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**DETERMINATION OF STATEWIDE GREENHOUSE GAS EMISSIONS LIMIT AND
SECTOR-SPECIFIC SUBLIMITS FOR 2050**

Pursuant to the Global Warming Solutions Act (Chapter 298 of the Acts of 2008, “GWSA,” as amended and codified at M.G.L. c. 21N, “Chapter 21N”), and having consulted with the Department of Environmental Protection (MassDEP) and the Department of Energy Resources (DOER), I hereby adopt the 2050 statewide greenhouse gas (GHG) emissions limit of Net Zero, defined as follows:

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 85 percent below the 1990 level.

In consultation with the Secretary of the Executive Office of Housing and Economic Development and the Secretary of the Massachusetts Department of Transportation, I hereby adopt the following sector-based statewide greenhouse gas emissions sublimits as components of the 2050 Net Zero statewide greenhouse gas emissions limit, represented as a percent reduction from the 1990 levels:

		2050
Statewide Limit		85%
Sector-based Sublimits	Residential Heating and Cooling	95%
	Commercial & Industrial Heating and Cooling	92%
	Transportation	86%
	Electric Power	93%
	Natural Gas Distribution & Service	72%
	Industrial Processes	-27%

* All limits shown are represented as percentage reductions as compared to 1990 levels.

* See Clean Energy and Climate Plan for 2050, Chapter 3, for more details on the limit and sublimits.

The sector-specific sublimits are set at levels slightly more stringent than necessary to achieve the required 85% GHG reduction target to allow for some margins for error in meeting each of the sector-specific sublimits.

The Massachusetts Clean Energy and Climate Plan for 2050 (“2050 CECP” or “Plan”), issued contemporaneously with this letter pursuant to Chapter 21N, provides a comprehensive, clear, and specific roadmap plan for how the Commonwealth will achieve Net Zero in 2050. The 2050 CECP is a landmark plan to prepare the Commonwealth for a Net Zero future and presents policies and programs to achieve Net Zero. As technology advances, climate science improves, and laws and regulations change, this plan will need to be adjusted to ensure the Commonwealth remains on the most effective pathway to Net Zero in 2050.

Background

The *Global Warming Solutions Act* (GWSA), passed in 2008 and amended most recently in the 2021 *An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy*, established Massachusetts’ comprehensive regulatory program to address climate change. The GWSA requires the Commonwealth to set emissions limits and sector-specific sublimits to maximize our ability to achieve Net Zero in 2050.

Since the GWSA was passed, the Commonwealth has developed a robust clean energy industry, expanded workforce opportunities, and accelerated GHG emissions reductions. In December 2020, the Baker-Polito Administration released the Massachusetts 2050 Decarbonization Roadmap (2050 Roadmap), detailing the necessary strategies and transitions in the near- and long-term and addressing the tradeoffs across different pathways to reach the levels of deep decarbonization needed to achieve net zero. In March 2021, Governor Baker signed into law *An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy* (2021 Climate Law), codifying the state’s commitment to Net Zero, increasing protections for environmental justice populations, and establishing a framework to plan and prepare to achieve Net Zero in 2050.

In June of this year, Massachusetts reported that it had met its 2020 emissions limit of 25% below the 1990 level by achieving an emissions level of at least 31.4% below the 1990 level, based on available data and measurements. The same day, the Secretary of the Executive Office of Energy and Environmental Affairs (EEA) established the emissions limits, accompanying sublimits, and released a plan to achieve those limits and sublimits for 2025 and 2030 in the Massachusetts Clean Energy and Climate Plan for 2025 and 2030. Through the combination of reducing emissions from and electrifying energy sources, Massachusetts is projected to achieve its emissions limits while continuing to support a vibrant economy, resilient communities, and a growing population.

Since the 2021 Climate Law, EEA, in consultation with MassDEP, DOER, other Commonwealth agencies, various regional authorities, and stakeholders, has been engaged in an analytical process to determine the necessary and appropriate strategies to achieve our GWSA limits and sublimits and maximize our ability to achieve Net Zero in 2050. These efforts have culminated in the 2050 CECP.

Achieving Net Zero in 2050 will require both government and private actions across the Commonwealth. Acknowledging the importance of including stakeholders in the process of planning for deep decarbonization, in October 2022, EEA posted for public review and comment the proposed emissions limit, sector-specific sublimits, natural and working land goals, and the

strategies, policies, and actions to achieve each limit and goal in 2050. EEA conducted three public hearings by webinar, which included live translation in Spanish, Portuguese, Haitian Creole, Vietnamese, and Cantonese, and the recordings were made available online. EEA also accepted written comments through October 21, 2022. EEA has reviewed more than 100 individual comment submissions, which provided valuable input and feedback in finalizing this determination.

Statutory Mandate

The GWSA “was passed to address the grave threats that climate change poses to the health, economy, and natural resources of the Commonwealth. The act is designed to make Massachusetts a national, and even international, leader in the efforts to reduce the greenhouse gas emissions that cause climate change.”¹ The GWSA, as amended most recently by the 2021 Climate Law, requires the Secretary of EEA to adopt a 2050 statewide emissions limit that achieves at least net-zero statewide greenhouse gas emissions, provided that in no event shall the level of emissions in 2050 be higher than a level 85 percent below the 1990 level. The law also requires the 2050 limit be accompanied by publication of a comprehensive, clear, and specific roadmap plan to realize said limit.

The GWSA requires consultation on each part of the limits, sublimits, and accompanying roadmap plans with various state and regional entities, as well as stakeholder engagement. Among other requirements, the Secretary must consider all relevant information pertaining to greenhouse gas emissions reduction goals and programs in other states and nations, evaluate the total potential costs and economic and noneconomic benefits of various reduction measures, and take into account the relative contribution of each source or source category to statewide greenhouse gas emissions.

Findings of Fact

Based on the findings and recommendations in the regional and Massachusetts-specific quantitative analysis conducted as part of EEA’s 2050 Decarbonization Roadmap effort and the analysis conducted in connection with the development of the 2050 CECP, I make the following findings:

- The 2050 CECP presents a portfolio of bold, ambitious, and viable policies, strategies, and plans for 2050 to achieve gross emissions reductions of at least 85% below the 1990 level. The Plan targets emissions reductions across all sectors of the economy in an integrated and balanced manner. The Plan is based on the current understanding and assessment of technical opportunities and limitations in each sector, relative costs across options, and the scope and pace of transformation in each sector to maximize the Commonwealth’s ability to achieve Net Zero in 2050.
- The analysis supporting the 2050 CECP shows that accelerating electrification of the transportation sector is needed. Such electrification will result in only a very small percentage of aged internal combustion engine vehicles remaining in 2050.
- The analysis shows that the lowest cost and lowest risk approach to decarbonize buildings is to advance energy efficiency by tightening building envelopes to significantly reduce the energy usage of buildings across the Commonwealth. In addition, the Commonwealth’s

¹ New England Power Generators Assoc. v. Dept. of Env’tl Prot., 480 Mass. 398, 399 (2018).

dominant strategy for building decarbonization is electrification. With the recommendations from the Commission on Clean Heat, and additional stakeholder engagements, the Commonwealth will develop and implement new regulatory approaches and programs to advance equitable access to clean heating technologies.

- Deploying clean energy to provide emission-free electricity is at the core of Massachusetts' clean energy transition. Such deployment requires substantial investment in offshore wind, solar photovoltaics (PV), energy storage, electric transmission, and a modern distribution system. These investments will require the Commonwealth to work closely with electric utilities across the Commonwealth to ensure that effective long-range system planning will ensure adequate investments in delivering clean, reliable, and affordable electricity to the residents and businesses of the Commonwealth.
- The wholesale electricity market needs significant reforms to efficiently integrate the clean energy needs of the region. Further, the high-voltage transmission system of the New England grid must be well planned so that adequate transmission capacity can deliver the necessary clean energy to and across New England and to ensure that the electricity system is resilient to variable and extreme weather conditions. Massachusetts remains committed to working closely with all neighboring states, the Independent System Operator of New England, and federal agencies to reform the way the wholesale electricity market is designed and operated, and the transmission system is planned, built, and paid for.
- Natural and working lands are one of Massachusetts' most valuable assets and protecting them from conversion will be key to achieving net-zero emissions in 2050. Thus, great efforts are needed to protect, manage, and restore our natural and working lands. In addition to their ability to sequester carbon dioxide and store carbon, they provide natural habitats for diverse ecosystems of plants and animals, and valuable places for recreation.
- The projections conducted and the analysis used to support the 2050 CECP assume that the remaining GHG emissions in 2050 are predominantly from fuel use in applications that cannot be easily or effectively electrified with today's technologies. This largely includes jet fuel use in aviation and varied fuel use in some remaining buildings (residential, commercial, and industrial).
- The availability of sustainable bio-based alternative fuels is limited. Current analysis assumes that the Commonwealth will supplement about half of the remaining total liquid and gaseous fuel needs in 2050 with fossil-fuel alternatives like biofuels from waste-based feedstocks along with some hydrogen and synthetic fuels. As technologies and alternative low and zero-carbon fuels become more available and more economical, such assumptions may need to be revisited.
- Massachusetts is unlikely to be a major driver of future markets for alternative fuels due to its relative size of demand and its fuel production capabilities. However, Massachusetts is well-poised to contribute to technological innovation through its academic and research institutions. In addition, opportunities to use the region's clean energy to help produce alternative fuels will be explored with the support of federal funding. Thus, future Clean Energy and Climate Plans will update the potential production and use of alternative fuels in Massachusetts to achieve Net Zero.
- Achieving net-zero emissions in 2050 will require the annual removal and storage of carbon dioxide or its equivalent by, or attributable to, the Commonwealth in quantities equal to the residual level of annual statewide greenhouse gas emissions. These removals will come from net carbon sequestration on Massachusetts' natural and working lands, and will also likely

need to include procuring additional nature- or engineering-based carbon sequestration from outside the Commonwealth.

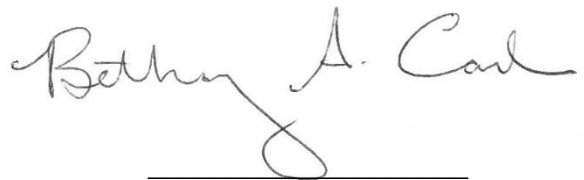
- Securing and procuring additional carbon sequestration resources requires a regionally consistent accounting framework to ensure that resources are of high integrity, include no double-counting, and minimize risks and unintended negative effects. If securing additional carbon sequestration resources is not feasible, Massachusetts will need to further reduce emissions to achieve Net Zero in 2050.

Determination of 2050 Limit and Sublimits

Based on the findings above, I hereby determine that the statewide greenhouse gas emissions limit of Net Zero and associated sector-based sublimits listed above for 2050, are reasonable and appropriate statewide emissions limits necessary to adequately protect the health, economy, people and natural resources of the Commonwealth, and maintain Massachusetts' critically important role as a national and international leader in the global effort to reduce the greenhouse gas emissions that cause climate change in a manner consistent with the goals of the GWSA.

December 21, 2022

Date



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