

## **Recommendations from the GWSA IAC Buildings Working Group**

### **October 23, 2018**

In response to EEA's 2017-2018 Work Plan for the IAC and due to the IAC's role as an advisory body, members of the IAC Buildings Working Group have developed and submitted the following recommendations to EEA and the IAC for consideration regarding the 2020 update to the Commonwealth's *Clean Energy and Climate Plan*. The IAC Buildings Working Group looks forward to continued involvement, participation, and dialogue around the development of building sector inputs and strategies included in the 2020 CECP, and the CECP process overall.

#### **Background & Nature of the Challenge**

According to the Commonwealth's latest inventory, burning oil and gas for space heating and building services produces about 33 percent of statewide greenhouse gas emissions annually.<sup>1</sup> When emissions from electricity used in buildings are included, that number grows dramatically, to about 50 percent.<sup>2</sup> Absent new regulations and programs designed expressly to reduce building sector emissions – particularly those which result from on-site combustion – Massachusetts will fail to meet its obligations under the Global Warming Solution Act (GWSA), almost certainly by 2030 and without doubt by 2050.<sup>3</sup> As a result, Massachusetts must act decisively to limit building sector emissions by fostering, incentivizing, and requiring – beginning today – a robust and steady thirty-year transition to clean heating, cooling, and building services in all real estate sectors statewide.

Decarbonizing the building sector involves ensuring that all building services are provided by ultra-low, if not net-zero, emissions energy sources by 2050.<sup>4</sup> And, as recent quantitative analysis confirms,<sup>5</sup> that challenge is overwhelmingly one that must focus on remediating – that is, retrofitting, or otherwise making 2050-compliant – existing structures. In order to reach our GWSA goals, this retrofitting effort must touch about 3 million buildings that are in service today and will represent approximately 85% of the structures that we reasonably expect will be in service in 2050. A large extent of making such structures 2050-compliant will involve modifying both building envelopes and their heating and service appliances (e.g., space and water heaters). Such conversions – of whichever type – must accelerate by 2020 and proceed on a pace and scale never before seen in New England: on the order of about 100,000 per year, for

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<sup>1</sup> MassDEP GHG Inventory (2015) (reporting statewide emissions of 76.3 MMTCO<sub>2</sub>e and total residential, commercial and industrial building emissions of 25 MMTCO<sub>2</sub>e).

<sup>2</sup> See EEA Presentation, GWSA Buildings Projections: Reference Case (Aug. 13, 2018), at 15.

<sup>3</sup> Initial emissions modeling by EEA using LEAP predict “business as usual” building sector emissions in 2030 of about 21 MMTCO<sub>2</sub>e and in 2050 of about 19 MMTCO<sub>2</sub>e; those levels represent about 48 and 100% of the Commonwealth's all-economy, all-sector statewide emissions limits for those years.

<sup>4</sup> See, e.g., Williams et al., *Pathways to Deep Decarbonization in the United States* (Nov. 2014) at 25-27 (describing technically viable decarbonization strategies for residential and commercial building sectors); *id.* at 66 (Decarbonizing the residential building sector likely requires “a rapid and relatively near-term transition, as electric heat [must constitute] the majority of new heating sales by 2020, and of total residential heating stock and final energy use by the 2030s, with almost all heating from electricity by 2050.”).

<sup>5</sup> See, e.g., Carbon Free Boston Presentation, *Building Sector Technical Advisory Group Meeting #3* (Jun. 8, 2018) at 36 (estimating 85% of Boston's 2050 building stock currently exists with only 15% coming from new build, 2018 - 2050).

every year between 2020 and 2050 in Massachusetts alone, which is about a 10x increase over current annual space heating conversions.

### Recommendations

Based on the above understanding of the scope of the Commonwealth's building sector emissions and the nature, scale, and pace of change required to successfully decarbonize buildings across Massachusetts as required to meet the mandated thresholds of the GWSA, we make the following 4 major recommendations. These are designed to immediately create the needed market signals and investment by establishing a concrete, cost-effective, and feasible 2020 to 2050 pathway for addressing building sector emissions.

**(1) *Set Mandatory Emissions Reduction Limits on Buildings by 2020.*** Consistent with the state's ongoing obligation under the GWSA to ensure steadily declining, volumetric reductions in statewide emissions, including those in the building sector,<sup>6</sup> EEA should set mandatory emissions reduction limits no later than about 2020, ramping up to 2030 and beyond, in order to achieve 2030 and 2050 thresholds. There are a range of potential regulations and complementary programs available for doing so, including:

- Higher renewable thermal requirements for electric utilities;
- A requirement for gas utilities to demonstrate compliance with the Alternative Portfolio Standard (APS);
- A mandatory threshold for the percentage of heating and cooling statewide that will come from renewable or electric sources (e.g. 30%) by 2030;<sup>7</sup>
- Incentives for the early retirement of inefficient HVAC systems and conversion to clean heating and cooling systems;
- Requirements to phase out fuel oil #2 and #6, and gas after a certain date; and
- Other actions already recommended by the State's Department of Energy Resources (DOER).<sup>8</sup>

**(2) *Make the Building Code 2050-Compliant.*** Because each building placed in service today is expected to be in service in 2050, and because building system costs are best minimized (and capitalized) at construction, the State should, by about 2020 and no later than the adoption of the 2021 International Codes, comprehensively revise and update the Massachusetts State Building Code to require all new construction and major renovations to meet 2050-compliant building envelope standards in addition to supporting greater adoption of distributed energy resources and energy resiliency, including: storage; renewables for electricity and thermal energy; zero-emission vehicle (ZEV) charging; and district heating and cooling.

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<sup>6</sup> New England Power Generators Association, Inc. v. Department of Environmental Protection, No. SJC-12477 (Sept. 4, 2018).

<sup>7</sup> MassDOER, *Commonwealth Accelerated Renewable Thermal Strategy* (Jan. 2014) at 2 ("With aggressive support for RT technologies and business-as-usual rates of conversion to natural gas, the state may serve a maximum of 32% of thermal loads with RT (up to 15,000 MWth of capacity).")

A number of ultra-low energy intensity, 2050-compliant codes are already in use across the U.S. and Europe (e.g., Living Building Challenge, PHIUS+ 2015) that provide ready examples in whole or in part.

**(3) *Require Expanded, Detailed Building Performance and Emissions Reporting and Improvements.*** EEA should work quickly to remedy the systemic lack of accurate information regarding building system performance and related building service emissions in Massachusetts by:

- Imposing, by 2020, mandatory building energy performance reporting requirements on all buildings of 20,000 square feet or greater throughout the Commonwealth, ratcheting down to smaller building footprints closer to 2030 and beyond.
  - Boston’s Building Energy Reporting and Disclosure Ordinance (BERDO) and Cambridge’s Building Energy Use and Disclosure Ordinance (BEUDO) provide ready examples of successful mandatory energy reporting and disclosure frameworks the state can emulate.
- Establishing high performance building requirements for new and existing buildings (e.g. imposing a GHG emissions per square foot cap).
- Requiring building energy efficiency scorecards at the point of listing for sale, lease, or rental to cover all building sizes and types by 2030, embedding these into the MLS and enumerating the climate, economic, and public health benefits, among others, of efficiency.
- Providing resources and guidance on green leases and other financing and incentive tools for both owners and tenants.

**(4) *Maintain a Cross-Sectional Focus.*** Our lives revolve around our homes and the buildings in which we work. Livable 2050-compliant buildings are connected to, and dependent on, a design ecosystem that includes local zoning; local, regional, and state transportation planning; our energy supply systems; public health considerations; and more. As we work to decarbonize our building sector as required by the GWSA, EEA should actively maintain a dynamic, cross-sector, “integrative design” approach that looks for and leverages win-win options that achieve or advance multiple goals simultaneously wherever possible. These include:

- **An interconnected regulatory landscape:** Explicit alignment between other environmental regulations and statutes and the mandated GWSA requirements, including the 3-year Energy Efficiency Plans, which are governed under the Green Communities Act, and the Board of Building Regulations and Standards (BBRS), which governs the State Building Code.
- **Local levers:** State funding and technical assistance programs that enable, accelerate, and incentivize climate-smart zoning, permitting, and inspectional processes; net zero planning; and financing mechanisms such as the HEAT loan, collective purchasing, and performance contracting.
- **Building operations:** Utility and State funding for building operator training and other workforce opportunities; routine commissioning; occupant-focused behavioral change programs; energy management systems, smart lighting, and

other smart controls; demand response programs; and technology transfer.

- **Resiliency:** Nature-based solutions (e.g. eco-roofs), preparedness, and smart growth coupled with energy resilient infrastructure and systems, including renewable-fueled microgrids, district heating and cooling systems, and storage.
- **Mobility and Smart Growth:** Buildings that serve as 2-way conduits for the transportation system of the future, including V2X,<sup>9</sup> lower parking requirements, Transportation Demand Management (TDM) strategies for workplace employees, and connections to transit and bike/ped infrastructure.
- **Waste:** Building level requirements in the municipal, residential, and commercial/industrial sectors for waste reduction, diversion, and clean waste-to-energy production.
- **Equity:** All of the programs and strategies suggested within these recommendations should provide adequate incentives and support for affordable housing and low- and moderate-income residents to comply with any mandates and fully participate in all benefits and opportunities.

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<sup>9</sup> V2X means generally vehicle-to-everything, and can include the grid, other vehicles, the built environment, and more. See, e.g., <https://www.zdnet.com/article/what-is-v2x-communication-creating-connectivity-for-the-autonomous-car-era/>