The Clear Skies Act of 2003

Massachusetts and Clear Skies

Highlights of Clear Skies in Massachusetts

- Massachusetts already has in place state requirements that will substantially reduce emissions of SO_2 and NO_x in the State.
- Clear Skies achieves additional emission reductions in Massachusetts, particularly for mercury; sources would reduce emissions of SO_2 by 51%, NO_x by 43%, and mercury by 52% by 2020 due to Clear Skies.
- The health benefits in Massachusetts would total $1.8 billion ($340 million under the alternative estimate) and include for the New England region 500 fewer premature deaths (290 fewer premature deaths under the alternative estimate) and 860 fewer hospitalizations/emergency room visits each year.
- In addition, Massachusetts would receive significant environmental benefits, including reductions in nitrogen deposition that would benefit estuarine waterways.
- Clear Skies does not significantly impact electricity prices. With or without Clear Skies, electricity prices in the electricity supply region that includes Massachusetts are expected to remain below 2000 prices.

Clear Skies: An Innovative Approach to Improving Human Health and the Environment

Why Clear Skies?

- **Air quality has improved, but serious concerns persist**
  - Massachusetts's citizens suffer ill effects from air pollution, including asthma attacks and premature death

- **Electricity generation sector remains a major emissions source**
  - Very cost-effective to control the power sector, relative to other sources
  - Sources are concerned about upcoming complex and burdensome regulations

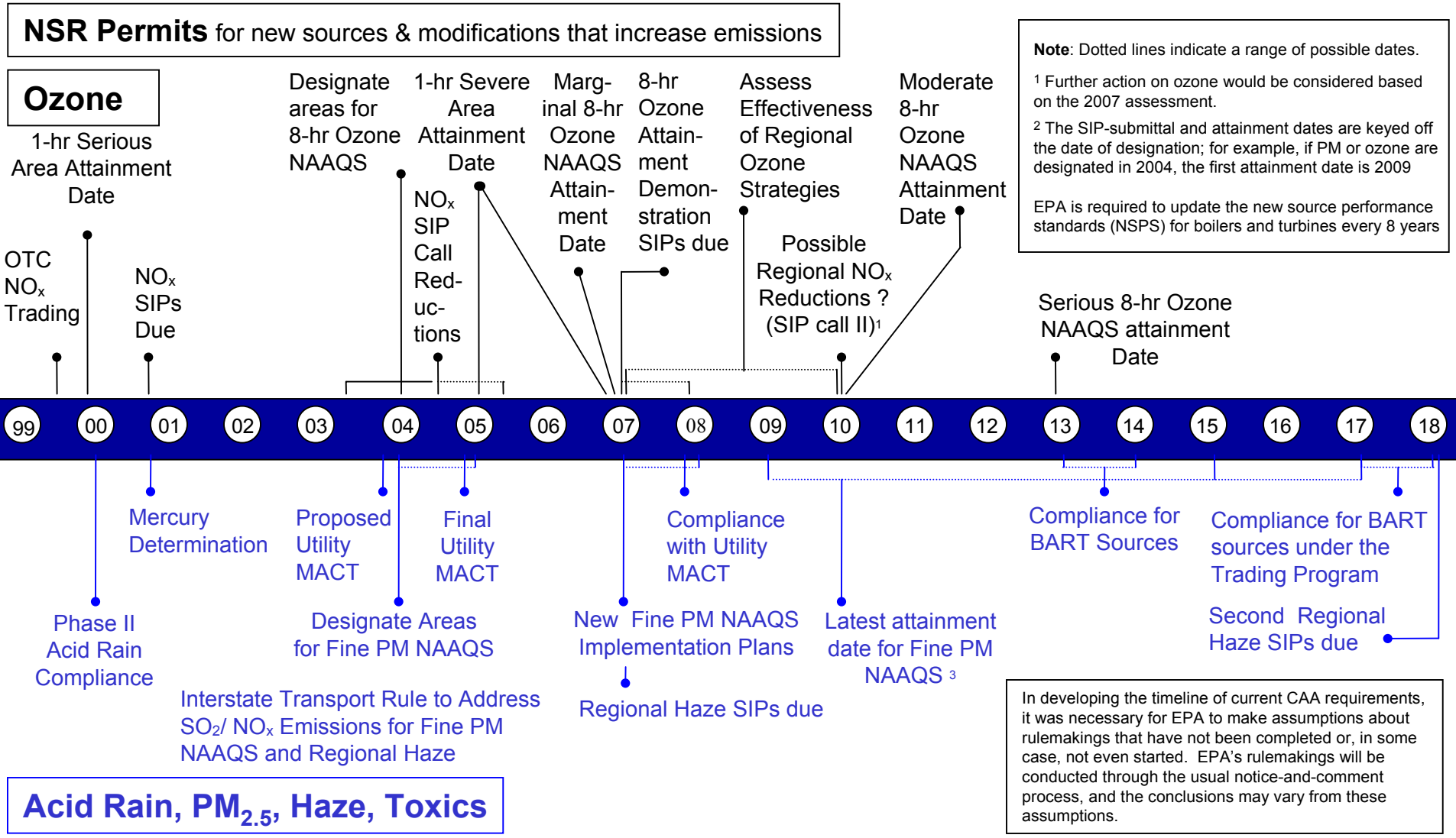
Advantages of the Clear Skies Approach

- **Guarantees significant nationwide emissions reductions – beginning years before full implementation**
  - Massachusetts sources would substantially reduce emissions of SO_2 and NO_x
  - Delivers dramatic progress towards achievement of critical health and environmental goals

- **Uses proven, market-based flexible approach with incentives for innovation**
  - Recognizes environmental needs as well as industry constraints, allowing industry to better manage its operations and finances while lowering risks to the public
  - Sources are projected to install pollution controls to enable continued reliance on coal

- **Increases certainty across the board for industry, regulators, and consumers**

Under Current Clean Air Act Power Plants Would Face a Complex Set of Requirements



Note: Dotted lines indicate a range of possible dates.

[1] Further action on ozone would be considered based on the 2007 assessment.

[2] The SIP-submittal and attainment dates are keyed off the date of designation; for example, if PM or ozone are designated in 2004, the first attainment date is 2009

EPA is required to update the new source performance standards (NSPS) for boilers and turbines every 8 years

In developing the timeline of current CAA requirements, it was necessary for EPA to make assumptions about rulemakings that have not been completed or, in some case, not even started. EPA's rulemakings will be conducted through the usual notice-and-comment process, and the conclusions may vary from these assumptions.

Clear Skies Sets a Firm Timeline for Emission Reductions

The existing Title IV SO_2 cap-and-trade program provides an incentive and a mechanism to begin reductions upon enactment of Clear Skies years before regulatory action under the current Act.

2004: The NOx SIP call (summertime NOx cap in 19 Eastern States + D.C.)

2004

2008: Clear Skies NOx Phase I (2.1 million ton annual cap assigned to two Zones with trading programs)

2008

2010: Clear Skies Hg Phase I (26 ton annual cap with a national trading program)

2010

2010: SO_2 Phase I (4.5 million ton annual cap with a national trading program)

2018: Clear Skies NOx Phase II (1.7 million ton annual cap assigned to two Zones with trading programs)

2018

2018: Clear Skies Hg Phase II (15 ton annual cap with a national trading program)

2018: Clear Skies SO_2 Phase II (3.0 million ton annual cap with a national trading program)

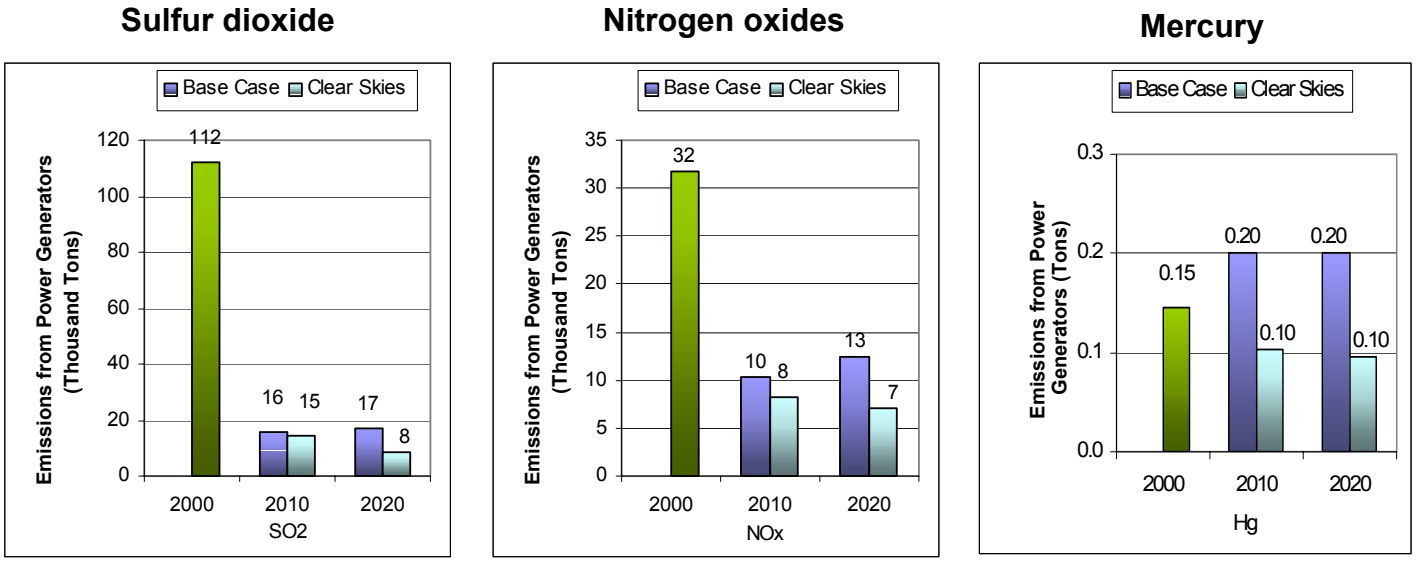
Emissions in Massachusetts under Clear Skies

Emissions in Massachusetts (2020) would be significantly reduced from 2000 levels:

- 93% reduction in SO_2 emissions
- 78% reduction in NO_x emissions
- 34% reduction in mercury emissions

These reductions are mostly attributable to the state regulation, with the exception of mercury, which is reduced by an additional 50% beyond what Massachusetts' rule would achieve in 2020.

Emissions: Current (2000) and Existing Clean Air Act Regulations (base case*) vs. Clear Skies in Massachusetts in 2010 and 2020



Note: The base case using IPM includes Title IV, the NO_x SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current ambient air quality standards or other parts of the Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated.

Clear Skies Health and Air Quality Benefits in Massachusetts

Improve Public Health

- **Reduced ozone and fine particle exposure** by 2020 would result in public health benefits of:
  - approximately 200 fewer premature deaths each year[1]
  - approximately 100 fewer cases of chronic bronchitis each year
  - approximately 500 fewer non-fatal heart attacks each year
  - approximately 400 fewer hospital and emergency room visits each year
  - approximately 26,000 fewer days workers are out sick due to respiratory symptoms each year
  - approximately 2,000 fewer school absences each year
- **Reduced mercury emissions** would reduce exposure to mercury through consumption of contaminated fish, resulting in additional, unquantified benefits to those who eat fish from Massachusetts' lakes and streams.

By 2020, Massachusetts would receive approximately $1.8 billion in annual health benefits from reductions in fine particle and ozone concentrations alone due to Clear Skies.[1]

Help Maintain Health-Based Air Quality Standards

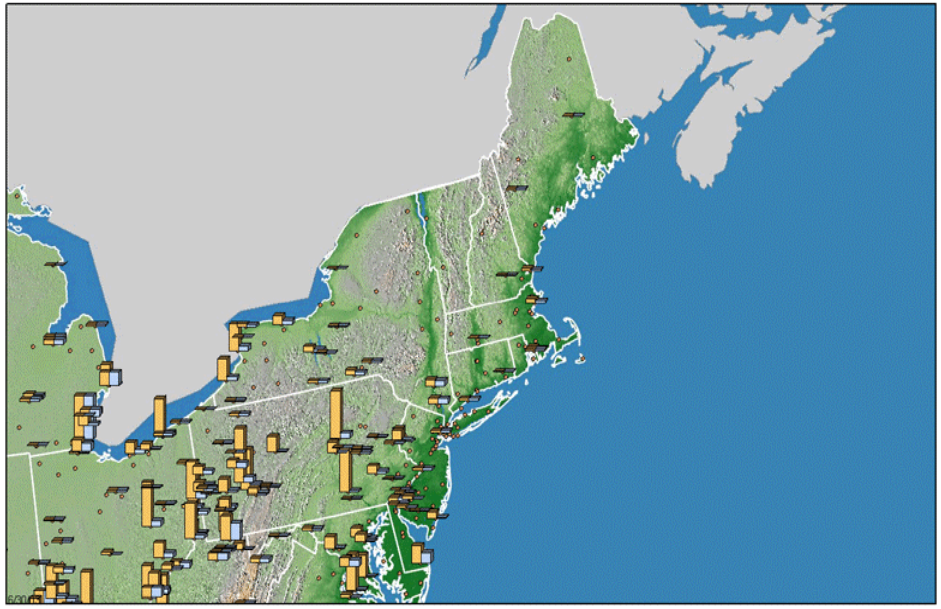
- All counties in Massachusetts currently meet the fine particle standard; all but seven counties currently meet the 8-hour ozone standard.[2]
- All 7 counties that currently exceed the ozone standard (population over 4 million) would be brought into attainment with the ozone standard under existing programs by 2010.
- Clear Skies would provide additional reductions in concentrations of ozone and fine particles in counties throughout Massachusetts.

1. An alternative methodology for calculating health-related benefits projects approximately 100 premature deaths prevented and $340 million million in health benefits each year in Massachusetts by 2020.

2. Based on 1999-2001 data of counties with monitors that have three years of complete data.

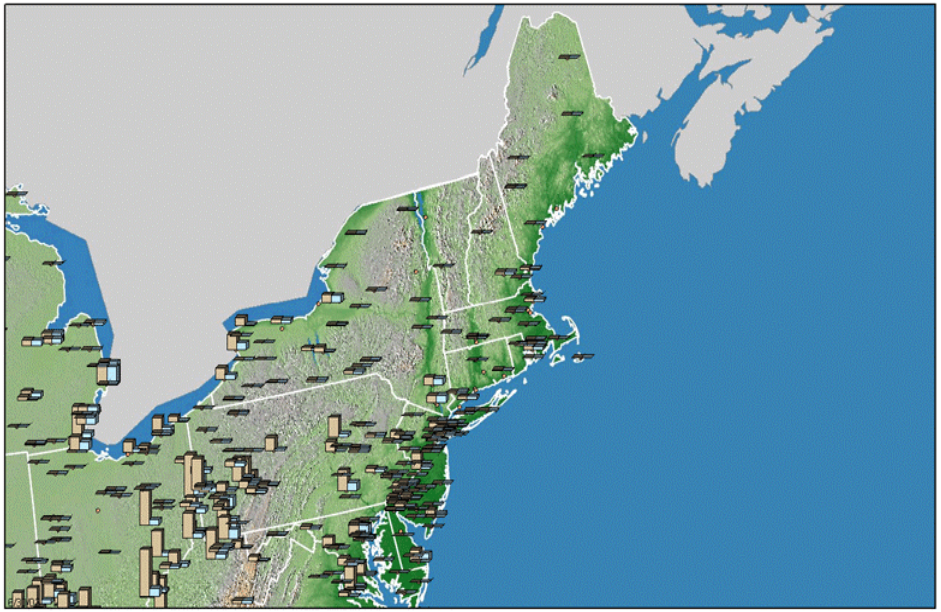
Emission Reductions under Clear Skies

Emissions in states surrounding Massachusetts would decrease considerably. These emission reductions would make it much easier for Massachusetts to comply with the national air quality standards.



Projected SO_2 Emissions from Power Plants with the Base Case and Clear Skies (2020)
Northeast

75,000 tons
Base Case Power Plant SO_2
Clear Skies Power Plant SO_2
Fossil Power Plants with Negligible SO_2 Emissions



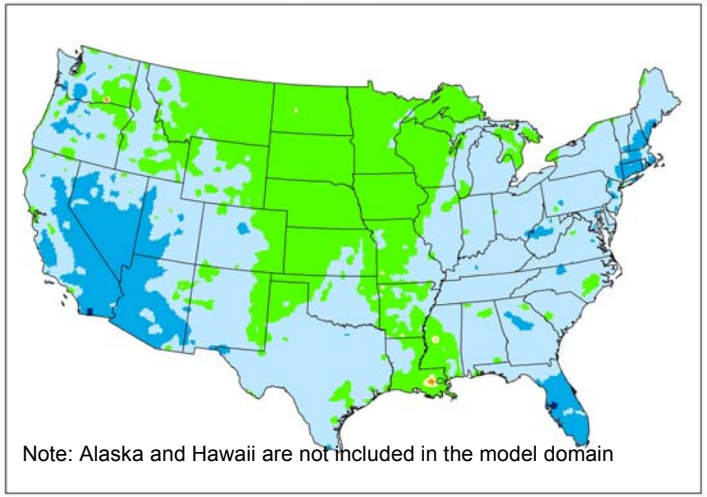
Projected NO_x Emissions from Power Plants with the Base Case and Clear Skies (2020)
Northeast

22,000 tons
Base Case Power Plant NO_x
Clear Skies Power Plant NO_x
Fossil Power Plants with Negligible NO_x Emissions

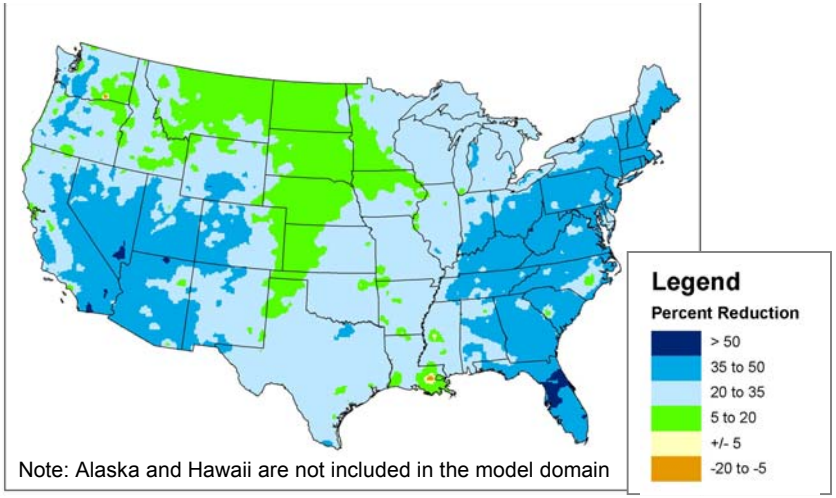
Note: The base case in IPM includes Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current ambient air quality standards or other parts of the Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated. Emissions projected for new units in 2020 are not reflected.

Clear Skies Environmental Benefits in Massachusetts

Projected Changes in Nitrogen Deposition Maryland with the Base Case in 2020 Compared to 2001



Projected Changes in Nitrogen Deposition Maryland with Clear Skies and the Base Case in 2020 Compared to 2001



Clear Skies Would Provide Substantial Environmental Benefits in Massachusetts

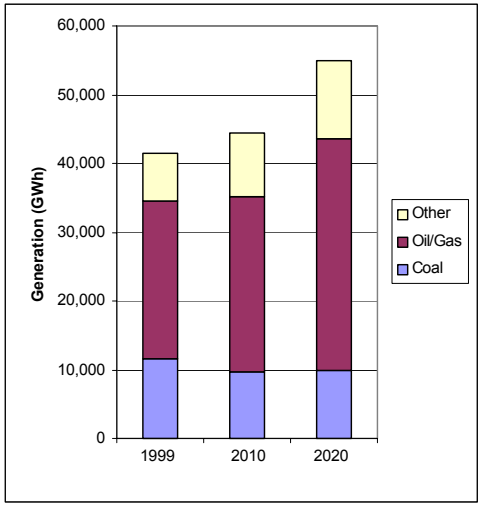
In comparison to existing programs,

- **Visibility would improve perceptibly in coastal areas of Massachusetts.**
  - The value of improved visibility for Massachusetts residents who visit National Parks and Wilderness areas nationwide would be $66 million each year by 2020.
- **Nitrogen deposition, a cause of damage in nitrogen-sensitive coastal waters, would be reduced** in coastal waters and surrounding watersheds by up to 20% beyond what is expected under the Base Case.
- **Sulfur deposition, a primary cause of acid rain, would decrease** by 15-30% across most of Massachusetts.
- **Mercury deposition would decrease** by up to 5% across most the state, and up to 15% along the western border.*

* These results are based on modeling the Clear Skies mercury cap without triggering the safety valve.

Electricity Generation in Massachusetts under Clear Skies

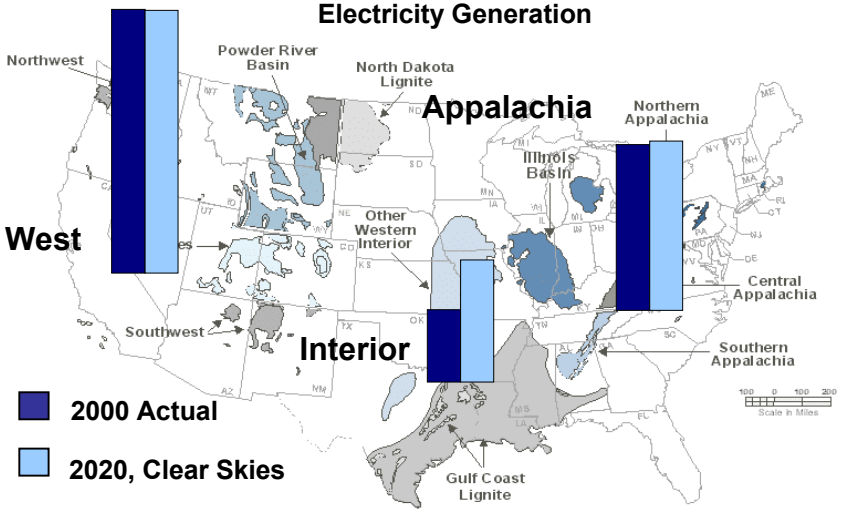
Current and Projected Generation by Fuel Type in Massachusetts under Clear Skies (GWh)



- **Massachusetts's sources are projected to reduce their emissions through the use of existing pollution controls, rather than through a switch from coal to natural gas.**
  - In 2010 and 2020, 100% of Massachusetts's coal-fired generation is projected to come from units with advanced SO_2 and/or NO_x control equipment that also substantially reduce mercury emissions.
  - No pollution controls are projected to be installed in Massachusetts under Clear Skies.

- **The major generation companies in Massachusetts include:**
  - PG&E National Energy Group
  - Mirant
  - Exelon
- **Total coal-fired capacity in Massachusetts is projected to be 1,545 MW in 2010**

Current and Projected Coal Production for Electricity Generation



Scale: Appalachia 2000 = 299 million tons

Notes:

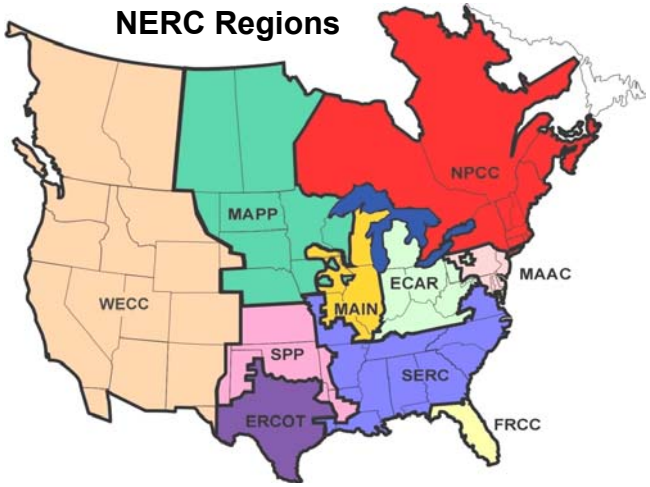
[1] Retrofits and total coal-fired capacity apply to coal units greater than 25 MW.

[2] Somerset units 7 & 8 are projected to be removed from operation by 2005 with Clear Skies due to excess gas-fired capacity in the marketplace, unless otherwise needed for voltage purposes. The recent overbuild of gas-fired generation reduces the need for less efficient units operating at lower capacity factors. These units are inefficient compared to other coal-fired plants and newer gas-fired generation. Less conservative assumptions regarding natural gas prices or electricity demand would create a greater incentive to keep these units operational.

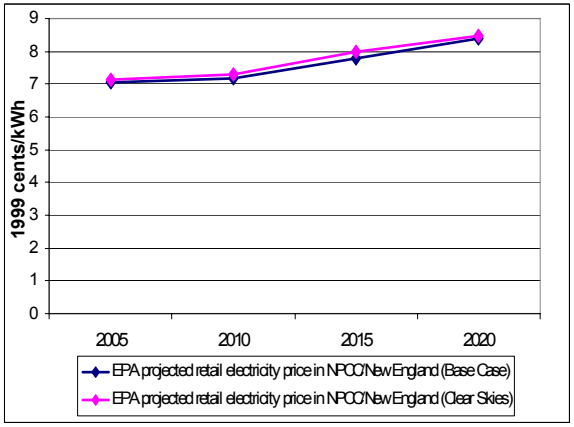
[3] Economic modeling projects that Salem Harbor unit 2 will convert to a combined cycle gas plant from coal steam.

Electricity Prices in Massachusetts under Clear Skies

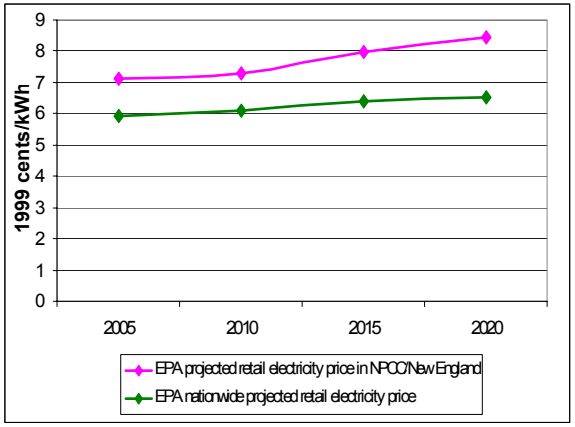
- **With or without Clear Skies, retail prices in the North American Electric Reliability Council (NERC) NPCC region (the electricity supply region that contains Massachusetts) are projected to increase between 2005 and 2020.**
- **With Clear Skies, retail prices are projected to be approximately 0.5 – 2.7% higher between 2005 and 2020 than in the absence of the legislation.**



Projected Retail Electricity Prices in Massachusetts under the Base Case and Clear Skies (2005-2020)



Projected National Retail Electricity Prices and Prices in Massachusetts under Clear Skies (2005-2020)



In 2000, the average retail electricity price in Massachusetts was approximately 9.5 cents/kWh, which was above the average *national* retail price of approximately 6.7 cents/kWh.

Note: The base case using IPM includes Title IV, the NO_x SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current ambient air quality standards or other parts of the Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated.

Costs and Benefits in Massachusetts under Clear Skies

Benefits Outweigh the Costs

- **In Massachusetts, economic modeling projects that the cost of generating electricity, of which a component is the cost of installing and operating pollution controls, is less under Clear Skies than under the base case as power production shifts within the region to enable the power sector to comply in the most cost-effective manner. Total annual health benefits in 2020 for Massachusetts are projected to be $1.8 billion.**

- **Nationwide, the projected annual costs of Clear Skies (in $1999) are $4.3 billion in 2010 and $6.3 billion in 2020; the nationwide benefits of Clear Skies are expected to be over $113 billion annually by 2020**
  - An alternate estimate projects annual health benefits totaling $23 billion

Clear Skies….

- **Guarantees significant emissions reductions – beginning years before full implementation**
- **Uses a proven and flexible market-based approach with incentives for innovation**
- **Increases certainty across the board for industry, regulators, and consumers**

Note: Costs include capital costs, fuel, and other operation and maintenance costs (both fixed and variable) associated with the achievement of the emissions caps in the legislation (for example, the installation and operation of pollution controls). These state-level production costs are estimates; they do not account for the costs associated with the transfer of electricity across regions, nor the costs or savings that could be associated with allowance movement between sources.

Notes on EPA's Analysis

- The information presented in this analysis reflects EPA's modeling of the Clear Skies Act of 2003.
  - EPA has updated this information to reflect modifications:
    - Changes included in the Clear Skies Act of 2003.
    - Revisions to the Base Case to reflect newly promulgated rules at the state and federal level since the initial analysis was undertaken.
  - The Clear Skies modeling results presented include the safety valve feature
- This analysis compares new programs to a Base Case (Existing Control Programs), which is typical when calculating costs and benefits of Agency rulemakings.
  - The Base Case reflects implementation of current control programs only:
    - Does not include yet-to-be developed regulations such as those to implement the National Ambient Air Quality Standards.
  - The EPA Base Case for power sector modeling includes:
    - Title IV, the NO_x SIP Call, NSR settlements, and state-specific caps in Massachusetts, Massachusetts, Missouri, New Hampshire, North Carolina, Texas, and Wisconsin finalized before March 2003.
  - For air quality modeling, the Base Case also includes federal and state control programs, as well as the Tier II, Heavy Duty Diesel, and Non-Road Diesel rules.

- **For more information regarding the Clear Skies Act, please visit the EPA website:**

(http://www.epa.gov/clearskies)

CLEAR SKIES
Better Health, Brighter Future