

# Commonwealth of Massachusetts

## Draft Climate Implementation Plan

### A framework for meeting the 2020 and 2050 goals of the Global Warming Solutions Act

#### 1. Introduction and Background

Since 2007, through comprehensive legislation, regulatory innovations, new incentives, and public/private partnerships, Massachusetts has launched to national leadership on building the clean energy economy and addressing climate change. With the most aggressive energy efficiency program in the country, solar installations that have multiplied twenty fold, wind installations that have multiplied ten fold, new building codes, and development of low carbon fuel standards, Massachusetts' clean energy sector is growing and greenhouse gas (GHG) emissions are decreasing.

The [Global Warming Solutions Act](#) (GWSA)<sup>1</sup> was one of numerous energy and environment bills passed in 2008 designed to reduce energy costs to ratepayers, expand clean energy jobs, attract clean energy businesses, increase the state's energy independence and reduce greenhouse gas emissions. When signed by Governor Deval Patrick in August 2008, the GWSA made Massachusetts one of the first states in the nation to move forward with a comprehensive program to address climate change.

The Act requires the Commonwealth, on an economy-wide basis, to:

- by 2020, reduce statewide GHG emissions between 10 percent and 25 percent below the statewide GHG emissions level in 1990, and
- by 2050, reduce statewide GHG emissions at least 80 percent below the statewide GHG emissions level in 1990.

To ensure that these goals will be met, by January 1, 2011 the Secretary of the [Executive Office of Energy and Environmental Affairs](#) (EOEEA)<sup>2</sup>, in consultation with other state agencies and the public, must:

- Set the 2020 emissions target (between 10% and 25%),
- Develop an implementation plan for achieving the required GHG emissions reductions by 2020.

**This draft implementation plan sets out a basic framework for meeting these goals and provides a basis for public and stakeholder comment to**

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<sup>1</sup> At <http://www.mass.gov/legis/laws/seslaw08/sl080298.htm>.

<sup>2</sup> At <http://www.mass.gov/eoeea/>.

**inform EOEAA action in setting the 2020 GHG reduction target and developing the implementation plan.**

**In April, Secretary Bowles announced a series of public hearings at which he would take public comment on a 2020 reduction target between 18 percent and 25 percent, as well as testimony on measures to achieve the target that show the greatest potential for energy cost savings and job growth.**

## **2. Development of the Draft Plan and Current Analysis**

This draft plan was developed by an inter-agency team with invaluable input from the Climate Protection and Green Economy Advisory Committee and an expert consultant team. As mandated by the Act, the Climate Protection and Green Economy Advisory Committee includes members representing the following sectors: commercial, industrial and manufacturing; transportation; low-income consumers; energy generation and distribution; environmental protection; energy efficiency and renewable energy; local government; and academic institutions. The Advisory Committee has held three public meetings and has also established seven subcommittees that have each held series of meetings to examine specific sectors of the economy. The consultant team includes several highly regarded firms with expertise from across all sectors of the economy and includes Eastern Research Group, Inc. (ERG), Synapse Energy Economics, Cambridge Systematics, Abt Associates, and Stockholm Environment Institute-US.

Analyses to date, as required by the Act, have determined fundamental aspects of Massachusetts GHG emissions history and projected emissions that are critical to making decisions moving forward (See Figure 1).

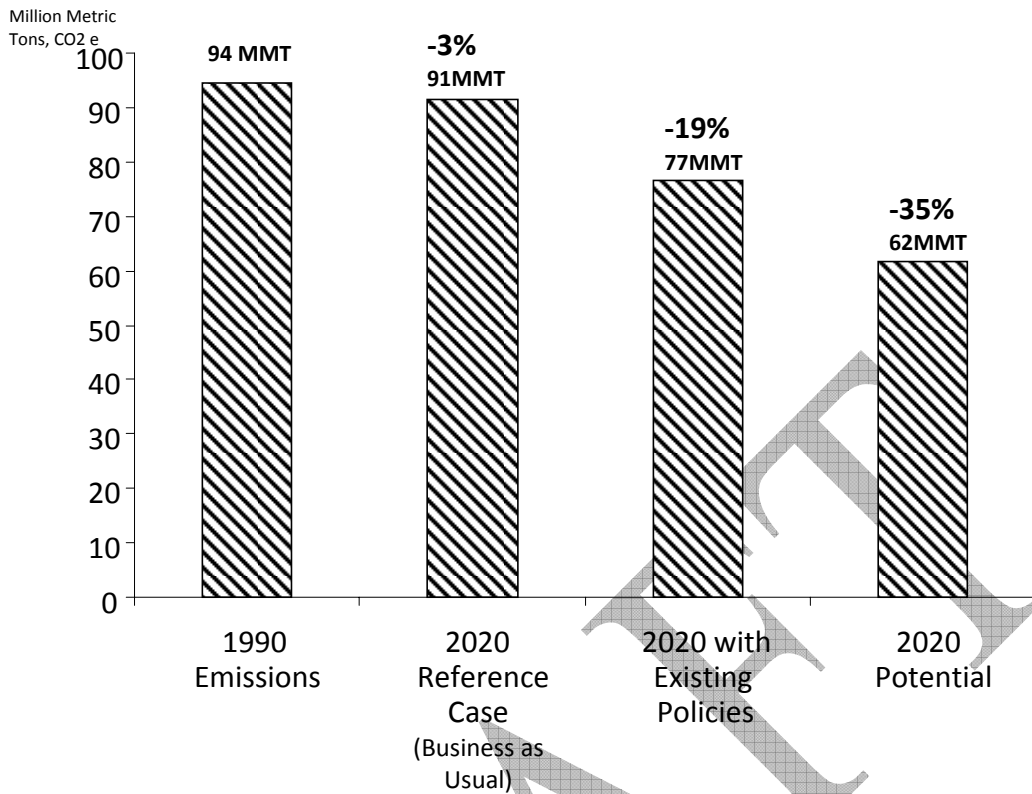
1. Overall, emissions in Massachusetts have remained relatively steady from 1990 through the present<sup>3</sup> ;
2. Modeling results show that in a Business as Usual scenario, without any new climate related policies since 2007, emissions would remain relatively steady from the present through 2020<sup>4</sup> ;
3. Modeling results also show that cost-effective policies enacted and planned since 2007 have already put us on a path to achieving emissions reduction of approximately 19% from 1990 levels by 2020<sup>5</sup>.
4. Further potential exists for low or no-cost reductions of up to a total of 35% reductions in GHG emissions below 1990 levels by 2020<sup>6</sup>.

<sup>3</sup> "Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection." July 1, 2009, at [http://www.mass.gov/dep/air/climate/1990\\_2020\\_final.pdf](http://www.mass.gov/dep/air/climate/1990_2020_final.pdf)

<sup>4</sup> "Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection." July 1, 2009, at [http://www.mass.gov/dep/air/climate/1990\\_2020\\_final.pdf](http://www.mass.gov/dep/air/climate/1990_2020_final.pdf)

<sup>5</sup> "Initial Estimates of Emissions Reductions from Existing Policies Related to Reducing Greenhouse Gas Emissions." ERG, April 30, 2010, at <http://www.mass.gov/dep/public/committee/ergprt.pdf>

<sup>6</sup> "Cost-Effective Greenhouse Gas Mitigation In Massachusetts: An Analysis Of 2020 Potential." [http://www.mass.gov/dep/air/climate/gwsa\\_docs.htm#implement](http://www.mass.gov/dep/air/climate/gwsa_docs.htm#implement)



**Figure 1.** Total Greenhouse Gas Emissions in Massachusetts (Bars show total GHG emissions in Massachusetts, while percentages show reductions in each case as compared to 1990 emissions.)

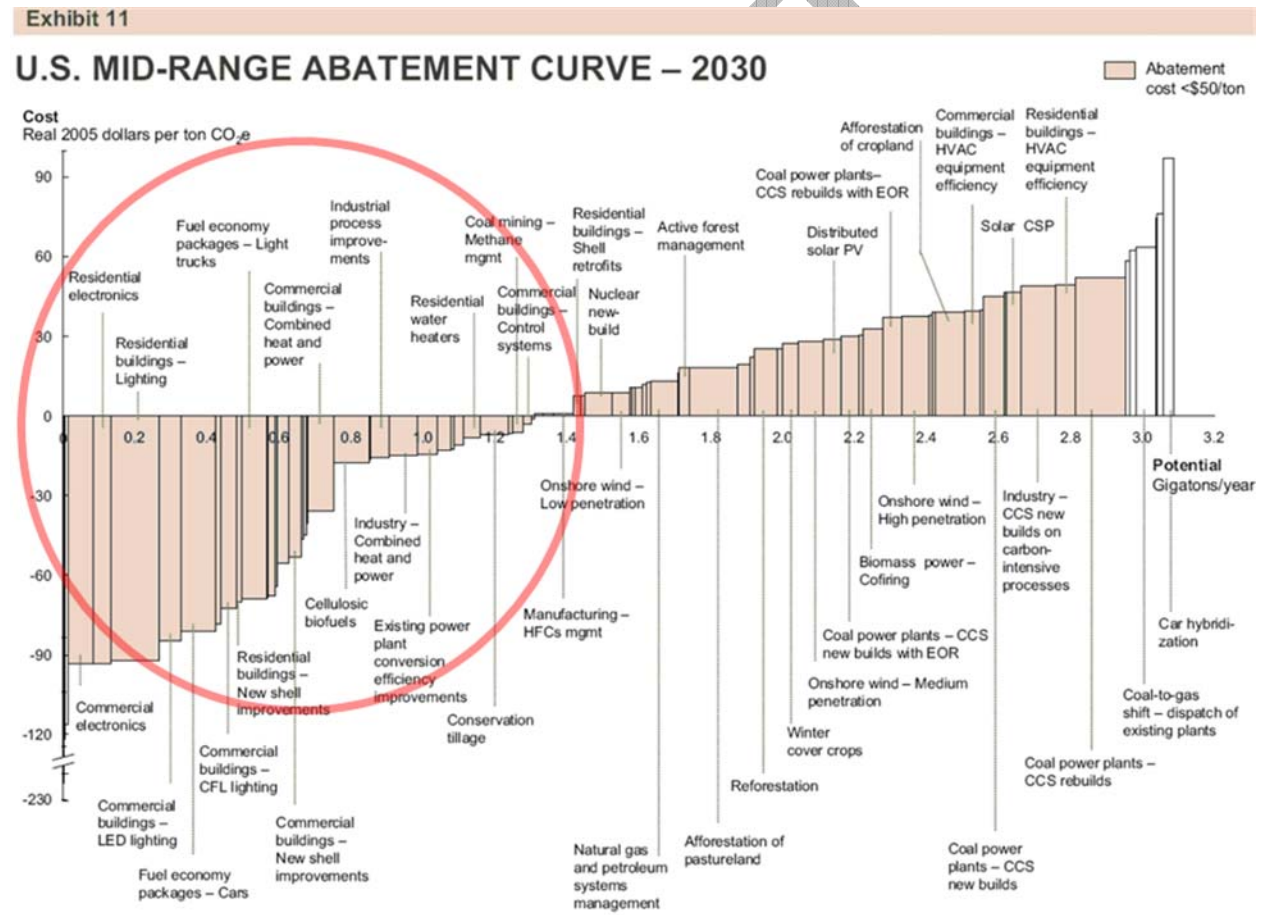
### 3. Draft Plan for Achieving Greenhouse Gas Reductions by 2020

EOEEA Secretary Bowles has stated his intention to set a 2020 emissions reduction requirement of 18 to 25 percent below 1990 levels and to consider for the plan to achieve this target only those measures that show potential for significant energy cost savings and/or job creation.

#### A. Criteria for Strategies to Reduce Massachusetts GHG Emissions

As outlined in the Act, the criteria used to develop a 2020 implementation plan are broad. These focus on cost-effective GHG reductions; lowering costs for consumers; increasing energy independence; promoting a clean energy economy; providing equity in costs and benefits; seizing opportunities for economic development in traditionally underserved communities; capitalizing on the Commonwealth's strategic advantages of a highly educated workforce, and innovative public and private institutions; creating complementary policies that reap GHG benefits and other environmental or health-related benefits; and creating a path to 80% reductions by 2050.

A wide range of regional, national and international studies suggest that there are abundant cost-effective opportunities, or “low-hanging-fruit,” that can meet many of these criteria simultaneously. One specific example of a study that examines this kind of potential is found in the widely cited 2007 report “Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?,” by McKinsey & Company. McKinsey estimated the tons of GHG emissions that could be reduced throughout the economy at various costs per ton. McKinsey found that a large portion of the potential reductions would save money, because the energy bill savings would exceed the initial costs; and that many other reductions could be accomplished at reasonable net costs (See Figure 2).<sup>7</sup>



**Figure 2.** McKinsey cost curve. Actions circled in red represent net savings or zero cost options.

As EEA develops the implementation plan, in consultation with other state agencies and the public, our focus will be on the left-hand side of the graph in Figure 2 (circled in red). Opportunities on this side of the graph represent no-

<sup>7</sup> “Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost? U.S. Greenhouse Gas Abatement Mapping Initiative Executive Report,” December 2007, Jon Creyts et al., McKinsey & Company and The Conference Board. See Exhibit 11, page 20, “U.S Mid-Range Abatement Curve – 2030.”

cost or net-savings solutions – the Commonwealth’s new aggressive energy efficiency programs are found here – that result in GHG reductions *and* savings to consumers.

Still, questions remain as to how to translate broad categories of cost-effective measures and concrete policies to capture those opportunities for emissions reduction.

## **B. Where should we look for cost-effective GHG reductions?**

In February 2010, the consultant team, led by ERG, issued an analysis of the reductions expected from existing and likely policies to reduce GHG gas emissions<sup>8 9</sup>. The ERG consulting team analyzed policies that have been adopted since 2007<sup>10</sup>, are being developed by the Commonwealth or the federal government, and are likely to be developed. Altogether, the consultant team estimated that, by 2020, Massachusetts’ GHG emissions would be reduced to about 77 MMTCO<sub>2e</sub>, which is nearly 19% below 1990 levels (roughly 94 MMTCO<sub>2e</sub>).

The consultant team has subsequently identified, in their April report, significant areas for potential reduction in each of the sectors of the Massachusetts economy that produce significant GHG emissions; each area is described below. These projections were based on assumptions about future economic activity, demographic changes, and the cost and availability of technology.<sup>11</sup>

The analysis suggests 3 major areas of opportunity:<sup>12</sup>

- Transportation
- Buildings
- Energy Supply

Within each of these groups, there exists significant potential for reducing emissions from both following through on existing and anticipated policies and by

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<sup>8</sup> “Initial Estimates of Emissions Reductions from Existing Policies Related to Reducing Greenhouse Gas Emissions.” ERG, April 30, 2010, at <http://www.mass.gov/dep/public/committee/ergprt.doc>

<sup>9</sup> The scope of this analysis was the major GHG emitting sectors and did not cover GHG sinks such as forestry or several of the smaller sectors in MA.

<sup>10</sup> Pre-2007 strategies and strategies were considered to be part of the 2020 “Business As Usual” Projection.

<sup>11</sup> As with any projection of this type, there are uncertainties in many assumptions about the future. However, the analysis provides the appropriate “resolution” for public discussion about what the emissions limit for 2020 should be and the types of strategies to include in the Commonwealth’s plan for achieving the 2020 GHG emissions limit.

<sup>12</sup> While other sectors of the economy also emit significant quantities of GHGs, their emissions are small compared to the sectors listed above. These sectors include: agriculture, wastewater treatment, and natural gas and oil systems. There is potential in these smaller sectors for cost-effective reductions of GHG emissions, but they have not yet been evaluated for this draft plan. To the extent that an analysis of their potential, as well as the potential in the biogenic (primarily forestry) sector, is completed over the next several months, the potential reductions from these sectors may also be included in the implementation plan to be released by January 1, 2011.

harnessing additional cost-effective potential. The following list summarizes the opportunities identified in the two reports:

### Transportation

#### *Transportation - existing and anticipated policies:*

- Implementation of federal and California standards for lower GHG emissions from new vehicles,
- Prioritization of transportation projects that preserve the existing transportation system, support denser “smart growth” development, and promote increased public transit ridership, walking and bicycling.

#### *Transportation— identified additional cost-effective potential:*

- The overall fuel efficiency of our vehicle fleet could be improved (beyond new federal standards) cost-effectively. In addition, automobiles could operate more efficiently if motorists modified their driving (driving more slowly, accelerating and decelerating more gradually) and followed manufacturers’ operating and maintenance recommendations (such as, keeping tires fully inflated).
- Vehicle miles travelled (VMT) could be reduced by additional “smart growth” development, fewer commuters traveling in single-occupancy vehicles, or travelers reducing the number of trips they make (e.g., combining errands into a single trip or walking, bicycling, or traveling by public transit).

### Buildings

#### *Buildings - existing and anticipated policies:*

- More efficient use of electricity in buildings,
- More efficient use of natural gas and fuel oil,
- Adoption of the International Energy Conservation Code for buildings,
- Energy efficiency standards for new appliances and products,
- Requiring large-scale development projects to analyze GHG emissions and potential reductions in filings under the Massachusetts Environmental Policy Act (MEPA).

#### *Buildings – identified additional cost-effective potential:*

- Further improvements in lighting, appliances, air conditioning and building envelope could reduce electricity demand and use of fossil fuels for heating.
- “Combined heat and power” units at existing industrial sites could generate energy more efficiently than having separate boilers for heating and purchasing electricity from the utilities.
- Efficiency improvements are available where electricity or fuels are used directly in manufacturing processes (i.e., heating, motors, and pumps).

### Energy Supply

*Fuels<sup>13</sup>—existing and anticipated policies:*

- Adoption of the 2007 federal Renewable Fuel Standard and the eleven Northeast and Mid-Atlantic states' Low Carbon Fuel Standard under development,

*Electricity – existing and anticipated policies:*

- Use of the Renewable Portfolio Standard to require Massachusetts electricity sellers to obtain specific percentages of their electricity from renewable sources with demonstrable lifecycle GHG reductions,
- Increasing imports of low-carbon electricity, through proposed expansion of transmission lines that could import Canadian wind and/or hydroelectric energy.

*Electricity – identified additional cost-effective potential:*

- Additional electricity imports of low-carbon electricity, through additional expansion of transmission lines that could import Canadian wind and/or hydroelectric energy.

Other

*Industrial Processes and Solid Waste – identified additional cost-effective potential:*

- Significant reductions could be realized by avoiding direct release of gases with high global warming potential from industrial processes (in particular in refrigeration and semiconductor manufacturing) and in electrical power distribution systems.
- Diverting waste plastic, metal, paper and other materials from disposal to recycling could reduce emissions.

Other sectors of the economy, including agriculture, wastewater treatment, and natural gas and oil systems, also emit significant quantities of GHGs, but their emissions in Massachusetts are small compared to the sectors listed above. The potential for cost-effective reductions of GHG emissions from these sectors has not been evaluated for this draft plan. To the extent that an analysis of their potential, as well as the potential in the biogenic (primarily forestry) sector, is completed over the next several months, the potential reductions from these sectors may also be included in the implementation plan to be released by January 1, 2011.

## **5. Next Steps – Continued Public Engagement**

During June 2010, the Secretary of EOEEA will conduct several public hearings across the state to encourage discussion and take comment on the proposed

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<sup>13</sup> Transportation fuels are often included in transportation sector in emissions analyses. However, they involve a different set of industries and stakeholders than vehicles. In addition, the recent trend towards electrification of transportation and heating suggests grouping fuels and electricity in energy supply.

range for the 2020 greenhouse gas emissions limit for 2020 and this implementation plan. Visit the MassDEP website at [http://www.mass.gov/dep/air/climate/gwsa\\_hearings.htm](http://www.mass.gov/dep/air/climate/gwsa_hearings.htm) for the hearing schedule and location information. Public comments must be submitted by email or mail to: [climate.strategies@state.ma.us](mailto:climate.strategies@state.ma.us); or Massachusetts Department of Environmental Protection, Bureau of Waste Prevention, One Winter Street 6<sup>th</sup> Floor, Boston, MA 02108, Attn: Lee Dillard Adams. The public comment period will close on July 15, 2010.

Following the close of the public comment period, the Agencies will complete a revised plan addressing public comments by January 2011. The responsible implementing agencies will prepare specific implementation policies, programs, and/or regulations during 2011. These policies, programs, and regulations must be in place by 1/1/2012.

## **6. Questions for Public Hearings**

EOEEA has identified some questions that the agency would like to hear public comment on during the June 2010 public hearings. These are listed below, in addition the Commonwealth welcomes and encourages sector specific comments, discussion and ideas.

### *2020 Goal:*

1. Where between 18 and 25 percent below 1990 levels should the emissions limit for 2020 be set and why?

### *Growing the clean energy economy:*

2. What role can Massachusetts state government play in catalyzing the clean energy economy? What policies could inspire entrepreneurship and create markets for clean energy products and services?

### *Time horizons:*

3. Over what number of years should cost effectiveness of strategies be evaluated in pursuit of the goals of the Commonwealth for 2020 and 2050? How should future costs be compared to present costs?

### *Criteria:*

4. How should the Commonwealth evaluate and prioritize strategies to achieve 2020 and 2050 goals?

### *Linkage with Adaptation Planning:*

5. Some GHG reduction strategies are also strategies for adapting to the climate change that is unavoidable. How should these adaptation benefits be valued or prioritized regardless of the cost/benefit?