal ?

It is my opinion we should be attempting to envision what appears necessary for the end goal in 2050, and set intermediate goals every 5 years that create a foundation for success in 2050.

Of course we will need to make mid-course corrections as we proceed down this path, but in my experience planning and executing projects, it is important to be open and realistic about where we are, where we need to be and when, and how we manage to get there.

Thank you for the opportunity to comment on the 2050 Roadmap.

Best Regards,
Michael Duclos

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Table 2: Comparison of Massachusetts 1990 and 2011 GHG Emissions, 2020 BAU and 2020 Limit Using Various GWPs ($MMTCO_2e$)

	1990 (Baseline)	2011 (Actual)	2020 BAU (Projection)*	2020 Limit: (25% below 1990)
Last published values (SAR)	94.4	80.0	94.0	70.8
Updated values (AR4)	94.4	78.6	92.7	70.8

*AR4 BAU Projection based on complete emissions for 1990-2008; original published BAU did not have complete emissions through 2008 for all sectors.

2020 Limit - 25% Reduction	70.8	
1990 Baseline	94.4	
Ratio - Checks 25% reduction	0.75	
1990		94.4
% per year		0.076
2020		70.8
2021	1	65.4
2022	2	60.4
2023	3	55.9
2024	4	51.6
2025	5	47.7
2026	6	44.1
2027	7	40.7
2028	8	37.6
2029	9	34.8
2030	10	32.1
Reduction 2020 to 2030		0.55
Reduction 1990 to 2030		0.66

Comments for March 4 Roadmap Meeting in Worcester

by Fran Cummings, 33 Martin Street, Acton MA 01720, fcummings@gmail.com

Thank you for this opportunity to provide comments to the GWSA Implementation Advisory Committee and the Commonwealth on the 2050 Roadmap.

The DRAFT DETERMINATION OF STATEWIDE EMISSIONS LIMIT FOR 2050 concludes with the following findings on page 7:

- To ensure no more than a 1.5°C rise in global mean temperature above pre-industrial levels, global GHG emissions should be reduced to at least net zero in 2050.
- As it has to date, emissions reduction activity on the pace and scale recommended by the IPCC is likely to continue to present the Commonwealth with increased opportunities to realize cost savings and increased energy independence, and to promote growth in clean energy jobs in Massachusetts.

It seems clear that for the entire world economy to achieve net zero by 2050, some countries and states will have to be leaders by doing better than net zero, or reaching net zero sooner, to demonstrate what can be done and to compensate for the parts of the world that are likely to have difficulty achieving net zero by 2050 themselves. Massachusetts should be a leader and do better than the global average, which could maximize the economic and other benefits stated in the last finding (e.g., cost savings, clean energy jobs).

Recommendation 1: Tighten 2050 Limit. Massachusetts can exercise this leadership by achieving a "level of statewide greenhouse gas emissions that is LESS THAN OR equal in quantity to the amount of carbon dioxide or its equivalent" that is removed and stored annually…." and by achieving a level of gross emissions that is better than 90% below the 1990 level. I therefore recommend that draft definition be revised to read as follows:

> A level of statewide greenhouse gas emissions that is less than or equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is 95% below the 1990 level.

Recommendation 2: Establish Ambitious 2030 Limit. Another way for Massachusetts to exercise this leadership is to achieve net zero earlier than 2050 and to front-load the reductions. This would be responsive to the most recent information including the Special Report on Global Warming of 1.5°C indicating that getting global net emissions to zero by 2050 will not guarantee keeping the temperature increase to 1.5 degrees C or less, but will likely lead to an increase in temperature significantly greater

than that. For example, today we are at about 1.2 degrees C, with more than a 0.2 degree increase per decade occurring recently. The most immediate opportunity to get onto the fastest path to net zero is the setting of the 2030 interim emissions limit under the GWSA, so I recommend that it be set at the most ambitious level possible.

Recommendation 3: Develop and Debate a Maximum-Acceleration Scenario. In order to credibly determine how much ambition is possible for both 2030 and 2050, I urge you to include one or more scenarios in modeling and in IAC discussions for the 2050 Decarbonization Roadmap that will substantially accelerate GHG reductions between now and 2030 consistent with climate science and the most up-to-date information on the global climate emergency, in order to identify the lowest level of 2030 GHG emissions that could be feasible with the most favorable state and federal policies. In particular, the 2030 reduction should not be artificially constrained to the 45% or 50% reduction that conventional wisdom might have considered realistic in the past. Modeling what is really needed by 2030 should be done without delay so that the the 2030 limit and plan can be adopted and implemented as soon as possible.

One scenario might be called the "emergency mobilization scenario" and would be different from many state plans that have been done to date, including the recent Comprehensive Energy Plan (CEP) that included an "aggressive" scenario with only a 43% overall GHG reduction by 2030. In that scenario, for example, heat pumps were assumed to gradually penetrate the market for heating systems that have failed and must be replaced, which only reduced GHG by some 20-21% by 2030 in the residential heating sector, so more aggressive assumptions would be needed that include such policies as paying building owners to replace working furnaces earlier, before they have failed. Given how challenging it may be to model the most ambitious GHG reductions for 2030 with existing analysis tools and within the planned schedule, the IAC and outside stakeholders should be asked to identify possible high-ambition, deep decarbonization and/or emergency mobilization scenarios, variables and strategies.

This approach would enable the analysis to address the following questions among others:

1. Based on what we know now, how soon must we start making the long-lead changes that we will need to reach the 2050 goal — such as changes to our building stock and moving off fossil fuels for transportation — and how fast could these transformations ramp up by 2030?
2. If the climate emergency becomes more extreme between now and 2030 and public support increases for more ambitious policies and results, what contingency plans could be prepared to kick in and accelerate progress?
3. How many more clean energy jobs could be expected in MA by 2030 if we start earlier and reduce GHG faster than other states?
4. How many fossil fuel related jobs stand to be lost and how much re-training will be needed to transition those workers to clean energy jobs?

5. How much space will be needed for the massive increase in solar capacity that will be needed by 2030 and what is the optimum approach to bring this capacity on-line while protecting the significant carbon removal by Massachusetts forests, that are among the most carbon dense in the Northeast, to reach net zero?
6. How soon will existing energy assets — such as fossil fuel power plants, natural gas infrastructure and oil and gas heating systems — need to be shut down and replaced early (before the end of their useful lives)?
7. What are the most critical policy interventions that would be required to achieve the level of mobilization and transformation needed to really minimize 2030 GHG emissions?

The 2050 Decarbonization Roadmap process can educate citizens and policymakers about the increasingly aggressive actions that need to be implemented to achieve net zero and what the benefits will be. While there are limits to how useful modeling can be, and reduction goals do not by themselves reduce emissions, the deliberations of the Implementation Advisory Committee and engagement of the public are an important opportunity to build public understanding and political will to support the major mobilization and transformation that is needed. There is no time to waste with incremental steps that are insufficient, so this Roadmap process must include the most ambitious scenarios and lead to the most ambitious 2030 limit.

I may provide additional or updated comments as this process proceeds.

April 10, 2020

Dear Governor Baker, Lieutenant Governor Polito, and Secretary Theoharides:

Thank you for your leadership in committing the Commonwealth to achieving net zero emissions by 2050, and for giving stakeholders, like the businesses that we represent, the opportunity to provide additional comments on your drafted letter of determination. A Better City represents nearly 130 member businesses, spanning the commercial real estate, banking, insurance, legal, healthcare, higher education, telecommunications, and energy sectors. On behalf of our diverse and expansive membership, A Better City writes in support of your commitment to achieve net zero by 2050. A Better City would also like to offer comments on several items relevant to the letter of determination: 1) interim targets; 2) direct emissions reductions vs. offsets; and 3) stakeholder engagement and incentives.

INTERIM TARGETS

In order to reach net zero by 2050, the Commonwealth must establish a rigorous and pragmatic roadmap to achieve deep emissions reductions over the next ten, twenty, and thirty years. Therefore, in establishing interim targets, A Better City recommends that emphasis be placed on setting economy-wide interim targets and ensuring consistency in defining and enforcing net zero across jurisdictions, including in the City of Boston, City of Cambridge, and others. The City of Boston's interim target of 50% emissions reduction from 1990 levels by 2030, as committed in the 2019 Climate Action Plan Update, will be an *extremely* heavy lift for the commercial sector and for large buildings. In alignment with internationally established science-based targets, A Better City recommends that the administration commit to an interim target of *at most* 50% emissions reduction from 1990 levels by 2030, that is applied economy-wide with rigorous engagement by relevant stakeholders to determine compliance pathways and sector-specific targets.

DIRECT EMISSIONS VS. OFFSETS

It may be particularly difficult to achieve 100% direct emissions reductions in certain sectors, including large buildings that are in operation 24/7 such as hospitals, labs, and data centers. Therefore, the definition of "net zero emissions" must sufficiently allow for the use of offsets. A Better City urges the administration to include in following definition of net zero emissions: "A level of state-wide greenhouse gas emissions that is equal in quantity to the amount of carbon

dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided however, that in no event shall the level of emissions be greater than a level that is 80% below that level." Setting the initial threshold at 80% will allow for up to 20% of emissions reductions to be achieved through offsets. More must be done to understand realistic and pragmatic ways to actualize direct emissions reductions—setting an 85% or 90% threshold at this time is not feasible. The 80% direct emissions reduction requirement under net zero by 2050 could be adjusted over time and increased as more technology and emissions-reduction opportunities become available.

For example, there could be compliance mechanisms designed in which options like offsets and Renewable Energy Credits (RECs) are only available if deep emissions reductions measures are also being performed in parallel. Additionally, market-based compliance mechanisms like economy-wide carbon pricing should be researched and explored as possible policy measures to implement moving forward.

STAKEHOLDER ENGAGEMENT, INCENTIVES, AND DISTRICT-LEVEL SOLUTIONS

For our business sector to comply with statewide emissions reductions targets, considerable resources will need to be invested upfront to achieve successful long-term decarbonization. A Better City encourages the administration to develop incentive structures for decarbonization that are equitable across all sectors—and to actively engage with business stakeholders at every step of the way. Moreover, A Better City urges the Commonwealth to invest in critical infrastructure upgrades at the district-level, as no individual business or business sector can tackle this challenge alone. Complex, systematic challenges—from building a cleaner transportation system to developing a cleaner grid—will benefit from robust stakeholder engagement and participation.

A Better City and its membership look forward to working collaboratively with the administration on a variety of critical aspects, including sector-specific targets, decarbonization of large buildings, carbon offsets best practices, models for climate financing and incentive structures, and emissions reduction solutions.

Thank you for your vision and leadership.

Sincerely,

Richard A. Dimino
President and CEO
A Better City

Comments on

Proposed Statewide Emissions Limit for 2050

by

Allan Fierce

I am a retired environmental lawyer who worked for the state for over 16 years in the Mass AG's office and at MassDEP. I am currently a member of the Mass chapter of Elders Climate Action. However, the views expressed below are my own.

Nearly three years ago I began working with a small group of environmental advocates to achieve passage by the Mass Legislature of what is now called the 2050 Roadmap Bill (currently H.3983). I engaged in this effort because I firmly believe that without a detailed, comprehensive plan for how the state will achieve its 2050 emissions limit, that limit will surely be exceeded. And if that 2050 limit cannot be achieved by a relatively wealthy, smart state like Massachusetts, one with deep resources in the scientific, academic, and green tech communities, then there is little chance that other less well equipped states and nations will be able to do so either. If that happens, the world will slide into a horrific period of global heating that could become unstoppable.

So, I view Massachusetts as one of those few political entities that are on the tip of the spear in fighting the global climate battle. Others include New York, California, and the EU. (I wish I could put the US on this leaderboard.) There may be a couple more, but not many. These spear-tip entities all need to succeed in meeting their own 2050 emission limits to set the example, to lead the way, for all the other disparate states and nations of the world. That's because this is a collective, global battle. Carbon pollution knows no boundaries. We cannot lose focus on this. For Mass alone to achieve its 2050 limit means nothing unless all the states and nations around the world can meet what is now their collective goal of net zero by 2050. Each state and nation does not need to meet that precise emissions limit, because it is a collective target. But if the leading-tip entities fail to meet their own 2050 limits, those less well equipped states and nations will surely not bail us out and will likely fail to meet their own less ambitious targets. Repeat after me: This is a global battle! It is not one Massachusetts can solve on its own. We need to keep our eye on the prize: collective global emissions reductions sufficient to keep the world from warming more than 1.5 C above pre-industrial levels. Nevertheless, it is critical, as an example to the world, that Mass is successful in achieving its 2050 emissions limit.

But "success" in Mass in meeting our 2050 limit means having a limit that is worthy of our participation in this spear-tip group of states and nations. To be worthy, it must meet two criteria:

- First, it must be both an **ambitious** limit and one that is viewed by other states and nations as such. If we are to be seen as a leader in the climate battle, we must set an aggressive emissions limit that stands as a marker and a challenge for other states and nations.
- Second, our 2050 limit must **meet the equity test**. That is, it must be a limit that not only (a) addresses **all** the ongoing emissions for which Massachusetts is responsible, but also (b) recognizes our decades-long, industrialized history of significant past emissions of GHGs to the atmosphere, along with our greater wealth and capability. Most developing nations and even some US states do not have this history of emissions or our wealth and capability. This means that we must do **more** than simply reduce "our proportionate share" based on some artificial

baseline year like 1990 or 2010. Instead, we need to reduce our "equitable share" of the world's ongoing emissions, which is an amount that considerably exceeds our relatively recent proportionate share. The notion here is that achieving world-wide net zero emissions by mid-century, as the UNFCCC and the UN's climate agencies have now called for, means acknowledging not only that some poorer, less capable states and nations will not be able to achieve the same level of emissions reductions as the leading-tip states and nations. It also means that, as a matter of equity, they should not have to. Indeed, this basic notion of equity is built into the 2016 Paris Agreement, which calls for Intended Nationally Determined Contributions (INDCs) that are not based on each country reducing emissions by the same proportionate share.

Of course, in setting a 2050 limit for Mass that is both ambitious and equitable, the EEA Secretary must meet the requirements of existing state law, currently the 2008 Global Warming Solutions Act (GWSA). But the important point here is that the GWSA sets only a minimum limit for 2050, not a maximum. So, there is nothing prohibiting the Secretary from setting a 2050 limit that meets the ambition and equity goals I have set forth above (so long as that limit meets or exceeds an 80% reduction by 2050).

The important point here is that a limit of net-zero by 2050 is the limit the UN wants to see collectively for all the states and nations of the world, not each one individually. Some states can and should do more, and some will do less. We should be one of the states that does more . . . because we can, and because equity won't be achieved if we just aim for the collective emissions limit of net zero by 2050.

With all this in mind, I offer the following comments, not necessarily in order of importance, on the Secretary's proposed statewide emissions limit for 2050.

1. **Climate conditions have worsened.** In the 18 months that have passed since the IPCC published its 2018 *Special Report on Global Warming of 1.5*℃, climate conditions have worsened considerably, raising doubts about the sufficiency of that report's conclusion that global GHG emissions reductions to at least net zero by 2050 are required to prevent a temperature rise of no more than 1.5°C . See the report this month by the World Meteorological Organization (WMO) on the state of the Global Climate in 2019: https://reliefweb.int/report/world/wmo-statement-state-global-climate-2019-enarru I will not repeat here the dire climate conditions reported by the WMO. But the recent data reported there and elsewhere at least raise the question whether a global emissions reductions target of at least net zero by 2050 will be stringent (or quick) enough to prevent a global temperature rise of greater than 1.5°C.

   What is a more stringent target? A goal of achieving some level of "**net negative**" emissions globally by 2050. That means removing more GHGs from the atmosphere in 2050 than are emitted. I know, of course, that we can't waive our magic wand and make the new global target a net negative one. But this is the kind of 2050 limit – a net-negative limit – that I will argue below needs to be adopted by the Secretary to meet the goals I outlined above for ambition and equity.

2. **A Mass 2050 emissions limit of net zero is neither sufficiently ambitious nor equitable.** Let's examine these one at a time.

Insufficiently ambitious: To be an ambitious 2050 limit for Mass, it must go beyond the "general" target that has been established globally, and "net zero by 2050" is the current global target. Adopting that same target for Massachusetts does not stand us out from the crowd. It does not set us apart as a leader. We won't even meet the Lake Wobegon standard ("above average"). And, as I noted above, Mass needs to be a tip-of-the-spear leader if the world is to have any reasonable chance of keeping global heating to no more than 1.5°C. If the wealthy and capable states and countries who must be the leaders all set limits of net zero by 2050, then the less wealthy and less capable countries will surely set lesser targets, and collectively we will fail to achieve the global net zero target. This is simple math. Mass needs to set a more ambitious target for this reason alone.

Insufficiently equitable: For Mass to set a 2050 target of net zero is inequitable to the rest of the world in several ways.

First, as mentioned above, Mass has a long history of significant emissions that many other states and nations do not have. The industrial revolution in the US began here with water powered mills, but steam generated by burning fossil fuels soon took over powering the mills. We used coal gas to light our homes and factories a century ago. And when electricity took over that role, we generated it by burning fossil fuels. Our contribution of GHGs to the atmosphere over more than a hundred years means we are more culpable for global heating than many other states and developing nations. It is simply not fair for Massachusetts to set its 2050 target at the same level as the global goal. How is that fair to Bangladesh, or even South Dakota? It's not. And we need to acknowledge that, and to set a tougher, legally binding net-negative target.

Second, a 2050 net zero emissions limit for Mass is inequitable because, other than for electricity generation, it does not take into account, or seek to reduce, any of our "embodied emissions" (sometimes called "consumption emissions") in the products we purchase from out of state and their transportation into our state. With the exception of electricity sector emissions, emissions that occur during the out-of-state manufacture of products used in Mass are not even included in our emissions inventory.

I understand that there are reasons for this. Indeed, some of these reasons were mentioned in the 2009 report EEA issued on the 1990 baseline and 2020 business as usual projection, including that this exclusion of embodied emissions "is consistent with the structure of GWSA." Clearly, there is difficulty in obtaining detailed information about how items imported into Mass are produced and what GHGs are emitted in the process. But in that same 2009 report EEA acknowledged the "importance" of embodied emissions, and promised "to track research in this area."

Indeed, it appears that the GWSA mandates tracking this research. This statement appears in G.L. c. 21, § 4(d): *"The secretary shall evaluate the total potential costs and economic and noneconomic benefits of various reduction measures to the economy, environment and public health, using the* ***best available*** *economic models, emissions estimation techniques and other scientific methods."* (Emphasis added.) Among those "various reduction measures" has to be reducing embodied emissions.

I don't know whether EEA has in fact tracked this research, but more research on this topic has in fact come out in the past decade. See this recent piece by David Roberts in *Vox*: https://www.vox.com/energy-and-environment/2019/7/1/18743992/climate-change-cities-food-cars-emissions So, I agree with this statement Roberts makes in the article:

> If climate change really is a crisis, then surely we — especially the "we" in the wealthy developed world, doing most of the consuming — must take some responsibility for our consumption emissions. This is especially true if we want to make some room for the millions now living in grinding poverty around the world to reach something close to the lifestyles we now enjoy.

Now that Mass has transitioned from an industrial state that produced much of what it consumed to a state whose economy is dominated by the medical, educational, high tech, pharmaceutical, and service sectors, we now import a huge amount of what we consume from other states and countries. As a result, we are responsible for a huge amount of emissions outside of Mass. A large portion of these emissions are in developing countries. We don't count these emissions. Shame on us. But we can, and we should, begin to address this issue.

I am not arguing here that we should begin to assess all our embodied emissions (although that would be great idea if it were feasible). What I am arguing, however, is that a simple Mass target of net-zero by 2050 is inequitable because it fails to include our embodied emissions, allowing us to continue to over-consume at will and forcing poorer states and countries where much of our product manufacturing occurs to address "our share" of their emissions. That's blatantly inequitable.

What's the answer? Well, at least it means that we should have a more ambitious 2050 target than net zero – the collective world target. We need to take responsibility for a greater share of our **total** emissions. And until our embodied emissions can be fairly counted, the best way to take at least some responsibility for them now (although somewhat crude) would be to set a net-negative 2050 emissions limit that aims to remove more GHGs from the atmosphere than we put in each year inside the state. Nothing less meets the equity test.

How many MMTCO_2e should that net-negative number be in 2050? I really don't know. I call on EEA to make a reasonable estimate of our embodied emissions in 2050 and use that as a starting point for calculating this number. Then add on at least another few MMT to address our well above average historical emissions.

3. With any form of "net" limit for 2050, having a "backstop" on actual in-state emissions reductions is a terrific idea, and it should be 90% (not 80 or 85%) below the 1990 baseline.

Whether EEA adopts a net zero limit for 2050 or a net negative one, it makes excellent sense to have a backstop number mandating a minimum amount of actual emissions reductions by 2050. That is why I wholehearted support EEA's proposal to include language in the 2050 limit that says: *"provided,*

however, that in no event shall the level of emissions be greater than a level that is [80, 85, 90]% below the 1990 level."

This not only makes sense; it really is the only rational way to proceed. That's because any "net" number does not mandate any particular amount of actual emissions reductions by the target date.

- A "net zero" limit simply mandates that whatever remaining GHG emissions you have by the target date must be offset by measures that remove a similar amount from the atmosphere.
- A "net negative" limit mandates that the amount removed from the atmosphere be greater than the remaining emissions on the target date, whatever those emissions are.

But in either case, there is **no limit** on the amount of amount of GHG emissions on the target date. Thus, the state could achieve net zero by 2050 by reducing actual emissions by, say, only 40% from the 1990 baseline, so long as an amount of CO_2e equal to the remaining 60% of emissions is removed from the atmosphere. Indeed, it could achieve net zero by 2050 with **any amount** of actual emissions reductions, so long as the amount of remaining emissions is offset with atmospheric removal.

Similarly, the state could achieve a net negative limit with **any amount** of actual emissions reductions by buying offsets, planting trees, or supporting other carbon removal technologies that, collectively, remove a greater amount of CO_2e from the atmosphere.

With this "provided however" clause, EEA is proposing to compel the state to continue reducing GHG emissions aggressively by limiting the amount of remaining emissions emitted statewide by 2050, even if net zero could be achieved with a higher level of remaining emissions.

Another way of putting this is that EEA is proposing that the remaining emissions in 2050 cannot be greater than [10%, 15%, or 20%] of the state's baseline emissions in 1990. In addition, whatever that level of allowed emissions is, it must be offset through atmospheric removal to achieve net zero.

Whether to have such a backstop is actually a matter of some debate among climate activists and policy wonks. (See below.) But, regardless of the policy debate, EEA may currently be legally obligated to set a 2050 target that includes a mandate of at least an 80% GHG reduction below 1990 levels. That legal obligation stems from the language of the GWSA, which says that the 2050 statewide emissions limit shall be "***at least*** 80 per cent below the 1990 level." So, EEA may have no choice here but to pair its proposed net zero limit with a 2050 limit on the amount of statewide emissions that can remain. And that remaining amount can be no more than 20% of the 1990 baseline. In my view (as a retired environmental lawyer), EEA must do this as a matter of law.

But because state law may change in the future (some pending bills this session would establish a simple net zero emissions limit for the state), it is worth examining briefly what the policy debate is over having this backstop emission limit paired with a net zero target.

What's that policy debate? Some climate activists and policy wonks think that pairing a net zero target with an emissions limit is a great idea, because it means that the state can't simply go wobbly on us and claim in 2050 that the amount of (often sketchy) carbon offsets it has purchased allows state sources to continue emitting GHGs at a level that is only, say, 70% below the 1990 baseline. They worry that future

state leaders may be tempted to do this to avoid having to turn the screws tighter on the remaining tough-to-remove 30% of transportation, heating, or electricity emissions. They also worry that at the get go, upon enacting a simple net zero target, the state will experience a slowdown in the early rapid emission reductions that the UN says are needed in the next decade. This worrying potential for laxity in simple net zero targets is the subject of a growing body of articles. Here's one from Carbon Brief titled "*The Problem with Net Zero Emission Targets*." There, Prof. Duncan McLaren, a research fellow at Lancaster University's Lancaster Environment Center, states:

> [O]ur newly published research – based on findings from expert interviews and stakeholder deliberations – suggests that combining emissions reductions and negative emissions into a single target of reaching "net-zero" may create problems. These could include delayed emissions cuts, but also insufficient focus on developing negative emissions technologies.
> ****
> If negative emissions are necessary for net-zero, but also uncertain, it would seem crucial to ensure that they are delivered in addition to rapid emissions reduction, rather than risking that they might slow it down.
>
> How can we design policy to get both? One potential mechanism, emerging from discussions in our deliberative workshops, would be to insist on formal separation of negative emissions targets and accounting for emissions reduction, rather than combining them in a single "net-zero" goal.

I wholeheartedly support Prof. McLaren's conclusions here, and I hereby incorporate his research as part of my comments.

Thankfully, EEA's "provided however" clause does just what Prof. McLaren recommends. It thereby avoids the problems he outlines, including but not limited to insufficient early focus in rapid reductions, laxity, and backsliding.

However, other climate activists and policy wonks prefer having a simple net zero goal, without the backstop, because that allows greater flexibility in designing the pathways available for achieving net zero by 2050. Conversely, they believe that setting a restrictive level of remaining emissions significantly limits the potential pathways for achieving net zero. These folks recognize the concern about validating negative emissions (eliminating the "sketchy" ones), and they say this needs to be addressed. But they say we really have no idea at present what the feasible pathways to net zero are. And adding an additional constraint, like EEA is proposing here, is unwise, they say. They would much prefer to first do the 2050 Roadmap planning and modeling, and then see whether a 2050 emissions backstop makes sense.

At this time, however, EEA is indeed proposing this type of additional constraint. And regardless of the policy concerns, the GWSA appears to legally compel this approach. But what if state law changes, and the 2050 limit becomes net zero without a requirement to achieve an 80% reduction? In that event, I would continue to press EEA to include such a backstop in its regulations. As long as net zero were achieved, that would meet the statutory requirement. I see no legal obstacle in having EEA continuing to include a backstop in state regulations. There would be no inconsistency.

Why do I support having a backstop like this, both under current law and even if net zero becomes the new statutory limit? Because I think it is needed now to protect against laxity in planning sector-by-sector emission reduction targets, to ensure that we continue to focus on deep emissions reductions in the next decade, and to prevent backsliding as it gets tougher and tougher to reduce emissions.

But what number should that second clause contain? 80, 85, or 90%?

I believe that the best case can be made for 90%. I say, let's make the level of emissions reductions required by 2050 as high a number as we can get. Supporting my sentiment here are my grave concerns about how the state in 2050 will go about offsetting its remaining emissions in order to claim it has achieved net zero. Right now there really are no proven technologies for significant carbon capture and removal. And history gives us no reason to have faith in sketchy offset trading programs, many of which have turned out to be scams. Apart from "the ocean" and "the soil," after billions of dollars and decades of government-funded research, the best carbon capture and storage device known is still the tree. But tree-planting and forest protection projects around the world have been among the most scam-ridden offset projects we've seen, while often concentrating pollution in marginalized communities and encouraging land grabs from indigenous peoples. So, let's not count on significant "real" offsets in 2050. Let's go for solid, verifiable emissions reductions . . . as many as we can get.

Please include the 90% "not greater than" backstop when you promulgate the 2050 emissions limit.

--end--

April 9, 2020

Secretary Kathleen Theoharides
Massachusetts Executive Office of Energy and Environmental Affairs

Dear Secretary Theoharides,

I applaud the Baker Administration for committing to reach **net-zero greenhouse gas emissions by 2050**. This commitment sets on the path of an all-out campaign to limit the increase in the global mean temperature to 1.5ºC, as recommended by the Intergovernmental Panel on Climate Change.

For me, the climate crisis is an ecological and moral emergency – a slo-mo coronavirus-type phenomenon. Pope Francis states: "Faced with a climate emergency, we must take action…to avoid perpetrating a brutal act of injustice towards the poor and future generations."

If there is anything that we have learned from the COVID-19 crisis, we now realize the impact of a **global level crisis** and the importance **of early intervention**. We have learned that **nature has a blind eye** for human welfare and that **we must deal with natural threats through changes in human behavior as well as through technology**. We have learned the decisive role of government in facilitating needed changes (Thank you, Governor Baker). And we have learned that the **failure of government leadership can be catastrophic**.

As our youth say, "We can't wait." My four grandchildren and all the children of the world are depending on you to craft the best Roadmap to their future.

I support the goal of net-zero GHG pollution by 2050.

I support the goal of a 60% reduction in 1990 levels of GHG.

I prioritize climate justice and equitable investment in setting GWSA goals and policies.

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I support the goal of net-zero GHG pollution by 2050.

- **The GWSA's goals need to be redefined. Instead of the % reduction from 1990 levels,** a new standard needs to be implemented based on the IPPC's definition of **net-zero.** I support this definition -- Net-zero: *"A level of statewide greenhouse gas emissions that is achieved when anthropogenic GHG emissions are balanced by the amount of anthropogenic GHG removals stored annually by, or attributable to the Commonwealth of Massachusetts."*
- **By necessity, this requires the removal of carbon from the atmosphere.**
    - If offsets are considered, however, they must be, real, additional, verifiable, enforceable and permanent, and meet the requirements established by the Regional Greenhouse Gas Inventory (RGGI).
    - Forests in Massachusetts have been proposed by the Office of Energy and Environmental Affairs (EEA) as carbon sinks. We don't think this qualifies as an offset, as these existing forests are already providing carbon sequestration. The only way forests

should be included is by establishing programs to plant more trees and put limits on the cutting of existing trees. Also, the maximum benefit of trees planted now comes many decades into the future, so they can't be included in reductions needed for the 2030 level. Another consideration is to add a ban on biomass incineration. Biomass incineration releases carbon pollution, and particulate matter now, and leads to deforestation. Biomass should not be considered a carbon-free or carbon-neutral power source.

- Regenerative agriculture should be pursued and incentivized now as a way to reduce carbon.

I support a goal of a 60% reduction in 1990 levels of GHG.
The IPPC report states that average global temperatures have already increased by 1.2 degrees, and there are already enough GHGs in the atmosphere to cause significant additional warming. It is, therefore, essential that interim limits for 2030 and 2040 be as strict as possible.

Since the Governor Baker's new goal of net-zero human-caused GHG emissions is in absolute terms and the current inventory of policies put out by the Implementation Advisory Committee (IAC) in August of 2019 are in reference to reductions from 1990 GHG levels, we have to bridge an even more significant gap in reducing emissions than previously planned. EEA's latest set of public projections, made in December 2018 to the IAC, would achieve only a 35% reduction in emissions in 2030. Even with current goals, we are unlikely to get to a 50% reduction by 2030, because most of the proposals are long-term in their impacts.

The most stringent level interim goals must be set. An ambitious 60% reduction in GHG by 2030 would help to put us on the right track. The remaining cuts will be much more challenging to make, so it is better to start early with a bold commitment. It is significantly less expensive in the long run to deal with mitigation than adaptation.

To achieve the goal of 60% reduction in 1990 levels of GHG:

Carbon pricing is essential. Carbon pricing must take place in three places – buildings, transportation, and economy-wide. All three of these policies must be fully considered and included in the modeling for the GWSA targets.

TCI alone will not get us to our 2030 target with even the most robust scenario with a 25% reduction in transportation emissions, which yields a 3% decrease in economy-wide emissions by 2030. In addition, recent cutbacks in federal regulation of fuel economy standards place these estimates in question.

We must:

- Provide attractive incentives and regulations to promote the electrification of vehicles and buildings.
- Eliminate the cap on solar and incentivize community solar
- Support programs to promote air source and geothermal heating and cooling.
- Promote energy efficiency programs for all residents and businesses
- Incentivize offset options for regenerative agriculture and reforestation starting now.
- Eliminate the inclusion of the burning of wood or biomass as renewable resources.

- Embargo new fossil fuel infrastructure that would prolong a transition to net zero emission economy.

I prioritize climate justice and equitable investment.

The IPCC declared in 2018 that "without increased and urgent mitigation....leading to a sharp decline in greenhouse gas emissions by 2030, global warming will [lead] to crisis after crisis for the most vulnerable people and societies". We have already seen such an impact in the Commonwealth with floods in Quincy and soaring asthma rates from particulates in Boston and Springfield. Also, COVID-19 patients from environmental justice communities are inequitably impacted by pollutants from the burning of fossil fuels.

I urge that:

- **Carbon emissions policy addresses the impact of carbon pricing on low and moderate-income people and rural residents**. Regulations must provide compensation for low and moderate-income people and rural residents. This compensation can come in the form of assistance for transitioning to low-carbon forms of energy, and via rebates to cover higher costs of energy due to carbon policies, including carbon pricing through TCI, RGGI, and other systems.

- **Spending the revenues:** Billions of dollars will be needed to pay for the improvements in buildings and transportation required to cut emissions sharply. Carbon pricing, from RGGI, TCI, and buildings can yield over $1 billion a year in revenues. To help all members of society transition to cleaner options, a significant portion of investment funds should be directed to projects that enable low and moderate-income people and Environmental Justice populations to reduce greenhouse gas emissions.

I pray that your team will produce a bold set of recommendations that will take effect at the earliest possible date. For too long, our state legislature has dallied in enacting the kind of policies that can lead us forward with the warp speed we need to address the existential threat of climate change.

Sincerely,

Fran Ludwig
19 Wyman Rd.
Lexington, MA 02420
Fludwig12@yahoo.com

BEAT
Berkshire Environmental
ACTION TEAM

20 Chapel St., Pittsfield, MA 01201
413-464-9402 • www.thebeatnews.org

no fracked
gas in mass.com
Protect Our
Common Wealth
A Program of
Berkshire Environmental Action Team

April 9, 2020

EOEEA
Net Zero Determination
c/o Claire Miziolek
100 Cambridge St., Suite 900
Boston, MA 02114

Re: Beyond Zero Greenhouse Gas Emissions in 2050 Goals

Please accept the following comments in strong support of a Beyond Zero greenhouse gas emissions (GHG) policy from No Fracked Gas in Mass & the Berkshire Environmental Action Team (BEAT). BEAT works to protect the environment for wildlife in support of the natural world that sustains us all. No Fracked Gas in Mass works to stop the expansion of fossil fuel infrastructure in the Northeast states and to promote energy efficiency and sustainable, renewable sources of energy and local, permanent jobs in a clean energy economy.

We support the state adopting a strict **Beyond Zero GHG policy**. This policy should have separate targets[1] for GHG emissions reduction and negative emissions. The policy should follow guidance from the Climate Justice Working Group (CJWG) of the Massachusetts Global Warming Solutions Act ("GWSA") Implementation Advisory Committee ("IAC") to ensure that the policy is just, equitable, diverse, and inclusive.

Specifically, our 2050 goals should be an emissions reduction goal to eliminate 100% of human-caused emissions, which we estimate would result in about a 95% reduction of our total 1990 emissions, and a natural climate solutions goal to capture 10% of our 1990 emissions, resulting in a net carbon capture of about 5% or 4.72 MTCO2e = Beyond Zero. *[All emissions reductions proposed in these comments are from 1990 levels]*

Separate Target for Reducing GHG Emissions & Creating Negative Emissions

[1] Beyond "Net-Zero": A Case for Separate Targets for Emissions Reduction and Negative Emissions. Duncan P. McLaren et al.. Clim., 21 August 2019 | https://doi.org/10.3389/fclim.2019.00004

The state should not rely on unproven or hard to account carbon-capture technologies for taking up carbon, but should instead be aiming to reduce human-caused emissions to zero and overall emissions to as close to zero as possible. We believe at least a 95% reduction is possible and that is where the 2050 target should be set. The electric, transportation, and building heating and cooling sectors should each have a goal of zero GHG emissions before 2050, not including embodied emissions. But embodied emissions must be accounted for, and equal or greater negative emissions must also be accounted to more than offset these embodied emissions. The goal for negative emission should be set to give us a Byond Zero goal overall. We suggest a goal equivalent to 10% of our 1990 emissions or 9.44 MTCO2e. Given that the level of CO2 in the atmosphere has historically been around 280 ppm, and that a "safe" level has been estimated at 350 ppm, and we are now above 414 ppm, we must aim at removing greenhouse gas from the atmosphere. Being neutral is not good enough.

Creating Negative Emissions

Negative Emissions from Natural Climate Solutions

> "Natural climate solutions (NCS) are actions to protect, restore, and better manage natural and working lands, such as forests, farms, wetlands, and urban greenspace, to reduce and remove carbon emissions. With currently available practices, Massachusetts' lands have the potential to remove and reduce an additional 2 million metric tons CO2e per year."[2]

The state should determine what the maximum amount of carbon capture protecting and better managing 3 million acres of Massachusetts forests (i.e. adding 1.6 million more acres) and 0.3 million acres of grasslands could capture annually if this is not included in the figure above. How much carbon could additionally be captured by moving all in-state agriculture to use carbon-capturing regenerative practices? The state should start a depave program to remove unnecessary pavement and replace it with natural climate solutions. On roofs that are not well suited for solar, the state should encourage green roofs. To make up the difference between what carbon we can sequester in-state and our goal of 9.4 MTCO2e, the state should purchase forest sequestration from verifiable sources.

Protecting and Better Managing our Existing Forests

Massachusetts is lucky to still be the third most densely populated and eighth most forested state in the United States, but we are losing this carbon storage at an alarming rate! According to Mass Audubon's most recent Losing Ground[3] "From June 2012 to June 2017, approximately 24,700 acres of natural land were converted to development in Massachusetts, translating to a pace of 13.5 acres per day through this 5-year period. Nearly 30,000 acres of forest were lost during this time period, some developed and some cleared." It is most alarming that nearly one-quarter of this loss was to mega-solar field development. Cutting down forest to build solar is totally inappropriate until every rooftop, brownfield,

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[2] Natural Climate Solutions Amendment Summary Memo (DOCX 17.42 KB) from the February 26, 2020 Meeting of the GWSA Implementation Advisory Committee (IAC)

[3] Losing Ground: Nature's Value in a Changing Climate (Sixth Edition) 2019 https://www.massaudubon.org/our-conservation-work/advocacy/shaping-the-future-of-your-community/publications-community-resources/losing-ground/key-findings

and parking lot has solar. We must permanently protect our remaining forests and better manage our already protected forests for carbon sequestration and uptake[4].

Urban Forestry

Through the Greening the Gateway Cities program, the state has already been working on reducing emissions and adding natural climate solutions by adding thousands of trees in more than a dozen cities. More restoration could be accomplished throughout the state that would also capture carbon and contribute to negative emissions.

Depave Unnecessary Paved Surfaces

The state should start a depave program with incentives to dig up and recycle pavement everywhere that it is not needed and plant vegetation in its place. This can have the added benefit of soaking up rainwater, preventing pollution, preventing flooding, recharging groundwater, and allowing that water to make its way slowly to rivers and streams contributing to maintaining flow during low-flow times of the year.

Local, Sustainably Harvested and Produced Building Materials and Furniture to Store Carbon

Carbon can be stored in our buildings and furniture, by using sustainably harvested wood using exemplary forestry as long as it does not reduce the carbon uptake of our forests. And in the future, it appears that cement may be produced in a carbon-neutral way that would allow it to also provide a degree of carbon capture (but first our quarries must dramatically reduce their current emissions!).

Wetlands creation is not an answer until and unless it can be done in a way that works

At least two major studies of wetlands that were to be either created in Massachusetts have shown that this has seldom actually worked[5]. Less than half of the proposed wetlands in both studies failed. Wetland creation and restoration is not an answer until and unless it can consistently be accomplished in a way that works.

<u>Reducing GHG Emissions</u>

Electric Sector 100% GHG Emissions Reduction by 2045 or earlier, with at least a 65% GHG reduction by 2030

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[4] Forest Carbon--An Essential Natural Solution for Climate Change 2020 https://necsc.umass.edu/news/new-publication-forest-carbon-essential-natural-solution-climate-change

[5] 2018 Wetland Replacement in Massachusetts, Lisa Rhodes, MassDEP Wetlands Program – December 04, 2018 https://files.engineers.org/file/2018-12-04-MassDEP-Wetland-Mitigation-In-MA-ACECMA-Energy-And-Envir-Aff-Comm.pdf

Effectiveness of Compensatory Wetland Mitigation in Massachusetts, USA. Brown & Veneman. 2001. Wetlands, Vol 21, No 4,pp 508-518 https://www.researchgate.net/profile/Stephen_Brown20/publication/225634382_Effectiveness_of_compensatory_wetland_mitigation_in_Massachusetts_USA/links/56435de408aef646e6c6a1a5.pdf

For the electric sector, we should be following California's lead and set a 100% clean, renewable energy by 2045 at the latest target. The electric sector is particularly important for at least two reasons. First, this is something we can achieve and we have the existing technology to do so. Second, so much of our reduction efforts rely on electrifying our other sectors, thus having zero-emission electricity vastly reduces these other sectors as they electrify. That does mean that biomass, biofuels, and waste must not be included in the portfolio of "clean" energy. Nor should nuclear power, which produces toxic waste that we have no solution for, be included as "clean", even though it produces little to no GHG emissions.

The California Public Utilities Commission (CPUC) on March 26, 2020 unanimously voted to approve a 46 million metric ton (MMT) greenhouse gas emissions target for the electric sector by 2030, a 56% reduction below 2000 levels. In addition, regulators have also asked utilities and other load-serving entities to simultaneously explore the possibility of further reducing emissions to 38 MMT, a 64% reduction. Surely, if California can do this, Massachusetts can as well. The We Mean Business Coalition also states that "65% of electricity could be from renewable sources globally by 2030 and electricity could be 100% zero carbon by 2050."[6]

Transportation Sector 100% GHG Emissions Reduction by 2045 with at least a 25% GHG Emissions Reduction by 2030

Reducing vehicle miles traveled should be our first objective. Cities should be built in neighborhood-friendly ways with healthy food, parks, and work close by, and routes that are walkable, cyclable, and have easy, inexpensive public transportation. These changes will take time, but changes in zoning can begin immediately. In rural areas, easy, inexpensive broadband access is essential to reducing vehicle miles traveled as well as providing equity.

All new vehicles sold in Massachusetts should be electric by 2035. All new light-duty vehicle sales should be electric by 2030, as advocated by the We Mean Business Coalition[7]. Subaru plans to sell only electric vehicles by 2035[8]. The UK plans to end sales of all non-electric vehicles by 2035[9]. Electric pickup trucks are coming online[10]. Electric garbage trucks are hitting the roads[11]. Electric school buses, which should have been among our first electric vehicles to protect children, are appearing everywhere[12]. Delivery

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[6] https://www.wemeanbusinesscoalition.org/wp-content/uploads/2019/08/Climate-Ambition-Benchmarks.pdf slide 5

[7] https://www.wemeanbusinesscoalition.org/blog/climate-ambition-benchmarks-defining-the-path-to-net-zero/

[8] https://cleantechnica.com/2020/01/22/subaru-plans-to-sell-only-electrified-vehicles-by-2035/

[9] https://www.caranddriver.com/news/a30772427/uk-ban-non-electric-cars-2035/

[10] https://www.cnet.com/roadshow/news/the-electric-pickup-trucks-that-may-change-your-mind-about-diesel/

[11] https://ww.electrek.co/2020/01/17/daimler-electric-garbage-truck/# & https://www.mcall.com/business/mc-biz-mack-trucks-shows-off-electric-garbage-truck-20200109-zocxh3ea3bacdpewvgadnlf5te-story.html

[12] https://cleantechnica.com/2020/01/12/largest-electric-school-bus-program-in-united-states-launching-in-virginia/

and long haul trucks, which are major pollution producers in our most vulnerable cities, are cheaper over their lifetime than internal combustion engine trucks and the switchover should be rapid just on economic grounds[13].

Three large impediments to reducing GHG from transportation are: people keep their vehicles and buy used vehicles so a complete turn over of vehicles currently on the road will be difficult; vehicles cross our borders; there is a lot of embodied carbon in the vehicles produced that must be accounted for, and equal negative emissions must also be accounted to offset these embodied emissions.

The transportation emissions target should be set to at least a 38% reduction by 2030, and this should be reevaluated and adjusted every 2.5 years to ensure we maximize our GHG reduction to what is achievable.

Reducing Building Sector Emissions

All new buildings should be at least zero net energy, and we must work on retrofitting existing buildings to become as close to zero net energy as possible. If done correctly, this will not only make buildings less expensive to heat and cool, but also make them more comfortable. All new buildings should be heated and cooled by electricity using heat-pump technology or other clean, zero-net energy technology. However, we need to account for lifecycle emissions, including embodied energy to produce the building as well as carbon stored as a result of the carbon within or absorbed by the building materials. Dalmia Cement has committed to net-zero GHG emissions by 2050 or earlier[14]. Depending on how Dalmia calculates this goal, it could result in negative emissions because cement products tend to absorb carbon over their lifetime, but usually, production emits a tremendous amount. The use of local wood, sustainably harvested from private lands using exemplary forestry[15], locally processed, and used for building locally can capture carbon for decades with relatively low carbon emissions.

In Conclusion

The 2050 goals should be set to our emissions reduction goal to eliminate 100% of human-caused emissions, which we estimate would result in about a 95% reduction of our total 1990 emissions, and our natural climate solutions to 10% of our 1990 emissions, resulting in a net carbon capture of 5% or 4.72 MTCO2e = Beyond Zero.

Interim Goals

The interim goals should try to move us as quickly as possible, rather than just in a straight line, toward the 2050 goal. The interim goal for 2030 should be a 55-75% economy-wide reduction from 1990 levels,

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[13] https://www.idtechex.com/en/research-report/electric-trucks-2020-2030/710

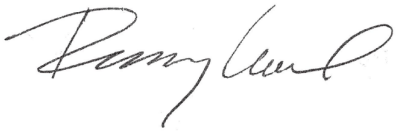
[14] https://www.wemeanbusinesscoalition.org/wp-content/uploads/2019/08/Climate-Ambition-Benchmarks.pdf slide 11

[15] https://newenglandforestry.org/learn/initiatives/exemplary-forestry/

with a natural climate solutions goal of 3-5% (2.83 - 4.72 MTCO2e). These goals should be reevaluated in 2025 to determine if a goal closer to the 75% and 5% levels could be achieved. If we have to set 2040 goals now, the 2040 goals should be set at 80 -95% economy-wide reduction of emissions from 1990 levels, and 7-10% for carbon uptake. Again these goals should be reevaluated at least every 5 years if not more frequently to determine exactly what goal could be reached within that range.

Respectfully submitted,

Jane Winn, Executive Director
Berkshire Environmental Action Team



Rosemary Wessel, Program Director
No Fracked Gas in Mass, A Program of Berkshire Environmental Action Team

Ceres
Sustainability is the bottom line.

April 10, 2020

Executive Office of Energy and Environmental Affairs
100 Cambridge St., Suite 900
Boston, MA 02144

Re: Business Coalition Comments on Massachusetts' 2050 Net-Zero Emissions Limit

Dear Secretary Theoharides,

Thank you for the opportunity to comment on the Commonwealth's 2050 emissions limit. I am writing to you on behalf of the Ceres BICEP (Business for Innovative Climate and Energy Policy) Network--a coalition of 58 major employers across the United States, many of whom have operations and facilities in Massachusetts. As Director of the Network, I would like to express our strong support for: (1) Massachusetts' commitment to reach net zero emissions by 2050; and (2) a definition of net zero emissions that requires absolute emissions to be less than or equal to a level that is at least 90% below the 1990 level; and offer three recommendations relative to policy content and implementation that will contribute to a robust and successful outcome.

A growing number of companies,[i] both large and small, have set science-based targets to reduce greenhouse gas emissions and invest in renewable energy and energy efficiency. In fact, 16 Massachusetts companies and investors, including BICEP members Autodesk, IKEA, JLL, and Worthen Industries publicly expressed their support for legislation codifying a 2050 emissions limit of net zero and the adoption of a roadmap to reaching that goal by joining a sign-on letter Ceres released last fall. Importantly, support among the private sector for a 2050 net zero emissions target is not unique to the Bay State. As of COP25 in December 2019, 177 businesses[ii] had set net zero emissions targets for 2050. They have done this not only because it is the right thing to do, but because it makes good business sense.

Clean energy and low carbon transportation practices help businesses and institutions cut energy costs, reduce exposure to volatile fossil fuel prices, and stay competitive. We applaud Massachusetts for working to adopt a net zero target for 2050, and encourage the Commonwealth to implement policy mechanisms that will help businesses reach their emissions reduction targets. Policies that facilitate corporate decarbonization will also make Massachusetts a strategic place for major companies with ambitious climate goals to invest their time and resources.

In addition to adopting an emissions target of net zero for 2050, we encourage Massachusetts to establish a ceiling on the level of emissions the Commonwealth can emit and offset that is consistent with a reduction of at least 90% relative to 1990 levels. Furthermore, to ensure that the Commonwealth maintains its ability to reach net zero emissions in 2050, we encourage the adoption of legally binding interim targets of 50% below 1990 levels for 2030 and 75% below 1990 levels for 2040. These targets should not be construed to imply a linear decline in emissions, and modeling must consider that our first reductions will be the cheapest and easiest to achieve. These interim goals are consistent with S.2477 - An Act Setting Next Generation Climate Policy, which was passed by the Massachusetts Senate early this year, H.3983 - An Act to Create a 2050 Roadmap to a Clean and Thriving Commonwealth, and the urgent need to decarbonize our economy established in the IPCC's 1.5 ℃ report.[iii]

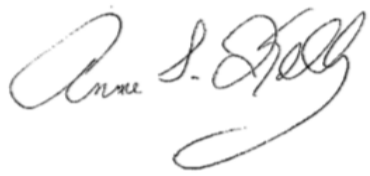
While establishing pathways to meet these goals, we encourage the Commonwealth to consider three recommendations:

1. Deploy policies with a cross-sectoral focus that leverage win-win options to capture cost savings by advancing multiple goals at once. The policy recommendations developed by the Implementation Action Committee (IAC) of the Global Warming Solutions Act (GWSA) provide an excellent framework for reaching this goal.
2. The Commonwealth must implement clear regulations that ensure the types of carbon offsets eligible for inclusion in the Commonwealth's emissions portfolio offer additionality from a business as usual scenario, and minimize the risk of carbon leakage and double counting. We recommend the regulations mirror the offset requirements[iv] for the Regional Greenhouse Gas Initiative (RGGI).
3. Continue to collect public feedback from the broader public on implementation that will ensure that low-income and marginalized communities are not disproportionately burdened, and can share in the benefits of the transition to a clean energy future.

We appreciate the commitment shown by the Commonwealth's policymakers to provide a strong foundation for the mitigation of climate change. We hope you will set goals and a path to achieving them that appropriately match the urgency of the risks that lie ahead.

Thank you for your attention to this important matter.

Sincerely,



Anne Kelly
Vice President, Government Relations, Ceres
99 Chauncy Street, 6th Floor
Boston, MA 02111
kelley@ceres.org
www.ceres.org/bicep

The Ceres BICEP Network comprises influential companies advocating for stronger climate and clean energy policies at the state and federal level in the U.S. For more information on the Ceres BICEP Network, visit www.ceres.org/BICEP.

*Bicep member names in **bold** have operation in Massachusetts.
For more information, please contact Dave Robba, Senior Associate for State Policy at Ceres (drobba@ceres.org).

Cc:
Speaker of the House Robert DeLeo,
Senate President Karen Spilka,
Members of the Joint Committee on Telecommunications, Utilities and Energy.

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[i] "Power Forward 3.0: How the Largest U.S. Companies Are Capturing Business Value While Addressing Climate Change." Ceres. Accessed April 3, 2020. https://www.ceres.org/resources/reports/power-forward-3.

[ii] UNFCCC. Accessed April 3, 2020. https://unfccc.int/news/at-cop-25-corporate-climate-movement-grows-as-new-companies-announce-plans-to-align-with-a-15degc.

[iii] Global Warming of 1.5 ºC. Accessed April 3, 2020. https://www.ipcc.ch/sr15/.

[iv] "Offsets Requirements." Offsets Requirements | RGGI, Inc. Accessed April 3, 2020. https://www.rggi.org/allowance-tracking/offsets/requirements.

Massachusetts Decarbonization Roadmap: Comments from Massachusetts Campaign for a Clean Energy Future

https://www.mass.gov/forms/comments-on-emissions-limit-for-2050

April 10, 2020

Dear Secretary Theoharides:

We thank the Baker Administration for committing to reach net zero greenhouse gas emissions by 2050. The International Panel on Climate Change states that this target is necessary to stabilize the planet's climate and protect ourselves from devastating results from the climate crisis.

We also thank the administration for the extensive planning process it is going through for how to get to the 2050 mandate and an interim goal for 2030.

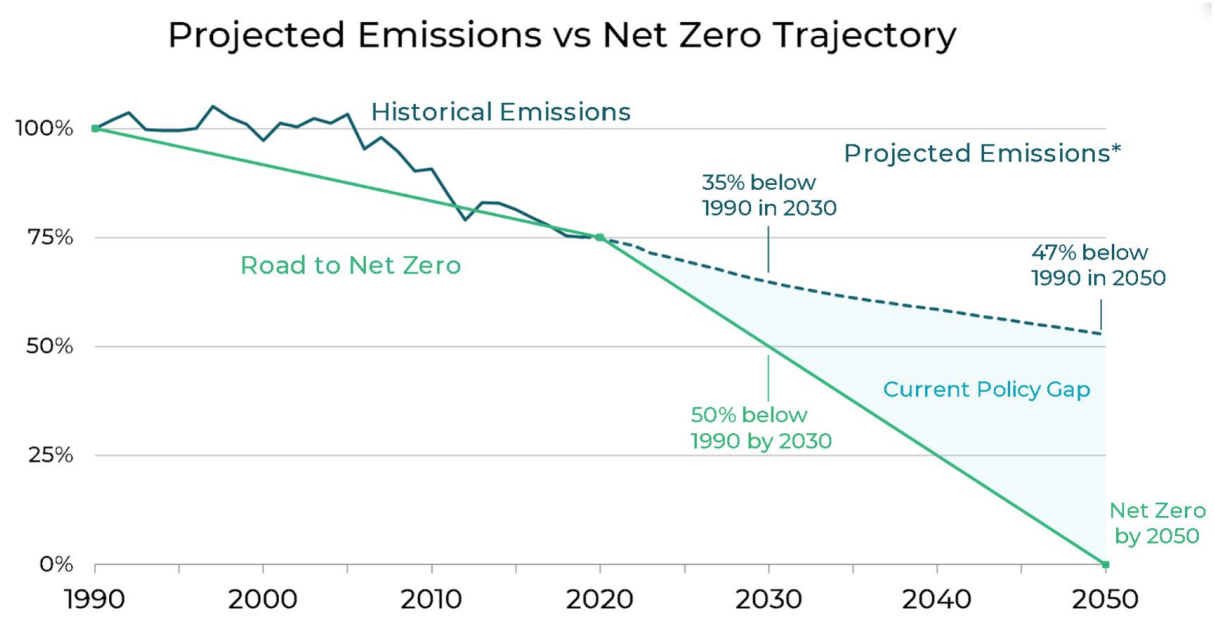
The signers of this letter appreciate the opportunity to submit comments on the Commonwealth's *Determination of Statewide Emissions Limit for 2050* – "Net-Zero Determination."

Below are our comments on the targets for 2030 and 2050, and the set of policies necessary to get us to those targets.

2018 projections will not get us to the 2030 or 2050 goals: EEA's latest set of public projections, made in December 2018 to the Implementation Advisory Committee (IAC), would get Massachusetts only to a 35% reduction in emissions in 2030 and a 47% cut by 2050. This compares, for example, to the latest IPCC goal of 45% below global 2010 emissions by 2030,[1] and to Governor Baker's call for net zero emissions in 2050. We realize that EEA is doing further projections since December 2018, with additional policies, but none are yet publicly available.

[1] "Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments," IPCC, October 8, 2018.

To get to net zero by 2050, on a straight line from the present the state must cut emissions by approximately 50% by 2030, including any offsets. Given that much of the world will have difficulty achieving the IPCC's 45% target, Massachusetts should be a leader and set its target for 2030 substantially above 50%. The Administration's policy scenarios and modeling should include the most ambitious possible 2030 goal.



2019 IAC policies inadequate for 2030 goal without carbon pricing: Given the state of the science on the climate crisis, it is critical that we achieve not only the 2050 target but also the shorter-term target for 2030. The inventory of policies put out by the IAC in August of 2019 are unlikely to get us to a 50% reduction by 2030, because most of them are long-term in their impacts. These include, for example, further extension of building codes, promoting alternatives to driving, "integrate transportation and land use planning," and "ensure Massachusetts' electricity distribution system is 2050-compliant."

The IAC inventory includes carbon pricing in three places – for buildings (Policy #1, "mandatory emission reductions," pages 2 and 7), transportation (Policy #3, "price transportation externalities," pages 6 and 30), and economy-wide ("Regional/State/Federal and economy-wide", page 31). All three of these policies must be fully considered and included in the modeling for the GWSA targets.

TCI will not get us to 2030 target: The Transportation and Climate Initiative (TCI), based on the strongest scenario modeled, with a 25% reduction in transportation emissions, will only yield us an additional 3% decrease in economy-wide emissions by 2030 (federal fuel efficiency standards, which make up 19% of TCI's reductions in transportation, are already in the 2018 projection). Thus, carbon pricing extended to the buildings sector and economy-wide must be implemented in the near future if we are to reach the 2030 target.

Protection of low and moderate income people: Carbon pricing policy must ensure that low and moderate income people who are the most impacted by climate change come out financially ahead. This will require both targeted infrastructure investments that help these

communities transition to low-carbon energy sources and income-based rebates to offset cost increases due to carbon pricing.

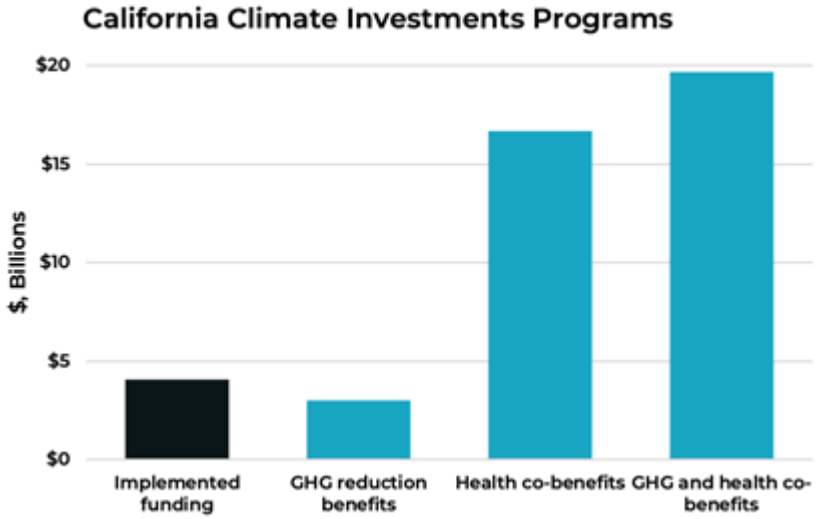
Spending the revenues: Billions of dollars will be needed to pay for the improvements in buildings and transportation needed to cut emissions sharply. Carbon pricing, from RGGI, TCI, and buildings can yield over $1 billion a year in revenues, as shown in the table below.

It is also sufficient to provide a high level of funding for Environmental Justice (EJ) populations. To help all members of society transition to cleaner options, at least 40% of investment funds should be directed to projects that enable low and moderate income people and Environmental Justice populations to reduce greenhouse gas emissions.

Carbon pricing sectors	Annual revenue $ millions[2]
RGGI	$90
TCI (20% vs 25% cut in emissions)	$150 to $590
Buildings – rising from $20 to $40 per ton	$330
3 sectors	$570 to $1,010
To EJ populations at 40% of total funding	$230 to $400

Health and other co-benefits: A recent study by coalition member Climate XChange showed that in California's cap-and-trade program the public health and GHG reduction benefits of the investments made with the funds raised were almost five times the cost of the programs.[3] We would urge EEA to fully model these health benefits in looking at the benefit-cost of its climate change programs, along with other co-benefits such as increases in employment.

[2] Projections made by Climate XChange based on expected emissions and price per ton.
[3] Cap-and-Trade in California: Health and Climate Benefits Greatly Outweigh Costs, Climate XChange, March 2020.



Thank you for the opportunity to comment on the Commonwealth's net-zero determination and plans for its 2030 limit. We look forward to further dialogue on these critical issues for the Commonwealth and the future of the planet.

Sincerely,

350MA
Allandale Coalition
Alliance for Business Leadership
Arlington Street Church, Boston (Rev. Fred Small, Minister for Climate Justice)
Citizens Climate Lobby-Massachusetts
Clean Water Action
Climate XChange (Marc Breslow, Policy & Research Director)
Healthy-Kids.info (Ellie Goldberg)
HealthLink
League of Women Voters of Massachusetts (Judy Zaunbrecher, Co-President)
Massachusetts Interfaith Power and Light (Jim Naill, President)
Mothers Out Front-Massachusetts
Our Climate (Eben Bein, New England Field Coordinator)
Sustainable Marblehead
Western Massachusetts CAN

April 10, 2020

To: Kathleen Theoharides, Secretary of Energy and Environmental Affairs
From: Cape Ann Climate Coalition

The Cape Ann Climate Coalition represents a broad cross-section of residents from Gloucester, Rockport and Manchester MA, who are committed to acting locally and cooperatively to address the climate crisis. We strongly agree with Governor Baker's recent announcement in support of setting net-zero as the new legal emissions limit for 2050.

The Intergovernmental Panel on Climate Change (IPCC) report has made it abundantly clear that there is no time to lose regarding implementing policies that effectively mitigate climate change, as we simultaneously accelerate efforts to create more resilient communities. We cite Governor Baker's words, "meeting this challenge will require bold action and partnerships throughout every sector of the economy."

We understand the Commonwealth has been a national climate leader and that the 2020 goal of a 25 percent reduction in greenhouse gases from 1990 levels appears to be nearly met. However, the results of the IPCC report indicate we have no choice but to mobilize a multiple pathway approach to reach net zero as quickly as possible.

We, the undersigned, recommend a statewide greenhouse gas emissions limit for 2030 to be at least 60 percent below the state's 1990 emissions level, with the remaining 40 percent reduction being accomplished between 2030 and 2050.

We, the undersigned, recommend decarbonization be accomplished through continued energy efficiency and weatherization programs, recycling and improved waste management, an updated public transportation system, adoption of electric vehicles, alterations in building construction and retrofitting, utilization of heat pumps, rapid development of solar and wind facilities, exploration of other renewable technologies such as geo-thermal micro-grids, carbon pricing mechanisms and carbon sequestration through reforestation, and the protection of our existing forests and other natural carbon sinks such as healthy marshlands and soil. All these efforts, and more, are needed to avert the worst climate

change projections and mitigate the inevitable flooding, weather extremes and health consequences of our already warming planet.

We await the announcement of the legally binding 2030 and 2050 emissions goals and the Clean Energy Plan that provides the Roadmap for how this goal will be reached. We appreciate the opportunity to submit this public comment and commit to being partners in this process.

Sincerely,

The following members of the Cape Ann Climate Coalition

Joanne Avallon, Rockport
Gordon Baird, Gloucester
Karen Bell, Gloucester
Linda Brayton, Glpucester
Andrew Brousseau, Gloucester
Chris Callahan, Gloucester
Deborah Cramer, Gloucester
Anne Deneen, Rockport
Greg Federspiel, Manchester
Dan Greenbaum, Gloucester
William Greenbaum, Gloucester
JoAnn Hart, Gloucester
Marcia Hart, Gloucester
Ken Hecht, Gloucester
Richard Higgins, Gloucester
Sarah Galadriel Hoague, Gloucester
Susan Hoague, Gloucester
Theodore Hoague, Gloucester
Earl Kishida, Rockport
Sharon Kishida, Rockport
Laura Kozachek, Rockport
Ellen Leaman, Gloucester
Cynthia Lyon, Gloucester
Eric Magers, Gloucester
Alan McCoy, Essex

Su-Yin Mittermaier, Manchester
Barry Moir, Gloucester
Alice Morris, Gloucester
Mathew Morris, Gloucester
Robert Myers, Gloucester
Amanda Nash, Gloucester
Karin Peterson, Gloucester
Marion Phipps, Gloucester
Beth Pocock, Gloucester
Jim Pocock, Gloucester
Dick Prouty, Gloucester
Doris Prouty, Gloucester
Susan Quateman, Gloucester
Sandra Ronan, Gloucester
Cynthia Schimanski, Gloucester
Nicki Richon-Schoel, Gloucester
James Schoel, Gloucester
Sam Silverman, Gloucester
Douglas Smith, Gloucester
Lisa Smith, Gloucester
Paul Wasserman, Gloucester
Candace Wheeler, Gloucester
Michael Wheeler, Gloucester

Massachusetts Decarbonization Roadmap: Comments from Greater Boston Interfaith Organization Climate Justice Task Force

https://www.mass.gov/forms/comments-on-emissions-limit-for-2050

April 10, 2020

Dear Secretary Theoharides:

We thank the Baker Administration for committing to reach net zero greenhouse gas emissions by 2050. The International Panel on Climate Change states that this target is necessary to stabilize the planet's climate and protect ourselves from devastating results from the climate crisis.

We also thank the administration for the extensive planning process it is going through for how to get to the 2050 mandate and an interim goal for 2030.

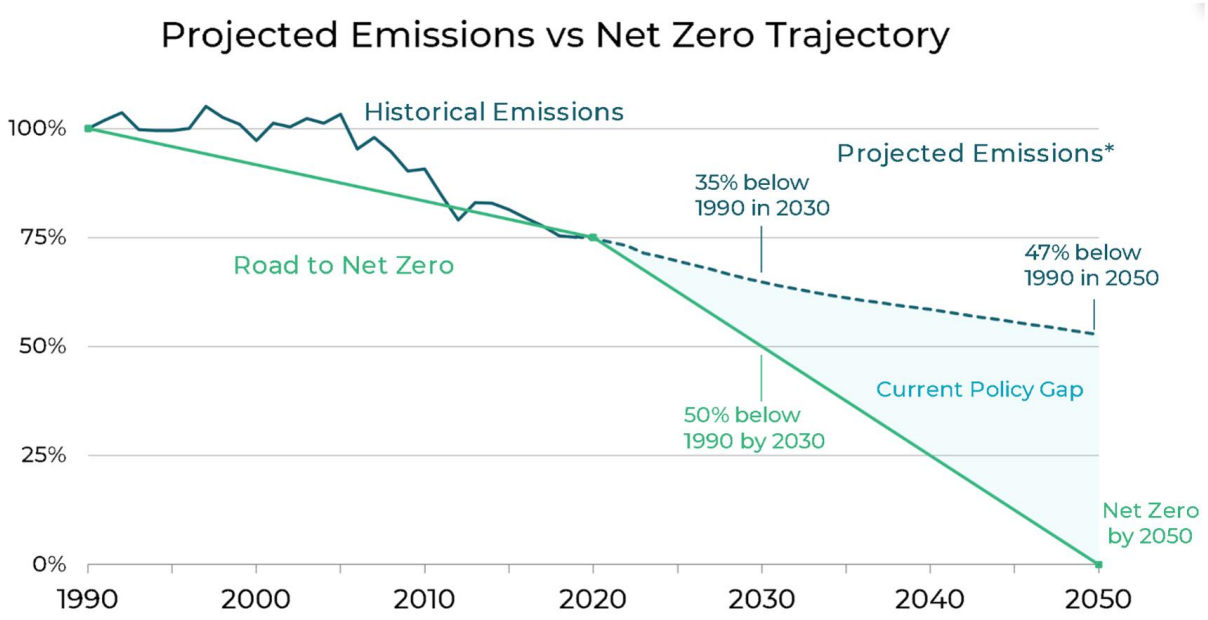
The signers of this letter appreciate the opportunity to submit comments on the Commonwealth's *Determination of Statewide Emissions Limit for 2050* – "Net-Zero Determination."

Below are our comments on the targets for 2030 and 2050, and the set of policies necessary to get us to those targets.

2018 projections will not get us to the 2030 or 2050 goals: EEA's latest set of public projections, made in December 2018 to the Implementation Advisory Committee (IAC), would get Massachusetts only to a 35% reduction in emissions in 2030 and a 47% cut by 2050. This compares, for example, to the latest IPCC goal of 45% below global 2010 emissions by 2030,[1] and to Governor Baker's call for net zero emissions in 2050. We realize that EEA is doing further projections since December 2018, with additional policies, but none are yet publicly available.

To get to net zero by 2050, on a straight line from the present the state must cut emissions by approximately 50% by 2030, including any offsets. Given that much of the world will have difficulty achieving the IPCC's 45% target, Massachusetts should be a leader and set its target for 2030 substantially above 50%. The Administration's policy scenarios and modeling should include the most ambitious possible 2030 goal.

[1] "Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments," IPCC, October 8, 2018.



2019 IAC policies inadequate for 2030 goal without carbon pricing: Given the state of the science on the climate crisis, it is critical that we achieve not only the 2050 target but also the shorter-term target for 2030. The inventory of policies put out by the IAC in August of 2019 are unlikely to get us to a 50% reduction by 2030, because most of them are long-term in their impacts. These include, for example, further extension of building codes, promoting alternatives to driving, "integrate transportation and land use planning," and "ensure Massachusetts' electricity distribution system is 2050-compliant."

The IAC inventory includes carbon pricing in three places – for buildings (Policy #1, "mandatory emission reductions," pages 2 and 7), transportation (Policy #3, "price transportation externalities," pages 6 and 30), and economy-wide ("Regional/State/Federal and economy-wide", page 31). All three of these policies must be fully considered and included in the modeling for the GWSA targets.

TCI will not get us to 2030 target: The Transportation and Climate Initiative (TCI), based on the strongest scenario modeled, with a 25% reduction in transportation emissions, will only yield us an additional 3% decrease in economy-wide emissions by 2030 (federal fuel efficiency standards, which make up 19% of TCI's reductions in transportation, are already in the 2018 projection). Thus, carbon pricing extended to the buildings sector and economy-wide must be implemented in the near future if we are to reach the 2030 target.

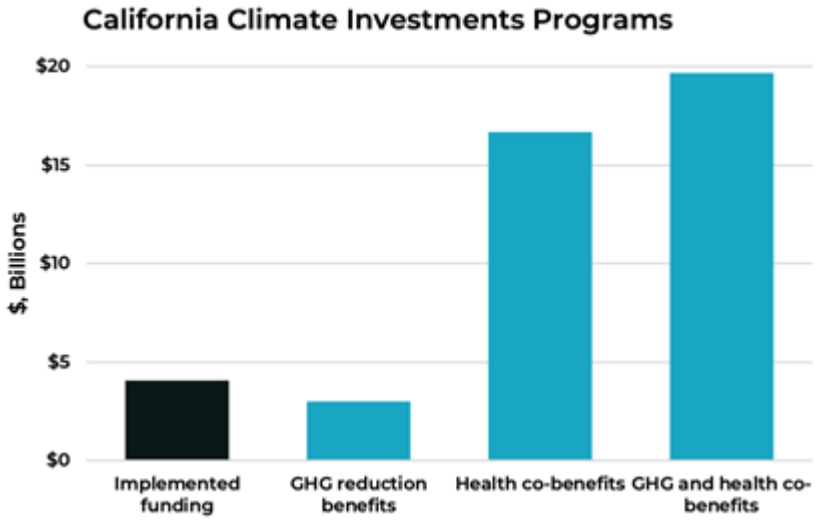
Protection of low and moderate income people: Carbon pricing policy must ensure that low and moderate income people who are the most impacted by climate change come out financially ahead. This will require both targeted infrastructure investments that help these communities transition to low-carbon energy sources and income-based rebates to offset cost increases due to carbon pricing.

Spending the revenues: Billions of dollars will be needed to pay for the improvements in buildings and transportation needed to cut emissions sharply. Carbon pricing, from RGGI, TCI, and buildings can yield over $1 billion a year in revenues, as shown in the table below.

It is also sufficient to provide a high level of funding for Environmental Justice (EJ) populations. To help all members of society transition to cleaner options, at least 40% of investment funds should be directed to projects that enable low and moderate income people and Environmental Justice populations to reduce greenhouse gas emissions.

Carbon pricing sectors	Annual revenue $ millions[2]
RGGI	$90
TCI (20% vs 25% cut in emissions)	$150 to $590
Buildings – rising from $20 to $40 per ton	$330
3 sectors	$570 to $1,010
To EJ populations at 40% of total funding	$230 to $400

Health and other co-benefits: A recent study by coalition member Climate XChange showed that in California's cap-and-trade program the public health and GHG reduction benefits of the investments made with the funds raised were almost five times the cost of the programs.[3] We would urge EEA to fully model these health benefits in looking at the benefit-cost of its climate change programs, along with other co-benefits such as increases in employment.



[2] Projections made by Climate XChange based on expected emissions and price per ton.
[3] Cap-and-Trade in California: Health and Climate Benefits Greatly Outweigh Costs, Climate XChange, March 2020.

Thank you for the opportunity to comment on the Commonwealth's net-zero determination and plans for its 2030 limit. We look forward to further dialogue on these critical issues for the Commonwealth and the future of the planet.

Sincerely,

Greater Boston Interfaith Organization Climate Justice Task Force

April 10, 2020

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

--- Submitted electronically via gwsa@mass.gov ---

Re: Climate Justice Working Group Comments
About the Determination of Statewide Emissions Limit for 2050

Dear Secretary Theoharides:

Thank you for the opportunity to provide comment on the Administration's proposal to adjust the 2050 emissions limit established by the Global Warming Solutions Act ("GWSA"). The undersigned are members of the Climate Justice Working Group ("CJWG"), one of five working groups within the Global Warming Solutions Act Implementation Advisory Committee ("GWSA IAC"). All of us are working to help Massachusetts reduce greenhouse gas ("GHG") emissions as required by GWSA and at a level that is consistent with scientific consensus.

The CJWG is also deeply committed to ensuring that the benefits of Massachusetts' clean energy, climate compliant transformation are fully realized by environmental justice populations and other historically marginalized communities. We believe that in addition to aggressively reducing GHG emissions, limit setting and policy solutions must safeguard public health and enable environmental sustainability and economic security, so that all communities thrive in the coming decades. To achieve this transformation, equity must be a primary factor in determining the 2050 emissions limit, but more importantly, in evaluating the path to compliance.

Toward that end, we strongly support establishing stringent interim emissions limits and the most robust 2050 emissions limit required to achieve carbon neutrality as soon as possible. As important as a robust 2050 emissions limit is, we also urge the Administration to consider that climate justice will only be achieved if the plan to achieve this emissions limit brings about concrete improvements in the health and lives of communities in the Commonwealth that continue to be disproportionately impacted by climate pollution.

COVID-19 is wreaking havoc on Massachusetts' most vulnerable residents,[1] including many residents of environmental justice populations.[2] It has, in a fairly short amount of time, caused tremendous disruption to all. For those people who lack expendable income, who suffer from underlying health issues, whose air quality is poor or whose housing or food security are

[1] Conservation Law Foundation, COVID-19 and Health Neighborhoods Study Communities, March 23, 2020. https://www.clf.org/covid-19-and-healthy-neighborhoods-study-communities/.

[2] For example, in Boston, data indicates that neighborhoods like Hyde Park, East Boston, Dorchester, and Mattapan have the highest rates of infection. See *Data Show COVID-19 is Hitting Essential Workers and Communities of Color Hardest*, ACLU MASSACHUSETTS (2020), https://www.aclum.org/en/publications/data-show-covid-19-hitting-essential-workers-and-people-color-hardest.

tenuous, the extreme effects of the COVID-19 public health crisis will be enduring.[3] The same is true of climate change. Those who have historically borne the brunt of environmental degradation are already experiencing the effects of a changing climate. The impacts of COVID-19 are indicative of what is to come if we do not center our most historically marginalized communities in the policy solutions included in the Clean Energy and Climate Plan for 2030 and the Roadmap to 2050.

The CJWG will continue to explore the public health, economic, quality of life, and environmental quality impacts, as well as impacts on adaptation and resilience from the environmental changes stemming from GWSA compliance. At a later date, we will offer specific recommendations to the IAC about implementation of specific policies capable of achieving equitable outcomes.

We look forward to working together to make Massachusetts a leader on equitable climate action.

For questions regarding the content of this letter or the Climate Justice Working Group, please contact Eugenia Gibbons, eugenia@greenenergyconsumers.org or Staci Rubin, srubin@clf.org.

Sincerely,

Alternatives for Community & Environment (ACE)

Clean Water Action

Conservation Law Foundation

Green Energy Consumers Alliance

GreenRoots

Neighbor to Neighbor MA

Toxics Action Center

[3] A recent study from the Harvard School of Public Health indicates that people who live in areas with poor air quality and contract COVID-19 are more likely to die from the virus than people who live in areas with better air quality. *See* Lisa Friedman, *New Research Links Air Pollution to Higher Coronavirus Death Rates*, NEW YORK TIMES (Apr. 7, 2020), *available at*: https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html.

clf
conservation law foundation

For a thriving New England

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www.clf.org

April 10, 2020

Submitted by Electronic Mail (gwsa@mass.gov)

EOEEA – Net Zero Determination
c/o Claire Miziolek
100 Cambridge St., Suite 900
Boston, MA 02114

Subj: Comments re: Net Zero Determination

Dear Secretary Theoharides,

Please accept the following comments by Conservation Law Foundation ("CLF") in response to the Department of Energy and Environmental Affairs ("EEA)'s February 26, 2020 request for comment regarding the Governor's commitment to achieving net-zero greenhouse gas emissions by 2050.

Founded in 1966, CLF is a non-profit, member-supported organization that protects New England's environment for the benefit of all people and future generations. CLF uses the law, science, and markets to create solutions that preserve and restore our natural resources, build healthy and resilient communities, and sustain a vibrant economy. Energy issues and greenhouse gas mitigation are central to that mission, and CLF is engaged in numerous efforts to move the New England region toward a net zero emission future.

CLF's comments and recommendations, explained in detail herein, are summarized as follows:

- **Massachusetts should commit to at least a 90 percent greenhouse gas emission reduction by 2050**. For many years, Massachusetts has led the nation in environmental protection. However, in recent years the Commonwealth has fallen behind. It is time that Massachusetts joins several other states and leads the nation with a commitment to reduce greenhouse gas emissions by at least 90 percent by 2050.

- **The final determination must include a clear definition for and regulations of allowable emission sinks for netting.** The department must be clear on what qualifies as a sink, whether offsets are included, and on acceptable locations for land-use and other sinks. It must also be clearly defined for which sectors or

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technologies netting can be applied, and no netting should be applied to reach 2030 and 2040 targets.

- **Modeling tools should include modeling of sub-state level effects and advanced technologies.** Modeling is necessary at the smallest geographic scale possible to evaluate energy supply and demand distinctions as well as impacts to demographic populations to achieve an accurate representation of the challenges and advantages expected in our decarbonization process.

- **Roadmap planning must center climate justice.** We urge you to integrate equity within the modeling of the Roadmap study as well as the development of the Clean Energy and Climate Plan to ensure that the transition to net zero addresses existing inequities. To this end, we recommend that you consider the framework proposed by the GWSA Implementation Advisory Committee (IAC) Climate Justice Working Group. We support the group's February 24, 2020 recommendations to the GWSA IAC, including that the "climate crisis, species loss, pollution, and predatory capitalism have placed increased pressures on our natural and built environment, often leaving the most marginalized communities, especially people of color, low-income residents, and English isolated residents, to bear the worst of the burden of environmental pollution."[1] The Commonwealth will not succeed in achieving net zero emissions without ensuring emission reductions in all communities.

CLF appreciates the opportunity to comment and looks forward to further collaboration with the EEA on this important work.

Sincerely,

CONSERVATION LAW FOUNDATION

By its Attorney

[1] Global Warming Solutions Act Implementation Advisory Committee Climate Justice Working Group Memorandum, "Recommendations for 80x50 Scenario Planning," (February 24, 2020), https://www.mass.gov/doc/gwsa-iac-climate-justice-working-group-memo/download.

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Caitlin Peale Sloan
Senior Attorney
Conservation Law Foundation

Comments on Massachusetts Decarbonization Roadmap

April 2020 – White Paper

Applied Economics Clinic

Prepared for: Conservation Law Foundation

Authors:

Elizabeth A. Stanton, PhD

Bryndis Woods

Eliandro Tavares

www.aeclinic.org

April 10, 2020

[AEC-2020-04-WP-01]

Executive Summary

In February 2020, the Massachusetts Executive Office of Energy and Environmental Affairs released a "Draft Letter of Determination" requesting public feedback on proposed language to set a 2050 emissions limit that will achieve the Commonwealth's 2050 goal of net-zero emissions. On behalf of Conservation Law Foundation, this Applied Economics Clinic white paper provides eight recommendations for the Commonwealth as it works to set its 2050 emission targets (see Figure ES-1 below). We argue that Massachusetts should set an ambitious 2050 emissions reductions target that builds in flexibility to account for truly recalcitrant emissions via carbon sinks, distinguishes the state as a national leader on climate, clearly defines and limits the use of carbon sinks until the Commonwealth approaches full decarbonization in 2050, considers the context of global climate change and local impacts, is in line with the best available science, and uses modeling tools that are able to consider a full range of emission reduction technologies,.

Figure ES-1. Guidelines for setting Massachusetts 2050 emission reduction goals

1.	Massachusetts should continue to lead the nation by aiming for full decarbonization by 2050.
2.	Any emissions "netting" that is permitted must include clear regulation of appropriate allowable sinks.
3.	Any allowable sinks must be real, verified, permanent and additional.
4.	Permitted netting should not exceed the size of the allowable sinks.
5.	No netting should be permitted in the 2030 and 2040 targets.
6.	The level of netting permitted should be considered in terms of its impact on global climate change.
7.	Massachusetts' carbon sinks should be fostered: they have an important role to play in slowing global climate change.
8.	Massachusetts' Decarbonization Roadmap modeling tools should be capable of modeling sub-state level impacts and cutting-edge technologies.

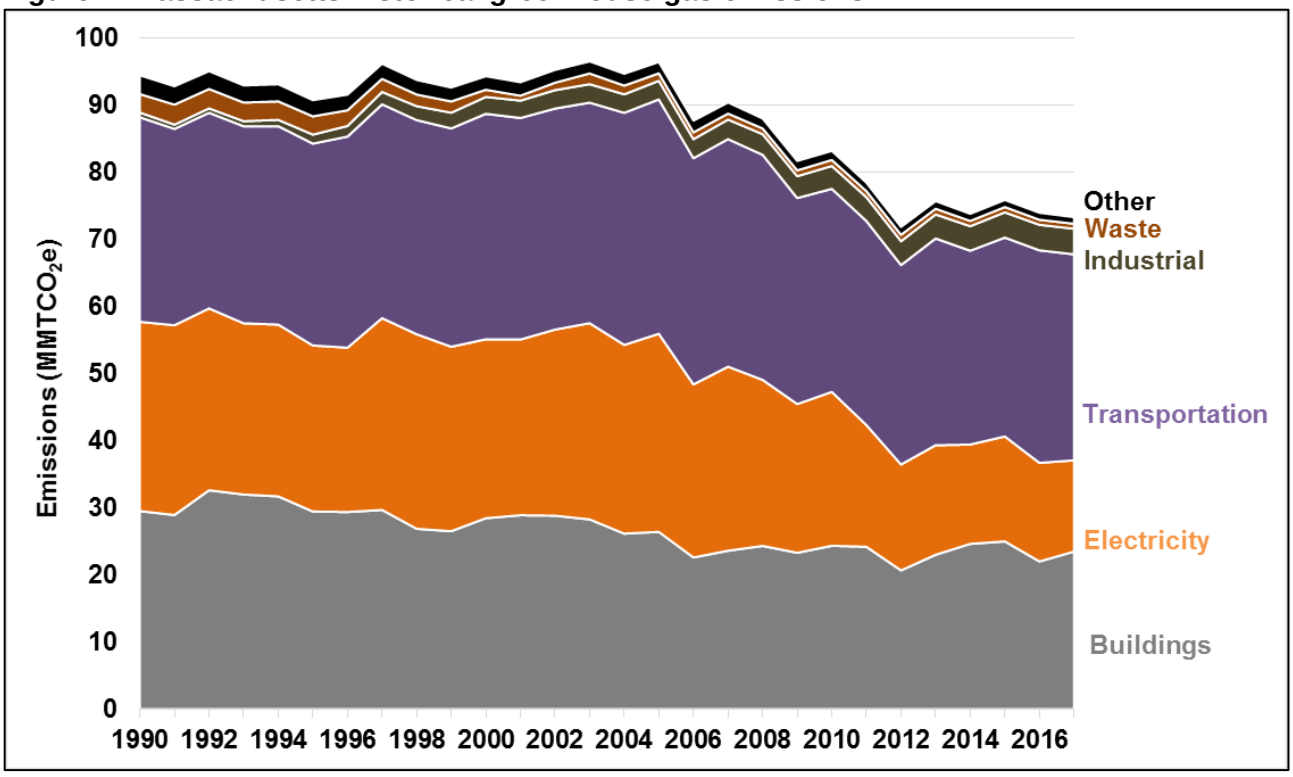
Table of Contents

Background

In 2008, Massachusetts enacted the Global Warming Solutions Act (GWSA),[1] which set statewide greenhouse gas emissions reduction targets, including a goal to reach "at least"[2] an 80 percent reduction by 2050 (from a 1990 baseline). GWSA also mandates 2020 emissions reductions (set at 25 percent below 1990 levels) and interim emission reduction targets be set for 2030 and 2040 that "maximize the ability of the Commonwealth to meet the 2050 emissions limit".[3]

The Commonwealth's 2020 target limits greenhouse gas emissions to 70.8 million metric tons (MMT) of carbon-dioxide equivalent (CO_2e) in the present year. While we do not yet know whether Massachusetts has achieved this goal, the most recent full year of available emissions data—from 2017—shows emissions at 22.4 percent (21.2 MMT) below 1990 levels (see Figure 1).

Figure 1. Massachusetts historical greenhouse gas emissions



Data source: MA DEP. 2018. Greenhouse Gas Emissions Reporting Program, Appendix C. Available at: https://www.mass.gov/doc/appendix-c-massachusetts-annual-greenhouse-gas-emissions-inventory-1990-2017-with-partial-2018/download.

[1] Commonwealth of Massachusetts. 2008. An Act establishing the Global Warming Solutions Act. The 191st General Court. Chapter 298. Available at: https://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter298.

[2] Ibid. Section 3(a).

[3] Ibid.

On January 21, 2020, during his State of the Commonwealth address, Governor Baker announced Massachusetts' commitment to achieve net-zero emissions by 2050.[4] In February 2020, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) released a "Draft Letter of Determination"[5] with proposed language to set a 2050 emissions limit that will achieve the Commonwealth's 2050 goal of net-zero emissions:

> *A level of statewide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is [80, 85, 90*]% below the 1990 level.*[6]

The emission target options presented in the Draft Letter of Determination include 80, 85 and 90 percent emissions reductions together with net zero emissions. Residual emissions—or the difference between the emissions target set and a 100 percent emission reduction—would be eligible for "netting" using one or both types of emission "sinks": 1) emission offsets (paying for the right to claim an emission reduction that happens elsewhere), and/or; 2) in-state carbon sequestration (measures that remove more carbon than they create, like forest restoration, changing farming practices, direct air capture, carbon storage and biochar).[7] Depending on what emission reduction target is chosen, in 2050 emissions sinks (offsets, in-state carbon sequestration) could net out between 10 and 20 percent of total 1990 emissions levels (or 9 to 18 MMT CO_2e).

This white paper argues that the Commonwealth should set a clear, ambitious 2050 target to: build in flexibility to account for truly recalcitrant emissions via carbon sinks, distinguish the state as a national leader on climate, clearly define and limit the use of carbon sinks until the Commonwealth approaches full decarbonization in 2050, and consider the target in the context of global climate change, local impacts, and the best available science. This target should be backed up by modeling that uses tools that are able to consider a full range of emission reduction technologies.

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[4] Solis, S. January 22, 2020. "Gov. Charlie Baker, lawmakers commit to net-zero emissions goal by 2050 for Massachusetts". Mass Live. Available at: https://www.masslive.com/politics/2020/01/gov-charlie-baker-lawmakers-commit-to-net-zero-emissions-goal-by-2050-for-massachusetts.html.

[5] Executive Office of Energy and Environmental Affairs. February 26, 2020. Request for comments: Opportunities for Public Comment re: Net-Zero Determination. Commonwealth of Massachusetts. Available at: https://www.mass.gov/doc/draft-letter-of-determination-on-the-2050-emissions-limit-revised-342020/download.

[6] Ibid.

[7] World Resources Institute. No date. "Carbon Removal". Available at: https://www.wri.org/our-work/project/carbon-removal.

1. Massachusetts should continue to lead the nation by aiming for full decarbonization by 2050

Eight states now share Massachusetts' goal to reduce 2050 emissions by 80 percent: Connecticut, Florida, Maine, Minnesota, New Hampshire, New Jersey, Pennsylvania and Rhode Island.[8] Colorado has set a 90 percent emission reduction target for 2050.[9] Another three states (California, New York and Hawaii) plus the District of Columbia, have gone further still and set either 100 percent emission reduction goals and/or net zero targets in 2050 (see Figure 2).[10]

For Massachusetts to continue to lead on climate solutions in the United States, its 2050 emissions limit should be on par with states with the most ambitious commitments to slowing global climate change: 100 percent emissions reduction and net zero targets. Committing to "net" zero builds in the necessary flexibility to address a small amount of emissions that may still be too difficult or costly to completely eliminate in 2050. Some concern is warranted, however, regarding the dangers of overcommitting to the use of sinks to "net out" emissions three decades from now. The practice of netting emissions with sinks should be limited to emissions that are truly recalcitrant in 2050—but what kind and how much of our emissions will turn out to be truly recalcitrant is impossible to know today. That is why the states currently leading on climate are setting very high emission reduction targets *and* allowing for the possibility of net zero: that way,

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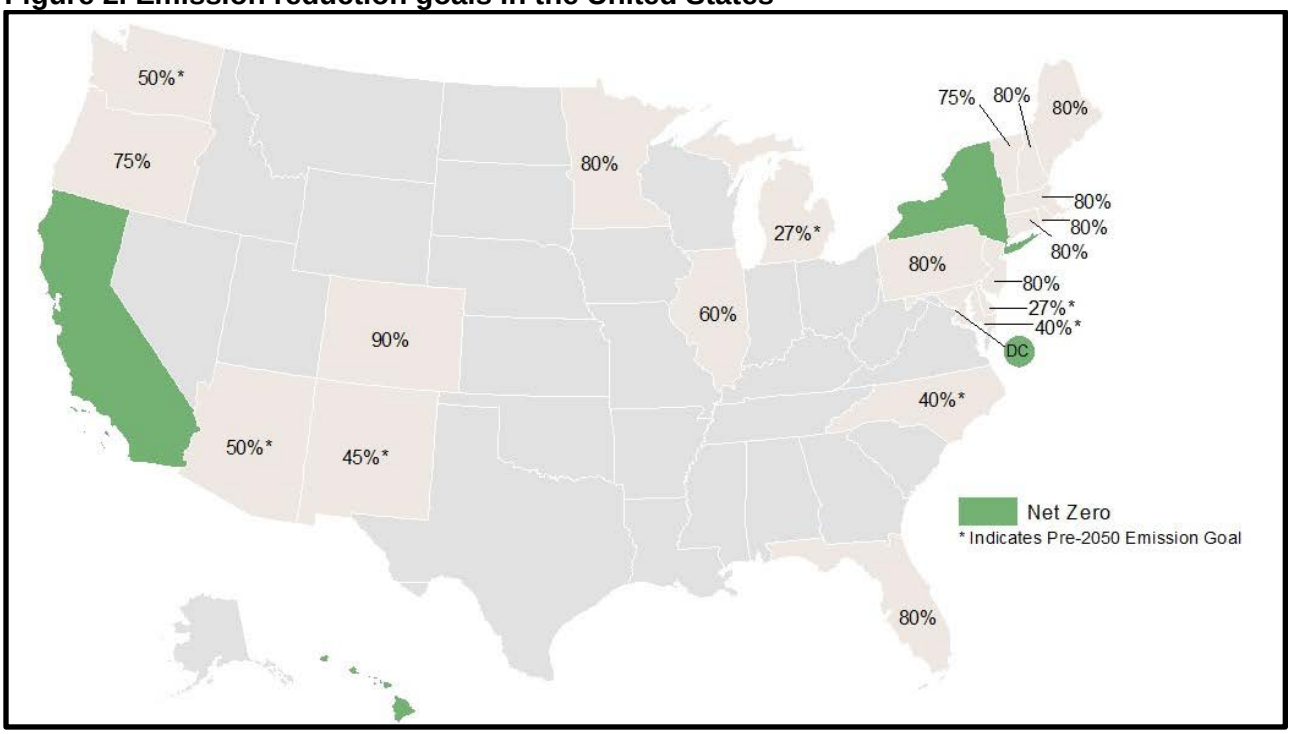
[8] 1) Commonwealth of Massachusetts. 2008. *An Act establishing the Global Warming Solutions Act*. The 191st General Court. Chapter 298. Available at: https://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter298; 2) State of Connecticut. June 2, 2008. *An Act concerning Connecticut global warming solutions*. HB 5600. Public Act No. 08-98. Available at: https://www.cga.ct.gov/2008/ACT/PA/2008PA-00098-R00HB-05600-PA.htm; 3) State of Florida. 2007. *Establishing the Florida Governor's Action Team on Energy and Climate Change*. Executive Order No. 07-128. Available at: http://www.fsec.ucf.edu/en/media/enews/2007/pdf/07-128-actionteam.pdf; 4) Minnesota Legislature. 2019. *Greenhouse gas emissions control*. 216H.02. Available at: https://www.revisor.mn.gov/statutes/cite/216H.02; 5) New Hampshire Climate Change Policy Task Force. March 2009. *The New Hampshire Climate Action Plan*. NH Department of Environmental Services. Available at: https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/nhcap_final.pdf; 6) Corzine, JS. 2010. *Executive order 54*. State of New Jersey. Available at: https://nj.gov/infobank/circular/eojsc54.htm; 7) Wolf, T. January 8, 2019. *Commonwealth Leadership in Addressing Climate Change and Promoting Energy Conservation and Sustainable Governance*. Commonwealth of Pennsylvania. Executive order No. 2019-01. Available at: https://www.oa.pa.gov/Policies/eo/Documents/2019-01.pdf; 8) State of Rhode Island. December 2016. *Rhode Island Greenhouse Gas Emissions Reduction Plan*. RIGL 46-6.2-2. Available at: http://climatechange.ri.gov/state-actions/reducing-emissions.php.

[9] State of Colorado. 2019. *An Act concerning the reduction of greenhouse gas pollution*. House Bill 19-1261. Available at: http://leg.colorado.gov/sites/default/files/2019a_1261_signed.pdf

[10] 1) Brown JR, EG. September 10, 2018. *Executive Order B-55-18 to achieve carbon neutrality*. Executive Department of the State of California. Available at: https://californiabiodiversityinitiative.org/pdf/executive-order-b-55-18.pdf; 2) State of New York. June 18, 2019. An Act to amend the environmental conservation law. S.6599. A.8429. Available at: https://legislation.nysenate.gov/pdf/bills/2019/S6599; 3) State of Hawaii. 2018. Zero emissions clean economy target. 225p-5. Vol. 04, Ch. 0201-0257. Available at: https://www.capitol.hawaii.gov/hrscurrent/Vol04_Ch0201-0257/HRS0225P/HRS_0225P-0005.htm

emissions netting is embraced as a last recourse, and never as an excuse to continue to emit easily mitigated greenhouse gases.

Figure 2. Emission reduction goals in the United States



Note: Data compiled by AEC from relevant state agency websites.

2. Any emissions "netting" that is permitted must include clear regulation of appropriate allowable sinks

Recent research at the Lancaster Environment Centre points out some problematic side effects of combining emissions reductions and negative emissions together into a single target of reaching "net-zero".[11] Such an approach could include interactive effects, double counting, delayed emissions cuts, and insufficient focus on developing negative emissions technologies.[12] A better approach—they suggest—would be to first reduce emissions as much as possible using one inventory and then, to match remaining recalcitrant emissions to carbon sinks using a separate

[11] McLaren, DP., et. al. August 21, 2019. *Beyond "Net-Zero": A Case for Separate Targets for Emissions Reduction and Negative Emissions*. Lancaster Environment Centre. Available at: https://www.frontiersin.org/articles/10.3389/fclim.2019.00004/full.

[12] McLaren, DP. September 30, 2019. Guest post: *The problem with net-zero emissions targets*. Carbon Brief. Available at: https://www.carbonbrief.org/guest-post-the-problem-with-net-zero-emissions-targets.

inventory.[13]

From the documentation publicly available on Massachusetts' Decarbonization Roadmap website,[14] it is unclear whether carbon offsets, in-state sequestration measures, or both, will be permitted to count towards the Commonwealth's calculations of "net zero" emissions in 2050. Carbon removal measures have a vital role to play in terms of providing the state with some flexibility to balance out any emissions that are still too difficult or too costly to eliminate in 2050. Nevertheless, it is very important that the Commonwealth set clear standards regarding:

- Criteria for classifying emissions as recalcitrant;
- Criteria for allowing specific carbon sinks to be permitted to net out these recalcitrant emissions;
- Criteria for ensuring that environmental justice communities do not bear the brunt of recalcitrant emissions; and
- A "polluter pays principle": Assignment of responsibility to the recalcitrant emitter for securing carbon sinks equivalent to the level of recalcitrant emissions.

Together, these standards will ensure the proper signal is being sent to those with the agency to reduce emissions, purchase offsets, and/or to enhance carbon removal.

California, for example, allows both in-state carbon sequestration and offsets to count towards its emission reduction goals. While the state has not yet provided guidance regarding negative emissions since it is still busy pursuing emission reductions, emission offsets are currently used. Under California's climate law, entities that are legally bound to reduce their emissions, including those in the electric, industrial and fuel supply sectors, must purchase emission allowances equal to their level of emissions—but they may also achieve up to eight percent of their compliance via offsets,[15] by investing in qualifying afforestation, urban forest, livestock, ozone depleting substance, methane capture and rice cultivation programs.[16] The responsibility for securing sinks lies with the source of the emissions that exceed the allowance.

In 2019, Hawaii passed HB 2182, which set a carbon neutral target for 2045 that permits netting

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[13] McLaren, DP., et. al. August 21, 2019. *Beyond "Net-Zero": A Case for Separate Targets for Emissions Reduction and Negative Emissions*. Lancaster Environment Centre. Available at: https://www.frontiersin.org/articles/10.3389/fclim.2019.00004/full.

[14] Executive Office of Energy and Environmental Affairs. No date. "MA Decarbonization Roadmap". Commonwealth of Massachusetts. Available at: https://www.mass.gov/info-details/ma-decarbonization-roadmap.

[15] California Air Resources Board. February 2015. *California Air Resources Board Offset Credit Regulatory Conformance and Invalidation Guidance*. State of California. Available at: https://ww3.arb.ca.gov/cc/capandtrade/offsets/arboc_guide_regul_conform_invalidation.pdf.

[16] California Air Resources Board. April 8, 2020. "Compliance Offset Program". State of California. Available at: https://ww3.arb.ca.gov/cc/capandtrade/offsets/offsets.htm.

from carbon sinks[17] including reforestation, carbon farming,[18] and urban trees.[19] In New York, the Climate Leadership and Community Protection Act directs the state's climate action council to assess reforestation, land restoration, greening infrastructure, urban forests, carbon capture and sequestration, and other carbon sink options that are "verifiable, enforceable, and permanent" to count towards greenhouse gas emission offset projects.[20] The Act stipulates that offsets may not count for more than 15 percent of total emission reductions, offsets "shall not result in disadvantaged communities having to bear a disproportionate burden of environmental impacts," and that offset projects should be prioritized when they create "localized benefits in disadvantaged communities".[21] Possible equity burdens include emitting larger quantities of harmful co-pollutants in a disadvantaged neighborhood that are then offset by carbon sinks implemented in elsewhere.

3. Any allowable sinks must be real, verified, permanent and additional

It is difficult to secure proven sinks that inspire the public's trust and provide real climate benefits. Even well-established carbon offset programs, like the United Nations' Reducing Emissions from Deforestation and Forest Degradation (REDD+) program and the Kyoto Protocol's Clean Development Mechanism (CDM), have had a poor track record of meaningful reductions in emissions.[22] For example, the REDD+ program has been active in the Amazon. However, independent reporting has exposed carbon offsets purchases in the REDD+ Amazon program that did not result in the carbon sequestration they were supposed to, were not accurately measured, or brought gains that were later reversed via deforestation.[23] A 2016 study of the CDM by the Institute for Applied Ecology found that "[i]t is likely that the large majority of the projects registered and [Certified Emission Reductions] issued under the CDM are not providing real, measurable and

[17] Gebers, S. June 4, 2018. "Hawaii sets ambitious goal: Carbon neutral by 2045". Hawaii News Now. Available at: https://www.hawaiinewsnow.com/story/38346913/hawaii-sets-ambitious-goal-carbon-neutral-by-2045/.

[18] Ibid.

[19] Ige, DY., Anderson, BS. March 6, 2019. "State on target to beat 2020 greenhouse gas emissions goal". State of Hawaii Department of Health. Docket 19-013. Available at: https://health.hawaii.gov/news/files/2019/03/19-013-State-on-target-to-beat-2020-greenhouse-gas-emission-goal.pdf.

[20] State of New York. June 18, 2019. *AN ACT to amend the environmental conservation law*. S.6599. A.8429. p.12. Available at: https://legislation.nysenate.gov/pdf/bills/2019/S6599.

[21] Ibid.

[22] Irfan, U. February 27, 2020. "Can you really negate your carbon emissions? Carbon offsets, explained". Vox. Available at: https://www.vox.com/2020/2/27/20994118/carbon-offset-climate-change-net-zero-neutral-emissions.

[23] Song, L., Moura, P. May 22, 2019. "An even more inconvenient truth". ProPublica. Available at: https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia/.

additional emission reductions."[24]

In the United States, many states depend on the EPA's State Inventory Tool (SIT) to measure their statewide emissions. The SIT calculates greenhouse gas emissions by sector using state-level data.[25] Some states, like Connecticut and Rhode Island, do not use SIT data on land use, land use change, and forestry because they have found it to be "unreliable".[26,27] Recent research by the ClimateWorks Foundation on the accuracy and quality of the National Greenhouse Gas Inventory[28] found that it is important to fill data gaps for land use activities where data are too incomplete for accurate emission estimation methodologies to be developed[29] and that there is a need to improve field measurements and data quality,[30] particularly as they relate to emissions and sequestration from rural and urban forests and soils.[31]

Ultimately, carbon sinks (both offsets and in-state carbon sequestration measures) are only truly beneficial for the climate when they are:

- Real—meaning that carbon sequestration has actually occurred;
- Verified—meaning that carbon sinks are recorded, monitored and tracked by a reputable, impartial entity;
- Permanent—meaning the carbon that is sequestered does not get re-released into the atmosphere later (for example, if you plant a tree, it should not be later cut down); and
- Additional—meaning that the carbon being sequestered would not have been stored without the incentive provided to enact this measure.

This last criterion—additionality—is of particular concern in any plan to address recalcitrant in-state emissions using land use carbon sequestration. If the carbon being sequestered via land use

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[24] Cames, M., et. al. March 2016. *How additional is the Clean Development Mechanism?* Oko Institute. Available at: https://ec.europa.eu/clima/sites/clima/files/ets/docs/clean_dev_mechanism_en.pdf.

[25] Connecticut Department of Energy and Environmental Protection. 2020. *2017 Connecticut Greenhouse Gas Emissions Inventory.* Available at: https://portal.ct.gov/-/media/DEEP/climatechange/2017_GHG_Inventory/2017_GHG_Inventory.pdf?la=en. P. 1

[26] Ibid.

[27] Ibid.

[28] McGlynn, Emily, et al. 2019. "Reducing climate policy risk: Improving certainty and accuracy in the U.S. land use, land use change, and forestry greenhouse gas inventory." *ClimateWorks Foundation.* Available at: https://www.researchgate.net/publication/338710564_Reducing_climate_policy_risk_Improving_certainty_and_accuracy_in_the_US_land_use_land_use_change_and_forestry_greenhouse_gas_inventory. P. 15.

[29] U.S Environmental Protection Agency. 2020. *Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks 2990-2018.* EPA 430-P-20-001. Available at: https://www.epa.gov/sites/production/files/2020-02/documents/us-ghg-inventory-2020-main-text.pdf. p. 1-24.

[30] Ibid. p. 12.

[31] Ibid. p. 39.

measures (to offset in-state emissions) is not limited to additional (new) sinks, it will not represent a change in emissions from 1990 (the baseline for emissions comparison under GWSA).

4. Permitted netting should not exceed the size of the allowable sinks

In order to determine the appropriate amount of emission netting, Massachusetts must first assess how many tons of emissions will need to be netted out given an 80, 85, 90 or greater than 90 percent emission reduction goal (see Table 1). The emissions reduction goal will determine what amount of negative emissions (and/or offsets) will be necessary to hit net zero.

Table 1. Future emission scenarios for Massachusetts

	Total annual emissions (MMT CO_2e)	% reduction from 1990 levels	Equal to emissions from (million cars)
1990	94.5	N/A	20.5
2017	73.3	22%	15.9
2050	18.9	80%	4.1
	14.2	85%	3.1
	9.4	90%	2.1

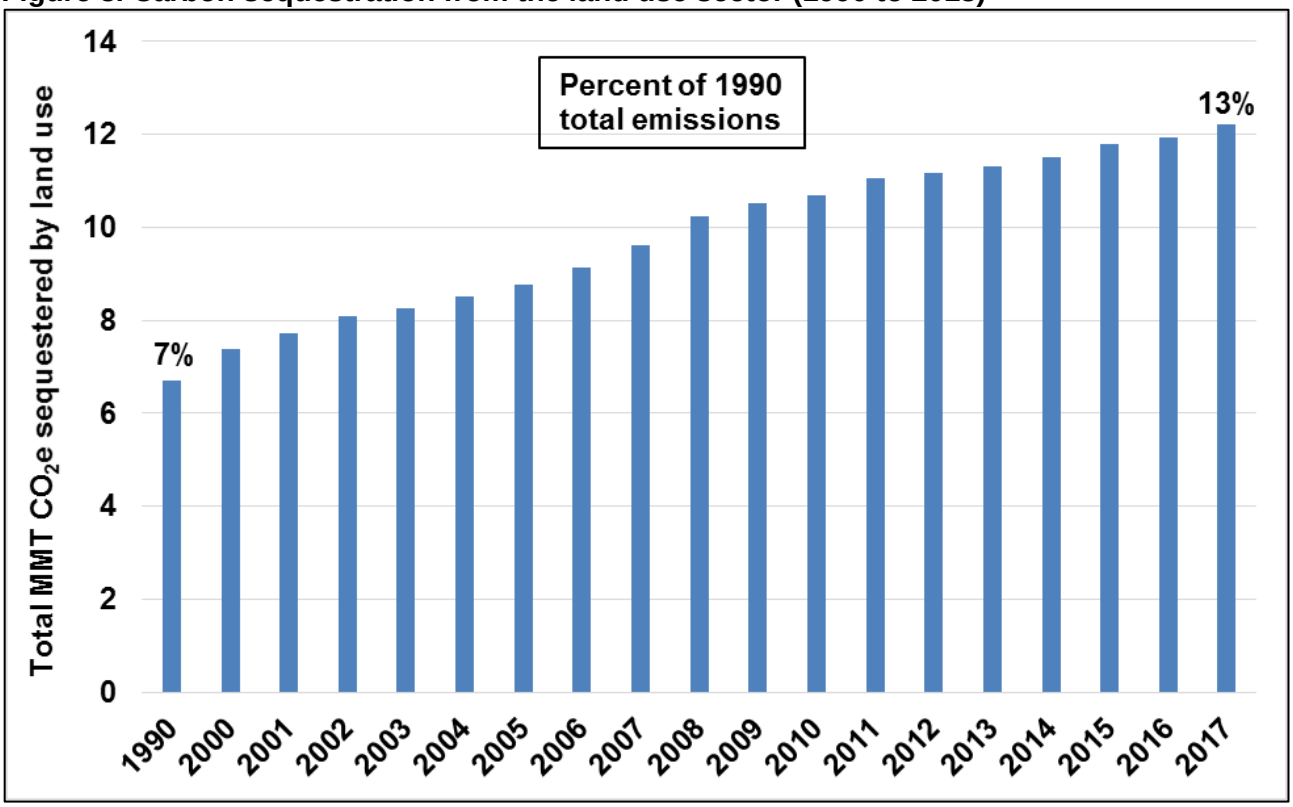
Data source: MA DEP. 2018. Greenhouse Gas Emissions Reporting Program, Appendix C. Available at: https://www.mass.gov/doc/appendix-c-massachusetts-annual-greenhouse-gas-emissions-inventory-1990-2017-with-partial-2018/download; U.S. EPA. 2018. Greenhouse Gas Emissions rom a Typical Passenger Vehicle. Available at: https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle

Carbon removal measures in the land use sector most commonly include afforestation, forest restoration, and changing farming practices to store more carbon in soils.[32] Available land use carbon sequestration and emissions data from Massachusetts demonstrate that the land use sector accounts for 7 to 13 percent of the state's total 1990 (baseline year) emissions (see Table 2).

If the Commonwealth's carbon sequestration from land use amounts to only 7 to 13 percent of 1990 emissions, this level either sets a limit on permitted netting or suggests that it will be necessary to go outside of the state's borders to secure more sinks. Setting the emission reduction target at 90 percent or higher would allow the Commonwealth to rely exclusively on in-state sinks.

[32] World Resources Institute. No date. "Carbon Removal". Available at: https://www.wri.org/our-work/project/carbon-removal.

Figure 3. Carbon sequestration from the land use sector (1990 to 2018)



Data source: MA DEP. 2018. Greenhouse Gas Emissions Reporting Program, Appendix C. Available at: https://www.mass.gov/doc/appendix-c-massachusetts-annual-greenhouse-gas-emissions-inventory-1990-2017-with-partial-2018/download.

Between 2007 and 2013, 112,000 acres of land in Massachusetts have come under conservation protection.[33] According to a 2014 study by Harvard University, every year, thousands of acres of Massachusetts land are lost to development, erasing progress in land conservation efforts.[34] If recent land development trends continue or increase, the consequences for people and nature will include not only important missed benefits like water filtration and habitat health,[35] but severe limits to the state's ability to utilize its land use sector for carbon sequestration.

5. No netting should be permitted in the 2030 and 2040 targets

Massachusetts' Decarbonization Roadmap and greenhouse gas emission targets should make clear that the use of sinks to net emissions is neither necessary nor permissible in 2030 and 2040. "Net" emissions are meant to be a safety valve for any emissions that turn out to be very difficult to

[33] Harvard University. 2014. *Changes to the Land: Four Scenarios for the Future of the Massachusetts Landscape*.

[34] Ibid.

[35] Ibid.

eliminate. There will be sufficient room to accommodate recalcitrant emissions in the permitted emission set for 2030 and 2040.

If, for example, Massachusetts sets its targets based on a linear (straight line) path between a 25 percent reduction in 2020 and a (minimum) 80 percent reduction in 2050, allowable emissions in 2030 and 2040 would be 54 MMT and 36 MMT, respectively. Limited flexibility to use sinks to net out emissions should only become necessary as the Commonwealth approaches full decarbonization in 2050.

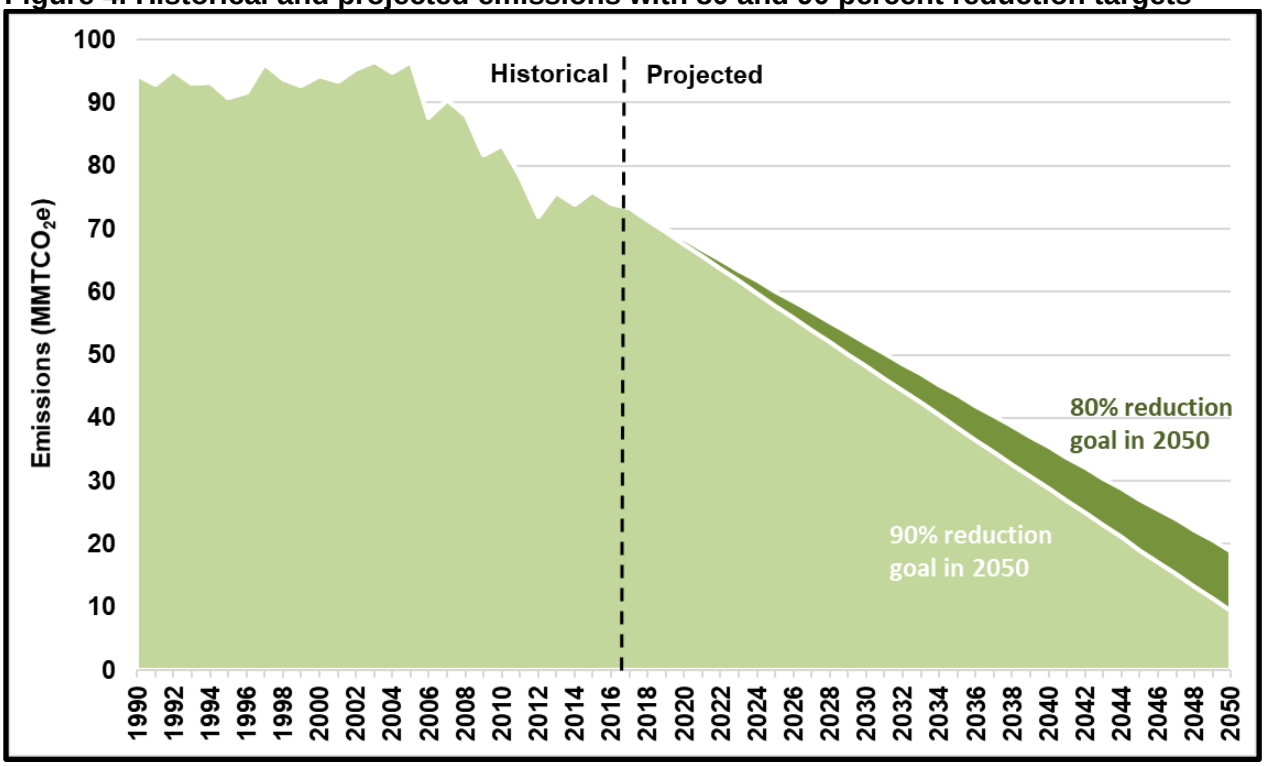
6. The level of netting permitted should be considered in terms of its impact on global climate change

If Massachusetts were to set an 80 percent emissions reduction target, total allowable emissions in 2050 would equal 18 MMT CO_2e. If Massachusetts were to set a 90 percent target, total allowable emissions in 2050 would equal 9 MMT. The difference between selecting a 80 or 90 percent target will results in the state netting out an additional 9 MMT, which is the equivalent of the annual emissions from over 2 million cars (see Table 1 above and Figure 4).[36]

Nine million metric tons of CO_2e (the difference in the total greenhouse gas emitted in 2050 if the Commonwealth were to choose an 80 percent versus 90 percent emission reduction target) is not negligible. Massachusetts should consider its proposed emission reduction targets in the context of global climate change and the negative impacts that residual emissions will have on the ability to limit average global temperature increase and avoid the impacts of dangerous climate change in our home state and around the world.

[36] U.S. EPA. 2018. “Greenhouse Gas Emissions from a Typical Passenger Vehicle”. Available at: https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle.

Figure 4. Historical and projected emissions with 80 and 90 percent reduction targets



Data source: MA DEP. 2018. Greenhouse Gas Emissions Reporting Program, Appendix C. Available at: https://www.mass.gov/doc/appendix-c-massachusetts-annual-greenhouse-gas-emissions-inventory-1990-2017-with-partial-2018/download.

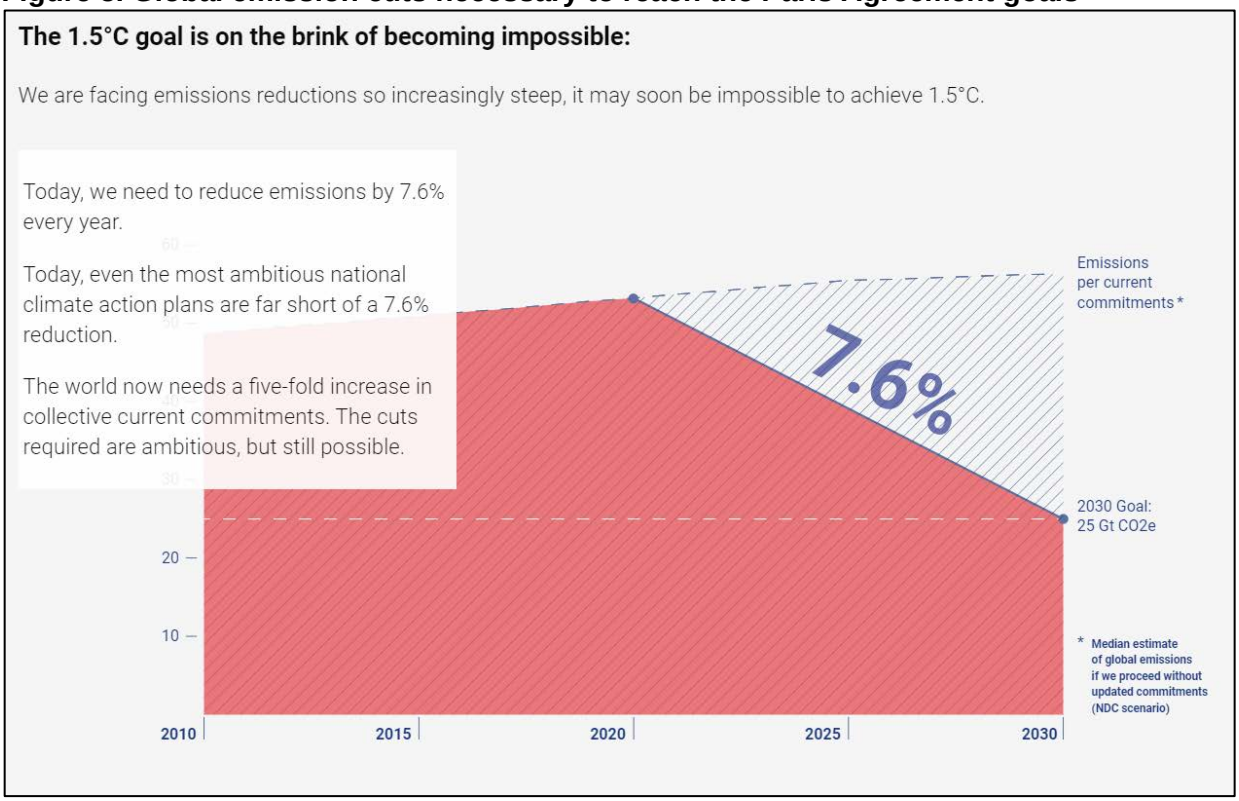
7. Massachusetts' carbon sinks should be fostered: they have an important role to play in slowing global climate change

In addition to balancing out truly recalcitrant emissions, the Commonwealth's carbon sinks can provide an important contribution to lowering global greenhouse gas emissions still further. According to the best available science from the Intergovernmental Panel on Climate Change (IPCC), even after accounting for existing emission reduction commitments by world governments (including pledges by the U.S. federal government, U.S. states and even U.S. cities)—global emissions must still fall by an additional 7.6 percent per year between 2020 and 2030 to have any chance of limiting global average warming to 1.5°C or less (see Figure 5).[37] At current emission levels (and accounting for existing emission reduction pledges), if we wait until 2025 to start making the necessary reductions—global emissions will need to fall by an additional 15.5 percent

[37] UN Environment Program. November 26, 2019. *Emissions Gap Report 2019*. United Nations. Available at: https://www.unenvironment.org/interactive/emissions-gap-report/2019/?fbclid=IwAR2x7YSxJw4D-xNvGrIC4VnB2yVRq1gMHnzWLG7TJWf8910-fjrRThiScEA.

each year, "making the 1.5°C target almost impossible."[38]

Figure 5. Global emission cuts necessary to reach the Paris Agreement goals



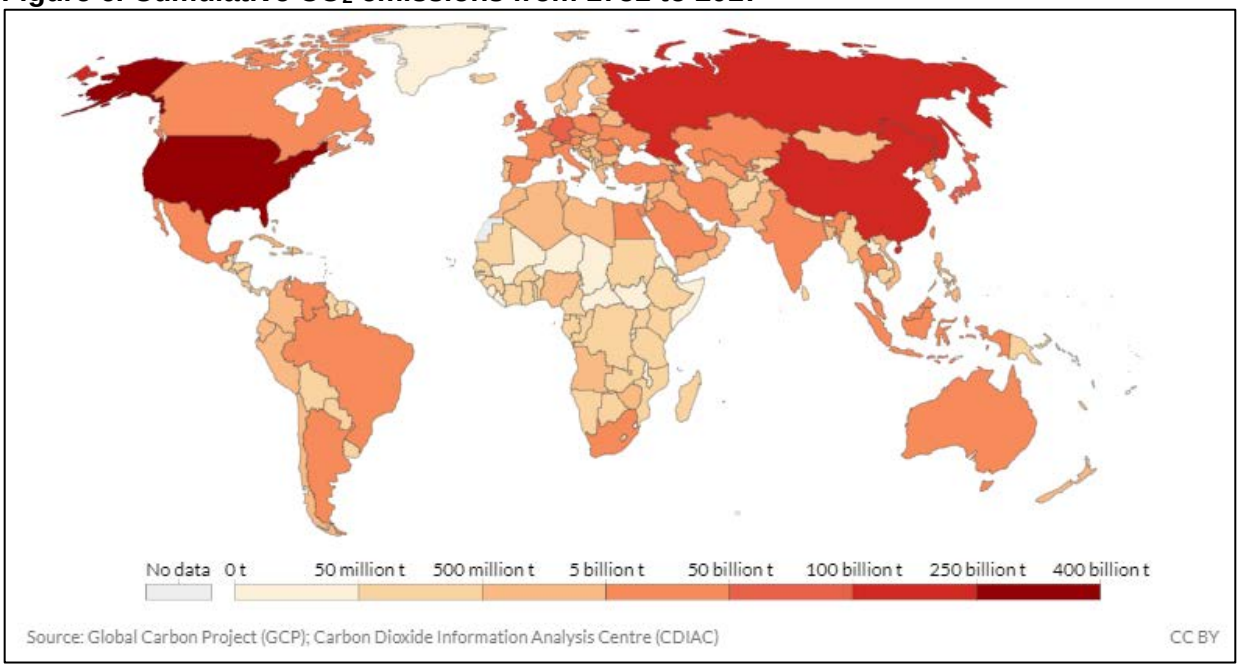
Source: Reproduced from UN Environment Programme. November 26, 2019. Emissions Gap Report 2019. Visual Interactive. Available at: https://www.unenvironment.org/interactive/emissions-gap-report/2019/?fbclid=IwAR2x7YSxJw4D-xNvGrIC4VnB2yVRq1gMHnzWLG7TJWf8910-fjrRThiScEA.

Given that the United States has emitted more than any other country historically (on a cumulative basis, see Figure 6), has the world's highest per capita emissions (see Figure 7), and is failing to meet its existing emission reduction commitments[39]—our "fair" share may be larger than our current share of global emissions. Massachusetts' responsibility to reduce its emissions, includes the best possible use of its carbon sinks.

[38] Ibid.

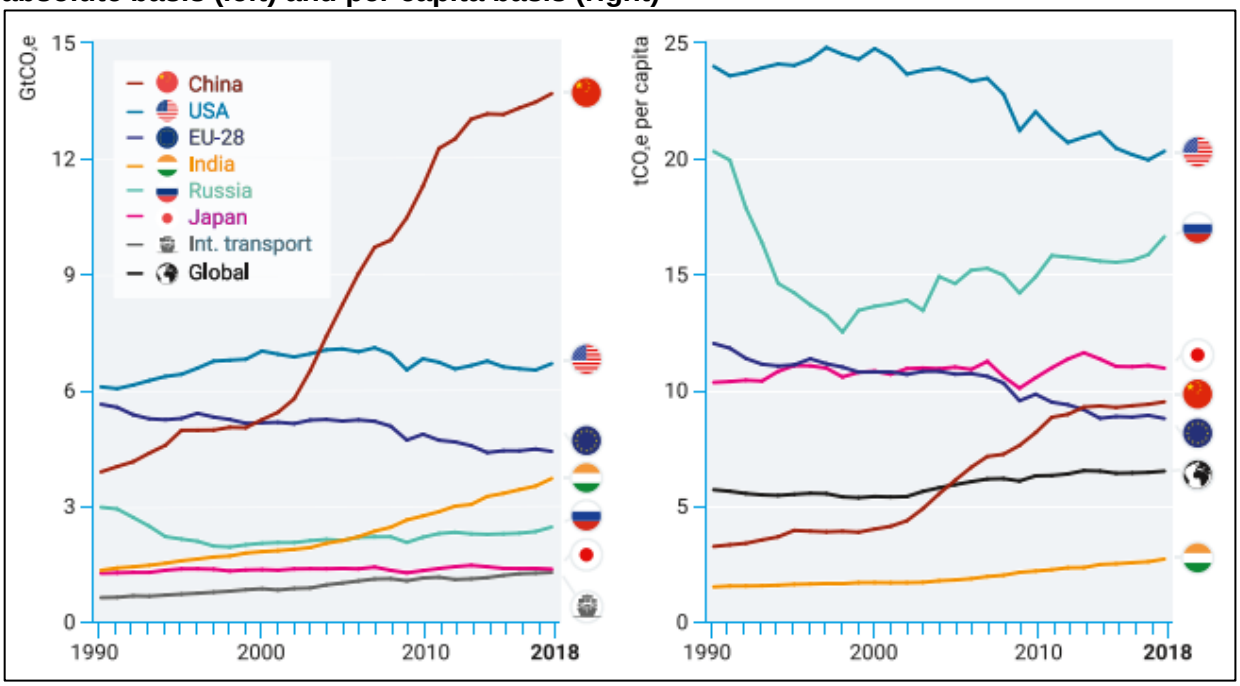
[39] UN Environment Programme. November 26, 2019. Emissions Gap Report 2019. Available at: https://www.unenvironment.org/resources/emissions-gap-report-2019.

Figure 6. Cumulative CO_2 emissions from 1751 to 2017



Source: Reproduced from Ritchie, H. and Roser, M. December 2019. CO_2 and Greenhouse Gas Emissions. Our World in Data. Available at: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions.

Figure 7. Top greenhouse gas emitters (excluding land-use change emissions) on an absolute basis (left) and per capita basis (right)



Source: Reproduced from UN Environment Programme. November 26, 2019. Emissions Gap Report 2019. Figure ES-2. Available at: https://www.unenvironment.org/resources/emissions-gap-report-2019.

Every ton of emissions that we fail to reduce between now and 2050 pushes us, as a state, country and planet, further away from the 1.5°C limit necessary to avoid the most catastrophic impacts of climate change.

8. Massachusetts' Decarbonization Roadmap modeling tools should be capable of modeling sub-state level impacts and cutting-edge technologies

Massachusetts EEA is currently engaged in a research and modeling effort to identify "strategies, policies, and implementation pathways…to achieve at least 80 [percent greenhouse gas] reductions by 2050, including multiple pathways to net-zero emissions."[40] EEA has engaged with several consulting groups to conduct this modeling and expects to publish its results in late 2020.

It is critical that the modeling tools select for this work have the capabilities necessary to represent a full range of emission reduction technologies and the techniques necessary to integrate these technologies in our energy system. Two areas of modeling capacity are of particular concern: geographic resolution and complex representation of electric dispatch.

Geographic resolution: It is not sufficient to model our energy system at the regional (New England) or even state level. Modeling sub-state electric distribution zones and other sub-state specific energy supply and demand distinctions is essential to achieve an accurate representation of the challenges and advantages expected in our decarbonization process. Without proper modeling of the distribution of energy services at a sub-state level, both the viability of emissions mitigation technologies and their costs may be represented inaccurately.

Complex representation of electric dispatch: A common failing of recent deep decarbonization studies is a built-in assumption that electric systems with very high shares of renewable energy supply must require either oversupply or "back up" supply to function: both of which add significant, and perhaps unnecessary, costs. Cutting-edge solutions to balancing high-renewable-supply electric systems include "flexible load balancers" such as demand response, behind-the-meter batteries, and virtual power plants. Not all electric dispatch modeling platforms have the capability to accurately model these solutions. To model inexpensive, flexible load balancers, models must be capable of hourly (or sub-hourly) dispatch resolution, demand-side (load reduction) dispatch, and representation of dispatchable demand response and batteries with varying characteristics.

[40] Executive Office of Energy and Environmental Affairs. No data. "MA Decarbonization Roadmap". Commonwealth of Massachusetts. Available at: https://www.mass.gov/info-details/ma-decarbonization-roadmap#current-research-effort-.

Conclusion

Massachusetts should set an ambitious emissions reductions target that aims for full decarbonization by 2050, while also prudently planning for flexibility by requiring net zero emissions and permitting the use of negative emissions measures to achieve this goal. Doing so will distinguish the Commonwealth as a national leader on climate, bring the state in line with the best available science, and mitigate against both global and local climate change impacts.

The Commonwealth, however, must be careful to ensure that its approach to net zero is clear, rigorous and transparent. Emissions netting should be embraced as a last recourse, not as an excuse to continue to emit easily mitigated greenhouse gases. In addition, it is vitally important that the Commonwealth protect against concentrating recalcitrant emissions in environmental justice communities that already face disproportionate environmental dangers and damages.

From: Claire Miller
To: gwsa (EEA)
Subject: Comments from Toxics Action Center
Date: Friday, April 10, 2020 4:58:31 PM

April 10, 2020

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

--- Submitted electronically via gwsa@mass.gov ---

Dear Governor Baker and Secretary Kathleen A. Theoharides,

In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required to minimize climate damage. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more globally by 2030 below the 1990 levels to achieve a 50% chance of avoiding the devastating consequences of a 1.5C rise in temperature. The more quickly we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction and demonstrate the leadership we all expect Massachusetts to provide.

While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve "Net Zero greenhouse gas pollution" by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction and climate justice.

The best available current science shows that in order to avoid the worst impacts of climate change, we need to:

- Reduce greenhouse gas emissions by 60% or more by 2030.
- Prioritize Environmental Justice communities.
-Achieve 100% renewable energy across electricity, transportation, and heating by 2040
- Get to a 100% reduction in human-caused emissions by 2050, and begin aggressively drawing down pollution from the atmosphere

Our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most.

A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity.

We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of

human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Further, we request that our 2050 goals include not just the elimination of pollution from the year 2050, but the beginning of an aggressive effort to drawdown pollution from the atmosphere that Massachusetts businesses and residents have historically polluted, using measures such as reforestation, land conservation, wetlands restoration, and other nature-based solutions. Additionally, we think it is critical to target these measures whenever possible in partnership with historically marginalized and disenfranchised Environmental Justice communities to ensure that they benefit and not further suffer from the implementation of such solutions.

Our Commonwealth's plans must be in line with the best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change.

Sincerely,
Toxics Action Center

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logo

Claire B.W. Müller (they/them)
Lead Community Organizer & Climate Justice Director
Toxics Action Center
Cell: 781-775-1429
294 Washington St. #500, Boston,MA
claire@toxicsaction.org | www.toxicsaction.org

From:	BRIAN CAM
To:	gwsa (EEA)
Subject:	Comments on Emissions Limit for 2050
Date:	Friday, April 10, 2020 3:51:31 PM

Dear Governor Baker and Secretary Kathleen A. Theoharides,

"**Massachusetts Greenhouse Gas (GHG) Inventory** shows that GHG emissions in 2017 were 22.4% below the 1990 baseline level, on track to meet the 25% reduction by 2020 required by the 2008 Global Warming Solutions Act (GWSA)." https://www.mass.gov/lists/massdep-emissions-inventories#2. However, the truth is Massachusetts will **Fail, 2020 Climate Goals**. Why? Because Massachusetts ignored Science and Prematurely closed (2019), Pilgrim Nuclear Plant which supplied Massachusetts with 62% of all Green, emission-free, electrical energy and judging by Oyster Creek, NJ, Nuclear premature closure in 2018 ,https://www.njspotlight.com/2020/01/op-ed-one-year-after-oyster-creek-shutdown-3-1m-tons-of-new-carbon-emissions/, Massachusetts is on track to increase emissions by at least 2 million tons / year to replace Pilgrim nuclear Electrical Generation with Fossil fuels. **Fail, 2020 Climate Goals**

Pilgrim Nuclear owner Exelon Corporation ("Exelon"), lobbied for Nuclear Power to be included the 2014 Massachusetts Clean Energy Standard ("CES"), but opposition to Nuclear Power prevailed, and Nuclear Power was excluded from, CES. In 2015, Exelon, had no choice but to close Pilgrim Nuclear due to low natural gas prices, a deregulated grid in name only, that devalues grid stability of base load power and risks rolling blackouts.

In 2016, Climate scientists and conservation leaders urge Massachusetts Governor and Legislature to end discrimination against nuclear energy, **http://environmentalprogress.org/massachusetts-letter.** This

2016 letter asked Massachusetts not to pass H4377 or S2372 in their current forms, but to amend them to recognize the ongoing importance of nuclear power. Again, Massachusetts ignored science and cemented the fact it would Not meet 2008 GWSA's 2020 target. Decades of fearmongering and harassment by state agencies finally succeeded in making way to burn more gas, in Massachusetts.

In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% pollution reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net pollution must be reduced by 50% or more by 2030 below the 1990 levels. On January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction.

Reality Check, Massachusetts failed, to meet its 2020 goals, meeting 2030 goals and beyond without new NUCLEAR POWER has extremely low probability of success**.**

Even if 1.6 Gigawatt of offshore wind and the 1.2-Gigawatt (GW=10^12 W), Central Maine Power (CMP) transmission line that Governor Baker has promoted are operating by 2030, meeting the target of 50% reduced greenhouse gas emission is highly improbable. The 1.6 GW of wind power requires about 6.4 GWh of energy storage to be steady enough to be useful for grid connection and is only equivalent to about 0.8 GW of power from a firm power source. Even with the Pilgrim Nuclear Power Plant were operating, the Massachusetts GWSA targets were very ambitious goals. A significant amount of Massachusetts greenhouse gas emission comes

from the transportation sector however transitioning to electric vehicles is only helpful if they can be charged using a resilient low greenhouse gas emission electric power grid. Governor Baker could have made the GWSA more achievable by adding a nuclear power plant rather than prematurely closing the only nuclear power plant in Massachusetts. All power sources and energy efficiency improving technologies that help reduce greenhouse gas emissions would be needed for GWSA to meet emission targets. PV systems in suitable places such as rooftops and parking lots and not covering all our public green space can help a little but at less than 14% capacity factor all the PV systems in Massachusetts have not replaced that one modest sized nuclear power plant that Massachusetts prematurely closed. PV systems are much more practical in high irradiance locations such as the southwest US where their capacity factor can approach 30%.

Even trash to energy is needed because landfills are very harmful and should not be used. However, SEMASS is a relatively small power plant and requires gas. Without nuclear power the Massachusetts GWSA seems hopelessly crippled.

New York has a diverse energy mix with multiple firm power sources and renewables including nuclear power and is now planning to cripple their Climate Leadership and Community Protection Act by prematurely closing the Indian Point nuclear power plant 2.2 GW, which is about three times larger than Pilgrim. If Indian Point (IP), nuclear power plant is prematurely closed most of its non-emission electrical generation will be replaced by gas. ISONE and Massachusetts is at the end of the already constrained New York, gas pipelines that will have to replace the IP electrical generation with more gas burning electrical generation.

This means more Fuel Oil burning in winter, as gas is diverted

from electrical generation to heat. Fuel Oil burning is much more polluting in that **fine particles** (also known as $PM_{2.5)}$: particles generally 2.5 μm in diameter or smaller. https://www.epa.gov/pmcourse/what-particle-pollution, increases vs gas. EIA Data for Kendall Station, Cambridge, MA is a 256-megawatt (MW=10^6 W) Co-generation power plant, for 2018 burned 24776 Barrels of fuel oil * 42 == 1,040,592 US Gallons =. 24776 US Oil Barrels https://www.eia.gov/electricity/data/browser/#/plant/1595?freq=A&ctype=linechart&ltype=pin&columnchart=ELEC.PLANT.GEN.1595-ALL-ALL.A&linechart=ELEC.PLANT.GEN.1595-ALL-ALL.A~ELEC.PLANT.CONS_TOT.1595-RFO-ALL.A&pin=&maptype=0 This is an increase over 2017, if winters are harsh this will increase and since fuel oil is limited to storage capacity, could lead to rolling blackouts if Gas supplies are constrained.

Massachusetts GWSA targets are very ambitious goals. In August 2017, EEA and MassDEP finalized 310 CMR 7.75: Clean Energy Standard Amendments to: 310 CMR 7.75 Clean Energy Standard CES-E Eligible Generators. . EEA and MassDEP are proposing to add a new defined term, “clean existing generation unit,” to identify generators that qualify under the CES-E. This definition specifies that eligible generators must: utilize hydroelectric or nuclear energy; 6

have a commercial operation date before January 1, 2011;
be in Massachusetts or a jurisdiction that has consistently exported electricity to Massachusetts;7 and
have a nameplate capacity of more than 30 MW.

The technology, vintage, and location requirements follow directly from the CES-E goal, which is to support generators that contribute to Massachusetts’ clean electricity supply but are not eligible for the CES because they commenced commercial operation before January 1, 2011. This must be backdated to 1990 the year Seabrook Station Nuclear, opened. This would allow SEABROOK Station Nuclear Power providing 57% of New Hampshire Electrical Power to be included in CES. This MUST happen if there is any hope of achieving these goals. Anti-

nuclear, C-10 Research and Education Foundation is Massachusetts state funded to $$180,000 /year. C-10 only duplicates, better measurement quality radiation monitoring done by the NRC and owner NEXT-ERA. This is waste of taxpayer money, is really used in lawsuits to drive up costs to Next Era and to Close the plant.

Massachusetts needs to re-dedicate itself to funding our Nuclear Research Reactors at M.I.T in Cambridge MA and UMASS Lowell and fund more Nuclear Research in Fission, Fusion and Nuclear Medicines. Small Module Reactors (SMR) can replace Kendall Station Co-gen that can supply Affordable, Electricity, heat and are walk away safe. https://www.open-100.com/

Climate Change is a Global Problem. Who is the USA to deny the rest of the world Electrical Power? Environmental Justice really means lifting the rest of the world out of Energy Poverty. However, developing nations are mainly using dirty COAL to do this. In 1953 President Eisenhower gave a “Atoms for Peace” Speech to the United Nations. This vision of Inexpensive, reliable, clean power can be achieved and exported around the world. That is the reason Bill Gates supports advanced Nuclear Power development. If Humanity desires to Solve Climate Change, Cure Cancer, and go to Mars, ONLY, Nuclear Technology can take us there.

Brian Campbell Electrical Engineer BSEE UMASS Lowell

From: Roslyn Feldberg
To: gwsa (EEA)
Subject: Comments on Mass Plan for 2050
Date: Thursday, April 9, 2020 7:03:12 AM

Comments on Mass Plan for 2050

The goal is good, but maybe not as forward thinking as we need to be. Can we get to zero emissions by 2045? Every small improvement counts in this urgent situation. And we need to start implementing our plans immediately.

The recent Coronavirus pandemic has shown us how quickly life can spin out of control. We must reduce our carbon emissions drastically and quickly. The sooner we do that, the better. Our goals need to focused on achieving reductions in carbon emissions in the next 5 years.

We should start where we know we can act effectively. Plant trees, grow forests. Tree planting will begin to help us draw carbon out of our atmosphere within 3-5 years. So we need to start now, in 2020. There is a lot of space to plant well-designed forests in Massachusetts. We need to start that project now.

We also need to protect the forests we already have. **We need to optimize cumulative carbon storage by increasing the acreage of protected natural forests** by a) **creating more reserves on our public lands**, and giving them permanent protection from resource extraction and development, and b) **giving equal public incentives for private land that is kept "forever wild,"** where all active management is precluded and nature prevails.

Regarding biomass in the Alternative Portfolio Standard (APS) and the Renewable Portfolio Standard (RPS): Woody biomass burning and trash burning should be removed from the APS and the RPS. Subsidizing these carbon emitting fuels is in direct opposition to the goals of the GWSA to reduce carbon emissions.

Regarding residential wood burning: Pellets, cordwood and wood chips are significant carbon emitters whose carbon should be counted and then therefore discouraged in Massachusetts.

Thank you for the opportunity to comment.
Roslyn Feldberg, Brookline

If you are from Brookline MA, join me in "Opting Up" to 100% renewable electricity through

our town's Brookline All Green plan! It takes 5 minutes, costs little, and doesn't change your billing or electric service. Go to https://brooklineoptup.com/.

Please follow Brookline Mother's Out Front on Twitter @BrooklineMOF and "like" our Facebook Page to check out what we're up to!

Sent from my iPad

Roslyn Feldberg, PhD
Independent Scholar
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3/4/20 Worcester Public Meeting on 2050 Roadmap
Additional Comments
4/10/2020

Comments by Michael Duclos, founder or co-founder of:

Passive House Massachusetts - https://phmass.org
DEAP Energy Group, LLC - http://www.deapgroup.com
Energy Raters of Mass, Inc. - http://www.energyratersma.com
Energy Efficiency Associates, LLC - http://www.eeassociates.com

Certified Passive House Consultant, PHIUS Plus Rater, HERS Rater with the MassSave New Construction Program since 2009. I've designed, verified, certified and monitored multiple Passive House buildings, the most energy efficient building standard in the world, with both PHIUS and PHI, and have energy and indoor environmental quality data demonstrating their performance. I've also worked on over a dozen buildings in the Deep Energy Retrofit Pilot program sponsored by National Grid and NSTAR.

Thank you for the opportunity to comment on the 2050 Roadmap.

I've submitted terse comments copied from this document online at:
https://www.mass.gov/forms/form-3-feedback-on-80x50?auHash=x9u7p0q10G_uGvM0t3cQ5RV46fdrOM9NB1AbWTZ8O8o

This document contains both those terse comments and immediately below, additional supporting references and discussion below each submitted comment

A great deal of time and effort has gone into the GWSA IAC work thus far, I have attended some of the public meetings and read the online documents to familiarize myself with what is begin done and considered. Thank for all your effort, I realize you have very large amount of work remaining prior to the May unveiling of the initial roadmap results, so I will try to be concise, but I see these issues as complex, requiring some explanation.

The time to act is now

A pound of CO2 equivalent –CO2e - generated in 2020 does not have the same impact as pound of CO2e generated in 2030, because it has an additional 10 years to help retain solar energy. We may well 'fall off the cliff' long before a 2050 'deadline' to reduce CO2e by 80%, we simply do not have the luxury of that much time given our past and present behavior. Supporting this is the UN Emissions Gap Report 2019 Executive Summary:
https://wedocs.unep.org/bitstream/handle/20.500.11822/30798/EGR19ESEN.pdf?sequence=1&isAllowed=y

Because we did not act decisively by 2010 (two years after the GWSA was enacted) we are now faced with the prospect of achieving a 7.6% decrease in CO2e each year, staring in 2020, to have a reasonable probability of achieving a 1.5C increase.

There is no plan in place of which I am aware to do this, and failing to meet this goal will increase the size of the annual reductions required going forward. The roadmap model should include actions directed at making up this 'lost ground,' and delivering an emissions profile compatible with the UN Climate Gap stipulations.

Model Input Considerations

Education
I believe the public will need to be much better educated in the causes and future implications of the climate crisis in order to support the governmental actions needed, as well as to make better informed decisions on their discretionary use of energy. There will need to be policy proposals, education, open meetings, etc. designed to bring the public 'on board' with the actions that are proposed in the roadmap model, and the resulting time delay to implemented actions reducing CO2e should be taken into account in the roadmap models for it to be realistic.

Implementation Delays
A realistic implementation delay should be included in the timeline of the roadmap model for realization of each proposed action scenario in the roadmap models, as should realistic legislative and organizational delays.

Motivation
For any recommended action, there must be pragmatically determined mechanism(s) (e.g. **Education, Financial reward of some sort, social incentives, etc.**), such that the action is sufficiently attractive to a large enough percentage of the public so the targeted result is achieved in reality. For example mandating a 50 cent per gallon gas tax, TCI or not, absent a credible mechanism to realize widespread public support should not be considered an acceptable option. Making 2 million buildings in Mass '2050 compliant' will require an enormous number of 'conversations' with owners, by contrast the actions taken so far on behalf of the GWSA have dealt with comparatively very few entities. The associated cost and delay overhead of marketing outreach and other steps to realize sufficient motivation should be accounted for in the roadmap model.

Risk of Failure to Achieve Goals
For any recommended action, the risk of failure should be pragmatically assessed, along with the impact of that action on the overall ability to achieve the stipulated CO2e reduction. If the risk of failure is too high the action should be revised, a credible 'alternative strategy' should be devised, or it should not be proposed for use – this must be a realistic plan with highly probable realized results. Two examples are a functioning transmission line from Hydro Quebec and functioning offshore wind farms like Vineyard Wind, which is currently stalled by federal

government permitting, and may continue to be for years. See further discussion with supporting references in my emailed comments.

The chosen approach to CO2e reduction of electrifying the Building and Transportation sectors, then generating sufficient low CO2e electricity to satisfy that load appears to be subject to very significant risks. The two largest sources of low CO2e electricity mentioned to date both appear to have very significant issues. Absent a transmission line path to Hydro Quebec, that resource will not be available. Senator Markey held a 'town hall' meeting in Acton on 1/5/2020, and someone working on the first procurement of 800 MW of Vineyard Wind asked when the federal government would approve permitting, originally expected Fall 2019. Markey intimated that if the election in November went one way there would be at least an additional four year delay. Confirming this statement, there is reported a new deadline in December 2020 AFTER the election, when it might easily again be further postponed: https://www.wnpr.org/post/sources-vineyard-wind-decision-delayed-until-december-2020 The risk of this happening should be pragmatically assessed to a high level of confidence, since it appears to be crucial to the realization of the current plan. If there is not a very high probability offshore wind is realized in the next year, a credible contingency plan should be developed. No excuses for performance should be expected, particularly given the high probability the offshore wind strategy may fail to be realized. Personally, given the current state of affairs, I do not see the realization offshore wind as sufficiently secure, since I consider it to be a single point of catastrophic failure for the Roadmap.

Unintended Consequences of ASHP Deployment at Envisioned Scale and Schedule

The environmental damage done by deploying ASHP at scale to displace fossil fuel heating in most of the buildings in the Commonwealth must be included in the roadmap model assumptions. The EC has addressed this via F-Gas Regulations, UK has published some measured data, see the Executive Summary: https://www.ammonia21.com/files/decc-refrigerants-heat-pumps.pdf and see my emailed comments for other references and discussion. All roadmap model assumptions should respect the participation of Mass. in the US Climate Alliance HFC Phasedown as well as the Kigali Amendment: https://ccacoalition.org/en/news/kigali-amendment-comes-force

From the October 23, 2018 GWSA IAC meeting we have the recommendation of 100,000 buildings retrofit per year from 2020 to 2050: https://www.mass.gov/files/documents/2018/10/25/gwa-ica-buildings-working-group-recommendations.pdf This is a very large number of machines to be correctly installed, all of which will leak varying amounts of high GWP refrigerant in the near term. I strongly recommend a review of at a minimum the Executive Summary of this study, and incorporating a realistic estimate for the impact of high GWP refrigerants (e.g. R410a) into the roadmap model: https://www.ammonia21.com/files/decc-refrigerants-heat-pumps.pdf We should expect greater leakage in the US due to the apparently much less stringent refrigerant licensing requirements. We should also consider the more rigorous F-Gas program the EU has instituted, and how such a mechanism can minimize the F-Gas impact, I've read this and there are many well thought out mechanisms we should consider applying here: https://eur-

lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0517&from=EN Supporting an aggressive focus on F-Gas leakage reduction is the phenomenal growth rate in F-Gasses of approximately 5% per year from 2009-2018 illustrated by the graph Figure ES.1 in the Executive Summary of the UN Emissions Gap Report 2019 https://wedocs.unep.org/bitstream/handle/20.500.11822/30798/EGR19ESEN.pdf?sequence=13 Total F-Gas leakage will only accelerate as electrification of space heating and DHW is rolled out at scale unless dramatic action is taken. "Someday" we will have lower GWP refrigerants, but what we build today, and probably for the next several years, will not, and that leakage will compound heat retention by the atmosphere for the remainder of the use of that equipment with that refrigerant. This impact must be included in the roadmap model. According to the table generated by Drawdown.org here: https://drawdown.org/solutions/table-of-solutions the 1.5C rise in temperature scenario lists Refrigerant Management in the top 10 actions by magnitude of potential reduction, yet the Mass. EEAC 2019/01/23 10 Year Progress Report lists stationary equipment refrigerant management at a 0.1% reduction and "Policy not yet pursued. " In the 2.0C scenario Refrigerant Management is #4. We need to learn how to address this before deploying ASHP at scale, and that learning must be accommodated in the roadmap model.

Evolution of Existing Grid for Renewable Energy Support & Building Adaptation

For non-dispatchable renewable energy to in large part offset grid fossil fuel generation, I believe a roadmap developed in close cooperation with ISO NE and all generation and distribution resources to evolve the existing electrical grid will be necessary for the roadmap models to reasonably accommodate this essential parameter. We also need to plan strategies to shape the load to be served, in particular, desirable attributes of the building sector for compatibility with the future grid. How can such a complex entity that has not yet been even superficially designed be modeled for the roadmap ? What savings might be realized by stipulating features in '2050 compliant buildings' that support 'light grid touch' that would reduce the need for massive amounts of expensive energy storage ? See additional discussion in my emailed comments.

The design of the 'grid of the future' has very significant implications for strategies to be applied in the Building sector to minimize peak loads, for both commercial and residential load management, shaping and shedding that should be considered when defining how the existing buildings in the Commonwealth will be retrofit to '2050 compliance' - see page 1 of the 10/23/2019 GWSA IAC minutes. I've participated in a design exercise in 'light grid touch' for the first certified Passive House Multifamily building in NH presented at the NESEA BE'18 conference and while it can be done, it is no trivial matter. Failure to design to accommodate the limitations and requirements of a mostly renewable energy grid when bringing 70,000 or more buildings per year in Mass. into '2050 compliance' will likely result in more expense in a 'second pass' of building upgrades for '2050 compliance', or much more expense in future grid infrastructure. Energy production and consumption sectors are intimately connected, the roadmap model inputs should recognize this and make a reasonable attempt to represent the associated cost and delay. The simulation assumptions and the underlying plans for both

building upgrades and energy system generation and delivery systems integration should be realistic in these areas.

Mass. Government Functions Not Responding as Required by Roadmap Plans

The risk of the inability of the MA state government to appropriately respond to the need to dramatically reduce CO2e should be included in the roadmap model. One example is BBRS, the body responsible for building code creation and enforcement. Removing the energy efficiency expertise from the advisory committee is an example of a significant backward step that further complicates making new, and existing Mass. Buildings 2050 Compliant (GWSA IAC Buildings Subcommittee 10/23/2018 Recommendations). This phrase '2050 compliant' should be sufficiently well defined by those doing the modeling (see GWSA IAC October 23, 2018 Recommendations, bottom of page 1) so it is clear, at least near term, what this means, '2050 complaint' code regulations can be implemented, so we stop creating 'new buildings contributing to the problem' rather than 'new buildings contributing to the solution.' As an example of why BBRS can be a very serious risk to any plan involving the building code please see this article in Commonwealth Magazine, "Cracking the Climate Code" https://commonwealthmagazine.org/energy/cracking-the-climate-code/ The roadmap models should include these risks factored in and/or propose credible alternatives to the scenarios that are simulated. The roadmap models should not ignore political reality.

Private Industry Controlling State Programs Not Responding as Required by Proposed Plans

The Program Administrators (Electricity and gas utility companies) control the MassSave New Construction, Major Renovation, Weatherization, and equipment incentives and continue to provide monetary incentives for the installation of fossil fuel equipment. Since they control the MassSave programs, the inability to suspend incentives for fossil fuel equipment as a signal to the market, as a sign of disapproval for creating new buildings dependent on fossil fuels by the State of Mass., or replacement fossil fuel equipment will be problematic because more buildings having fossil fuel equipment newly installed will be more difficult to displace by all electric equipment envisioned as part of the 2050 Roadmap. The public will be (and is now) confused by the mixed messages this situation sends. This risk of the inability to change this behavior to the envisioned migration to all electric buildings should be included in the roadmap models. The models should not ignore political reality.

COVID-19 Impact Delaying Effective Action

With the current COVID-19 crisis, the leadership and political difficulty of changing behavior on a large scale should be pragmatically accessed and incorporated into the model as a significant risk. People will be (and are) very fatigued from the current situation and will not have an appetite for more change. This risk should be pragmatically assessed for any proposed action that is simulated in the roadmap models. The models should not ignore political reality.

Fossil Fuel Price Erosion Slows Electrification Transition

As the transition away from fossil fuels accelerates, there will likely be serious price erosion, particularly for oil, in addition to OPEC price control 'issues' such as is currently being played out (e.g. Saudi Arabia and Russia with current crude oil price collapse). Lower fuel (gasoline, fuel oil) costs will slow the transition from ICE to EVs and fuel oil for space heating to ASHP/GSHP. Those companies extracting natural gas may need to sell product to pay loads, even at or below cost to produce, to avoid bankruptcy. These risks to effectively shifting the market away from lower priced fossil fuels should be pragmatically assessed and included in the roadmap models.

'Sunny Day' Perspective

Optimistic, best case assumptions that deliver to plan are not typically realized in implemented plans. Some additional CO2e savings should be generated in the roadmap models to account for situations that do not go exactly according to plan.

Preliminary Plan Public Review

As Alan Fierce stated in the 3/4/20 Worcester listening session, there must be a public examination and opportunity for public feedback of the 'draft proposals' of the roadmap models, so that a model iteration incorporating those inputs can be done. Unfortunately we don't have the luxury of more time to do this, but it is a critical step that must not be omitted.

Again, thank you for the opportunity to comment on the 2050 Roadmap.

Best Regards,

Michael Duclos

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April 10, 2020

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs

Dear Secretary Kathleen A. Theoharides, and Members of the EEA

In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% pollution reduction is required. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net pollution must be reduced by 50% or more by 2030 below the 1990 levels. The more we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction.

While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve Net Zero greenhouse gas pollution by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction.

The best available current science shows that in order to avoid the worst impacts of climate change, we need to:

- Reduce greenhouse gas pollution by 60% or more by 2030.
- Get to a 100% reduction in human-caused pollution by 2050.
- Prioritize Environmental Justice communities.
- Not consider biomass a carbon-neutral power source.
- Include municipal light plants in the Clean Energy Standard.
- Include carbon pricing, an important solution that must consider Environmental Justice communities.

Our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most.

Biomass incineration releases carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass should not be considered as a carbon free or carbon neutral power source in this planning.

A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity.

Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies.

We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing support for Environmental Justice communities. Our Commonwealth's plans must be in line with best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change.

CC. Governor Charlie D. Baker

Sincerely,

Michaela Kerns **350 Cape Cod & FCEN**	Dennis DiTullio **350 Mass Central**	Ellen Leaman **350 Mass**	Suzette Abbott **350 Mass**	Henry Rose **350 Mass Berkshires**
Lissa Gifford **350 Mass Watertown**	Elizabeth Fowler **350 Mass**	Ingrid Geis **350 Mass**	Joy Gurrie **350 Mass**	Maria Wilkens **350 Mass**
Bob Tumposky **350 Mass Boston**	Emily O'Keefe **350 Mass**	Paul Shorb **350 Mass**	Carolyn C Barthel **350 Mass**	Rand Barthel **350 Mass**
Alan Field **350 Mass MetroNorth**	Larry Stoodt **350 Mass MetroNorth**	Susan Purser **350 Mass Berkshires**	Susan Purser **350 Mass**	Susan Dworkin **350 Mass**
Diane Sheahan **350 Mass North Shore**	Elizabeth Gifford **350 Mass Watertown**	Al Blake **350 Mass Berkshires**	Jennifer Riley **350 Mass**	Judy Gitelson **350 Mass Berkshire**
James Mulloy **350 Mass**	Justin Brown **350 Mass**	Amanda Genovese **350 Mass Boston**	Amanda Genovese **350MASS, Sustainable Marblehead, JCAN**	Joan Trowbridge **Allina Health**

Natalia Carbullido **American Academy of Arts and Sciences**	Edwin Jaros **Applied Cleantech Research**	Michael Greenstein **Arlington schools**	Matthew Marshquist **Chair, Ashland Sustainability Committee**	Jake Laughner **Berkshire Environmental Action Team**
Jane Winn **Executive Director, Berkshire Environmental Action Team**	Lisa Wolf **Beverly High School**	Wallace B. Cole **BlueSel Home Solar Inc**	Andrew Wells-Bean **Boston Climate Action Network**	George B. Henderson **Boston Climate Action Network**
Sara Driscoll **Boston Climate Action Network**	Theresa Mason **Boston Climate Action Network**	Frances Bigda-Peyton **Boston Graduate School of Psychoanalysis**	Anna Goldman, MD, MPA, MPH **Boston Medical Center**	Stefano Monti **Boston University**
Trevor Leuzinger **Brandeis University**	Pamela Blau **C.G.Jung Institute-Boston**	Sam Musher **Cambridge Public Schools**	Janet Williams **Cape Cod Climate Change Collaborative**	Tom Farkas **Cape Cod Permaculture**
Bridget Spann **Caretaker Farm**	Bouzha Cookman **Catlin & Cookman Group, LLC**	John R Nelson **Chair, Association of Massachusetts Bird Clubs**	Herb Brown, MD **Citizens Climate Lobby**	Stan Franzeen **Citizens' Climate Lobby and Salem Alliance for the Environment**
Alison M. Leary **City Councilor, City of Newton**	Julia Long **Clean Energy Advisory Committee**	Vick Mohanka **Clean Energy Organizer, Clean Water Action Mass**	Katherine Lowe **Cleveland Clinic Lerner College of Medicine**	Tom Kilday **Climate Action Brookline**
Shaun Bartone **Climate Action Network**	Micky McKinley **Climate Action Now, Western**	Adele Franks **Climate Action Now, Western**	Larry Yu **Climate Coalition of Somerville**	Malcolm Cummings **Climate Coalition of Somerville**

	Mass	**Mass**		
Ken McAloon **Professor Emeritus, CUNY**	Nancy Davison **Dennis Community Action Network**	Ian Todreas **Vice President, Eastern Research Group, Inc.**	**Dr. Bruce A. Egan** **EganEnvironmental Sciences**	**Maiyim Baron** Elders Climate Action
Eileen Zubrowski **Elders for Climate Change**	Spencer Almen **Enel Green Power**	Linda Clark **First Parish Cambridge**	Sean Leach **EPS Communications**	Ben Hacker **Extinction Rebellion, University of Maine**
Deborah Marya Axner **Faith and Solidarity**	Carolyn Solomon **Faith Communities Environmental Network**	Rosanne Shapiro **Faith Communities Environmental Network**	Lewis Stern **Faith Communities Environmental Network, Cape Cod Climate Change Collaborative**	Gail Melix **Faith Community Environmental Network**
Bob Armstrong **FCCPR Climate Crisis Task Force**	Sheila Place **FCEN, 350 Cape Cod**	EC Whittemore **Federated Church of Orleans, MA**	Jedd Talmadge **Federated Church of Orleans, Orleans, MA**	Rev. Tina Walker-Morin **Minister, First Church Sandwich, UCC**
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Edie Heinemann **Greening Greenfield**	Nancy Hazard **Greening Greenfield**	Becca King **Greening Greenfield**	Sarah Partan **Professor, Hampshire College**	Allie Webster **Manager, HBS**
Isabella Birchem **Student**	Jessica Garrett **i2 Learning, Mass schools**	Carolyn Britt **Vice Chair, Ipswich Climate Resiliency**	Fred Davis **Vice-President, Jewish Climate**	Maria G. Truslow **Retired, Boston VA Medical Center**

		Committee	**Action Network**	
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Climate

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John Prince **QuickSilver Intellectual Property Services, LLC**	Rebecca Kornblatt **Psychologist**	Ann Mottl **Renaissance Informatics Group**	James O. Michel **Co-Founder, Resist the Pipeline**	Barbara Ann DiVitto **psychologist**
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Winchester Unitarian Society	**Worcester Climate Action**	**Worcester Polytechnic Institute**	**Worcester State University**	**www.healthy-kids.info**
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Alison Conant	Alison Omsberg	Amanda Nash	Ann S. Witzig	Anne Mazar
Barb Lambdin	Barbara Harris	Benjamin Oyer	Beth Myers	Bill Sloan
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Carol Berlin	Carol Boggs	Carol Noble	Carrie Nugent	Christine Lojko
Christopher Golden	Claire Nivola	Cole Graham	Daniel Bostwick	Daniel Quinn
Dara Brigham	Deanne Dworski-Riggs	Debbie Sussman	Diane Brooks Ring	Don Hnatowich
Dyann Sechi	Elinor R. Brown	Elisabeth Waingrow	Elsa Lawrence	Emily E Hardt
Emma R Williams	Fran Ludwig	Fritz Fleischmann	Hara Klein	Helen Jordan
Ian McDonnell	Isabelle Holt	J. William Stubblefield	Jacob Knowles	Jacqueline Presedo
James H Loehlin	James Satterthwaite	Janet Mosley	Jeanette Ruyle	Jeanette Tozer
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Joan W Kaufman	John Solomon	Jonathan Adams	Joseph Harvey	Julie Kennie

Karen Martin	Katherine Kraft	Katherine S. Kaufmann	Katherine Triest	Keith S. Anderson
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Louise Amyot	Chuck Quigley	Louise Quigley	Lynn Waldron	Madeleine Altmann
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Mary Brown	Mary Stock	Maureen Sullivan	Melissa Eusden	Melissa Eusden
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Peter O'Kelly	Phyllis Theermann	Prudence Barker	Richard McGarr	Robert L. Fultz
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Samantha Sprague	Sarah Koolsbergen	Scott R Greenbaum	Selena Zubrowski	Stephen Provizer
Steven Adler-Golden	Sue Hacker	Susaan Straus	Susan Erony	Susan Flynn
Susan Rapoport	Susan Turner	Susan Worgaftik	Taylor A Varner	Therese Kelly
Thomas Sciacca	Timothy Yoon	Vanessa Kirchner-Leida	Vianna Heath	Vlada Rousseff-boutique
Zach McDonald	Florrie Wescoat	Gail Page **Massachusetts Climate Action Network**	Mina Reddy	Dahlia Rudavsky
Sandra K Haworth	Jane Newbold	Anna Henchman	Steve Biel **Mahindra Humanities Center Harvard**	Ginger Ryan **Mothers Out Front**

Donald L. Walker Jr.	Shirley Ezerins **Sustainable Middleboro**	Sandra Lee Smikey **Sustainable Middleboro**	Diane Nassif	Alison Altman
Paula Rayman **Professor Emerita UMass Lowell**	Sarah Schwartz **Professor, Suffolk University**	Jessica Cashdan	Mark T Haworth	Nina Dillon **Mothers Out Front**
MinhKhang Vu **Student, Olin College of Engineering**	Lisa Brukilacchio	Lois Aldrich	Matthew Hochman	Patricia Marti
Renee Kasinsky **Mothers Out Front**	William D Howe **Mothers Out Front**	Sue Stafford **Mothers Out Front**	Barbara Englesberg **Mothers Out Front**	Doris Corbo
Deborah Silverstein	Deborah Silverstein	Judith Glixon	Elizabeth Hayes **Mothers Out Front**	Gia Neswald **Wendell State Forest Alliance**
Barbara Darling **Church of the Covenant**	Barbara Baatz **Mothers Out Front, Elders Climate Action**	Janet Hartke Bowser **Board President, Massachusetts Climate Action Network**	Evelyn Kimber	Anita Gram
Holly Humphreys	Susan Racine	Hannah Mahoney	Mirret El-Hagrassy	Shola Friedensohn
Deborah Baumgarten	Eugenia S Ware	Letitia Upton	James Eggleston	Hadleigh Nunes
Grove Harris	Gabriela Romanow **MGH**	Timothy Groves	Judith Ann Bigelow-Costa **Networking**	Nora Grodzins

			Support Plus	
Deborah Ashman	Karen Henry **Innovations for Learning**	Linda Bardwell **Sustainable Middleborough**	Adrienne Williams	Arthur Glasgow, M.D.
Erin E. Dorr **Mothers Out Front**	David Pap **First Parish Cambridge Environmental Justice Task Force**	Kathryn Stebbins	William B. Ashley	Helen Lozoraitis
Don Mallinson	Suzanne Mrozak **The Arnold Arboretum of Harvard University**	Eva Cashdan	Donna Ciappina	Kyle Combes
Miche McCall **Massachusetts Climate Action Network**				

April 10, 2020

Secretary Kathleen Theoharides
Massachusetts Executive Office of Energy and Environmental Affairs

Dear Secretary Theoharides,

We applaud the Baker Administration for committing to reach **net zero greenhouse gas emissions by 2050**. For this reason we urge an all-out campaign to put us on track to limit the increase in the global mean temperature to 1.5ºC, as recommended by the Intergovernmental panel on Climate Change. As our youth say, "We can't wait." This means that we must lower GHG emissions to at least **net zero by 2050.**

We support the goal of net zero GHG pollution by 2050.

We support the goal of 60% reduction in 1990 levels of GHG.

We prioritize climate justice and equitable investment in setting GWSA goals and policies.

****

We support the goal of net zero GHG pollution by 2050.

- **The GWSA's goals need to be redefined. Instead of the % reduction from 1990 levels,** a new standard needs to be implemented based on the IPPC's definition of **net zero.** We propose this definition -- Net zero: *"A level of statewide greenhouse gas emissions that is achieved when anthropogenic GHG emissions are balanced by the amount of anthropogenic GHG removals stored annually by, or attributable to the Commonwealth of Massachusetts."*
- **By necessity, this requires the removal of carbon from the atmosphere.**
    - If offsets are considered however, they must be, real, additional, verifiable, enforceable and permanent, and meet the requirements established by the Regional Greenhouse Gas Inventory (RGGI).
    - Forests in Massachusetts have been proposed by the Office of Energy and Environmental Affairs (EEA) as carbon sinks. We don't think this qualifies as an offset, as these existing forests are already providing carbon sequestration. The only way forests should be included is by establishing programs to plant more trees and put limits on the cutting of existing trees. Also, the maximum benefit of trees planted now comes many decades into the future, so they can't be included in reductions needed for the 2030 level. Another consideration is to include a ban on biomass incineration. Biomass incineration releases carbon pollution, and particulate matter now, and leads to

deforestation. Biomass should not be considered a carbon free or carbon neutral power source.
- Regenerative agriculture should be pursued and incentivized now as a way to reduce carbon.

We support a goal of 60% reduction in 1990 levels of GHG.
The IPPC report states that average global temperatures have already increased by 1.2 degrees and there are already enough GHGs in the atmosphere to cause significant additional warming. It is therefore essential that interim limits for 2030 and 2040 be as strict as possible.

Since the Governor Baker's new goal of net zero human-caused GHG emissions is in absolute terms and the current inventory of policies put out by the Implementation Advisory Committee (IAC) in August of 2019 are in reference to reductions from 1990 GHG levels, we have to bridge an even greater gap in reducing emissions than previously planned for. EEA's latest set of public projections, made in December 2018 to the IAC would achieve only a 35% reduction in emissions in 2030. Even with current goals, we are unlikely to get to a 50% reduction by 2030, because most of the proposals are long-term in their impacts.

It is essential that the most stringent level interim goals be set. An ambitious 60% reduction in GHG by 2030 would really help to put us on the right track. The remaining reductions will be much more difficult to make, so it is better to start early with a bold commitment. It is significantly less expensive in the long run to deal with mitigation than adaptation.

To achieve the goal of 60% reduction in 1990 levels of GHG:

Carbon pricing is essential. Carbon pricing must take place in three places – buildings, transportation, and economy-wide. All three of these policies must be fully considered and included in the modeling for the GWSA targets.

TCI alone will not get us to our 2030 target with even the strongest scenario with 25% reduction in transportation emissions, which yield a 3% decrease in economy-wide emissions by 2030. In addition, recent reductions in federal regulation of fuel economy standards place these estimates in question.

We must:
- Provide attractive incentives and regulations to promote electrification of vehicles and buildings.
- Eliminate the cap on solar and incentivize community solar
- Support programs to promote air source and geothermal heating and cooling.
- Promote energy efficiency programs for all residents and businesses
- Incentivize offset options for regenerative agriculture and reforestation starting now.
- Eliminate the inclusion of burning of wood or biomass as renewable resources.
- Embargo new fossil fuel infrastructure that would prolong a transition to net zero emission economy.

We prioritize climate justice and equitable investment.

The IPCC declared in 2018 that "without increased and urgent mitigation....leading to a sharp decline in greenhouse gas emissions by 2030, global warming will [lead] to crisis after crisis for the most

vulnerable people and societies". We have already seen such impact in the Commonwealth with floods in Quincy and soaring asthma rates from particulates in Boston and Springfield. In addition, COVID-19 patients from environmental justice communities are inequitably impacted by pollutants from the burning of fossil fuels.

We urge that:

- **Carbon emissions policy address impact of carbon pricing on low and moderate income people and rural residents**. Regulations on carbon pollution must provide compensation for low and moderate income people and rural residents, who are most impacted by climate change. This compensation can come in the form of assistance for transitioning to low-carbon forms of energy, and via rebates to cover higher costs of energy due to carbon policies, including carbon pricing through TCI, RGGI, and other systems.

- **Spending the revenues:** Billions of dollars will be needed to pay for the improvements in buildings and transportation needed to cut emissions sharply. Carbon pricing, from RGGI, TCI, and buildings can yield over $1 billion a year in revenues. To help all members of society transition to cleaner options, a significant portion of investment funds should be directed to projects that enable low and moderate income people and Environmental Justice populations to reduce greenhouse gas emissions.

The Lexington Global Warming Action coalition supports you in developing a bold and effective Roadmap to 2050 so that Massachusetts can move with urgency to addresses the climate crisis, improve our citizens' health, and move toward a clean and sustainable economy.

Sincerely,

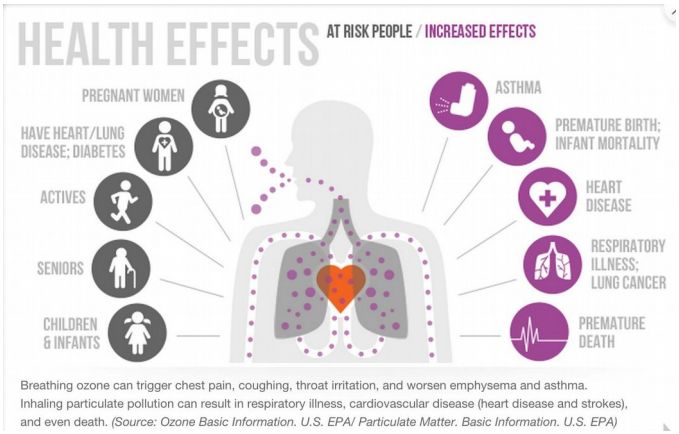
Ricki Pappo, Chair
And the members of the Lexington Global Warming Action Coalition (LexGWAC)

TRANSPORTATION & CLIMATE INITIATIVE
Of the Northeast and Mid-Atlantic States
TCI Regional Policy Design Stakeholder Feedback

To: All to whom it may concern
From: Richard Kerver, a stakeholder
Re: Feedback from participation in Community Engagement Workshop October 23rd ([1])

Thank you for the opportunity to participate and respond.

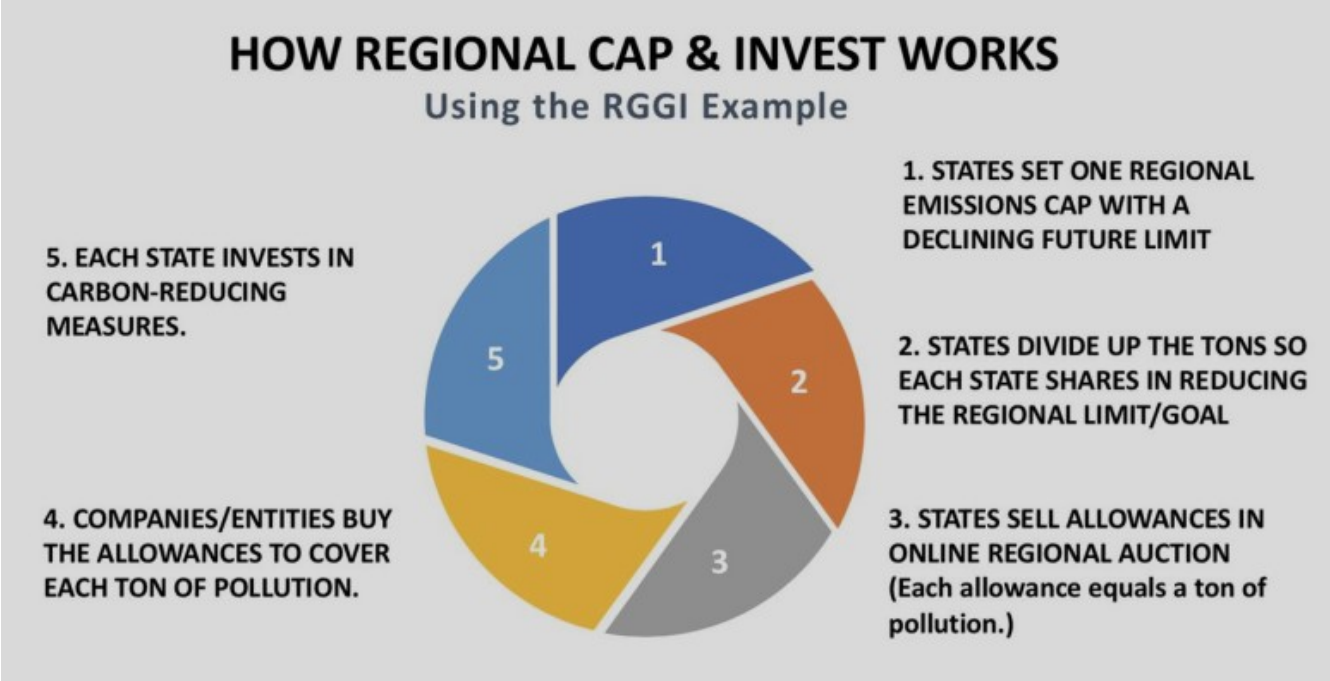
I have an M.P.H. degree and have researched the health impacts of tail-pipe emissions, so concur with the health effects slide. Our regulation of the tail-pipe – what is allowed to be emitted – hopefully in steadily diminishing quantities - is even now wholly permissible on public health grounds alone.



I would only add that we now have sufficiently conclusive evidence that forms of dementia including Alzheimer's may be caused by the breathing in of the vast array of micro-particulates being released into the air for all forms of fossil-fuel burning, including gasoline and diesel fuels for propulsion. Breath to brain transfer is direct through the brain cavity, and is highly toxic. As the TCI case is being made for the public and policy makers, I recommend enhancements to the science, references and so forth and the presentation as here.

A strong endorsement for the direction TCI is taking us! A yes to a multi-modal approach as displayed:

1 https://www.transportationandclimate.org/main-menu/tci-regional-policy-design-stakeholder-input-form; Submitted November 5, 2019



While I support the RGGI (Regional Greenhouse Gas Initiative) model for TCI, a cap-and-invest system and believe it would efficiently lower GG's from the transportation sector, I also believe there are other approaches which might be used in tandem here in the Commonwealth:

- ➔ Abandon a commitment to let the federal EPA control tail-pipe emissions through CAFE standards (note [2]). Their record is highly questionable, especially under the current administration. Massachusetts, California and the other states signing onto CARB should continue to set our own standards, and regulate the industry accordingly.

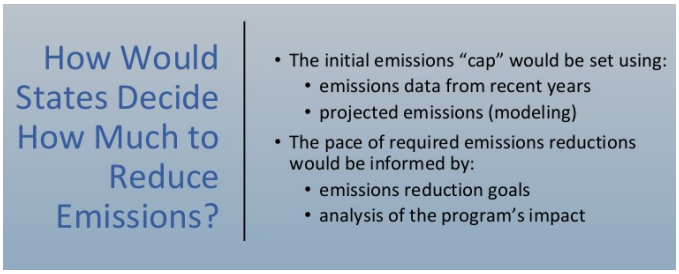
  California enacted legislation in 2002 directing CARB to develop global warming pollution standards for light-duty vehicles, which were finalized in 2004. Other states are able to adopt the California standards in lieu of the federal standards under section 177 of the Clean Air Act. Currently, 13 other states and the District of Columbia follow the state standards, representing nearly 40% of new vehicles sold in the United States.

Regulate the Tailpipe!

- ➔ So, per the TCI model, tax the fuel for subsequent investment. Also regulate the tailpipe through DMV and vehicle inspections.
- ➔ And modify the roadways, through Complete Street initiatives and Bicycle Friendly cities – see attached Mobility2040 feedback provided to CMRPC staff (Central Massachusetts Regional Planning Commission).

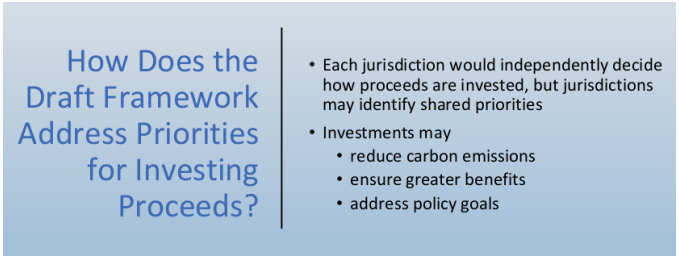
2 https://www.ucsusa.org/resources/brief-history-us-fuel-efficiency A Brief History of US Fuel Efficiency Standards: Where we are—and where are we going? Published Jul 25, 2006 & Updated Dec 6, 2017; attached in addendum

The Global Warming Solutions Act sets these goals for the Commonwealth. Current legislative session bills may amend the act to require a 100% reduction by 2050. An aggressive tact requires many entities to adopt early.

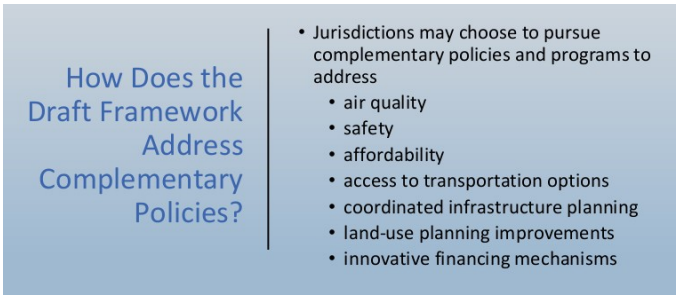


Our initiative in Worcester currently being considered by the City Council standing committee for Public Health and Human Services, as part of its Declaration of a Climate Emergency (note [3]) asks for a City commitment to be 100% by 2035, with a principal initiative of replacing its vehicle fleet with all electric.

There should be a broad consensus on investments. Fleet purchasing arrangements, for instance, across the region. A very large significant contract with one of the major automobile manufacturers committed to a transition to all electric (like Ford), will greatly hasten the requisite modal-shift we need.



This needs to be made explicit. A lot of complementary policies. The final TCI report must be detailed. My recommendation provided as an attachment, in the context of Mobility2040 is to implement ***Complete Streets*** and Bicycle Friendly policies ***Very Fast.*** Stop the conventional funding of roadways through TIP. Pour ***ALL AVAILABLE MONIES*** into a complete make-over of our cities and towns, so that bicycle and pedestrian transit becomes the preferred mode for most people most of the time.



And a modernized all-electric trolley service in our urban core ([4]). Which was once principal transit for working people before the oil & car corporations strategically destroyed that vital infrastructure.

I particularly liked the suggestion for a car-buy-back scheme to enable purchases of electric plug-in vehicles and a vast expansion or charging station infrastructure.

And follow the New York example (note [5] - New York City to 'break car culture' and build more than 250 new bike lanes).

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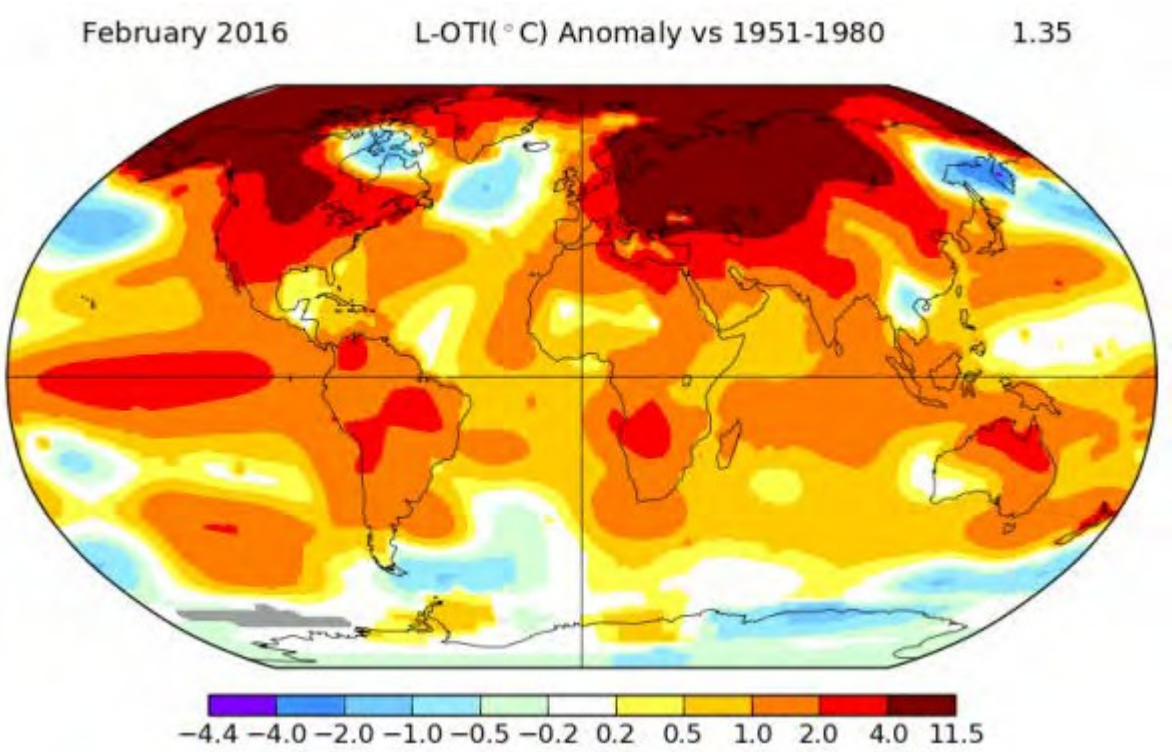
3 The Declaration of a Climate Emergency passed unanimously by City Council September 17th 2019 by petition of the members of 350 Central Massachusetts, Mothers Out Front, Extinction Rebellion and concerned citizens

4 https://worcester.ma/2016/08/free-to-read-worcestory-lesson-all-aboard-the-heydey-of-worcester-trolley-service/

5 New York City to 'break car culture' and build more than 250 new bike lanes; attached in addendum https://www.theguardian.com/us-news/2019/nov/01/new-york-city-bike-lanes-car-culture



Echo Chamber

Having read some of the many comments made by others (note [6]), I endorse the following:

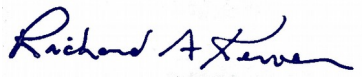
1. Some input received at public workshops and via online submission expressed opposition to market-based strategies for reducing emissions, including cap-and-invest or cap-and-trade approaches. They urged jurisdictions to focus on other policy approaches, and to focus their efforts on local air pollution reductions in places that are disproportionately affected by air pollution, and on improving transportation options for underserved communities. They pointed to their experiences with cap-and-invest programs applied to stationary sources and expressed concern that a regional transportation program could result in local air pollution increases in historically overburdened communities.
2. They also expressed skepticism that revenues would be invested in ways that benefit low-income communities and communities of color, and asked that the policy development process be extended to provide more time for community engagement.
3. Timeline for policy development - Many individuals and organizations, citing the urgency of the climate crisis, urged TCI states to move as quickly as possible and asked them to hold firm to their commitment to develop a policy proposal.
4. Another suggestion was that a percentage of investment dollars should fund projects that are community-led, operated by residents currently living or working in a specified area, and/or in collaboration with community-based organizations.
5. The public should have an opportunity to comment on proposed funding allocations before the spending plan is finalized. Many also asked that community members have meaningful roles in determining how those monies should be spent. Some specifically suggested that some portion of proceeds be set aside for community led initiatives,

6 WHAT WE'VE HEARD SO FAR; https://www.transportationandclimate.org/sites/default/files/TCI-What-Weve-Heard_10-01-2019.pdf

and that RFPs and project selection processes be set up to provide community members with meaningful roles in evaluating and selecting projects. For example, one coalition of organizations asked that no less than 10% of investment dollars should fund projects that are community-led and operated by residents currently living or working in a target area, or in collaboration with community-based organizations.

6. Input from many participants at public workshops and from a variety of groups and individuals urged that electrification of transportation, including private vehicles, public transit, and commercial freight vehicles.
7. Bicycling and Pedestrian Infrastructure: Commenters and workshop speakers described the need to invest in active transportation infrastructure, including dedicated bicycling lanes, improved sidewalks, and other components of "complete streets" policies to provide better transportation alternatives and improve safety.
8. Land Use and Planning: Input from numerous groups and individuals asked TCI jurisdictions to consider investments in initiatives to make streets more friendly to pedestrians and cyclists. Related input advocated for more extensive attention to land use planning to make it easier for people to reach jobs, services, and businesses without using their cars.
9. Another suggestion was that affordable housing should be located near transit hubs.

Thank all involved for your dedication!



Richard Kerver
rkerver@gmail.com
508-753-8874

Addendum

1. 22-April-2019 (Earth Day) re-submission of 2015 Mobility2040 Public Response to the Central Massachusetts RPC and MPO regarding Bicycle Friendly, Naomi Klein's This Changes Everything, The Inadequacy of the Mobility2040 <then> Draft, and Conclusion <still relevant four years latter>
2. The Guardian Article on UN warning "We have 12 years to limit climate change catastrophe" (note [7])
3. and attachment thereto of the Stephen Moss 28 April 2015 article "End of the car age: how cities are outgrowing the automobile"
4. The Union of Concerned Scientists "A Brief History of US Fuel Efficiency Standards: Where we are—and where are we going?" Published Jul 25, 2006 & Updated Dec 6, 2017
5. The Guardian article "New York City to 'break car culture' and build more than 250 new bike lanes" published Nov 1, 2019

7 We have 12 years to limit climate change catastrophe, warns UN; Jonathan Watts, Global environment editor, The Guardian, Mon 8 Oct 2018; https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report

GREEN ENERGY CONSUMERS ALLIANCE

April 10, 2020

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

--- Submitted electronically via gwsa@mass.gov ---

Re: Determination of Statewide Emissions Limit for 2050 - Comments from Green Energy Consumers Alliance

Dear Secretary Theoharides,

Green Energy Consumers Alliance is a non-profit consumer and environmental advocacy organization whose mission is to harness the power of energy users to speed the transition to a low carbon economy. Our organization is primarily focused on advancing policy and program solutions that enable deep greenhouse gas (GHG) emission reductions through energy efficiency, electrification of vehicles and buildings, and in support of renewable energy development.

We write to express strong support for a Global Warming Solutions Act (GWSA) GHG limit adjustment of **no less than 90%** *["...provided that in no event shall the level of emissions be greater than a level that is 90% below the 1990 level."]*. In fact, we believe that interim targets and the long term limit must be as stringent as possible to achieve carbon neutrality as quickly, as urgently as possible.

Like many, Green Energy Consumers Alliance was pleased to hear Governor Baker commit the Commonwealth to achieving Net Zero by 2050 in his State of the State address. We commend the Administration for taking steps to adjust Massachusetts' long-term GHG emission limit to reflect what global scientific consensus indicates is required to avert some of the worst effects of climate change. Any limit that is less than 90% below 1990 levels is insufficient to set Massachusetts on the trajectory to achieve carbon neutrality.

We feel similarly about interim targets and strongly encourage the administration to set a target for 2030 that is at least 50% below 1990 levels. Robust GHG emission limits will not only facilitate long term compliance with the GWSA, but can and should be done in a manner that significantly improves public health and enhances the state's economy.

Our organization is committed to helping Massachusetts reduce GHG emissions as required by the GWSA and at a level consistent with scientific consensus. The Commonwealth can and should be an exemplar of state-led, equitable clean energy and climate action, particularly at a time when action and leadership federally is lacking.

We look forward to ongoing engagement in this and the Clean Energy and Climate Planning process.

Sincerely,
Larry Chretien, Executive Director

greenenergyconsumers.org

Boston: 284 Amory Street, Boston, MA 02130 | Phone: 800-287-3950
Providence: 2 Regency Plaza, Suite 8, Providence, RI 02903 | Phone: 401-861-6111

April 10, 2020

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
c/o Claire Miziolek -- Net Zero Determination
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: MA Decarbonization Roadmap—Net Zero Determination

Dear Secretary Theoharides:

On behalf of the undersigned organizations, we are writing to share our strong support for a 2050 greenhouse gas (GHG) emissions limit of net zero, as proposed in the draft determination of a statewide emissions limit for 2050 released on February 26, 2020. We feel strongly that the limit be set with a verified GHG emissions reduction requirement of no less than 90% and as close to 100% as possible. Our organizations collectively possess expertise related to affordable housing, smart growth, and climate change, among many other areas, and are committed both to addressing GHG emissions and advancing equity. Thank you for the opportunity to provide feedback on this proposal.

Getting to net zero GHG emissions by no later than 2050 is imperative. As a result of climate change, the world and the region are already experiencing higher annual temperatures, storms with increased frequency and severity, extreme weather, and rising sea levels.[1] In 2018, the Intergovernmental Panel on Climate Change (IPCC) determined that, with current levels of warming, the Earth could experience an increase in global temperatures of 1.5 degrees Celsius as soon as 2030. That degree of warming would significantly increase the risk of dire impacts, affecting human health, food and water supply, sea level rise, and extinction.[2] Similar warnings have come from the United States Global Change Research Program in 2018[3] and the World Economic Forum's Global Risks Report in 2019.[4]

The science is clear. The future severity of climate change impacts depends on two things: (1) actions taken to reduce GHG emissions and (2) actions taken to adapt to the changes that will occur. Countries, states, regions, and cities and towns must take critical steps both to reduce their carbon footprints and to assess and address local vulnerabilities. In the absence of federal action, the Commonwealth must continue to lead. We therefore urge the Executive Office of Energy and Environmental Affairs to set a statewide GHG emissions limit for 2050 of no less than 90%, from the options proposed of 80%, 85%, and 90%, with a preference to set the limit as close to 100% as possible. Likewise, for 2030, we strongly urge a limit of no less than 50%, with a preference to set the limit as close as possible to 60%.[5] Robust 2030 and 2050 GHG emissions

[1] NASA, The Effects of Climate Change, https://climate.nasa.gov/effects/ (last updated Feb. 20, 2020).
[2] Myles Allen et al., IPCC 2018: Summary for Policymakers, Summary for Policymakers at https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf (last visited Apr. 7, 2020).
[3] US Global Change Research Program, Fourth National Climate Assessment, Vol. II (2018), https://nca2018.globalchange.gov/ (last visited Apr. 7, 2020).
[4] World Economic Forum, The Global Risks Report 2019 (Jan. 15, 2019), https://www.weforum.org/reports/the-global-risks-report-2019
[5] The Massachusetts Senate has passed and the House of Representatives is considering bills that would set a 50% emissions reduction requirement for 2030. See S.2500, An Act Setting Next-Generation Climate Policy, https://malegislature.gov/Bills/191/S2500 (passed by the

limits will help to ensure that the Commonwealth is responding to the latest science, and taking the necessary steps to protect our people, the resources upon which we depend, and the economy of Massachusetts.

Many municipalities here in Massachusetts are already leading the way to net zero. Within the Greater Boston region alone, at least 33 communities have established a GHG reduction goal and at least 17 have committed to carbon neutrality by 2050. The Decarbonization Roadmap study will enable the Commonwealth to better understand the impacts of existing local land use, housing production, open space, harbor, and master plans, among others, to chart the accelerated path to 2050 that is urgently needed. This path should incorporate smart growth strategies, such as transit-oriented development, multifamily and mixed-use housing (including affordable housing), and zoning reform, that can reduce GHG emissions and create more livable neighborhoods. It can also inform the local decisions that municipalities, housing authorities, and developers are making daily to avoid locking in our carbon emissions for years to come.

With this in mind, as organizations with years of collective experience in the affordable housing and climate fields, we urge you to pursue strategies that both rapidly decarbonize new and existing buildings and support housing production and preservation, especially affordable housing, including public, subsidized, and naturally occurring housing. Both of these critical needs must be addressed fully and in parallel.

Any pathway forward must take into consideration the potential impacts on the ability to produce or preserve homes that are affordable for low- and moderate-income households in the Commonwealth. New robust subsidies and incentives must be provided to ensure that both new and existing affordable housing can achieve our decarbonization goals without jeopardizing availability and affordability. The preservation of existing affordable units – generally after the expiration of contracts or subsidies – is a critical issue facing the housing field, especially in high-cost, low-income communities, and funds for preservation are very limited. Since the production of affordable units (and, in fact, all units) lags far behind demand, we simply cannot afford to lose existing affordable homes.[6] To minimize the impact on residents and project feasibility, protections for residents and developers of affordable housing must be put in place while also constructing and retrofitting buildings to high performance standards, such as Passive House.

Within the current three-year energy-efficiency plan, Mass Save has begun offering valuable Passive House financial incentives and training. Combining clean energy with high-performance building standards in this way, and increasing the scale and funding allocated to these programs substantially, will be needed to help Massachusetts achieve carbon neutrality by 2050. Clean heating and cooling systems, combined with efficient building design and operation, are already producing multifamily buildings that are dramatically less reliant on fossil fuels.[7] The

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Senate in January 2020); H.3983, An Act to Create a 2050 Roadmap to a Clean and Thriving Commonwealth, https://malegislature.gov/Bills/191/H3983 (currently before the House Committee on Ways and Means).

[6] We would define such housing as serving households earning <=80% of Area Median Income (currently, $89,200 for a 4-person household), without having to pay >30% of income for housing costs. (Please note that many affordable or even mixed-income housing developments provide housing restricted to much lower-income households.) The need for these units is desperate – currently, in the Greater Boston region, 24% of renter households and 12% of owner households are "extremely cost burdened," which means they are paying over half of their income to cover housing costs.

[7] Clean heating and cooling includes heating systems that utilize renewable or highly efficient alternative heat resources that do not utilize

Department of Energy Resources released a Comprehensive Energy Plan (CEP) in December 2018 that identified strategies to meet the targets of the Global Warming Solutions Act (GWSA).[8] The CEP identifies building electrification as a critical component of meeting future GHG emissions goals. In most cases, current non-fossil-fuel-reliant technologies – especially when coupled with appropriate efficiency measures, operator education, financing, and incentives – are already cost-competitive with gas-powered systems for new construction. The CEP further finds that deep energy efficiency measures combined with electrification of heating and other end uses results in the greatest emissions reductions and energy cost savings.

High-performance standards generate numerous benefits for occupants due largely to the robust building envelope and enclosures required.[9] These benefits include improved public health outcomes,[10] resilience to extreme weather,[11] decreased operating costs,[12] and job creation opportunities.[13] Moreover, when a recent Built Environment Plus (formerly U.S. Green Building Council – Massachusetts Chapter) report evaluated six different building typologies in the Commonwealth, it conservatively found that the increased cost of net zero buildings (which does not account for the avoided costs from the benefits above) was in the range of only zero to seven percent.[14] Just last month, Boston's Department of Neighborhood Development released a guidebook for Zero Emission Buildings (ZEBs) aimed at its portfolio of new construction affordable housing in which it reports that "there is little-to-no cost increase for building to [ZEB] standards."[15] Likewise, the MassCEC Passive House Challenge expects to demonstrate that multifamily affordable Passive House projects can be built now for less than a three percent premium.[16] Continued demonstrations, adequately funded to ensure a serious evaluation component, are essential to creating pathways to cost parity, in both development and operations, and to addressing the cost differential without sacrificing the preservation or creation of affordable units.

Programs like this will require rapid and large-scale investment and scaling. They will also require the explicit inclusion of equity considerations. While Massachusetts has been building a robust clean energy workforce for years, women remain underrepresented,[17] and many incentive

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combustion to generate energy for space heating, space cooling, process heat, or hot water such as air-source heat pumps, ground-source (geothermal) heat pumps, and solar thermal.

[8] Massachusetts Department of Energy Resources, Massachusetts Comprehensive Energy Plan - Commonwealth and Regional Demand Analysis (Dec. 12, 2018) https://www.mass.gov/files/documents/2019/01/10/CEP%20Report-%20Final%2001102019.pdf

[9] US EPA, Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy (2018). https://www.epa.gov/statelocalenergy/quantifying-multiple-benefits-energy-efficiency-and-renewable-energy-guide-state

[10] US Department of Energy, Home Rx: The Health Benefits of Home Performance (2016). https://www.energy.gov/eere/buildings/downloads/home-rx-health-benefits-home-performance-review-current-evidence

[11] Rocky Mountain Institute, Hours of Safety in Cold Weather: A framework for considering resilience in building envelope design and construction (2020). https://rmi.org/insight/hours-of-safety-in-cold-weather/

[12] US General Services Administration, The Impact of High-Performance Buildings (2018). https://www.gsa.gov/about-us/organization/office-of-governmentwide-policy/office-of-federal-highperformance-buildings/resource-library/integrative-strategies/the-impact-of-highperformance-buildings

[13] Massachusetts Clean Energy Center, Massachusetts Clean Energy Industry Report (2019). https://www.masscec.com/2019-massachusetts-clean-energy-industry-report

[14] USGBC Massachusetts, Zero Energy Buildings in Massachusetts: Saving Money from the Start (2019). https://builtenvironmentplus.org/zero-energy-buildings/

[15] City of Boston – Department of Neighborhood Development, Guidebook for Zero Emission Buildings (2020). "Total construction cost increases range from 2.5% or less before rebates and incentives are considered. The rebates and incentives currently available have the potential to make these buildings less expensive to build, with additional long-term operational savings," p. 5. https://www.boston.gov/sites/default/files/file/2020/03/200306_DND%20book_FOR%20WEB.pdf

[16] According to Passive House Massachusetts, an affordable multifamily Passive House project under construction in Mattapan is on track to be built for a cost premium of only 2%.

[17] Massachusetts Clean Energy Center, Massachusetts Clean Energy Industry Report (2019), p. 27. https://www.masscec.com/2019-massachusetts-clean-energy-industry-report

programs currently underserve some of those who could benefit most, such as low- and moderate-income residents.[18] We urge you to integrate equity within the modeling of the Roadmap Study as well as within the update to the Clean Energy and Climate Plan to ensure that the transition to net zero accounts for and addresses existing inequities. To this end, we recommend that you consider the framework proposed by the GWSA Implementation Advisory Committee (IAC) Climate Justice Working Group. We support the spirit of the group's February 24, 2020 recommendations to the GWSA IAC, including that the "climate crisis, species loss, pollution, and predatory capitalism have placed increased pressures on our natural and built environment, often leaving the most marginalized communities, especially people of color, low-income residents, and English isolated residents, to bear the worst of the burden of environmental pollution."[19] It is incumbent upon the Commonwealth to center climate justice in our work to achieve net zero GHG emissions by 2050.

Lastly, let us remember that moving to an equitable net zero future will have a positive impact not only on our people, but also on our economy. The clean energy sector now represents 3.1% of the total workforce and an 86% increase in jobs since 2010.[20] We already have commercially available efficiency and construction technologies and materials that can transform our economy, enhance equity, and create jobs. As we look to rebound from the COVID-19 pandemic, a commitment to an equitable net-zero economy that preserves and protects affordable housing development and our most vulnerable can address both existential and immediate needs.

Thank you for your consideration of our comments and attention to these urgent issues.

Sincerely,

Andre Leroux
Executive Director
Massachusetts Smart Growth Alliance

Rachel Heller
Chief Executive Officer
Citizens' Housing and Planning Association

Marc D. Draisen
Executive Director
Metropolitan Area Planning Council

Caitlin Peale Sloan
Senior Attorney
Conservation Law Foundation

Peter Daly
Executive Director
Homeowner's Rehab, Inc. (HRI)

Karen E. Kelleher
Executive Director
LISC Boston

Nancy Goodman
Vice President for Policy
Environmental League of Massachusetts

Joe Kriesberg
President
Massachusetts Association of Community Development Corporations

[18] Applied Economics Clinic, Accessing Energy Efficiency in Massachusetts (2018). https://aeclinic.org/publicationpages/2018/2/26/accessing-energy-efficiency-in-massachusetts

[19] https://www.mass.gov/doc/gwsa-iac-climate-justice-working-group-memo/download (last visited Mar. 24, 2020).

[20] Massachusetts Clean Energy Center, Massachusetts Clean Energy Industry Report (2019), p. 4. https://www.masscec.com/2019-massachusetts-clean-energy-industry-report

Hank Keating
President
Passive House Massachusetts

Rebecca Winterich-Knox
Net Zero Organizer
Massachusetts Climate Action Network

Kathy Brown
Coordinator
Boston Tenants Coalition

Meredith Elbaum
Executive Director
Built Environment Plus
(formerly USGBC MA)

Frank O'Brien
Allandale Coalition

Submitted electronically

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

RE: Determination of Statewide Emissions Limit for 2050

Dear Secretary Theoharides,

On behalf of Northeast Energy Efficiency Partnerships (NEEP)[1], I am pleased to submit comments relative to the Commonwealth's Determination of Statewide Emissions Limit for 2050 – "Net-Zero Determination." NEEP is a non-profit with a mission to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities. With the goal to assist the region's leaders to reduce building sector energy consumption three percent per year and carbon emissions at least 40 percent by 2030, our vision is that the region's homes, buildings, and communities will be transformed into efficient affordable, low-carbon, resilient places to live, work, and play.

We thank the Executive Office of Energy and Environmental Affairs (EOEEA) for the opportunity to provide input and applaud Massachusetts' commitment to updating the 2050 emissions limit to net-zero. Massachusetts has much to be proud of in terms of its progress to date for addressing climate change. We support a science-based approach and recommend the Commonwealth continue to update climate targets to reflect the most up-to-date scientific consensus to mitigate impacts of climate change.

NEEP supports a net-zero requirement with at least 90 percent greenhouse gas emission (GHG) reduction from 1990 levels by 2050. The Global Warming Solutions Act (GWSA) requires the Secretary, in consultation with MassDEP and the Department of Energy Resources (DOER), adopt separate statewide GHG emissions limits for 2020, 2030, 2040 and 2050. In addition to setting these targets, EOEEA should consider setting interim targets for every five years leading up to 2050 to ensure the state is on track to comply with the GWSA, starting with at least 40 percent in 2030.

[1] These comments are offered by NEEP staff and do not necessarily represent the view of the NEEP Board of Directors, sponsors or partners. NEEP is a 501 (c)(3) non-profit organization that does not lobby or litigate.

NEEP is available to provide support and technical assistance as needed to the EOEEA. The following resources may be useful during the development of the 2050 Roadmap and policy pathways to achieve net-zero GHG emissions:

- Building Decarbonization Public Policy Framework
- Action Plan to Accelerate Strategic Electrification in the Northeast
- Building Energy Codes for a Carbon Constrained Era
- Readiness for Advanced Measurement and Verification in the Northeast

Thank you for the opportunity to comment on the net-zero determination. Please consider NEEP a resource to provide technical assistance as EOEEA continues to pursue clean, low-carbon, and efficient energy solutions for Massachusetts' long-term future.

Sincerely,

Samantha Caputo
Senior Policy and Research Associate
Northeast Energy Efficiency Partnerships
781-860-9177 ext. 102 or scaputo@neep.org

MAPC
METROPOLITAN AREA PLANNING COUNCIL

SMART GROWTH AND REGIONAL COLLABORATION

April 10, 2020

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
c/o Claire Miziolek ~ Net Zero Determination
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: MA Decarbonization Roadmap—Net Zero Determination

Dear Secretary Theoharides:

I am writing on behalf of the Metropolitan Area Planning Council (MAPC) to share our strong support for a 2050 greenhouse gas (GHG) emissions limit of Net Zero as proposed in the draft determination of the statewide emissions limit for 2050 released on February 26, 2020. Among the options for comment, we feel strongly that the limit be set with a verified GHG emissions reduction requirement of no less than 90%. Thank you for the opportunity to provide feedback on this proposal.

The severe disruptions and harm to public health and the economy that COVID-19 has wrought demonstrates the heightened need to take action to avert the damage due to the climate crisis. Increasingly and in the long term, climate change will have severe consequences and pose a grave threat to our health, our economy, and the environment. Getting to net zero GHG emissions by 2050, if not sooner, is an imperative. The Governor's announcement in support of a carbon-neutral 2050 GHG emissions limit builds on the Commonwealth's leadership of passing legislation like the 2008 Global Warming Solutions Act (GWSA) and implementing robust clean energy and climate institutions like the Green Communities Program and the Massachusetts Clean Energy Center.

Many communities here in Massachusetts are already leading the way to Net Zero. Within our region alone, at least 33 communities have established a GHG emissions reduction goal and at least 17, including major metropolitan areas like the City of Boston and smaller communities like the Town of Natick, have committed to carbon neutrality by 2050. The Decarbonization Roadmap study will enable the Commonwealth to better understand the impacts of existing local land use, housing production, open space, harbor, and master plans, among others, to chart the accelerated path to 2050 that is urgently needed. This path should incorporate smart growth strategies, such as transit-oriented development, multifamily and mixed-use housing (including affordable housing), and zoning reform, that can reduce GHG emissions and create more livable neighborhoods. It can also inform the local decisions that municipalities, housing authorities, and developers are making daily to avoid locking in our carbon emissions for years to come. By coordinating at every level and

across state government agencies, regional agencies, and municipalities, we can make strong progress toward deep decarbonization.

The science is clear. The future severity of climate change impacts depends on two things: (1) actions taken to reduce GHG emissions and (2) actions taken to adapt to the changes that will occur. Countries, states, and regions must take critical steps both to reduce their carbon footprints and help municipalities to assess and address local vulnerabilities. In the absence of federal action, these tasks fall to the Commonwealth.

We therefore are strongly supportive of a statewide GHG emissions limit of at least 90% below 1990 levels, from the options proposed of 80%, 85%, or 90%, with targets and policies delineated by sector. A 2050 greenhouse gas emissions limit of as close to 100% as possible ensures the Commonwealth is responding to the latest science, with the understanding that temperatures have been rising and impacts occurring more rapidly than previous scenarios had forecast, and that we must expedite our emissions reductions in a way that is immediate, economically viable, and sensitive to vulnerable residents.

We urge the Commonwealth to include natural climate solutions within the Roadmap Study as they are critically able to bridge the gap to achieve Net Zero. Soils, forests, and coastal and inland wetlands are most effective at carbon sequestration while providing additional public health and livability benefits to the Commonwealth. For example, the degradation of the Commonwealth's salt marshes will contribute centuries worth of carbon into our atmosphere, thereby negating all the tremendous efforts to decarbonize. The Roadmap should include the measurement of the ecological and monetary value of these systems and create appropriate policy and investment recommendations so ecological systems remain viable through various land use and climate change impacts and are managed in a manner that maximizes carbon sequestration and minimizes loss of ecological function.

We also urge the Commonwealth to set a 2030 emissions reduction limit of at least 50%, as proposed in both S.2500 and H.3983. In October 2018, the United Nations Intergovernmental Panel on Climate Change (IPCC) released a landmark report that warned that only *twelve years* remained for our global community to significantly act to mitigate climate change. The IPCC found that even half a degree more of warming will significantly worsen the risks of drought, floods, and extreme heat for hundreds of millions of people. Just one month later, in November 2018, the U.S. government released the 4th National Climate Assessment, which highlighted impacts of global climate change already being felt nationally and projected to intensify, particularly here in New England. Pursuit and achievement of Net Zero in Massachusetts helps us to do our part to avoid these outcomes and to benefit our citizens in parallel.

To improve these outcomes for all of our citizens, we urge you to integrate equity considerations within the modeling of the Roadmap Study as well as within the update to the Clean Energy and Climate Plan to ensure that the transition to net zero accounts for and addresses existing inequities. An equitable net zero future will have a positive impact not only on our people, but also on our economy. The clean energy sector continues to grow, now representing 3% of the total

workforce and an 84% increase in jobs since 2010.[1] From advances in lighting controls, clean heating and cooling, electrified transportation, and high performance building practices that make zero-emissions new buildings a reality, Massachusetts should continue to lead the way on commercially available clean energy and smart city technologies that can transform our economy and improve quality of life equitably across the Commonwealth. Our cities and towns stand ready to continue to pioneer innovative technologies, program models, and policies toward this end.

Thank you for your consideration of MAPC's comments and attention to these important issues. If you have any questions, please do not hesitate to contact me at rdavis@mapc.org or MAPC's Director of Government Affairs, Lizzi Weyant, at eweyant@mapc.org.

Sincerely,

Rebecca Davis
Deputy Director

Our Work:
MAPC is the Regional Planning Agency serving the people who live and work in the 101 cities and towns of Greater Boston, which comprises roughly half of the state's population and two-thirds of the state's jobs. We are committed to smart growth, sustainability, regional collaboration, and advancing equity. MAPC has long recognized that making our Commonwealth more resilient to climate change for residents of all income levels will lead to healthier and stronger communities, and we have focused much of our work on climate preparedness, adaptation, and mitigation.

We are working every day with municipalities to reduce their carbon footprints. MAPC has served on the Global Warming Solutions Act Implementation Advisory Committee (GWSA IAC) since its inception, and we appreciate the opportunities offered to the IAC to weigh in throughout the Roadmap scenario development and policy planning efforts as well as the update to the Clean Energy and Climate Plan (CECP). We remain in support of the recommendations of all of the GWSA IAC Work Groups, and look forward to continued and deep engagement with EEA throughout this process and beyond. By participating in the IAC work groups, including as chair of the Buildings Work Group, we will continue to raise up issues that are important to us, our cities and towns, and the state's decarbonization overall. These issues include deep energy efficiency retrofits and high performance building standards, a Net Zero Stretch Energy Code, the preservation of existing affordable housing, the full implementation of the Commonwealth Accelerated Renewable Thermal Strategy (CARTS) report, equitable transit-oriented development, climate-smart land use decisions, and the Transportation Climate Initiative (TCI), among others.

[1] www.masscec.com/2018-massachusetts-clean-energy-industry-report

We represent municipalities on the Massachusetts Energy Efficiency Advisory Council (EEAC), and we staff the Metropolitan Mayors Coalition's Climate Taskforce. In 2016, the Taskforce made a first-in-the-nation commitment to becoming a Net Zero region by 2050. MAPC works with cities and towns across our region to reduce greenhouse gas emissions and address the impacts of a changing climate through holistic and multi-benefit Net Zero planning. Regional and collaborative efforts, led by public agencies like MAPC, are particularly valuable to the Commonwealth and can deploy localized climate action at scale, economically and efficiently. These efforts should be accounted for and supported in the state's climate action planning and investments.

EVERSOURCE ENERGY

247 Station Drive
Westwood, MA 02090

April 10, 2020

EOEEA – Net Zero Determination
c/o Claire Miziolek
100 Cambridge St., Suite 900
Boston, MA 02114

Re: Comments on Draft Determination of Statewide Emissions Limit for 2050

Dear Ms. Miziolek:

NSTAR Gas Company and NSTAR Electric Company (collectively, "Eversource") submit this comment letter in response to the February 26, 2020 Public Notice from the Executive Office of Energy and Environmental Affairs requesting comments on its proposed framework for determination of statewide emissions limits for 2050.

Eversource applauds the Baker Administration's leadership in promoting innovative approaches to reducing greenhouse gas emissions in the region. The Commonwealth's goal for Net Zero Greenhouse Gas Emissions by 2050 will be well supported by Eversource's strong efforts to lead by example driving down our own carbon footprint, as well as bringing clean energy into the region.

In December 2019 Eversource announced an industry-leading goal to be carbon neutral by 2030. We plan to achieve this aggressive goal through a series of targeted steps across our territory to reduce carbon emissions in areas we own and operate. While we do this, we will continue to support regional economic growth and maintaining cost – effective, safe and reliable service for our approximately four million customers.

Eversource also continues to advance clean energy solutions for the region that will result in significant greenhouse gas reductions. Our strategy supports the pathway outlined in the Pillars of Decarbonization in roadmap documents. In partnership with Orsted we are advancing offshore wind projects across the region. In addition, Eversource is the long-term contract counterparty to significant quantities of clean energy and offshore wind under Section 83D and Section 83C of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.

We are expanding electric vehicle charging infrastructure and developing energy storage projects in strategic locations on Cape Cod and Martha's Vineyard. Our nation leading Energy Efficiency programs also provide a pathway towards reducing emissions in the region, as well as lowering costs for our customers. Upgrades to our transmission system help to reduce emissions and serve as a critical link to integration for more clean energy resources across the Commonwealth. In addition, we are actively pursuing carbon-reducing initiatives in gas operations, including replacing aging pipe at an accelerated pace, and exploring the use of both renewable and responsibly produced natural gas.

We look forward to continuing as an active stakeholder in the process developing the pathway for statewide emission reductions for 2050 and supporting your efforts.

Sincerely,

Catherine Finneran

Vice President, Sustainability and Environmental Affairs

April 10, 2020

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

Dear Secretary Theoharides,

In his state of the state address in January of this year Governor Baker made a commitment that the Commonwealth would achieve "net zero greenhouse gas emissions" by 2050. We thank the governor for that commitment and offer the following comments on the 2050, 2040 and 2030 limits and the issues to consider in the modelling and analysis needed to choose the best pathways to attain those limits.

In the most strongly worded of its several reports, the Intergovernmental Panel on Climate Change (IPCC) declared in 2018 that "without increased and urgent mitigation….leading to a sharp decline in greenhouse gas emissions by 2030, global warming will [lead] to crisis after crisis for the most vulnerable people and societies".[1] Since 1991 Boston has experienced 21 weather related events that triggered

federal or state disaster declarations. The climate emergency is also a public health crisis, as evidenced by a recent study which cited Boston as having the third highest mortality rate for asthma in the country and Springfield as having the highest rate of asthma hospitalizations in the country.

[1] IPCC, 2018: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press. p.vi.

1. **2050 Emissions Limit.**

The Global Warming Solutions Act (GWSA) of 2008 currently establishes a statewide greenhouse gas (GHG) emissions limit that is "at least 80% below the 1990 level". On February 26th of this year, you issued a Request for Public Comments regarding the 2050 emissions limit. It was accompanied by Findings of Fact that include the following:

- In order to avoid significantly damaging and potentially irreversible climate change, global atmospheric CO2 concentrations should be stabilized at levels consistent with no more than a 1.5°C rise in global mean temperature above pre-industrial levels.
- To ensure no more than a 1.5°C rise in global mean temperature above pre-industrial levels, global GHG emissions should be reduced to at least net zero in 2050.
- Unless mitigated on the pace, scale and scope identified by the IPCC, climate change is likely to exceed the capacity of natural, managed and human systems globally and in the Commonwealth to adapt to it.

The IPCC definition of net zero carbon dioxide emissions is: "Net zero carbon dioxide (CO2) emissions are achieved when anthropogenic CO2 emissions are balanced globally by anthropogenic CO2 removals over a specified period."[2] In order to achieve the goals stated in the above findings of fact Massachusetts should adopt a definition of net zero carbon dioxide emissions consistent with the IPCC definition.

We recommend that:

- Massachusetts should adopt a 2050 emissions limit of net zero greenhouse gas emissions, defined as: "A level of statewide greenhouse gas emissions that is achieved when anthropogenic GHG emissions are balanced by the amount of anthropogenic GHG removals stored annually by, or attributable to the Commonwealth of Massachusetts."

Offsets should not be considered as contributing to the attainment of net zero GHG. If offsets are used however, they must be, real, additional, verifiable, enforceable and permanent, and meet the requirements established by the Regional Greenhouse Gas Inventory (RGGI).

2. **2030 and 2040 Interim Limits.**

Average temperatures have already increased by 1.2 degrees and there are already enough GHGs in the atmosphere to cause significant additional warming. It is therefore essential that interim limits for 2030 and 2040 be as strict as possible.

[2] Id., pp. 543,555.

We recommend that the 2050 Roadmap:

- Include one or more scenarios in modeling that will substantially accelerate GHG reductions between now and 2030 consistent with the most up-to-date climate science in order to identify the lowest level of 2030 GHG emissions that could be obtained with the strongest state policies.
- Modeling should not be limited to a "straight line" progression back from net zero in 2050; and,
- The **absolute minimum** interim reductions should be 50% by 2030 and 75% by 2040.

A recent study of California climate change policies shows that the benefits that have been achieved are worth 5 times the cost of their implementation. The longer that GHG reductions are delayed in Massachusetts, the longer vulnerable individuals will suffer, and the more severe will be the damage to public health and property.

3. **Climate Justice**.

Leaders of the Black Church in the United States declared in 2015 that climate change was "a moral issue and one of the **greatest public health challenges of our time** particularly for Black and other marginalized communities" because…Breathing dirty, carbon-polluted air…contributes to thousands of asthma attacks, hospital visits, and premature deaths every year.." *A Rabbinic Letter on the Climate Crisis* signed by more than 400 rabbis, also in 2015 proclaimed that "the poor in America and around the globe are **the first and the worst to suffer** from the typhoons, floods, droughts, and diseases brought on by climate chaos." Last year Pope Francis declared that "Faced with a climate emergency, we must take action…in order to avoid perpetrating **a brutal act of injustice towards the poor and future generations."** Massachusetts faith leaders across the religious spectrum have signed petitions, advocated in the legislature and participated in civil disobedience actions, all with the goal of fighting for bold solutions to address climate injustices.

The modelling for the 2050 Roadmap must carefully evaluate whether proposed policies are designed to restore the enormous damage already done to environmental justice communities in Massachusetts.

We recommend that the modeling include evaluation of:

- Whether historically marginalized communities participated meaningfully in the development of particular policies.
- The extent to which the policy contributes to improved safety, air quality, and public health in historically marginalized communities, especially those with disproportionate numbers of people of color, lower-income residents, and English-isolated residents.
- The extent to which the policy confers economic, social, and health benefits for historically marginalized communities, especially for environmental justice populations.
- Whether the policies target distribution of benefits to environmental justice populations; and
- Whether polluters are contributing a financial share that is proportionate to their GHG emissions contributions.

4. <u>Carbon Pricing</u>.

Three-hundred thirty Massachusetts faith leaders have signed the *Massachusetts Interfaith Call for Carbon Pricing*, calling for "a price on carbon that reflects its costs to the climate, public health, and the economy." Pope Francis has stated that "carbon pricing is essential if humanity is to use the resources of creation wisely." "Our use of the world's natural resources can only be considered when the economic and social costs of using them are transparently recognized and are fully borne by those who incur them, rather than by other people or future generations (cf. Laudato Si', 195)." Similar positions have been taken by the national bodies of the Union for Reform Judaism, the United Church of Christ and the Episcopal Church, USA, among others.

Further complicating the crisis, the economic harm being caused by the Covid19 pandemic will have serious impacts on the budgets of states. By adopting a "polluter pays" principle, carbon pricing provides a much-needed alternative source of the revenues that will be essential during the hard times ahead.

We recommend that:

- Massachusetts commit to **economy-wide carbon pricing.** Our state cannot achieve a 50% reduction in GHGs by 2030 unless we commit to carbon pricing across the transportation and the building sectors. The Transportation Climate Initiative, (TCI) coupled with other Administration efforts focused on the transportation sector, may get us to a 38% emission reduction by 2030, but we will need carbon pricing to make the deeper reductions necessary.
- Carbon pricing policy must **address the impact on low- and moderate-income people** by providing rebates, weighted to be larger than any resulting cost increases for low-income people, and equal to any increases for moderate-income people.
- A percentage of revenues from carbon pricing **should be invested in clean energy and transportation**, to accelerate the transition to a green economy. To help all members of society transition to cleaner options, at least 50% of investment funds should be directed to projects that ameliorate the past and future damage to environmental justice communities.

The foreword to the IPCC Special Report on 1.5 degrees Celsius, concludes with the words, ***"Every bit of warming matters, every year matters, every choice matters."*** Please be guided by those words as you make your decisions.

Thank you for the opportunity to provide these comments on this critically important issue.

With gratitude and hope,
Fran Ludwig, Chair, Boston Catholic Climate Movement
The Rt. Rev. Dr. Douglas Fisher, Bishop, The Episcopal Diocese of Western Massachusetts
Peter Dunbeck and Rev. Fred Small, co-chairs, Steering Committee, Faith Science Alliance
Rabbi Katy Allen, President, Jewish Climate Action Network (JCAN)
Jim Nail, President, Massachusetts Interfaith Power & Light, Inc.
Barbara Darling & Ted Wade, co-chairs, Environmental Ministries, So. New England Conference, United Church of Christ

From: Claire Miller
To: gwsa (EEA)
Subject: Comments on Emission Targets
Date: Friday, April 10, 2020 4:01:48 PM

April 10, 2020

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

--- Submitted electronically via gwsa@mass.gov ---

Dear Governor Baker and Secretary Kathleen A. Theoharides,

Mass Power Forward is a coalition of environmental leaders, community development organizations, clean energy businesses, faith groups, neighborhood health and safety advocates, and Massachusetts families fighting for clean, affordable, reliable energy and a thriving economy.

In 2008, when the Global Warming Solutions Act was passed, the science recommended that an 80% reduction in pollution would mitigate the effects of climate change in Massachusetts. Since that time, the science has been updated and it has become clear that a 100% emissions reduction is required to minimize climate damage. The Intergovernmental Panel on Climate Change (IPCC) research shows that global net human-caused pollution must be reduced by 50% or more globally by 2030 below the 1990 levels to achieve a 50% chance of avoiding the devastating consequences of a 1.5C rise in temperature. The more quickly we reduce, the higher the chance of avoiding the worst impacts of climate change, which is why we encourage Energy and Environmental Affairs to make the 2030 goal a 60% reduction and demonstrate the leadership we all expect Massachusetts to provide.

While we applaud the fact that on January 21, 2020, the Governor committed the Commonwealth to achieve “Net Zero greenhouse gas pollution” by 2050 in accordance with section 3(b) of G.L. 21N, further action must be taken by the Administration in order to get us to 100% climate pollution reduction and climate justice.

The best available current science shows that in order to avoid the worst impacts of climate change, we need to:

- Reduce greenhouse gas emissions by 60% or more by 2030.
- Prioritize Environmental Justice communities.

-Achieve 100% renewable energy across electricity, transportation, and heating by 2040
- Get to a 100% reduction in human-caused emissions by 2050, and begin aggressively drawing down pollution from the atmosphere
- Not consider biomass or trash incineration as a carbon-neutral power source, but rather count their emissions
- Include municipal light plants in the Clean Energy Standard.
- Include carbon pricing, an important solution that must consider Environmental Justice communities.

Our Commonwealth needs to prioritize Environmental Justice communities when deciding on policy pathways. There is a historic burden on low-income and communities of color in environmental policy that must be corrected as we chart our path to 2030 and 2050. These communities need to be prioritized as Massachusetts supports clean all-electric public transportation, Net Zero affordable housing, and access to safe and Net Zero schools and workplaces. To accomplish these goals, there is a need to invite frontline community participation early in the decision-making process to identify the policies that will benefit them most.

A climate plan that requires the elimination of all greenhouse gas pollution from the economy by 2050 is the only plan that allows for a holistic approach. Making policy align with the goal of zero climate pollution by 2050 will give the Commonwealth, residents, and commercial interests enough time to plan and adapt equitably. We ask that the tools used to decide policy use a clear and transparent scorecard that gives weight to environmental equity.

Biomass and trash incineration release carbon pollution and particulate matter. The people that live near these incineration sites are often Environmental Justice communities, and those who live there are at a higher risk of asthma and other respiratory and heart diseases. As such, biomass and trash should not be considered as a carbon free or carbon neutral power source in this planning, and in fact be counted *towards* emissions.

Every resident, municipality, and business has a role to play and we need every tool available to tackle this complex issue; municipal light plants make up 14% of the Commonwealth's energy use. This is why we encourage the EEA to include municipal light plants when considering both clean energy and energy efficiency. If the modeling shows that there is no other pathway to zero climate change-causing pollution by 2050, another policy that will help our Commonwealth drive down climate pollution is carbon pricing. Before enacted, this solution must address the needs of Environmental Justice communities, those already burdened by pollution, and others who are dependent on fossil fuel economies.

We respectfully request that you ensure that the 2050 Decarbonization Roadmap plans for a 100% reduction of human-caused climate change-causing pollution by 2050, while prioritizing

support for Environmental Justice communities. Further, we request that our 2050 goals include not just the elimination of pollution from the year 2050, but the beginning of an aggressive effort to drawdown pollution from the atmosphere that Massachusetts businesses and residents have historically polluted, using measures such as reforestation, land conservation, wetlands restoration, and other nature-based solutions. Additionally, we think it is critical to target these measures whenever possible in partnership with historically marginalized and disenfranchised Environmental Justice communities to ensure that they benefit and not further suffer from the implementation of such solutions.

Our Commonwealth's plans must be in line with the best available science and they must reduce the burden that Environmental Justice communities experience from the effects of climate change.

Sincerely,
The Mass Power Forward Coalition

The Planning Team of Mass Power Forward is 350 Mass, Climate Action Now of Western Mass, Environment Massachusetts, GreenRoots, Massachusetts Climate Action Network, Neighbor to Neighbor Massachusetts, Pipeline Awareness Network, Sierra Club Massachusetts Chapter, Toxics Action Center, UU Mass Action

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logo

Claire B.W. Müller (they/them)
Lead Community Organizer & Climate Justice Director
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MASSACHUSETTS FOREST ALLIANCE
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April 10, 2020

Claire Miziolek, Decarbonization Roadmap Manager
Executive Office of Energy and Environmental Affairs
100 Cambridge St, Suite 900
Boston, MA 02114

Ms. Miziolek:

The Massachusetts Forest Alliance represents forest landowners, foresters, timber harvesters, and forest products companies in Massachusetts. We appreciate the opportunity to comment on the 2050 Decarbonization Roadmap.

We are concerned about climate change. We expect to see tree species reliant on cold weather retreat to higher slopes while species accustomed to warmer climates begin to grow here in an adaptation response. We've seen increasing problems with invasive plants and pests that have had a negative effect on our forests, driving up tree mortality.

We believe forests managed in a sustainable way can help mitigate against climate change in a number of different ways – carbon sequestration in our forests, but also carbon stored in long-lived wood products, the use of bioenergy to displace fossil fuels, and more. Additionally, long-term sustainable forest management can increase forest resilience in the face of climate change by creating a more diverse mix of ages and species that can be more resistant to severe weather events and help speed adaptation to climate change with warmer-weather species.

Massachusetts forests are growing nearly four times as much wood each year as is being harvested, after accounting for the rise in tree mortality (from invasive insects and diseases, weather events, or overstocking), which outweighs harvesting almost three to one. Because of this significant net growth, carbon storage and sequestration in our forests is rising each year – all while we obtain the forest products we all use and rely on every day. The harvesting and processing of these forest products accounts for $3 billion in annual value to the Massachusetts economy and nearly 17,000 jobs, many in struggling rural towns.

Carbon accounting for forests and wood products is extremely complex. Different initial inputs and assumptions – for example, substituting the industrial-scale clearcutting of man-made plantations of trees in the southeastern United States for the sustainable long-term forest management using best management practices of Massachusetts – can lead to dramatic changes in the results. We believe it's critical that EEA provide detailed information about the calculations behind pre-determined scenarios to ensure the most accurate and transparent inputs and assumptions.

Additionally, it's important to note that carbon storage in forests is not like a bank deposit protected by the FDIC. Severe weather, insects, and diseases can all take a toll, killing trees and releasing stored carbon back into the atmosphere. The recent gypsy moth outbreak, focused on south central Massachusetts, killed millions of oak trees.

The Emerald Ash Borer threatens four million ash trees in the Commonwealth. Severe weather is more likely to occur with climate change, and we've seen dramatic impacts in the past - the 1938 hurricane blew down 90 million trees in Massachusetts in just a few hours.

The Global Warming Solutions Act requires "strategies that conserve and sustainably employ the resources of the Commonwealth." A growing body of research shows that the use of cross-laminated timber can significantly reduce embodied carbon in buildings, plus store additional carbon in the wood that they're made from. We strongly believe that any calculation of carbon and forest management **must** include carbon stored in wood products, even if this calculation is difficult and requires diligent work to obtain. Simply ignoring it because it's too hard to figure out leads to inaccurate results and betrays the Global Warming Solutions Act's requirements to use the best scientific methods and information.

Further, we think that modeling should not automatically disadvantage optimal long-term forest management, which can have a carbon benefit over time and is encouraged by current policies. Any examination of wood energy should be based on actual forest management practices in Massachusetts to generate accurate results. Lifecycle comparisons should be apples-to-apples, collecting and comparing the same information – production, shipping, end use, environmental impact, etc. – for all fuels.

The biggest threat to our forests in Massachusetts is deforestation for development. More than 13 acres on average are lost to development every day, according to Mass Audubon's 2020 *Losing Ground* report. With the majority of forestland in Massachusetts in private hands, we're concerned that reducing or eliminating the ability of forest landowners in Massachusetts to gain an economic return from their forest in order to boost carbon stocks would result in additional land lost to development, ultimately backfiring as a strategy to increase the carbon sink.

Environmental justice and equity are usually framed in an urban context, but there is a strong case to be made for rural equity as well. Our struggling rural towns are being hollowed out by population loss because of the poor economic climate there. Sustainable forest management creates jobs with a livable wage that come from the forest value chain, and many more jobs could result from good, innovative rural policy. Resilience, energy diversification, and local infrastructure redundancy are also potential benefits from using forest products as a strategy in reducing emissions and achieving statewide climate goals. We're concerned that negative economic impacts from the Roadmap will be focused on powerless rural communities largely ignored by Beacon Hill in lieu of requiring lifestyle changes for affluent and politically powerful suburbanites, such as reforesting the multi-acre rolling lawns of suburban mansions.

Adding trees in places without them – in urban and even suburban areas – can make a significant difference. Planting one million trees in these areas would result in roughly 20,000 acres of new tree cover. These trees, because they're not competing with other trees as they would in a forest, grow faster and thus sequester carbon at a faster rate. These urban trees also have been proven to reduce heating and cooling energy demands, thereby reducing emissions, and can improve air quality. This additive approach has essentially no negative economic impact compared to the rural job losses and forestland sold for development that would result from restricting or prohibiting harvesting of trees in the Commonwealth. It's also relatively inexpensive for the scope of the change it can produce. We strongly encourage EEA to push for even more funding to expand its current urban tree-planting projects as part of the Roadmap.

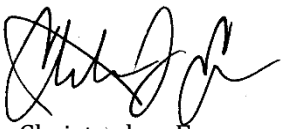
We appreciate the fact that you're working with Harvard Forest on the forest carbon piece of the roadmap. Their paper, *The Illusion of Preservation*, advances an important argument that policymakers developing the roadmap should understand. In short, if demand for wood products is unchanged, reducing or even eliminating harvesting of trees in Massachusetts will push that demand elsewhere, to places that don't have the same heavily regulated forest management best practices. As a result, any additional carbon sequestration relied on to meet the Massachusetts goals will simply be a paper figure, detached from reality. While Massachusetts could pat itself on the back for the additional carbon sink, emissions elsewhere to meet Massachusetts residents' need for forest products would typically more than displace additional carbon stored here, leaving the global environment worse off. Known as "leakage," this factor **must** be considered in the calculations.

In summary, we believe that the sustainable forest management we engage in has a climate change mitigation benefit through carbon sequestration in forests; expanding use of long-lived wood products such as cross-laminated timber instead of high-carbon concrete and steel; displacing fossil fuels with bioenergy; and more. The Intergovernmental Panel on Climate Change (IPCC) released a Special Report on Climate Change and Land last year. In it, they said the following:

> *Sustainable forest management can prevent deforestation, maintain and enhance carbon sinks and can contribute towards GHG emissions-reduction goals. Sustainable forest management generates socio-economic benefits, and provides fiber, timber and biomass to meet society's growing needs.*

We hope the Roadmap team recognizes these benefits as it develops its plan. Thank you again for the opportunity to comment.

Sincerely,



Christopher Egan
Executive Director

To: Secretary Kathleen A. Theoharides, Massachusetts Executive Office of Energy and Environmental Affairs; Claire Miziolek, Decarbonization Roadmap Manager; Hong-Hanh Chu, GWSA Program Manager; Benjamin Miller, Decarbonization Roadmap Technical Lead; and staff of the relevant agencies

CC: Representative Susannah Whipps; Representative William Pignatelli; Representative Denise Provost; Senator Ann Gobi; Senator Karen Spilka; Senator Jo Comerford; Representative Mindy Domb; Jim Montgomery, Department of Conservation and Recreation; State Forester Peter Church; Janet Sinclair; Michael Kellett; Franklin Land Trust, Mass Audubon, the Trustees of Reservations, the Nature Conservancy of Massachusetts and the Environmental League of Massachusetts, E.O. Wilson of Harvard University, writer and activist Bill McKibben, Green Berkshires, Climate Action Now, the Center for Biological Diversity, the Walden Woods Project and Biodiversity for a Livable Climate, and Jonathan Thompson of Harvard Forest

Date: April 10, 2020

Re: Open Letter on Proforestation (submitted as a public comment to the Decarbonization Roadmap/Emissions Limits for 2050)

Dear Honorable Officials (elected and appointed), employees of the Commonwealth, and esteemed citizen-activist/scientists,

You are aware of the struggle to preserve Massachusett's commonly-held state forests from lumbering and biomass production. Citizens and scientists, especially forestry researchers, have been arguing directly *with you—the government of the Commonwealth*—for a paradigm shift in forest management for more than a decade.

It was discouraging to participate in the virtual public meeting on March 27, 2020 and listen to the obfuscation of your representatives as they fielded specific questions about proforestation and pretended there was no data or that the science is somehow unclear. This is not true: the scientific evidence has been consistent and provided to you regularly, repeatedly, in a timely manner. The questions were also not new. To those who have been engaged in and following the process for years, the disrespect is obvious. That the EOEEA continues to fail to lead in this fundamental and essential component of mitigating climate change is disturbing in and of itself. Worst is that the adverse consequences are increasing exponentially.

As "the first state in the nation to combine energy and environmental agencies under one Cabinet secretary"[i] there is an incredible responsibility upon you to establish policy that *actually* does the dual work of "promoting efficient energy use…*while protecting and preserving Massachusetts' natural environment*" (emphasis

added).[ii] It appears as if you have interpreted this dual charge in a hierarchical way, putting energy before the environment.

Researchers in 2009-2010[iii] documented two pathways to improved carbon sequestration by forests, concluding that "a shift to less intensive forest management alternatives will result in a net increase in C sequestration in northern hardwood ecosystems (Nunery & Keeton, p. 1374). One path involves "unmanaged northern hardwood forests [which can then] sequester 39 to 118% more C than any of the active management options evaluated;" and another path involving "a shift from high frequency management with low structural retention to low frequency management with high structural retention can sequester up to 57% more C" (Nunery & Keeton, p. 1374). Increasing carbon sequestration is vital to reaching the 2050 zero emissions target. (And why aren't we trying to reach it sooner?)

Technical Committee Members of the Forest Futures Visioning Process, initiated by the Massachusetts' Department of Conservation and Recreation (DCR) in 2009, submitted a final report in which they explicitly and specifically laid out the imperative to shift the forest management paradigm to "an ecosystem services model" (see endnote for details)[iv] which is another way of saying based the principle of "forest as infrastructure"—which was introduced by the Harvard Forest in their 2013 preview video, *Changes to the Land*, and elaborated in their 2014 report (with the Smithsonian Institute).[v] The press release for these findings explicitly warned of the "peril of land use decisions"[vi] if we continue in the current paradigm of business as usual.

DCR was reminded, in 2016, in another public comment period, that the Forest Futures Visioning Process had made these plain recommendations.[vii] And there have been thousands of other submissions over the past decade along these same lines.

Finally, in 2019, a perspective article for *Frontiers in Forests and Global Change*, synthesized the evidence and urgent need for the proforestation approach.

> "…growing existing forests intact to their ecological potential—termed *proforestation*—is a more effective, immediate, and low-cost approach that could be mobilized across suitable forests of all types. Proforestation serves the greatest public good by maximizing co-benefits such as nature-based biological carbon sequestration and unparalleled ecosystem services such as biodiversity enhancement, water and air quality, flood and erosion control, public health benefits, low impact recreation, and scenic beauty." (Moomaw, Masino & Faison, 2019, p. 1)[viii]

The argument for proforestation is clear. In truth we need to also protect private forests from further development, too. The hurdles involve overcoming centuries of legalized habits of allowing monied interests to dictate public policy.

In the 10 Year Progress Report on Massachusetts' progress on the Global Warming Solutions Act, the emphasis is on planting trees in urban and residential areas to achieve a "density" of 5 trees per acre.[ix] While the gains of shade for energy consumption are real, this strategy alone is insufficient.

Folks, the forest in Massachusetts helps everyone! It is the largest intact forest in the United States. The southeastern forest has been decimated. The northwestern forests are badly pockmocked. Our neighbor to the north has logged the heck out of their part of the formerly extensive northeastern woodlands.

WE NEED the Massachusetts forest to fight climate change! We need old trees and big Big BIG stretches of untouched forest. Here are the key points:

- proforestation, which is net gain in forest, as in absolutely zero loss + regain the losses of the last three years and continue to increase!
- stop cutting any/all old growth, full stop! Because the bigger older trees sequester more carbon.
- stop pretending that "the science" isn't clear or "the data" isn't available - it's been established consistently over more than a decade.
- follow the recommendations from the Harvard Forest/Smithsonian study for clustered development and rewarding "forest as infrastructure."
- create/invent alternative financial rewards for maintaining and preserving forests intact as "ecosystem services" that contribute to the general welfare and health of everyone (in MA and beyond).
- do not count wood fuels/biomass as an efficient or positive/good energy fuel.
- do not trade forest for solar.
- recognize the value of forests for clean water and wildlife and all the 'intangibles' these add to quality of life and climate stability.
- find another way that people who have made their incomes (and profits) from harvesting lumber and wood products to contribute to the economy through retooling and repurposing their assets ~ instead of continuing to operate via sneaky ways of allowing abuse of the forest by unfairly permitting class/money privilege to buy state legislation favorable to their personal interests rather than the public good.

It seems, from the outside anyway, that you are prioritizing carefully selected, pre-existing forestry-related industries to guide your decision-making. There is no other explanation for the willful ignoring of, by now, *thousands* of comments and contributions of time and energy by dedicated individuals who are *trusting* that *this* administration in *this* state will *do the right thing* and change the guiding framework for land management away from monetary generation and profit to a stewardship model that literally puts the forests first.

It can be done. You are smart enough; you understand the principles well enough -- you must find the will to overcome the legacy of privilege that some legislators and certain companies and particular individuals are trying to protect.

This legislature has bills before it that would protect the Massachusetts forest. This is your moment to prove that democracy works by adopting and applying the wisdom coming from citizens of the Commonwealth.

Thank you sincerely,

Stephanie Jo Kent

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[i] https://www.mass.gov/about-the-executive-office-of-energy-and-environmental-affairs retrieved April 10, 2020.

[ii] https://en.wikipedia.org/wiki/Massachusetts_Executive_Office_of_Energy_and_Environmental_Affairs
[ii] https://en.wikipedia.org/wiki/Massachusetts_Executive_Office_of_Energy_and_Environmental_Affairs retrieved April 10, 2020

[iii] Nunery, J.S., and Keeton, W.S. (2010). "Forest carbon storage in the northeastern United States: Net effects of harvesting frequency, post-harvest retention, and wood products" in *Forest Ecology and Management 259*, pp. 1363–1375.

[iv] State Library of Massachusetts Archives (July 30, 2010). *The Forest Futures Visioning Process Recommendations of the Technical Steering Committee: final report* states: "Recommendation 1: Adoption of an Ecosystem Services Model to Guide Forest Protection and Management -- The fundamental guiding principle for all forest protection and management policies in the Commonwealth should be to ensure the sustainable provision of a comprehensive suite of forest ecosystem services. Moreover, DCR should adopt a planning framework for the state parks and forests that focuses on the provision of key ecosystem services not expected to be provided, or not provided in adequate amounts, from private lands in the Commonwealth. The adoption and prioritization of ecosystem services is intended, in part, to address conflicts inherent in competing demands on our forests. Essential ecosystem services represent primary management goals for DCR lands. These include biodiversity protection, clean water, carbon sequestration, soil formation and nutrient cycling, and public recreation including wilderness/old growth/spiritual experiences. In addition to these services, some DCR lands will serve to demonstrate how forests can be managed to provide sustainably grown wood products, and others will emphasize quality outdoor recreation experiences." (p. 7) https://archives.lib.state.ma.us/handle/2452/50079, retrieved April 10, 2020.

[v] Harvard Forest *Changes to the Land preview* (2013) https://www.youtube.com/watch?v=dFf8H3e-X0E; *Changes to the Land: Four Scenarios for the Future of the Massachusetts Landscape* (2014) https://harvardforest.fas.harvard.edu/changes-to-the-land

[vi] Harvard Forest Press Release (2013) https://harvardforest.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/HF%20Changes%20to%20the%20Land%20press%20release%20-%20for%20immediate%20release.pdf

[vii] Comments submitted to Jessica Rowcroft, Project Manager, DCR April 10, 2016. http://ellenmoyerphd.com/wp-content/uploads/2014/08/DCR_forest_projects_ltr_RESTORE_etal.pdf retrieved April 10, 2020.

[viii] Moomaw, W.R., Masino, S.A. and Faison, E.K. (2019) "Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good" in *Frontiers in Forests and Global Change, Volume 2, Article 27.* https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full retrieved April 10, 2020.

[ix] Global Warming Solutions Act: 10-Year Progress Report (2019). https://www.mass.gov/files/documents/2019/04/02/GWSA-10-Year-Progress-Report.pdf?_ga=2.55017835.1768772727.1586451057-1946861827.1578661505 retrieved April 10, 2020.

necec
Your Partner in the Clean Energy Economy

Via Electronic Submission

April 10, 2020

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

Re: NECEC Comments on Draft Determination of Statewide Emissions Limit for 2050

Dear Secretary Theoharides,

The Northeast Clean Energy Council ("NECEC") appreciates the opportunity to provide comments on the Draft Determination of Statewide Emissions Limit for 2050 ("Draft Determination"). We applaud the Baker-Polito administration for recognizing the need for a net-zero by 2050 standard, which aligns the Commonwealth with scientific consensus and places us among the leaders, national and globally, in our commitment to addressing our contributions to climate change.

NECEC is a clean energy business, policy, and innovation organization whose mission is to create a world-class clean energy hub in the Northeast, delivering global impact with economic, energy and environmental solutions. NECEC is the only organization in the Northeast that covers all of the clean energy market segments, representing the business perspectives of investors and clean energy companies across every stage of development. NECEC members span the broad spectrum of the clean energy industry, including clean transportation, energy efficiency, wind, solar, energy storage, microgrids, fuel cells, and advanced and "smart" technologies.

NECEC strongly supports a requirement for net-zero emissions by 2050. We further request the development of sector-specific targets to ensure that each sector is reducing its emissions in a timely manner while providing clear direction to the clean energy sector for how to provide both near and long-term solutions. We note that the next decade must be a decade of action and support the establishment of an aggressive 2030 emissions target.

In addition, we recognize that the needed clean energy transition must be just and equitable. NECEC urges EEA to consider equity and solar justice in each sector and for each element of the GHG mitigation strategy.

We look forward to working with the Administration to promote policies, such as those produced by the Implementation Advisory Committee, that will advance our progress towards net-zero emissions and accelerate the transition to a clean energy economy. Meeting the net-

zero requirement will necessitate ambitious and innovative solutions from policymakers and industry alike. We, and our members, stand ready to help meet the challenge.

Thank you for the opportunity to comment on the Draft Determination. We appreciate the Administration's leadership and look forward to continuing to engage both through our participation on Implementation Advisory Council and other relevant forums.

Sincerely,

Peter Rothstein
President

Jeremy McDiarmid
Vice President, Policy and Government Affairs

April 10, 2020

To Secretary Kathleen Theoharides:

Given the available information on the unavoidable effects of climate change, from the IPCC report and other credible sources, it is obvious that we must act swiftly and boldly to reduce greenhouse gas emissions. Any delay, in the aggressive reduction of emissions, will only exacerbate the social disruption, economic loss, and health consequences projected in the models currently available.

That is why I am asking for at least a 60 percent reduction of emission as the 2030 goals and a legal commitment to achieving net zero by 2050.

As a retired registered nurse, I am watching the COVID-19 pandemic unfold and cannot help but see similarities between that crisis and the climate crisis. We have recently witnessed "magical thinking," in the face of expert medical prediction and advice. Soaring world-wide fatalities and global disruption have resulted. In regard to the climate, scientific warnings from experts detailing the consequences and devastation of delayed action, are now plentiful and credible. Yet, even we, in progressive Massachusetts, seem to be pretending we have more time to act than predictions indicate and that somehow we will magically avoid the consequences of our choices and deferred action.

I completely concur with the IPCC report's statement that, "Limiting global warming to 1.5 degrees C would require rapid, far-reaching transitions in land, energy, industry, buildings, transportation and cities." And in what Debra Roberts, Co-Chair of the IPCC Working Group II(group that addresses impacts, adaptation and vulnerability) said, "The next few years are probably the most important in our history."

The above quotes are the obvious reality. We ignore them at our own peril.

It is clear that the climate crisis requires action on all possible fronts. We must expand our renewable energy infrastructure dramatically. Please understand that I do not include nuclear power as a viable alternative. In my mind 100 percent

renewables come solely from sources that do not come with devastating health consequences.

The health benefits of divesting from fossil fuels and nuclear energy are clear. We must also alter our modes of transportation, build and retrofit our structures to utilize newer technologies that are more eco-system friendly and utilize biomimicry techniques that lead to a zero-waste world. We must support healthy food practices, promote health soils and support the world's natural carbon sinks.

We must change our world, or as we are currently witnessing, our world will change us.

I believe in the hopeful message within the Green New Deal, that we can transform our world while creating jobs, protecting the vulnerable, and promoting justice. It is not only possible but is the only choice that will sustain this beautiful world for future generations.

Time is up. Please rationally consider the many dramatic and sweeping changes that are necessary today to allow us to have a productive tomorrow.

May the extreme challenges and lessons from the current pandemic, alert you to better prepare for the future and take action to avoid further catastrophe.

May this Holy time for many and this 50th Earth Day bring clarity on the preciousness of people and the beauty of our planet. Please have the courage to be a positive example of right action for the rest of the nation.

I wish you, and yours, and those working on this project, good health and safety.

Sincerely,
Marcia F Hart RN
Gloucester, MA

The Nature Conservancy in Massachusetts
99 Bedford Street, Suite 500
Boston, MA 02111
617.532.8300

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

April 10, 2020

RE: EOEEA – Net-zero Determination

Dear Secretary Theoharides:

The Nature Conservancy thanks the Baker/Polito administration for its leadership on climate change mitigation, adaptation, and resiliency. We appreciate the opportunity to comment on the Executive Office of Energy and Environmental Affairs' (EEA) "Draft Determination of Statewide Emissions Limit for 2050" (Letter of Determination) regarding the formalization of Governor Baker's January 21, 2020 commitment to the Commonwealth achieving net-zero greenhouse gas emissions in 2050 pursuant to section 3(b) of G.L. 21N.

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 deal with 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.

Our comments below are in response to EEA's request for public comments regarding:

- Recommendations on whether net-zero emissions reductions should be either 80%, 85% or 90%;
- Suggestions for implementation pathways, policies, programs, etc. to consider for greenhouse gas mitigation; and,
- Feedback on the anticipated systems transformations for achieving net-zero emissions.

The Conservancy respectfully ***recommends that gross emissions reductions should be 90%.*** We encourage a goal of "gross" emissions reductions to reflect the need for first achieving deep greenhouse gas emissions reductions across all sectors before considering ways to absorb or offset the remaining unavoidable greenhouse gas emissions.

We also recommend that the final Letter of Determination include interim goals, consistent with legislation passed by the Massachusetts Senate on January 30, 2020, S.2500 *An Act setting next-generation climate policy*. This legislation proposes the following interim goals:

- 2030 statewide greenhouse gas emissions limit of not less than 50 percent below the 1990 emissions; and,
- 2040 statewide greenhouse gas emissions limit of not less than 75 percent below the 1990 emissions level.

The bill would also require an adjustment of interim goals every five years starting in 2025.

The Conservancy also respectfully offers our ***suggestions for implementation pathways, policies, and programs to consider for greenhouse gas mitigation.***

The Conservancy recognizes that reducing fossil fuel use is **the most** important thing we can do to fight climate change. However, reducing fossil fuel use alone is not enough to reach the goal of "net-zero" emissions—which means the amount of greenhouse gases emitted each year is equal to the amount of greenhouse gases removed each year. To get to net-zero, the Land Use and Nature-Based Solutions Working Group of the Global Warming Solutions Act (GWSA) Implementation Advisory Committee (IAC) recommended policies that recognize and support natural climate solutions. "Natural climate solutions" are actions to protect, manage, and restore natural and working lands, such as forests, farms, and wetlands, to both reduce emissions from lands and to remove and store carbon that has already been emitted. When land is developed or poorly managed it is a source of carbon emissions. When land is protected and well-managed, it removes carbon from the air.

Massachusetts has some of New England's richest natural carbon resources in our forests, wetlands, and soils. With currently available practices, Massachusetts' lands have the potential to remove and/or reduce **an additional 1-2 million metric tons CO_2e per year.**[1] As we move toward net-zero, and emissions reductions from other sectors get more challenging and expensive over time, natural climate solutions will become increasingly needed and important. *The only viable tool we have right now to remove carbon pollution already in the air is nature.*

The Conservancy is a member of the GWSA IAC and leads the Working Group on Land Use and Nature-Based Solutions. We strongly support the policy recommendations to reduce emissions and mitigate climate change that were developed by the five IAC Working Groups—Electricity, Transportation, Buildings, Land Use and Nature-Based Solutions, and Climate Justice—and approved by the full IAC. As the Climate Justice Working Group is currently in the process of developing policy recommendations, we urge the other working groups to prioritize policy solutions that achieve benefits for vulnerable populations and to reconsider suggested policies that exacerbate, rather than correct, environmental injustices.

In order to effectively implement the recommendations of the Land Use and Nature-Based Solutions Working Group, The Conservancy recommends that EEA's Letter of Determination should define and codify the land sector as a separate sector, just like buildings, transportation, and electricity. We also urge the Commonwealth set numeric goals for reducing greenhouse gas emissions ***and*** for increasing carbon sequestration in the land sector, both of which must be

[1] Nature4Climate. 2020. See MA state profile at: https://nature4climate.org/u-s-carbon-mapper/
Please note that this tool includes some, but not all available natural climate solutions strategies. For example, at present, this tool does not include information on blue carbon, improved natural forest management, or wood building, as those data are still being updated.

measured against the 1990 baseline and business as usual projections, just as in other sectors. Governor Baker committed to such a goal when he signed on to the U.S. Climate Alliance's Natural and Working Lands Challenge, 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."[2]

To meet emissions reduction and carbon drawdown goals while making the best use of limited funding and resources, The Conservancy recommends that this hierarchy should be followed:

- First, protect forests (especially highly resilient and connected interior forests), wetlands, and farm soils. Much of the carbon in these lands is irrecoverable carbon[3]—meaning that once it is emitted into the air as land is developed, it is not possible to regain that carbon through management or restoration over 30 years (the net-zero timeframe).
- Second, manage forests and farms in ways that grow carbon in soil and plants over time. This includes paying attention to forest carbon stocks and agricultural soil health and carbon stocks, while also ensuring that there is a steady supply of wood and food coming from our working lands. In the case of wood, sustainably and locally harvested wood can replace more carbon intensive building materials, like concrete and steel, thereby reducing carbon emissions from the building sector.
- Third, when it has not been possible to protect or sustainably manage lands, take action to restore them. These actions include tree planting (both reforestation and city tree planting), restoration of coastal wetlands, and actions to repair soil health.

Applying this hierarchy will require a recognition of the value of natural and working lands carbon. Robust funding for these actions, including incentives for the private landowners who own most of Massachusetts' lands to help them protect, sustainably manage, and restore their lands, will be necessary.

Additionally, The Conservancy recommends that EEA convene a robust stakeholder process if considering offsets. Most importantly, any consideration of using increases in the amount of carbon sequestered by lands to offset emissions from other sectors needs to establish requirements that ***avoid unintended consequences***, such as allowing more pollution in underserved and overburdened communities. Stakeholders should help develop:

- Requirements and ranking criteria relating to additionality, verification, leakage, permanence, and co-benefits.
- Preferential criteria – offsets that have both climate mitigation and adaptation benefits should receive preference for funding.

Finally, the Conservancy offers ***feedback on the anticipated systems transformations for achieving net-zero emissions.*** Transforming the current land use sector will require that we:

[2] United States Climate Alliance. 2020. Natural and Working Lands Challenge. Available here: http://www.usclimatealliance.org/nwlchallenge

[3] Goldstein et al. 2020. Protecting irrecoverable carbon in Earth's ecosystems. Nature Climate Change. Vol 10, pp. 287–295 https://doi.org/10.1038/s41558-020-0738-8

- Place a value on nature to ensure no net loss of natural resources, including carbon, land, and water. Just as Massachusetts capitalized on using nature to foster nature-based solutions to reduce the impacts of climate change in the 2018 Climate and Environment Bond and in the Municipal Vulnerability Preparedness Program, we can also enact policies to use nature to reduce emissions and remove carbon pollution from the atmosphere;
- Continue the integrated approach to climate change action codified in Executive Order 569, requiring that the Commonwealth's policies on climate change mitigation work in concert with climate change adaptation/resiliency; and
- Place climate justice front and center in a net-zero framework so that the benefits of clean energy, drawdown of carbon pollution by nature, and increased community resilience are concentrated in underserved and overburdened communities.

Addressing climate change is necessary to create a world where both people and nature thrive—where we provide food and goods for our growing population, design healthy and livable cities, and conserve and protect lands, freshwaters, and oceans. To create this world, the Commonwealth's continued innovation and leadership is necessary. The Conservancy recognizes and appreciates that moving to a net-zero framework is just the latest example of the Commonwealth acting on the scale needed to address the problem of climate change.

To summarize, we respectfully recommend:

1. Codifying an emissions reduction goal of 90%;
2. Continuing to include natural and working lands as a sector when measuring greenhouse gas emissions;
3. Setting goals for reduced emissions **and** increased sequestration in the lands sector;
4. Recognizing the value of natural and working lands carbon in policies and funding to achieve this goal; and
5. Carrying out a robust stakeholder process for any offsets considered as part of the net-zero framework.

Thank you for your time and consideration. Please feel free to direct any questions to Steve Long at slong@TNC.org.

Sincerely

Deb Markowitz
State Director
The Nature Conservancy in Massachusetts

From:	Richard Fennelly
To:	Miziolek, Claire (EEA)
Subject:	Your 2050 Roadmap: Climate Change
Date:	Tuesday, March 24, 2020 11:02:05 AM
Attachments:	Kigali Knowledge Brief.pdf Carbon Trust Chart.jpg Coil Cleaning Fact Sheet.docx

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Hi Claire

Your roadmap would greatly be benefited by initiatives directed to the coil cleaning and related maintenance of air conditioning and refrigeration of all types now deployed in the State. Commercial refrigeration in foodservice and healthcare is especially attractive low hanging fruit for targeting.

Attached are some items ---- I'm available to give a short briefing to your energy efficiency team on this topic.

--
Richard Fennelly
CoilPod LLC
www.coilpod.com
Phone: 1 914 819 8937
Skype: fenquarry
Twitter: @COILPOD
LinkedIn: Richard Fennelly

Optimization, monitoring, and maintenance of cooling technology

KIGALI
COOLING EFFICIENCY PROGRAM

This Knowledge Brief from the Kigali Cooling Efficiency Program, outlines the need for maintaining and servicing of cooling technology. It estimates that better optimization, monitoring, and maintenance of cooling equipment the potential to save 30Gt of CO_2 emissions by 2050.

THE NEED FOR COOLING EFFICIENCY

Cooling is essential to health, prosperity, and the environment, underpinning many of the Sustainable Development Goals. Yet currently most cooling is energy intensive and highly polluting. Demand for cooling is booming, so there is an urgent need to not only cut pollution from existing cooling but to ensure future cooling needs are met sustainably.

COOLING ACCOUNTS FOR > 7% GHG EMISSIONS

Use of cooling technologies causes substantial global GHG emissions of between 3.8[1,2], and 4.1[3] $GtCO_2eq$ p.a. (>7% global emissions). The International Institute of Refrigeration has estimated that cooling consumes 17.2%[4] of global electricity (c.3,500 TWh p.a. based on 2015 consumption)[5]. Indirect emissions from electricity to power cooling technologies causes 63% of cooling emissions[6]. The impact of global GHG emissions from cooling equipment is projected to grow between now and 2050 as developing nations gain access to energy and new technologies. It is estimated that improving the efficiency of cooling equipment between now and 2050 can avoid the emission of approximately 80Gt CO_2eq.

OPTIMIZATION, MONITORING, & MAINTENANCE CAN REDUCE TOTAL COOLING GHG EMISSIONS BY 13%

Neglecting the optimization, monitoring, and maintenance of cooling equipment results in increased energy use, lower cooling performance, and shortens equipment life. Effective optimization, monitoring, and maintenance of cooling equipment could deliver substantial electricity savings of up to 20%[7] (700 TWh), particularly if equipment has not been maintained for a long time, leading to emissions savings of up to 0.5Gt CO_2eq p.a.

The global stock of room air conditioners is expected to grow from 900 in million in 2015 to 2.5 billion units in 2050. (Clean Energy Ministerial, 2016)

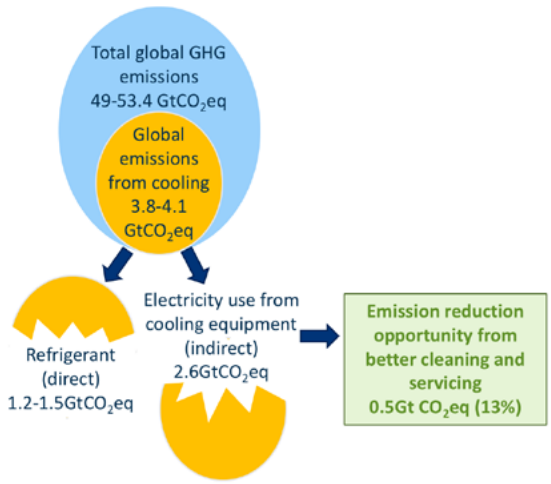
The Carbon Trust, the International Institute of Refrigeration, ans ASHRAE have supported the Kigali Cooling Efficnency Program in the publication of this brief.

'Better optimization, monitoring, and maintenance of cooling equipment has the potential to save 30Gt of CO_2 emissions by 2050 – contributing a further 38% of savings on top of those delivered through the planned phase down of high GWP refrigerants agreed at Kigali.'

– Didier Coulomb, Director-General, International Institute of Refrigeration

Policy makers should make effective optimization, monitoring, and maintenance of cooling equipment a key goal as the 20% savings in electricity translate into a 13% reduction in total cooling emissions (including GHG emissions from refrigerants). Figure 1 breaks down annual global GHG emissions to the opportunity presented through better optimization, monitoring, and maintenance of cooling equipment.

Figure 1 – Breakdown of annual total global GHG emissions to the cleaning and servicing opportunity



Sources: PBL Netherlands Environmental Assessment Agency, 2017; International Institute of Refrigeration, 2017; IPCC, 2014; Green Cooling Initiative, 2016, Carbon Trust analysis. All carbon savings numbers in Figure 1 relate to potential cumulative savings from now to 2050. They represent an initial, indicative view of savings and will be refined through further work.

SECTOR FOCUS: UNITARY AIR CONDITIONING

Unitary air conditioning (UAC) refers to ductless split, ducted split and rooftop ACs, variable refrigerant flow (VRF) systems and self-contained units. Typically, one unit will be installed per room, apart from VRF systems and multi-splits which can be used to cool several rooms (Green Cooling Initiative, n.d.).

UAC is the largest cooling market with an estimated installed base of 870-950 million units (2017)[8], about 30% of the three billion pieces of cooling equipment in use around the globe (International Institute of Refrigeration). UAC annual sales were approximately 100 million units (2012) worth USD 73 billion (Green Cooling Initiative, n.d.).

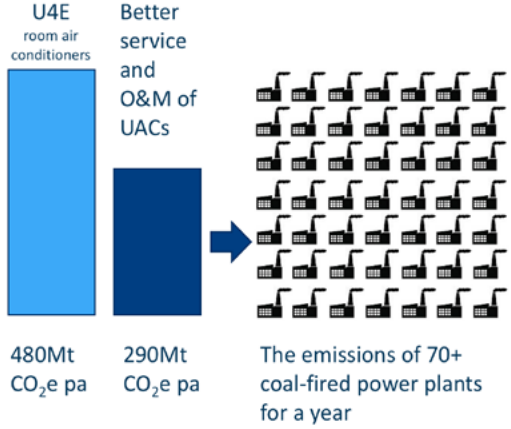
UAC ACCOUNTS FOR 30% OF ALL COOLING GHG EMISSIONS

Given their abundance, UACs are a major contributor to cooling related GHG emissions, estimated by the Green Cooling Initiative to be 1.28Gt of CO_2eq (in 2016) – equivalent to around 30% of total cooling GHG emissions in 2017. The 1.28Gt of CO_2eq break down into 330Mt related to refrigerant emissions and 950Mt from indirect emissions due to electricity consumption. Potential emissions reductions through effective optimization, monitoring, and maintenance are estimated to be 190Mt CO_2eq p.a. based on 2016 electricity consumption, rising to 290Mt CO_2eq p.a. by 2030[9] - equivalent to the emissions of over 70 coal-fired power plants in one year[10]. By comparison, the UN's United for Efficiency (U4E) estimates the total emissions savings opportunity across 150 developing countries of switching to energy efficient and climate friendly air conditioners at 480 Mt CO_2eq p.a. by 2030. Emissions reductions do not include those that exist due to better leakage management.

ACTION TO OPTIMISE, MONITOR AND MAINTAIN COOLING EQUIPMENT COULD SAVE 30GT CO_2EQ BY 2050

Following this same approach, an estimate for the potential impact of better optimization, monitoring, and maintenance on the overall cooling market to 2050 can be obtained. Based on total cooling emissions from electricity in 2016 of 2.6Gt CO2eq, 20% savings would deliver 0.5Gt CO2eq of savings p.a. Again assuming a 3% compound annual growth rate, total savings could reach 1.4Gt p.a. by 2050 – equivalent to the emissions of nearly 350 coal-fired power plants for a year. This would represent a cumulative saving of 30Gt by 2050.

Figure 2 – Potential emissions savings opportunities by 2030



COLLECTIVE ACTION IS ALREADY IMPROVING THE QUALITY OF UAC EQUIPMENT.

Given the scale of GHG impacts due to UAC, current global and regional initiatives are focused on controlling emissions due to product design inefficiencies, including the United for Efficiency initiatives, SEAD, CLASP, and EU EcoDesign.

THE IMPACT OF THESE INITIATIVES COULD BE LOST THROUGH POOR OPTIMIZATION, MONITORING, & MAINTENANCE OF COOLING PRODUCTS.

In addition to initiatives encouraging use of energy efficient products, policy makers are encouraged to develop national cooling equipment optimization, monitoring, and maintenance competencies in industry and the user base. This could include:

- Setting up an independent national standards body
- Creation of national standards for cooling optimization, monitoring, & maintenance.
- Programme of audits of refrigeration technologies to identify optimization, monitoring, & maintenance opportunities
- Investment in facilities providing best practice training in, as examples, equipment optimization and monitoring, supplier maintenance, or customer maintenance management programmes
- Developing supply chains for optimization, monitoring, & maintenance technologies.

Adoption of such practices could reduce needless emissions due to poor optimization, monitoring, and maintenance practices.

OPTIMIZATION, MONITORING, & MAINTENANCE PROJECTS

From initial research undertaken as part of preparing this brief, few examples of programs focused on better optimization, monitoring, and maintenance of cooling equipment have been uncovered – possibly reflecting difficulties implementing programs in some hard-to-reach sectors (e.g. residential) or that these elements in other sectors (e.g. commercial) are not made explicit. Nevertheless it seems likely that optimization, monitoring, and maintenance programs represent a major opportunity for energy and emissions savings. The following examples of what has been done give a sense of what can be implemented on the ground to take advantage of this huge opportunity.

ASHRAE

A trial to understand the benefits of coil cleaning was conducted at 1500 Broadway, Times Square in New York City between July and September 2005. The 34 storey building has 4 air handling units servicing 111 500 m^2 of air conditioned and heated space. The trial showed that good maintenance and operating practices including coil cleaning significantly improved the energy efficiency of the HVAC&R systems by 10% to 15% and delivered comfort increases. The trial also identified other optimization and maintenance processes that will improve energy efficiency for years to come. ASHRAE (2006)[11].

DEFRA UK

As part of a UK Department of Food and Rural Affairs Programme identifying reductions in energy inputs to the food industry, a trial was undertaken to assess the impact of applying low cost maintenance measures to commercial fridges at the University of Bristol Langfood Canteen. The canteen provides 200 to 300 meals per day. One large upright fridge consumed 40% of the canteens cooling load. Inspection of the fridge showed it had a dirty condenser which when cleaned delivered an 8% energy efficiency saving. The fridge was also found to have too low a temperature set point which was raised from -21ºC to -16ºC, giving an additional 11% energy efficiency saving. Together these two measures delivered a 19% energy reduction. (Defra)[12].

THE CARBON TRUST

The Carbon Trust, the UK Institute of Refrigeration and the British Retail Association worked together to propose a set of monitoring, maintenance and technology optimization measures that when applied could significantly reduce emissions from retail refrigeration equipment. A basket of monitoring, optimisation and maintenance measures could improve energy efficiency by 20 to 30% (e.g. training, cleaning and maintenance, re-commissioning, set-point temperature, store temperature). Additional technologies could significantly increase these savings[13].

ABOUT K-CEP

The Kigali Cooling Efficiency Program (K-CEP) is a philanthropic collaboration launched in 2017 to support the Kigali Amendment of the Montreal Protocol and the transition to energy efficient, climate-friendly, affordable cooling solutions for all. K-CEP's secretariat, the Efficiency Cooling Office, is located at the ClimateWorks Foundation.

K-CEP SUPPORT FOR OPTIMIZATION, MONITORING, & MAINTENANCE

Optimization, monitoring, and maintenance represent a major opportunity for the range of projects and activities funded by K-CEP. Existing and future projects should consider the possibility of adapting or expanding their brief to include an optimization, monitoring, and maintenance element.

FEEDBACK ON THIS BRIEF

The Carbon Trust put together this brief for K-CEP with assistance from the International Institute of Refrigeration and ASHRAE. We would welcome any feedback on calculating the emissions reduction potential of better optimization, monitoring, and maintenance and on better understanding the landscape of optimization, monitoring, and maintenance more generally. Please contact Paul Huggins at paul.huggins@carbontrust.com.

CONTACT US

For more details please visit www.k-cep.org, follow us at @Kigali_Cooling, or contact us at info@k-cep.org.

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4. Cited in International Institute of Refrigeration, 29th Informatory Note: The Role of Refrigeration in the Global Economy, November 2015.
5. Based on 1737 Mtoe (= 20,201 TWh) of total electricity consumed globally in 2015. Taken from IEA, Key world energy statistics 2017, 2017, p41.
6. International Institute of Refrigeration, 35th Informatory Note, The impact of the refrigeration sector on climate change, December 2017
7. Research for this brief indicated savings could range from as low as 3 to 4% to as high as 60% or more. Multiple studies gave savings in the range 15 - 25%.
8. These estimates are based on 750 million UAC units in 2012 (Green Cooling Initiative) and 900 million UAC units in 2015 (Clean Energy Ministerial), extrapolated using a 3% compound annual growth rate (itself sourced from the Clean Energy Ministerial assumption that UAC units would reach 2.5 billion by 2050).
9. This assumes that the 2016 emissions of 1.28Gt of CO2e are produced by 843 million units, which rise to 1,268 units by 2030 and consume electricity with a constant emissions factor. The unit numbers are based on 750 million UAC units in 2012 (Green Cooling Initiative) and a 3% compound annual growth rate 2015-2050 provided by the Clean Energy Ministerial in 2016.
10. Based on calculations using the U.S. Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator.
11. Study Verifies Coil Cleaning Savings Energy. Ross D. Montgomery, P.E., Member ASHRAE; and Robert Baker, Member ASHRAE, ASHRAE Journal. Nov 2006. 34-36.
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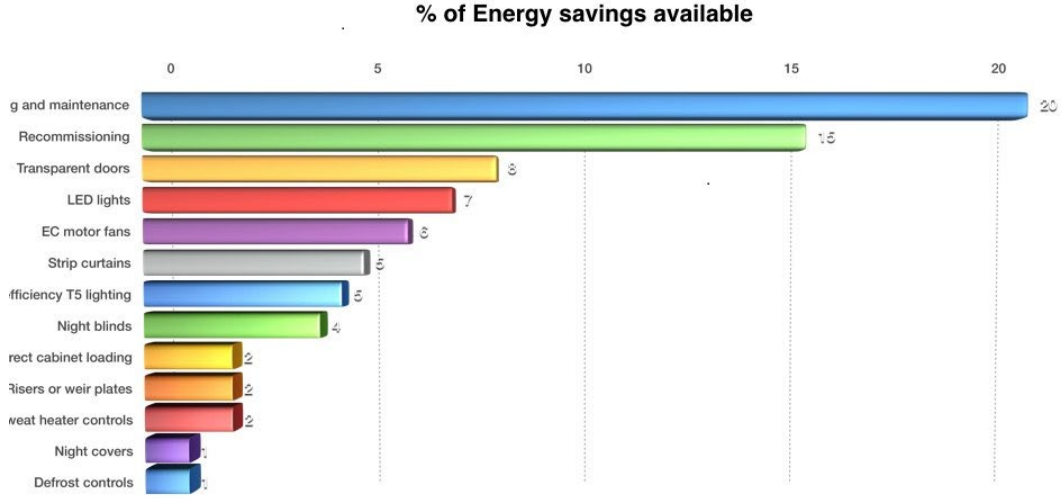
The Carbon Trust has identified cleaning and maintenance as the largest area for energy savings in cold chain refrigeration

"In the UK, refrigerated display cabinets use around 5,800 GWh/year. This is over a third of all the electricity used for refrigeration in the food chain and costs around £500m per year."

Refrigerated display cases rank number 1 in areas where energy use can be significantly cut. (source; Carbon Trust)



CONDENSER COIL CLEANING: FACT SHEET

The vast majority of self-contained condenser coils now in service are not cleaned under existing preventative maintenance protocols: they are allowed to run dirty.

One refrigeration expert recently stated: "Eighty percent of operators do nothing, no maintenance, ever. Maybe 20% do some, but not enough". *Source: Refrigeration Magazine December, 2015*.

Coils need cleaning at least quarterly for: (a) reduced electrical usage; (b) reduced service calls; and (c) prolonged equipment life. Dirty coils are the main reason for service calls. With routine quarterly maintenance, operators have virtually no breakdowns. *Sources: Food Service Technology Center (FSTC), San Ramon, CA* and *Refrigeration Magazine December, 2015.*

Exemplary yearly savings for refrigerator coil cleaning: Average energy savings of 17%. An average of 1250 KwH/non-residential unit/year and 280 KwH/residential unit/year. *Sources: Cool Savings Project – FSTC and the City of San Francisco (*https://fishnick.com/publications/fieldstudies/SFE_Refrigeration_Cool_Savings_Report.pdf - see p.10) and CoilPod LLC analysis. A "knowledge brief" from the Kigali Cooling Efficiency Projects surmises an average energy savings of 19.2% (http://k-cep.org/wp-content/uploads/2018/03/Optimization-Monitoring-Maintenance-of-Cooling-Technology-v2-subhead....pdf – see p. 2, Fig.1)

Compressed air is needed to quickly and effectively remove deeply deposited dirt/debris inside the coil's structure. *Source: CoilPod LLC (manufacturer of the COILPOD dust hood – described at www.coilpod.com).*

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