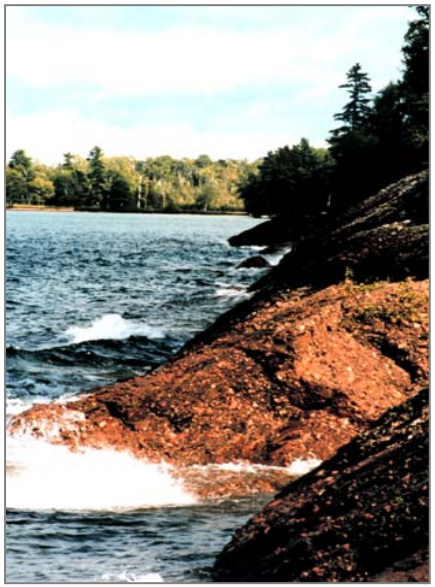


The Clear Skies Act of 2003

Michigan and Clear Skies

Highlights of Clear Skies in Michigan

- Michigan sources would reduce emissions of SO_2 by 18%, NO_x by 27%, and mercury by 15% by 2020 due to Clear Skies.

- The health benefits in Michigan would total $4.3 billion annually ($810 million under the alternative estimate) and include approximately 600 fewer premature deaths (300 under the alternative estimate) and 1,400 fewer hospitalizations/ emergency room visits each year.

- In addition, Michigan would receive environmental benefits including reduced sulfur deposition, reduced mercury deposition along the Great Lakes and improved visibility. The value of this benefit for Michigan residents who visit America's National Parks and Wilderness Areas nationwide is $83 million.

- Clear Skies does not significantly impact electricity prices. With or without Clear Skies, electricity prices in the electricity supply region that includes Michigan are expected to remain below 2000 prices.

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

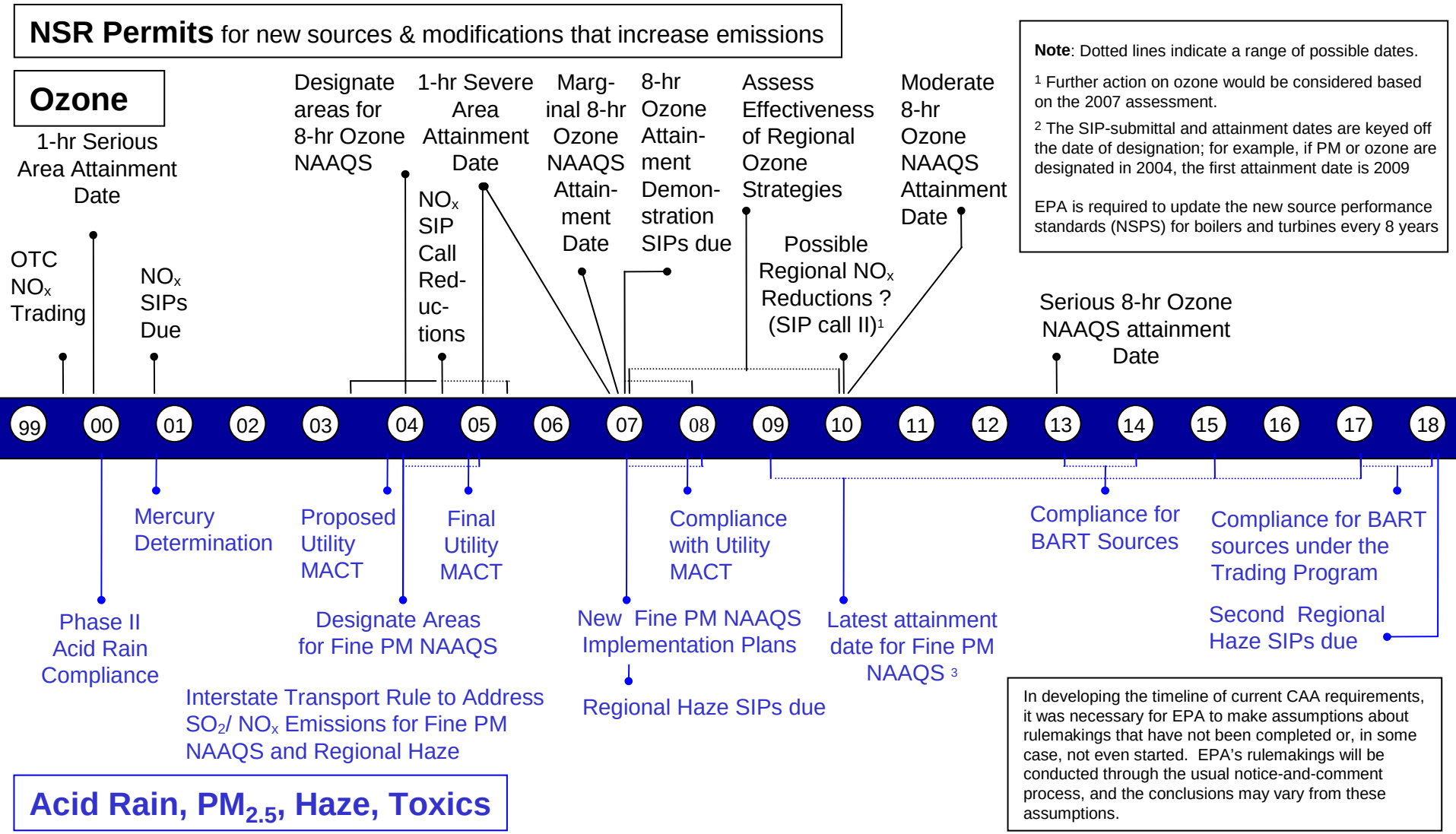
Why Clear Skies?

- **Air quality has improved, but serious concerns persist**
  - Michigan'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**
  - Michigan sources would reduce emissions of SO_2, NO_x, and mercury
  - 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) → **2010**

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**

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

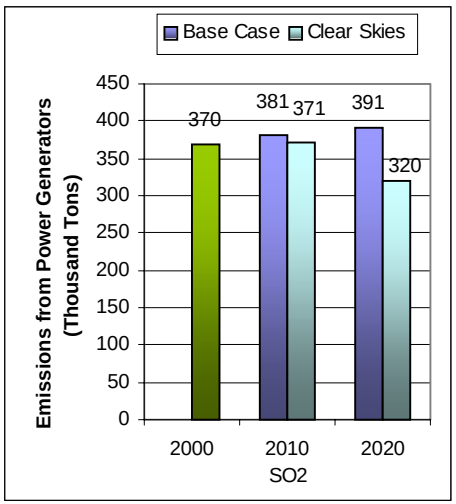
Emissions in Michigan under Clear Skies

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

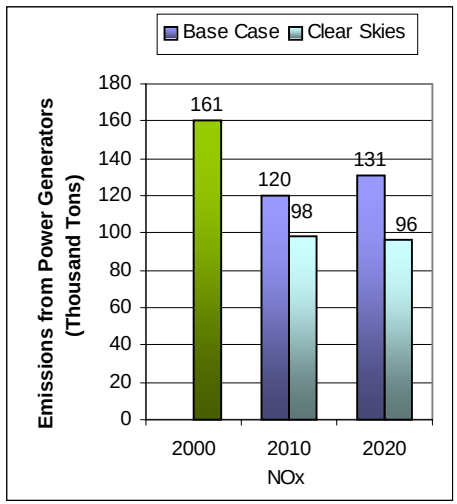
- 14% reduction in SO_2 emissions
- 40% reduction in NO_x emissions
- 18% reduction in mercury emissions

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

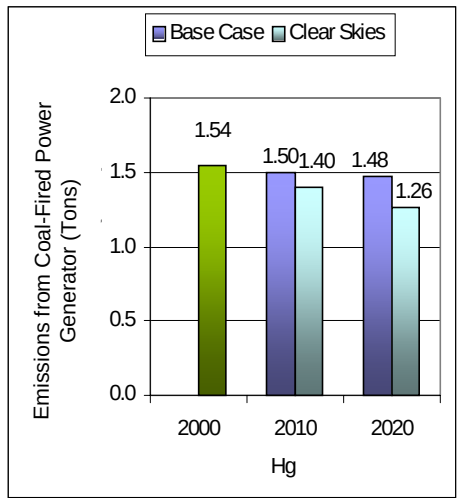
Sulfur dioxide



Nitrogen oxides



Mercury



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 Michigan

Improve Public Health

- **Reduced ozone and fine particle exposure** by 2020 would result in public health benefits of:
  - approximately 600 fewer premature deaths each year[1]
  - approximately 400 fewer cases of chronic bronchitis each year
  - approximately 1,000 fewer non-fatal heart attacks each year
  - approximately 1,400 fewer hospital and emergency room visits each year
  - approximately 66,000 fewer days workers are out sick due to respiratory symptoms each year
  - approximately 7,600 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 Michigan's lakes.

By 2020, Michigan would receive approximately $4.3 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

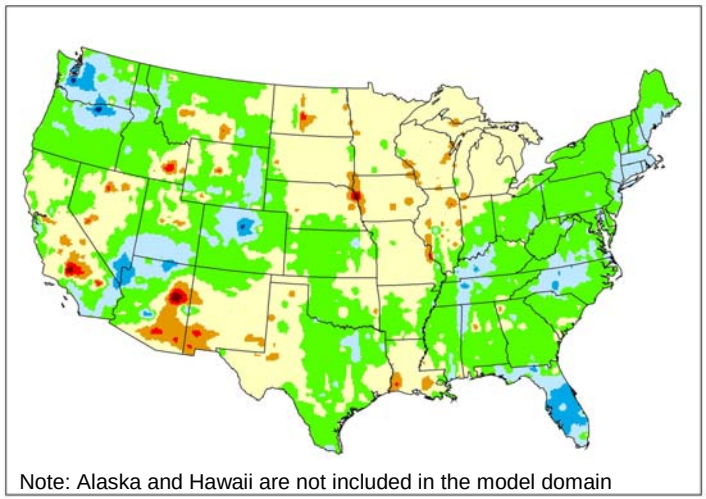
- One county in Michigan currently exceeds the fine particle standard, and 10 counties currently exceed the 8-hour ozone standard.[2]
- Under existing programs, 8 counties in Michigan (population approximately 1.1 million) would be brought into attainment with the ozone standard.
- Clear Skies would significantly reduce concentrations of ozone and fine particles in the remaining nonattainment counties, bringing them closer to attainment.

1. An alternative methodology for calculating health-related benefits projects approximately 300 premature deaths prevented and $810 million in health benefits each year in Michigan by 2020.

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

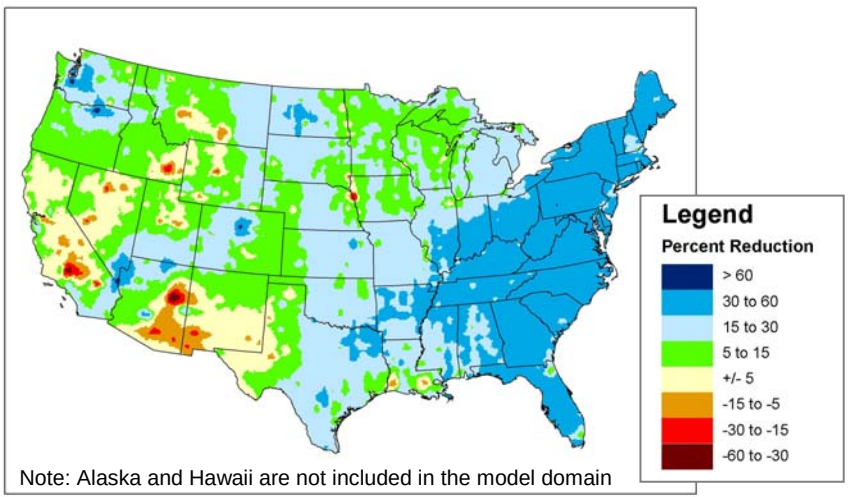
Clear Skies Environmental Benefits in Michigan

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



Note: Alaska and Hawaii are not included in the model domain

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



Note: Alaska and Hawaii are not included in the model domain

Clear Skies Would Provide Substantial Environmental Benefits in Michigan

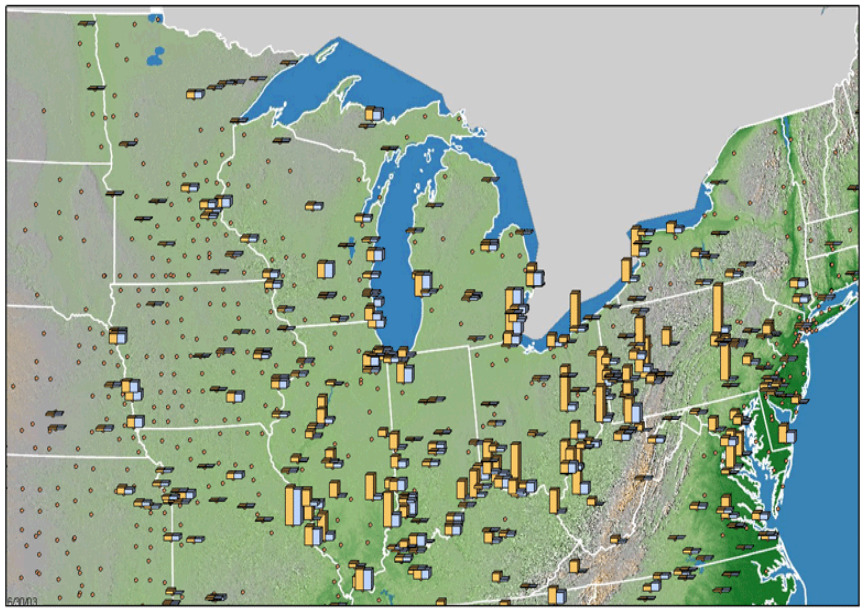
In comparison to existing programs,

- **Visibility would improve** perceptibly.
  - The value of this benefit for Michigan residents who visit America's National Parks and Wilderness Areas is $83 million.
- **Sulfur deposition, a primary cause of acid rain, would decrease** by up to 30% throughout most of the state.
- **Nitrogen deposition, another significant contributor to acid rain as well as a cause of damage in nitrogen-sensitive forests, would decrease** 5-20%.
- **Mercury deposition would decrease** by up to 5% throughout most of Michigan and up to 15% in small areas along the eastern border of the state.*

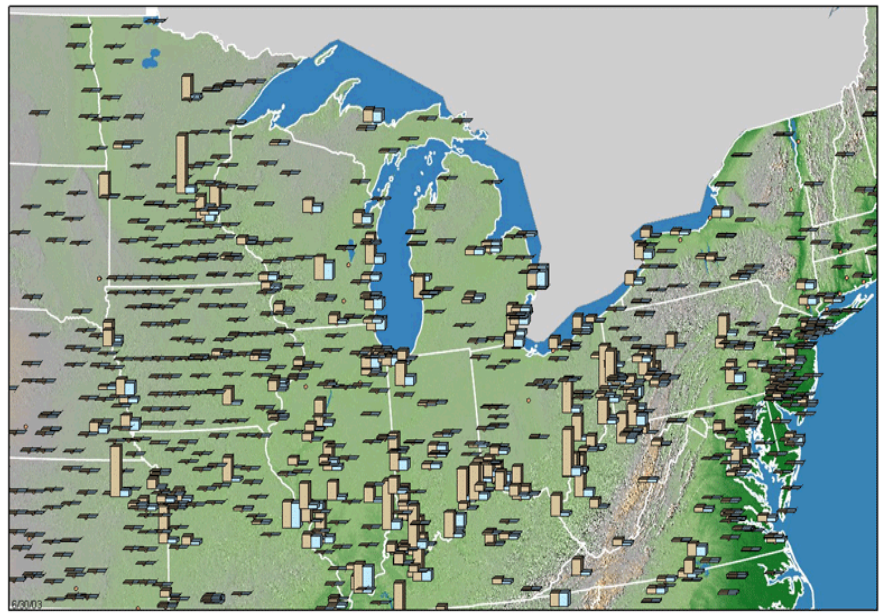
* These results are based on modeling the Clear Skies mercury cap without triggering the safety valve.

SO_2 and NO_x Emissions Reductions under Clear Skies

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



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

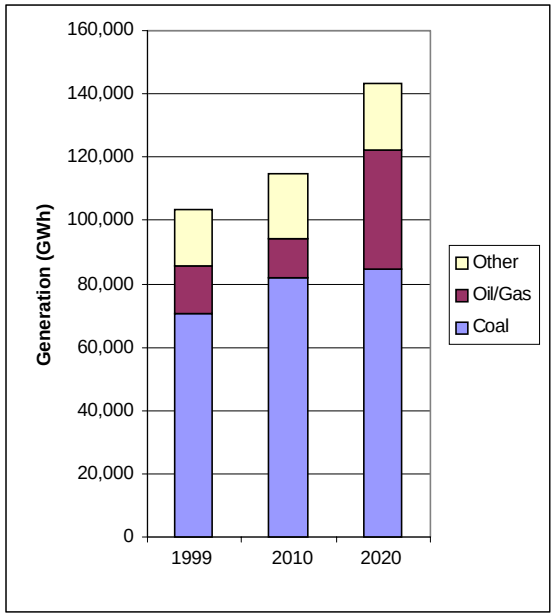


Projected NO_x Emissions from Power Plants with the Base Case and Clear Skies (2020)
Midwest

Note: The base case in 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. Emissions projected for new units in 2020 are not reflected.

Electricity Generation in Michigan under Clear Skies

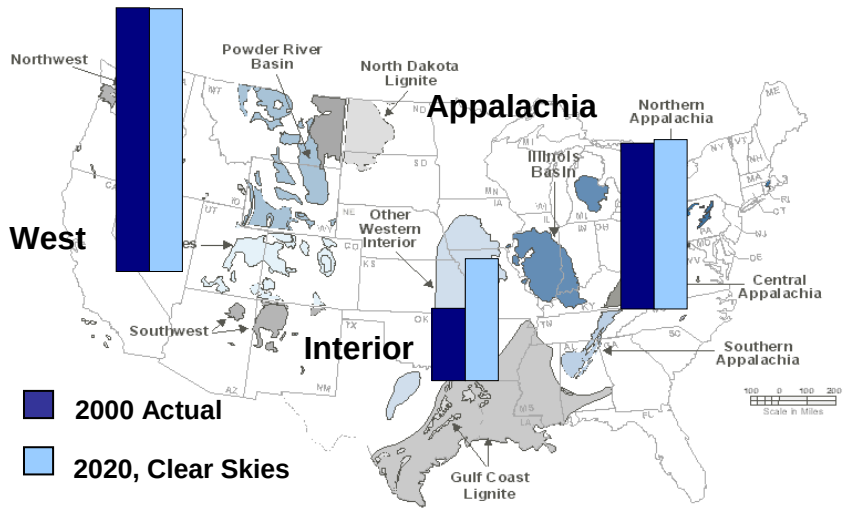
Current and Projected Generation by Fuel Type in Michigan under Clear Skies (GWh)



- **Michigan's electricity growth is projected to be met by increases in gas-fired and coal-fired generation. Clear Skies does not significantly alter this projection.**
  - Electricity from coal-fired generation will increase by 20% from 1999 to 2020.

- **Michigan's sources are projected to reduce their emissions through the installation of emission controls, rather than through a switch from coal to natural gas.**
  - In 2010, 36% of Michigan's coal-fired generation is projected to come from units with advanced SO_2 and/or NOx control equipment that also substantially reduce mercury emissions; in 2020, the percentage is projected to increase to 58%.
  - No coal-fired units in Michigan are projected to be removed from operation as a result from Clear Skies.

Current and Projected Coal Production for Electricity Generation



Scale: Appalachia 2000 = 299 million tons

Emission Controls in Michigan under Clear Skies

- **Under Clear Skies by 2020...**
  - 1% of coal-fired capacity would install SCR
  - 16% would install scrubbers

- **The major generation companies in Michigan include:**
  - Detroit Edison Company
  - Consumers Energy Company
  - We Energies

- **Total coal-fired capacity in Michigan is projected to be 11,526 MW in 2010**

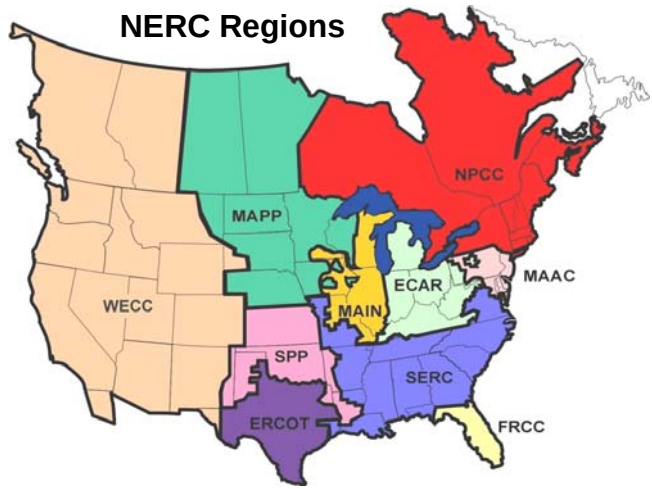
Units in Michigan Projected to Be Retrofitted Due to Clear Skies by 2020

Plant Name	Unit ID	Technology
ST CLAIR	1	Scrubber
ST CLAIR	2	Scrubber
ST CLAIR	3	Scrubber
ST CLAIR	4	Scrubber
ST CLAIR	6	Scrubber
ST CLAIR	7	Scrubber
TRENTON CHANNEL	9A	Scrubber
ERICKSON	1	SCR

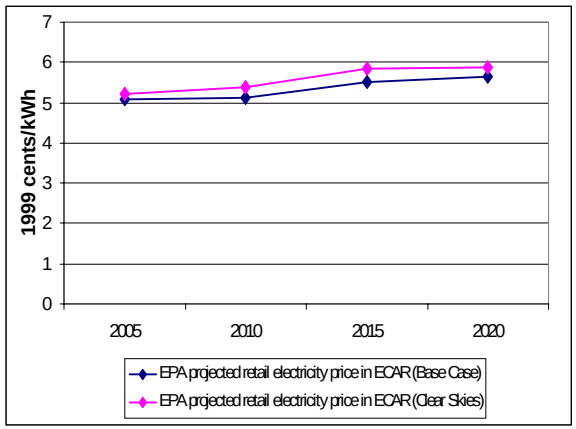
Note: Retrofits and total coal-fired capacity apply to coal units greater than 25 MW.

Electricity Prices in Michigan under Clear Skies

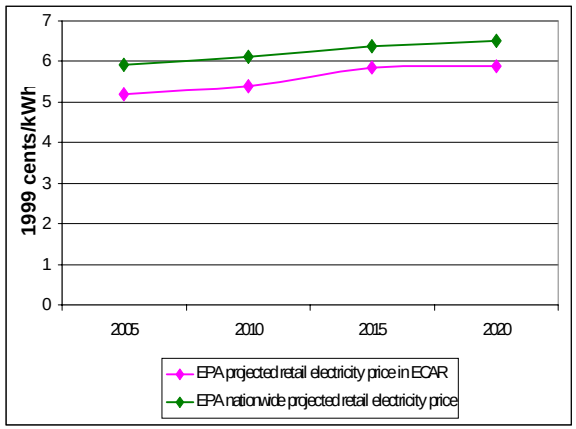
- **With or without Clear Skies, retail prices in the North American Electric Reliability Council (NERC) ECAR region (the electricity supply region that contains Michigan) are projected to increase between 2005 and 2020.**
- **With Clear Skies, retail prices are projected to be approximately 2.4 – 6.4% higher between 2005 and 2020 than in the absence of the legislation.**



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



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



In 2000, the average retail electricity price in Michigan was approximately 7.1 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 Michigan under Clear Skies

Benefits Outweigh the Costs

- **In Michigan, Clear Skies is projected to cost approximately $226 million annually by 2020 while providing health benefits totaling approximately $4.3 billion annually**.
- **The increases in production costs under Clear Skies represent only a small percentage of total retail electricity sales revenue in Michigan.**
  - Retail electricity sales revenue in Michigan was almost $7.4 billion in 2000.
  - Adjusting these sales revenues by the same growth rate used for the modeling of costs would result in revenues of almost $11.5 billion annually in 2020
- **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 Connecticut, 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