

US EPA ARCHIVE DOCUMENT



The Clear Skies Act of 2003

Iowa and Clear Skies



Highlights of Clear Skies in Iowa

- Iowa sources would reduce emissions of SO₂ by 7%, NO_x by 67% and mercury by 25% by 2020 due to Clear Skies.
- The health benefits in Iowa would total \$1.2 billion annually (\$240 million under the alternative estimate) and include approximately 200 fewer premature deaths (100 under the alternative estimate) and 400 fewer hospitalizations/emergency room visits each year.
- In addition, Iowa would receive environmental benefits, including improved visibility and reduced nitrogen deposition.
- Clear Skies does not significantly impact electricity prices. With or without Clear Skies, electricity prices in the electric supply region that includes Iowa 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**
 - Iowa'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**
 - Iowa sources would reduce emissions of SO₂, 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

NSR Permits for new sources & modifications that increase emissions

Ozone

1-hr Serious Area Attainment Date

Designate areas for 8-hr Ozone NAAQS

1-hr Severe Area Attainment Date

Marginal 8-hr Ozone NAAQS Attainment Date

8-hr Ozone Attainment Demonstration SIPs due

Assess Effectiveness of Regional Ozone Strategies

Moderate 8-hr Ozone NAAQS Attainment Date

Possible Regional NO_x Reductions ? (SIP call II)¹

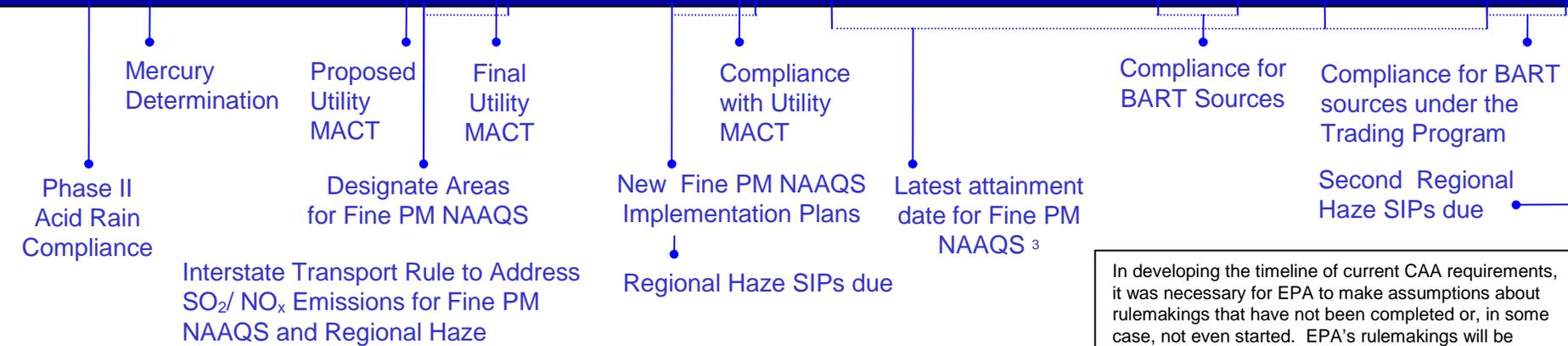
Note: Dotted lines indicate a range of possible dates.

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

Serious 8-hr Ozone NAAQS attainment Date



Acid Rain, PM_{2.5}, Haze, Toxics

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

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

2004

The existing Title IV SO₂ 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.

2008: Clear Skies NO_x 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: SO₂ Phase I (4.5 million ton annual cap with a national trading program)

2018: Clear Skies NO_x 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 SO₂ Phase II (3.0 million ton annual cap with a national trading program)

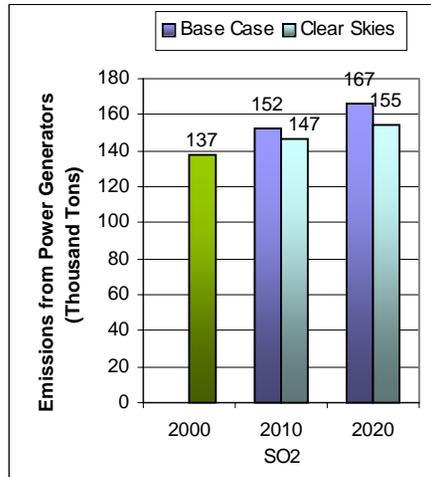
Emissions in Iowa under Clear Skies

Emissions in Iowa (2020) compared to 2000 levels:

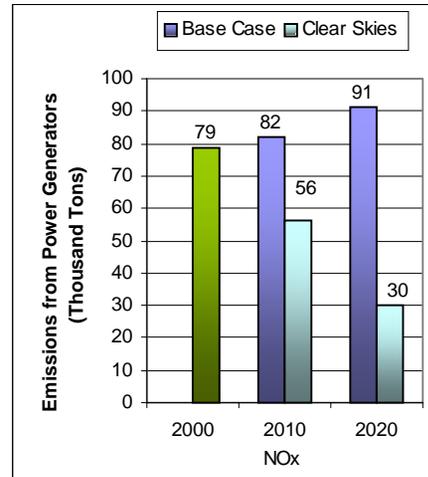
- 61% reduction in NO_x emissions
- 33% reduction in mercury emissions; and
- 7% decrease in SO₂ emissions from the base case

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

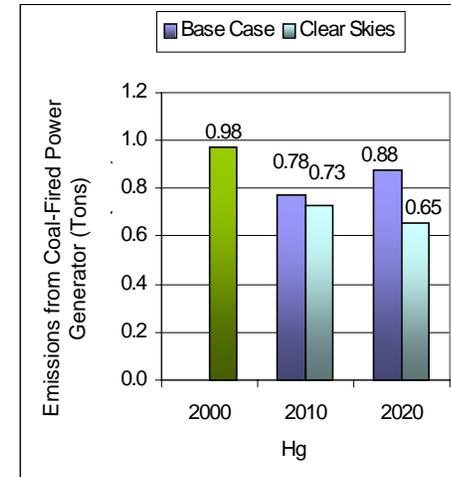
Sulfur dioxide



Nitrogen oxides

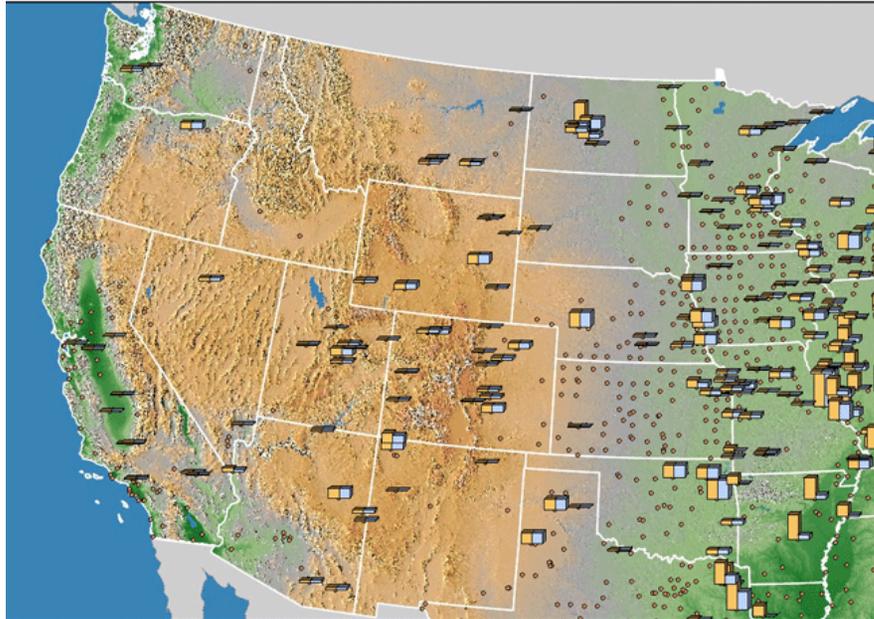


Mercury



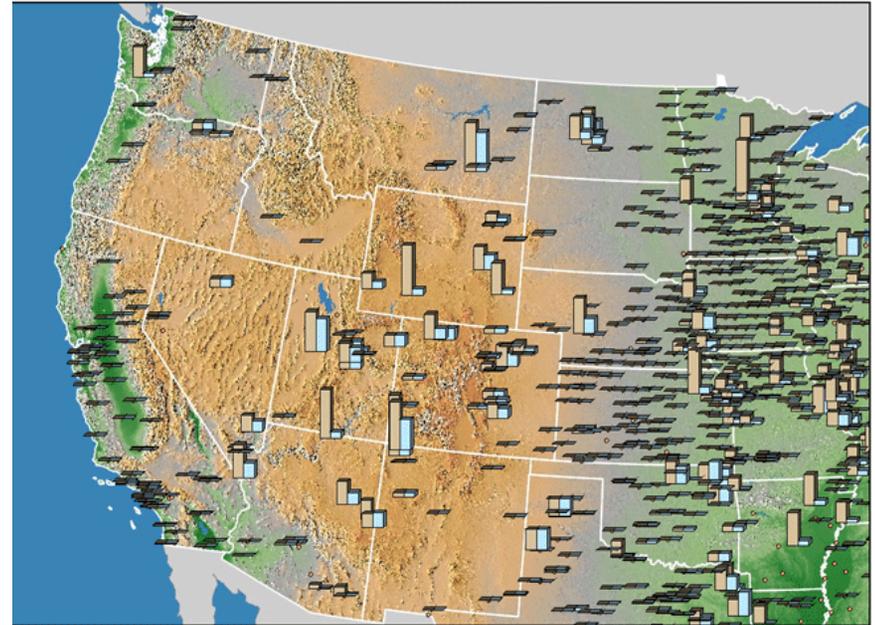
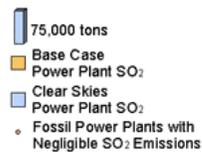
Note: The base case using IPM includes Title IV, the NO_x SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current ambient air quality standards or other parts of the 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.

SO₂ and NO_x Emissions Reductions under Clear Skies



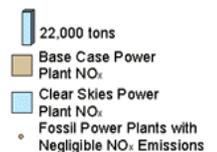
Projected SO₂ Emissions from Power Plants
with the Base Case and Clear Skies (2020)

West



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

West



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.

Clear Skies Health and Air Quality Benefits in Iowa

Improve Public Health

- **Reduced ozone and fine particle exposure** by 2020 would result in public health benefits of:
 - approximately 200 fewer premature deaths each year¹
 - approximately 100 fewer cases of chronic bronchitis each year
 - approximately 300 fewer non-fatal heart attacks each year
 - approximately 400 fewer hospital and emergency room visits each year
 - approximately 18,000 fewer days workers are out sick due to respiratory symptoms each year
 - approximately 3,800 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 Iowa's mercury-contaminated lakes and streams.

By 2020, Iowa would receive approximately \$1.2 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

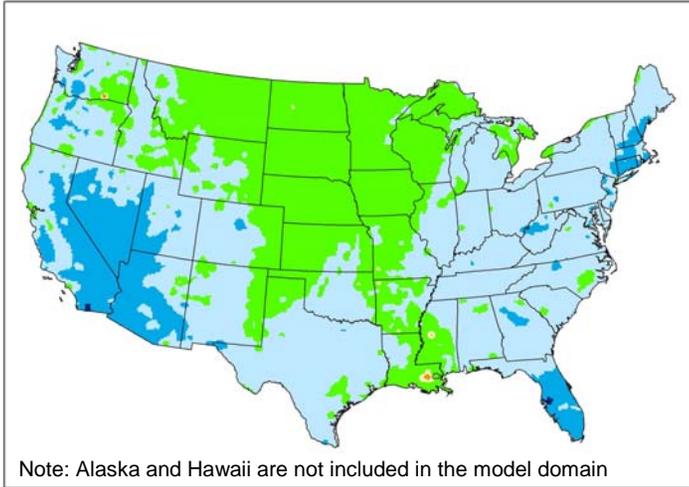
- Currently, all counties in Iowa meet the 8-hour ozone and fine particle standards.²
- Clear Skies would further reduce concentrations of ozone and fine particles throughout Iowa.

1. An alternative methodology for calculating health-related benefits projects approximately 100 premature deaths prevented and \$240 million in health benefits each year in Iowa by 2020.

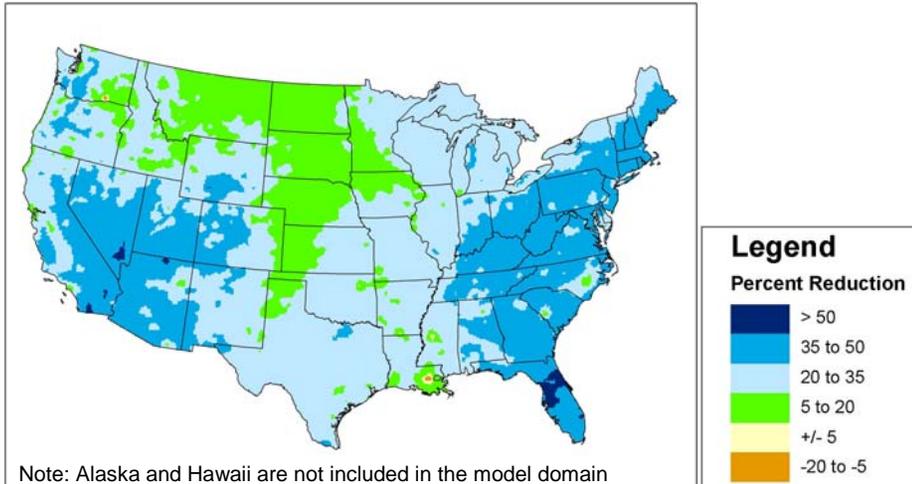
2. Based on 1999-2001 data of counties with monitors that have three years of complete data.

Clear Skies Environmental Benefits in Iowa

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



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



Clear Skies Would Provide Environmental Benefits in Iowa

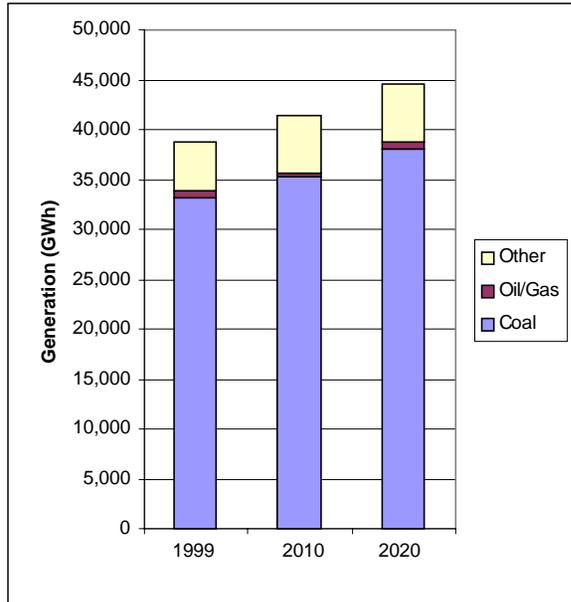
In comparison to existing programs,

- **Visibility would improve** perceptibly.
 - The value of this benefit for Iowa who visit National Parks and wilderness areas nationwide is \$21 million.
- **Sulfur deposition would decrease 15-30%** in most central and eastern portions of the state and up to 15% in the rest of the state.
- **Nitrogen deposition would decrease 5-20% in Iowa.**
- **Mercury deposition would decrease up to 15%*** in isolated parts of the state.

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

Electricity Generation in Iowa under Clear Skies

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

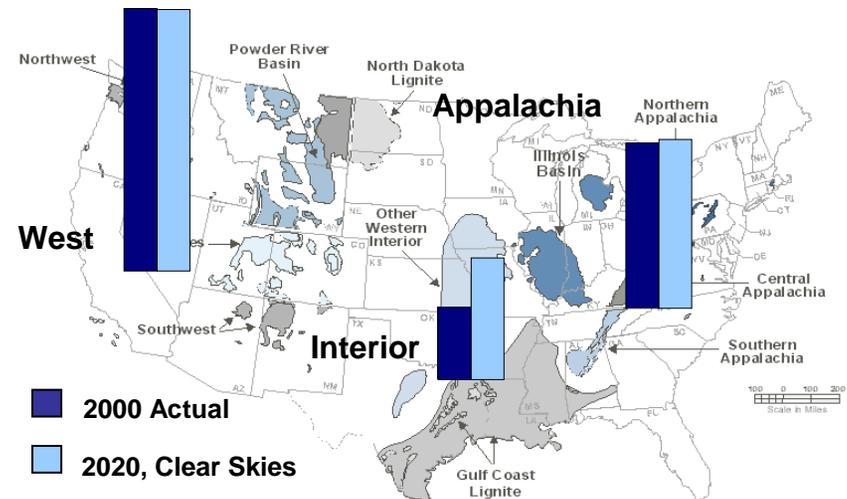


- Iowa's electricity growth is projected to be met by increases in coal-fired generation. Clear Skies does not significantly alter this projection.

- Electricity from coal-fired generation will increase by 15% from 1999 to 2020.

- Iowa'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, 78% of Iowa's coal-fired generation is projected to come from units with advanced SO₂, NO_x and/or mercury control equipment; in 2020, the percentage is projected to increase to 93%.

Current and Projected Coal Production for Electricity Generation



Scale: Appalachia 2000 = 299 million tons

Emission Controls in Iowa under Clear Skies

- **Under Clear Skies by 2020...**

- 62% of coal-fired capacity would install SCR
- No scrubbers would be installed
- 12% would install mercury controls

- **The major generation companies in Iowa include:**

- MidAmerican Energy Company
- Alliant Energy Corporation
- IES Utilities, Inc

- **Total coal-fired capacity in Iowa is projected to be 5,171 MW in 2010.**

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

Plant Name	Unit ID	Technology
COUNCIL BLUFFS	3	SCR/ ACI
GEORGE NEAL NORTH	1	SCR
GEORGE NEAL NORTH	2	SCR
GEORGE NEAL SOUTH	4	SCR
LOUISA	101	SCR
MILTON L KAPP	2	SCR
OTTUMWA	1	SCR*

* Retrofit was installed under Clear Skies by 2010

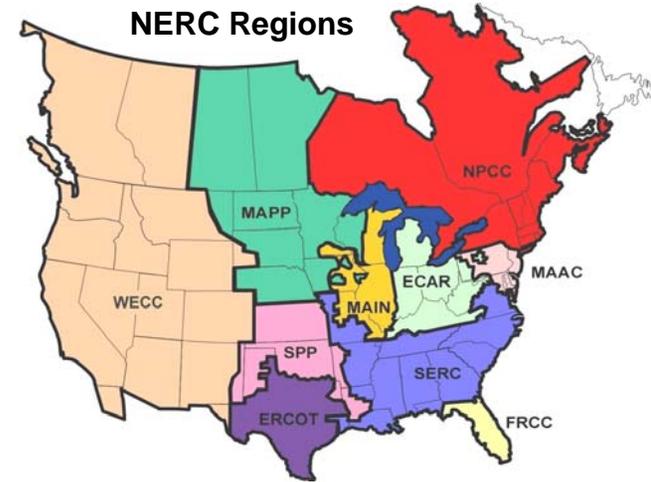
Notes:

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

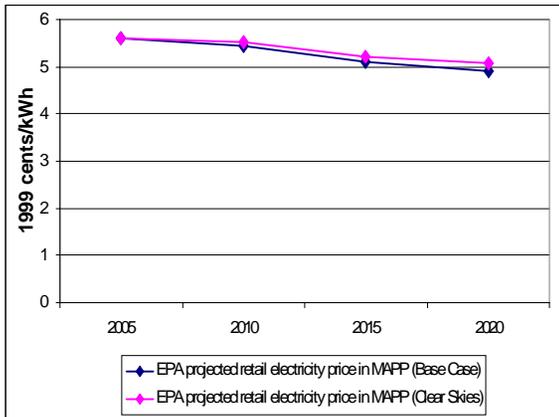
[2] Dubuque unit 1 and Prairie Creek unit 3 are projected to be removed from operation by 2005 with Clear Skies due to excess gas-fired capacity in the marketplace, unless otherwise needed for voltage purposes. The recent overbuild of gas-fired generation reduces the need for less efficient units operating 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.

Electricity Prices in Iowa under Clear Skies

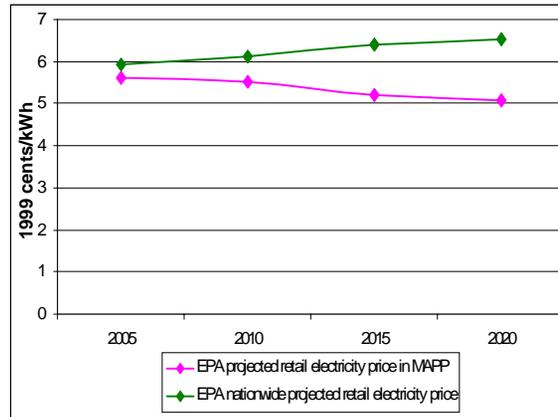
- With or without Clear Skies, retail prices in the North American Electric Reliability Council (NERC) MAPP region (the electricity supply region that contains Iowa) are projected to decrease between 2005 and 2020.
- With Clear Skies, retail prices are projected to be approximately 0.2 – 3.5% higher between 2005 and 2020 than in the absence of the legislation.



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



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



In 2000, the average retail electricity price in Iowa was approximately 5.9 cents/kWh, which was below 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 Iowa under Clear Skies

Benefits Outweigh the Costs

- In Iowa, 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. This is because power production shifts within the region enable the power sector to comply in the most cost-effective manner. Total annual health benefits in 2020 for Iowa are projected to be \$1.2 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 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>)

