

The Global Warming Solutions Act: Proposed 1990 Greenhouse Gas Emissions Baseline and 2020 Business As Usual Projection

Technical Issues

May 18, 2009

Overview

- The Global Warming Solutions Act (GWSA)
- The Proposed 1990 Greenhouse Gas (GHG) Emissions Baseline
- The Proposed 2020 Business As Usual (BAU) Emissions Projection

The Global Warming Solutions Act

- Mandatory Reporting of GHG Emissions
- Track Statewide GHG Emissions
- Convene Advisory Committees
- Develop Limits and Plans to Achieve Statewide Reductions
- Develop 1990 Baseline and 2020 BAU Projection

Reporting of Greenhouse Gas Emissions

- Require the Reporting and Verification of GHG Emissions
- Establish a Regional GHG Registry
- Required Reporters:
 - Facilities that emit >5,000 tons/year in CO₂e and certain other air pollution sources
 - Electricity Sellers in Massachusetts
- Other Facilities May Voluntarily Report GHG Emissions
- December 29, 2008 – Initial GHG Reporting Regulations
- July 1, 2009 – Comprehensive GHG Reporting Regulations

Tracking Requirements

- Every 3 years - Publish Statewide GHG Inventory
- Every 5 years - Publish a Report Regarding GWSA Implementation Including:
 - Costs, Impact on Low Income, Impact on Other Pollutants and Other Overall Social Benefits

Climate Protection and Green Economy Advisory Committee

- Members represent all sectors of the economy and key stakeholders, including
 - commercial, industrial, manufacturing, transportation, low-income consumers, energy generation and distribution, environmental protection, energy, local government and academia
- Advise Executive Office of Energy and Environmental Affairs (EEA) on development of the Commonwealth's economy-wide plan to meet the goals of the Act using strategies that combat climate change and drive job creation and economic prosperity
- First Meeting: May 11, 2009

Emission Limits and Plans

- Statewide GHG emissions limits:
 - 2020 emission limit - **10-25%** below 1990 Baseline
 - Interim 2030 emission limit
 - Interim 2040 emission limit
 - 2050 emission limit - at least **80%** below 1990 Baseline
- Economy-wide emission reduction plans



GWSA 2010-2013 Milestones

- *Now to Summer 2010* – Evaluate Economy-Wide Policy Options to Obtain GHG Reductions
 - State Agency Working Groups
 - Public Work Sessions
- *Summer 2010* – Public Meetings to Discuss Proposed 2020 Limit and Plan
- *January 1, 2011* – Executive Office of Energy and Environmental Affairs (EEA) Set Emission Limit for 2020, Including Plan to Achieve Limit
- *January 1, 2012* – Department of Environmental Protection (MassDEP) Promulgate Regulations for 2020 Plan
- *January 1, 2013* – Regulations Take Effect

Proposed 1990 Baseline and 2020 BAU Projection

- Requirement
- 1990 Baseline
 - Purpose
 - Sectors Included
 - Methodology
 - Sectors Excluded
- 2020 BAU Projection
 - Purpose
 - Alternative Methodologies
- Schedule

Legislative mandate

*The department shall, pursuant to chapter 30A, determine the **statewide greenhouse gas emissions** level in calendar year 1990 and reasonably project what the emissions level will be in calendar year 2020 if **no measures** are imposed to lower emissions **other than those formally adopted and implemented as of January 1, 2009**. This projection shall hereafter be referred to as the projected 2020 business as usual level.*

Purpose of 1990 Baseline

- Future emission reductions will be measured from the 1990 Baseline.

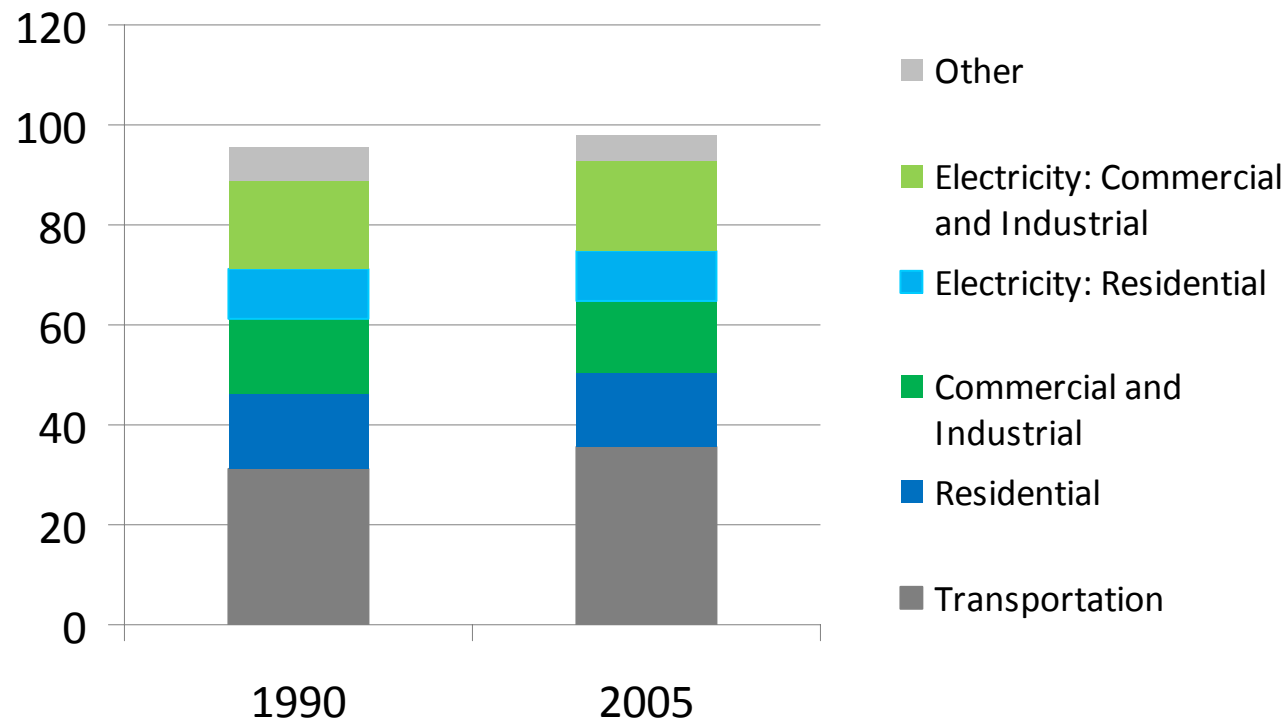
1990 Greenhouse Gas Baseline Emissions

(million metric tons of carbon dioxide equivalents)

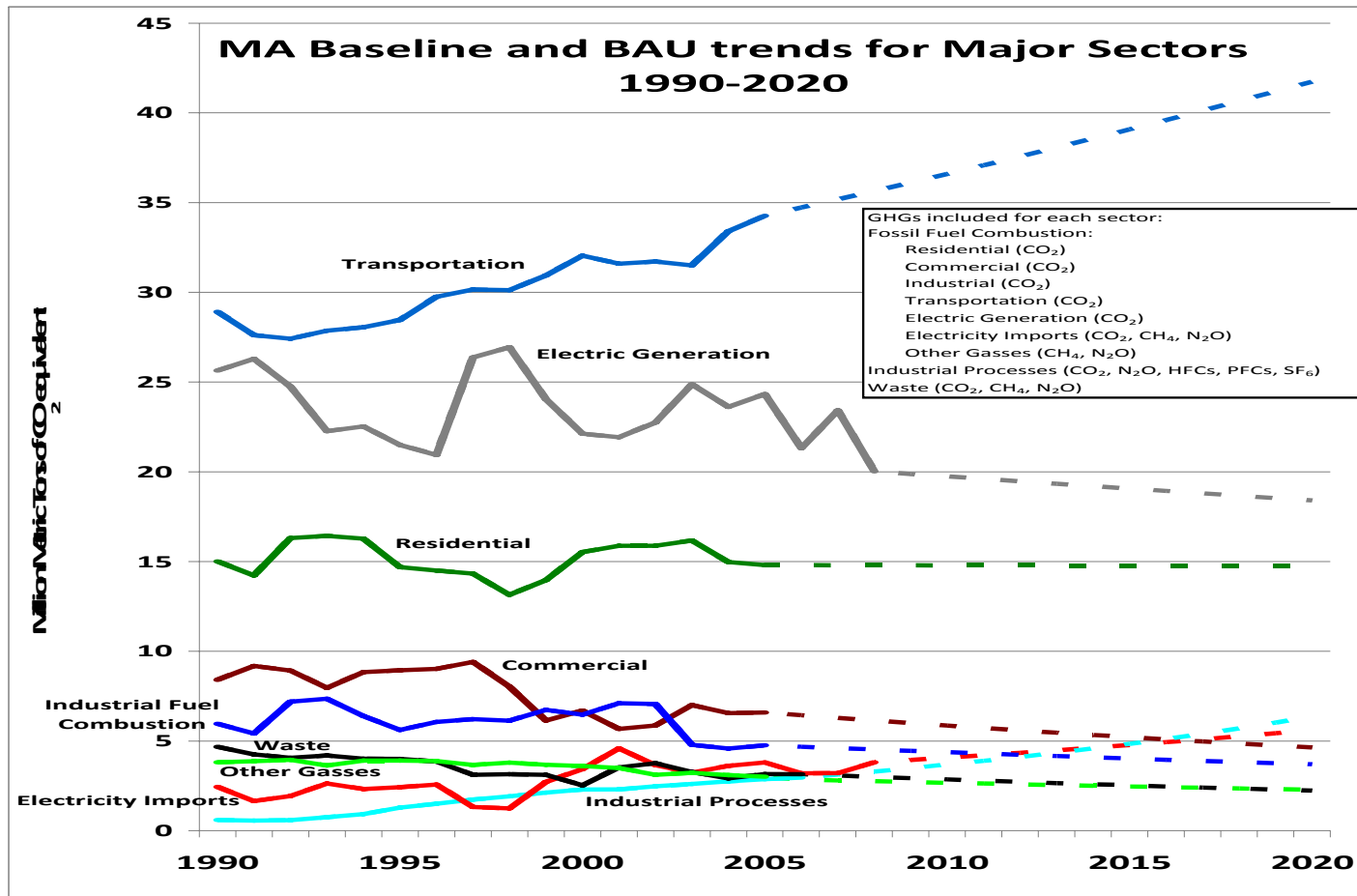
Transportation	30
Electricity	28
Residential	15
Commercial and Industrial	15
Other*	7
Total	96

*"Other" includes Agriculture, Waste, and
Natural Gas transmission and distribution

Massachusetts GHG Emissions by sector



**"Other" includes Agriculture, Waste, and Natural Gas transmission and distribution



Sectors

- Included:
 - Fossil Fuel Combustion: Residential, Commercial, Industrial, Transportation, Electric Generation (CO₂)
 - Electricity Imports (CO₂, CH₄, N₂O)
 - Stationary & Mobile Combustion, Agriculture (CH₄, N₂O)
 - Natural Gas and Oil Systems (CH₄)
 - Industrial Processes (CO₂, N₂O, HFCs, PFCs, SF₆)
 - Waste (CO₂, CH₄, N₂O)
- Excluded:
 - Embodied Emissions
- Under Consideration:
 - Land Use Change
 - Biomass (CO₂)

Methodology

- The proposed 1990 Baseline was derived using a federal software tool designed to estimate GHG emissions and using data on electricity imports.
- Details in spreadsheet Appendix to the Proposed 1990 Baseline/2020 BAU Projection on the MassDEP website http://www.mass.gov/dep/air/climate/gwsa_docs.htm

EPA SGIT

- State GHG Inventory Tool (SGIT) software by United States Environmental Protection Agency (EPA)
- Methodologies used by SGIT are described in EPA's *Inventory of U.S. Greenhouse Gas Emissions & Sinks: 1990-2007*
<http://epa.gov/climatechange/emissions/usinventoryreport.html>
- For more information about SGIT, see EPA's web site
http://epa.gov/climatechange/emissions/state_guidance.html#state
or contact Andrea Denny denny.andrea@epa.gov

Years Available, by Sector

1990-2005	<ul style="list-style-type: none"> ●CO₂ from Fossil Fuel Combustion: Residential, Commercial, Industrial, Transportation ●Stationary Combustion ●Natural Gas and Oil Systems
1990-2006	<ul style="list-style-type: none"> ●Industrial Processes (except see next slide) ●Agriculture ●Waste ●Mobile Combustion (CH₄, N₂O)
1990-2008	<ul style="list-style-type: none"> ●CO₂ from Fossil Fuel Combustion: Electric Generation ●Electricity Imports (not from SGIT)

Sectors for which SGIT has incomplete data for the 1990 Baseline

- Production of lime 1990-1992 and 2001-2006
- Production of limestone 1990-1993
- Should existing data be extrapolated back to 1990? Or averaged and applied to missing years, including 1990? Or segregate these sectors in future inventories to acknowledge they were not included in 1990?

Imported Electricity

- MA's in-state power plants only generate 75-80% of the electricity consumed by MA consumers
- GWSA defines ***Statewide greenhouse gas emissions*** as *the total annual emissions of greenhouse gases in the commonwealth, including all emissions of greenhouse gases from the generation of electricity **delivered to and consumed in the commonwealth**, accounting for transmission and distribution line losses, **whether the electricity is generated in the commonwealth or imported***

In-state + Imported Electricity GHGs

- Added:
 - GHG from in-state MA electricity generators
 - A portion of GHG from generators in New England states (CT, ME, NH, RI, VT), in years that those states generated more electricity than they used
 - A portion of GHG from generators in adjacent control areas (New York, New Brunswick, Quebec), in years that New England received net imports of electricity from those control areas

Embodied Emissions

- Embodied emissions are emissions associated with manufacturing products elsewhere and transporting them to Massachusetts
- Not included in 1990 Baseline or 2020 BAU Projection because research is in its infancy

Biogenic CO₂ Emissions

- SGIT does not calculate CO₂ emissions associated with biomass combustion by Residential, Commercial, Industrial, Transportation (ethanol) or Waste sectors, on the logic that:
 - The fuel is harvested from biomass that regrows, thus recapturing CO₂
 - Any land that does not regrow biomass is accounted for in the Land Use change part of SGIT or other EPA GHG inventories
- Should biogenic CO₂ emissions be calculated and accompany the final 1990 Baseline/2020 BAU Projection as additional information?

Land Use Change

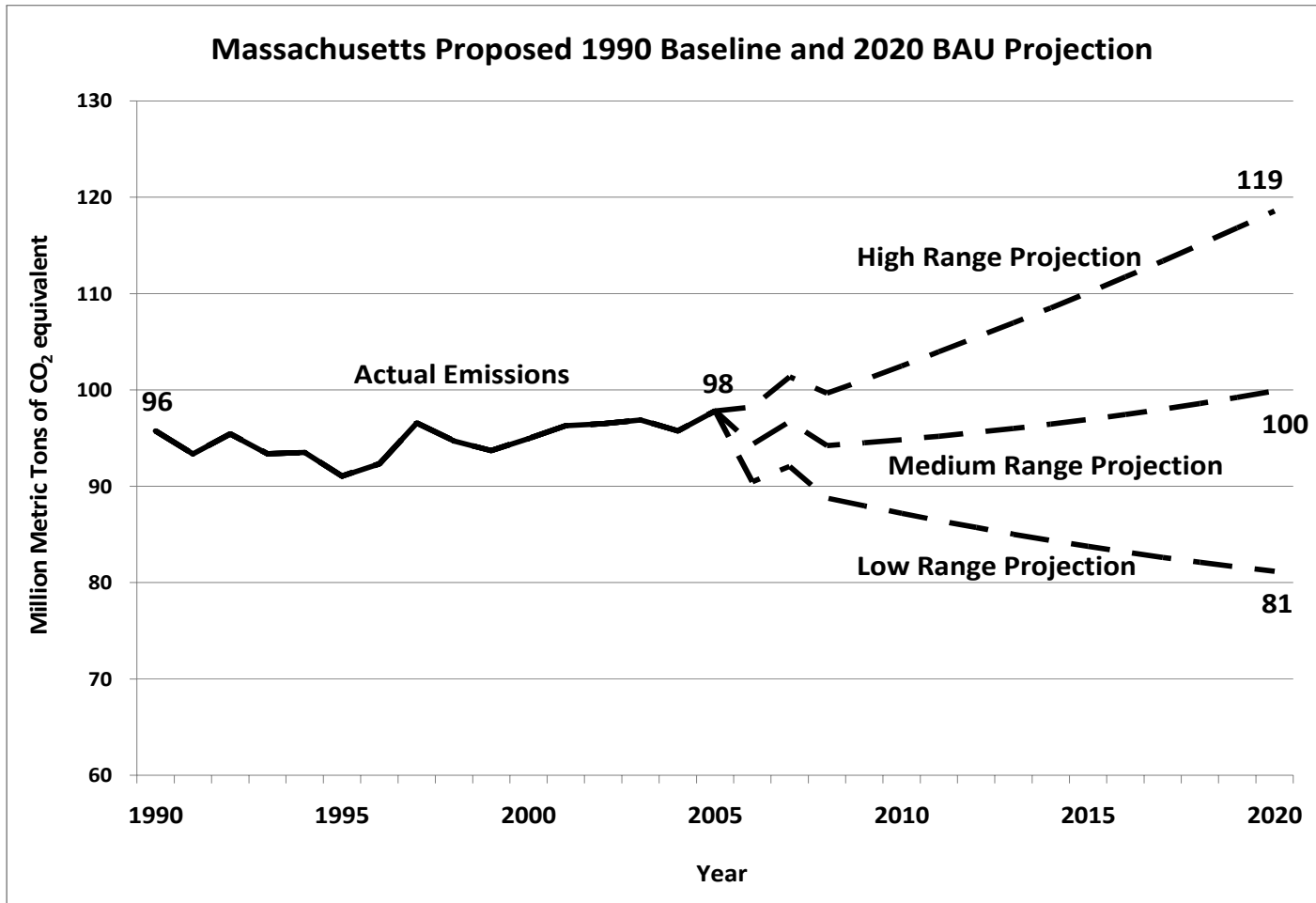
- Land Use changes can cause carbon captured in trees, grasses, roots, soils to be released, or additional carbon to be sequestered
- Not yet included in 1990 Baseline or 2020 BAU Projection because:
 - Methodology to calculate land use change has evolved, MA has intermittent historical data
 - Quantity of carbon captured in land cover is the subject of much research that is ongoing
- Based on public comment we are working to develop a 1990 value for biomass sinks

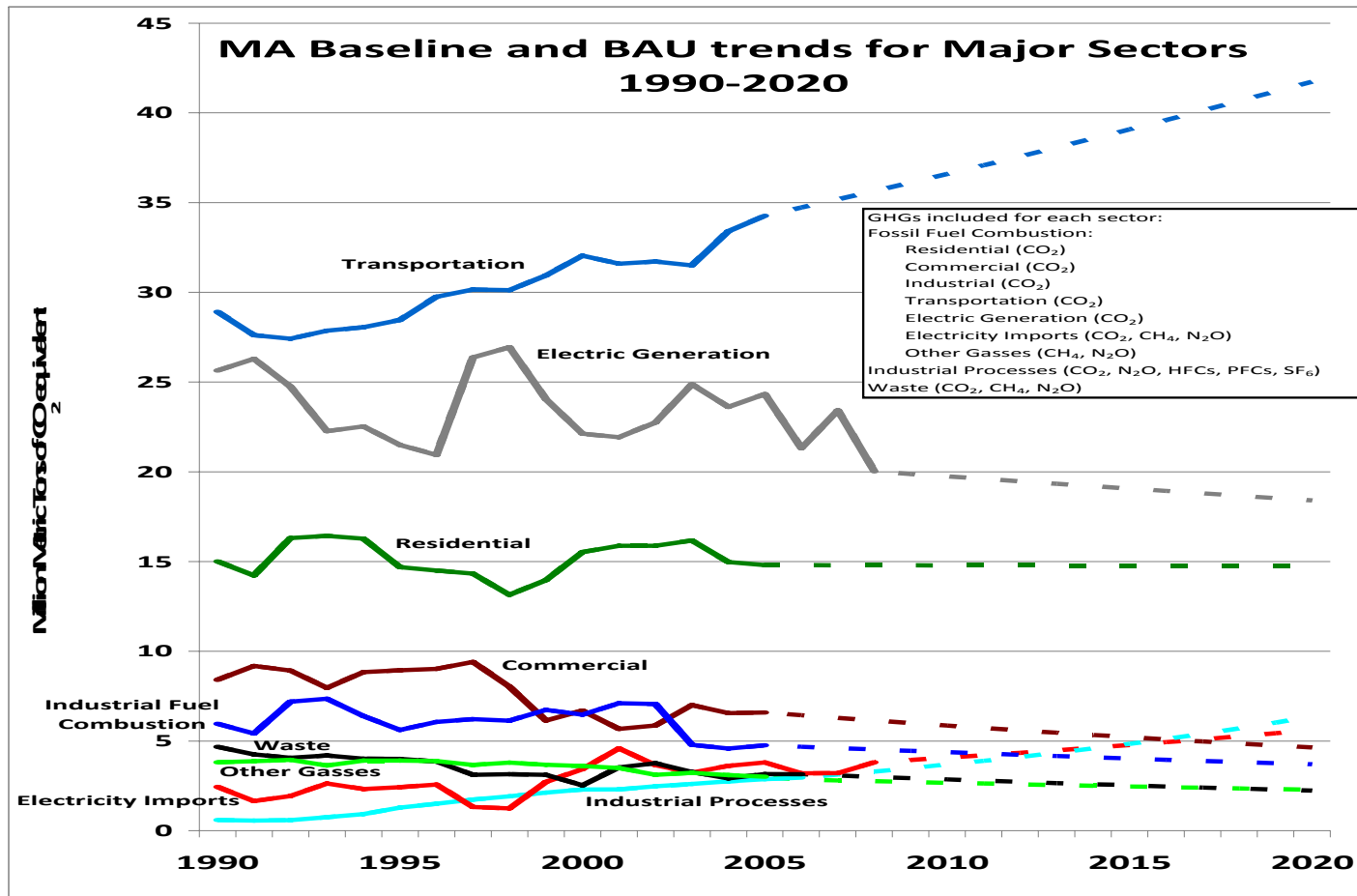
Proposed 2020 BAU Projection

- 2020 BAU Projection has been developed based on a simple extrapolation of historical emission trends
- Because of uncertainties with projections, 2020 BAU Projection is shown as a range

Purpose of 2020 BAU Projection

- Estimates the magnitude of GHG reductions necessary to achieve the limit set for 2020 (10-25% below the 1990 Baseline).
- Provides context to understand the emissions reductions achieved by implementing future measures to reduce GHGs, compared to what emissions would be if such measures were not implemented, i.e., business as usual.





Initial Approach Considered for 2020 BAU Projection

- United States Department of Energy each year projects energy use and emissions.

Not used because:

- Projects at the regional level, not by state.
- Highly dependant on predicted price of fuel and rate of economic growth.

Chosen Approach to 2020 BAU Projection

- Medium Range Projection is the sum of linear extrapolations of historic data for each sector
- To portray uncertainty, High and Low Range Projections in 2020 are +/- 1 standard deviation by sector of the Medium Range Projection from 1990-2020

Comment on Approaches to 2020 BAU Projection?

- Use of linear projection for Medium Range Projection
- Use of +/- 1 standard deviation as a way to portray uncertainty in High and Low Range Projection

Measures adopted as of January 1, 2009

- Certain measures adopted before January 1, 2009 are not reflected in 2020 BAU Projection because they are federal or regional in scope, and the specific emissions reductions in Massachusetts are not known
 - Regional Greenhouse Gas Initiative (RGGI)
 - revised Federal Corporate Average Fuel Economy (CAFE) vehicle efficiency standard
 - Federal Renewable Fuel Standard (RFS)
- These programs will be factored into setting the 2020 emissions limit and plan to achieve that limit.
- Comment on this approach?

Stakeholder Involvement for the 1990 Baseline and 2020 BAU Projection

- 6 Public Meetings, Including 1 Technical
- May 19, 2009 - Public Hearing
- June 1, 2009 - Comment Deadline
- July 1, 2009 - Publish Final 1990 Baseline and 2020 BAU Projection

For More Information:

<http://www.mass.gov/eea/>

Ian Finlayson

email ian.finlayson@state.ma.us

phone 617-626-4910

<http://www.mass.gov/dep/>

Sharon Weber

email sharon.weber@state.ma.us

phone 617-556-1190