US EPA ARCHIVE DOCUMENT

The information presented here reflects EPA's modeling of the Clear Skies Act of 2002. The Agency is in the process of updating this information to reflect modifications included in the Clear Skies Act of 2003. The revised information will be posted on the Agency's Clear Skies Web site (www.epa.gov/clearskies) as soon as possible.

CLEAR SKIES IN MICHIGAN[1]

Human Health and Environmental Benefits of Clear Skies: Clear Skies would protect human health, improve air quality, and reduce deposition of sulfur (SO_2), nitrogen (NO_x), and mercury.[2]

- Beginning in 2020, approximately $3 billion of the annual benefits from Clear Skies would occur in Michigan. Every year, these would include:
  - approximately 400 fewer premature deaths;
  - over 200 fewer cases of chronic bronchitis;
  - approximately 8,000 fewer asthma attacks;
  - approximately 300 fewer hospitalizations and emergency room visits; and
  - approximately 70,000 fewer lost work days due to respiratory symptoms.

- Based on initial modeling, numerous counties in Michigan that currently exceed the 8-hour ozone and fine particle standards would be brought into attainment under existing programs. Clear Skies would reduce concentrations of ozone and fine particles in the two remaining nonattainment counties.[4]

Clear Skies Benefits Nationwide

- In 2020, annual health benefits from reductions in ozone and fine particles would total $93 billion, including 12,000 fewer premature deaths, far outweighing the $6.49 billion cost of the Clear Skies program.
- Using an alternative methodology results in over 7,000 premature deaths prevented and $11 billion in benefits by 2020—still exceeding the cost of the program.[3]
- Clear Skies would provide an additional $3 billion in benefits due to improved visibility in National Parks and wilderness areas in 2020.

- Clear Skies delivers numerous environmental benefits by 2020:
  - visibility would improve 1-2 deciviews (a change of 1 deciview is a perceptible change in visibility);
  - sulfur deposition would decrease 15-30%;
  - nitrogen deposition would decrease 15-30%; and
  - mercury deposition would decrease up to 25% in the southern part of the state.

[1] The projected impacts are the results of extensive emissions and regional air quality modeling and benefits analyses as summarized in the *Technical Addendum: Methodologies for Benefit Analysis of the Clear Skies Initiative, 2002*. While the policy analyses tools EPA used are among the best available, all such national scale policy assessments are subject to a number of uncertainties, particularly when projecting air quality or environmental impacts in particular locations.

[2] All human health and environmental benefits are calculated in comparison to existing Clean Air Act programs.

[3] The two sets of estimates reflect alternative assumptions and analytical approaches regarding quantifying and evaluating the effects of airborne particles on public health. All estimates assume that particles are causally associated with health effects, and that all components have the same toxicity. Linear concentration-response relationships between PM and all health effects are assumed, indicating that reductions in PM have the same impact on health outcomes regardless of the absolute level of PM in a given location. The base estimate relies on estimates of the potential cumulative effect of long-term exposure to particles, while the alternative estimate presumes that PM effects are limited to those that accumulate over much shorter time periods. All such estimates are subject to a number of assumptions and uncertainties. It is of note that, based on recent preliminary findings from the Health Effects Institute, the magnitude of mortality from short-term exposure (alternative estimates) and hospital/ER admissions estimates (both estimates) may be overstated. The alternatives also use different approaches to value health effects damages. The key assumptions, uncertainties, and valuation methodologies underlying the approaches used to produce these results are detailed in the *Technical Addendum* noted above.

[4] To permit comparisons among various analyses, the air quality data used in this analysis was fixed as the most complete and recently available as of mid-2001 (1997-1999 ozone monitoring data and 1999-2000 PM2.5 data). More complete and more recent air quality data for ozone and fine particles (1999-2001 data) indicates some differences in the likely attainment status of some counties. Future analyses of Clear Skies will incorporate the most recent data available.

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Changes in Emissions Under Clear Skies: Clear Skies is projected to result in significant emissions reductions from power generators by 2020.

- In Michigan, Clear Skies is projected to significantly reduce emissions from power generators by 2020 (relative to 2000 emissions):
  - SO_2 emissions would be reduced by 22%;
  - NO_x emissions would be reduced by 59%; and
  - mercury emissions would be reduced by 39%.

Nationwide Emissions under Clear Skies in 2020

- SO_2 emissions from power generators are projected to be 3.9 million tons (a 65% reduction from 2000 levels).
- NO_x emissions are projected to be 1.7 million tons (a 67% reduction from 2000 levels).
- Mercury emissions are projected to be 18 tons (a 63% reduction from 2000 levels).
- At full implementation, the emission reductions would be 73% for SO_2, 67% for NO_x, and 69% for mercury.

Figures 1a, 1b and 1c. *Existing Clean Air Act Regulations (base case[5]) vs. Clear Skies in Michigan in 2010 and 2020*

Figure 1a. SO_2

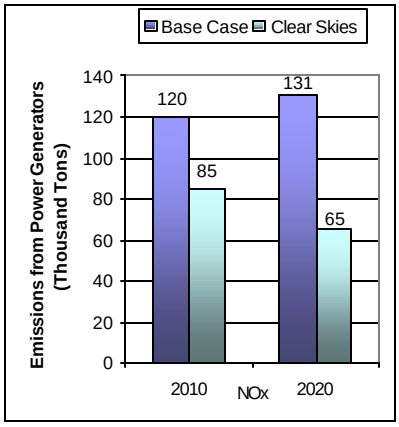


Figure 1b. NO_x

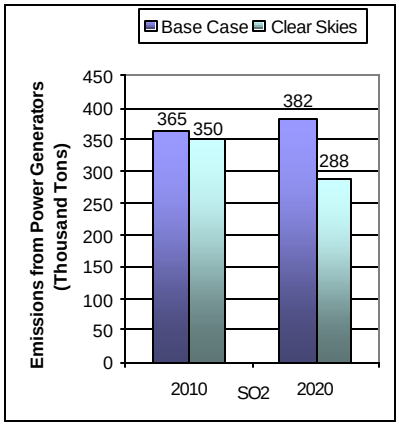
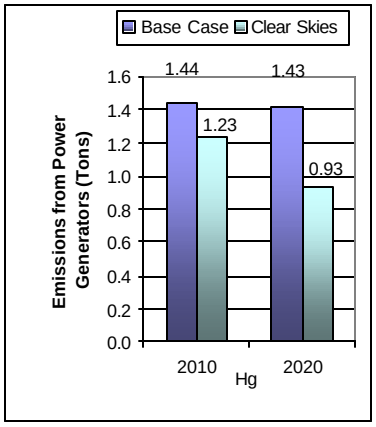


Figure 1c. Mercury



- Emissions rates in Michigan in 2010 and 2020:

Table 1. *Projected Emissions Rates in 2010 and 2020 in Michigan*

Year		SO2	NO_x			Hg
		Coal	All	Coal	Gas	Coal
		lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/TBtu
2010	Base Case	0.96	0.29	0.30	0.19	3.79
	Clear Skies	0.96	0.21	0.21	0.18	3.37
2020	Base Case	0.95	0.28	0.30	0.15	3.54
	Clear Skies	0.78	0.14	0.15	0.12	2.52

Costs: Nationwide, the projected annual costs of Clear Skies (in $1999) are $3.69 billion in 2010 and $6.49 billion in 2020.[6]

[5] The base case includes Title IV, the NO_x SIP call and State-specific caps in CT, MO and TX. It does not include mercury MACT in 2008 or any other potential future regulations to implement the current Clean Air Act.

[6] EPA uses the Integrated Planning Model (IPM) to project the economic impact of Clear Skies on the power generation sector. IPM disaggregates the power generation sector into specific regions based on properties of the electric transmission system, power market fundamentals, and regional environmental regulations. These regions do not conform to States or EPA region boundaries making some compliance options, such as dispatch and associated costs, impractical to differentiate at a State or Regional level.

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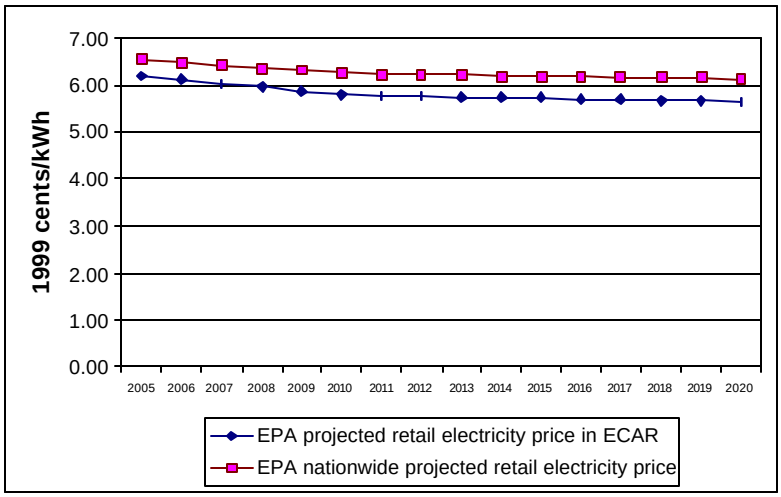
Changes in Projected Retail Electricity Prices Under Clear Skies: Electricity prices in Michigan would not be significantly affected by Clear Skies.

- In 1999, the average retail electricity price in Michigan was approximately 7.14 cents/kWh, which was above the average *national* retail price of approximately 6.66 cents/kWh.[7] As shown in Figure 3, retail prices in ECAR (the North American Electric Reliability Council (NERC) region that contains Michigan[8]) are projected to decrease and remain below the national average between 2005 and 2020.

***Figure 2**. Projected Retail Electricity Prices in ECAR under Clear Skies (2005-2020)*



Generation Under Clear Skies: Coal-fired power plants currently produce 68% of the electricity used in Michigan. Although coal-fired generation will continue to increase under Clear Skies, the portion of total generation from coal-fired plants will remain constant at approximately 69% in 2010 and 2020.

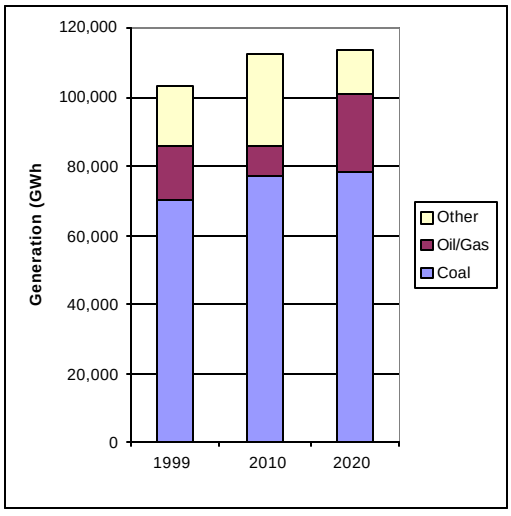


***Figure 3**. Current and Projected Generation by Fuel Type in Michigan under Clear Skies(GWh)*[9]

[7] Source: 1999 data from the Energy Information Administration (EIA) at http://www.eia.doe.gov/cneaf/electricity/page/fact_sheets/retailprice.html.
[8] Michigan falls under NERC regions ECAR and MAIN. The region shown in the graph represents the larger capacity share of the state.
[9] Source: 1999 data from the Energy Information Administration at http://www.eia.doe.gov/cneaf/electricity/st_profiles/michigan/mi.html (Table 5).

- EPA does not project that any facilities in Michigan will switch from coal to natural gas in response to the Clear Skies emissions caps. Instead, sources in Michigan would reduce their emissions through the installation of control technologies.

  - In 2010, coal-fired capacity in Michigan is projected to be approximately 11,500 MW under Clear Skies. Approximately 4,400 MW of Michigan's coal-fired capacity are projected to install Selective Catalytic Reduction (SCR).

  - Between 2010 and 2020, an additional 2,500 MW are projected to install SCR and 1,900 MW are projected to install scrubbers.

- 44% of Michigan's coal-fired generation is projected to come from coal units with emission control equipment in 2010, and 67% of the coal-fired generation will be controlled in 2020.[10]

Coal Production: Michigan did not produce coal in 2000 and is not projected to produce coal under Clear Skies.

Major Generation Companies in Michigan: The ten largest plants in the State -- each over 1000 MW -- are a combination of nuclear, petroleum, gas, hydro and coal-fired plants. The major generation companies include: Detroit Edison Company, Consumers Energy Company, Wisconsin Electric Power Co., Indiana Michigan Power Co, and Lansing Board Of Water & Light.

[10] Emissions control equipment includes, where applicable, scrubbers, selective catalytic reduction, selective non-catalytic reduction, gas-reburn and activated carbon injection.

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