

US EPA ARCHIVE DOCUMENT



# The Clear Skies Act of 2003

Oklahoma and Clear Skies

## Highlights of Clear Skies in Oklahoma

---

- Oklahoma sources would reduce emissions of SO<sub>2</sub> by 1%, NO<sub>x</sub> by 8%, and mercury by 3% by 2020 due to Clear Skies.
- The health benefits in Oklahoma would total \$1.3 billion annually (\$240 million under the alternative estimate) and include 200 fewer premature deaths (100 under the alternative estimate) and 400 fewer hospitalizations/emergency room visits each year.
- Oklahoma 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 electricity supply region that includes Oklahoma 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**
  - Oklahoma'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**
  - Oklahoma sources would reduce emissions of NO<sub>x</sub> and hold the line on SO<sub>2</sub> 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**



# Clear Skies Sets a Firm Timeline for Emission Reductions

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

**2004**

The existing Title IV SO<sub>2</sub> 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 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<sub>2</sub> 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<sub>2</sub> Phase II (3.0 million ton annual cap with a national trading program)**

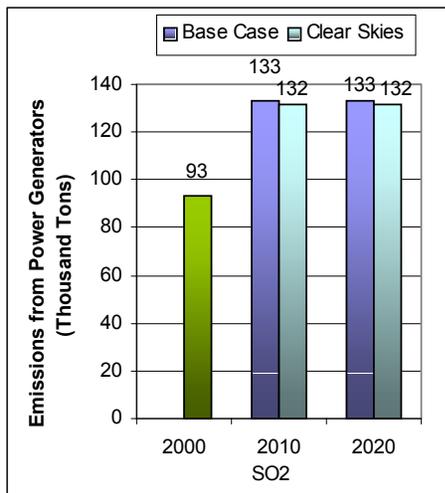
# Emissions in Oklahoma under Clear Skies

## Emissions in Oklahoma (2020) compared to the base case:

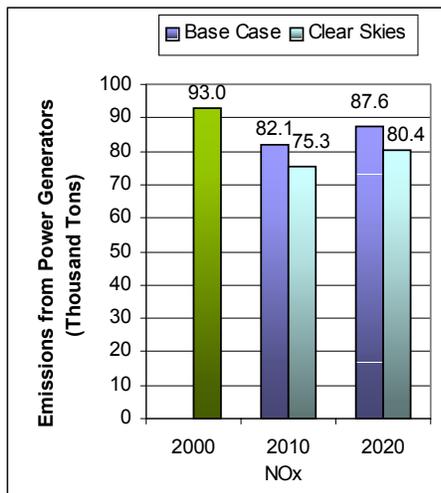
- 1% decrease in SO<sub>2</sub> emissions
- 8% decrease in NO<sub>x</sub> emissions
- 3% decrease in mercury emissions

### Emissions: Existing Clean Air Act Regulations (base case\*) vs. Clear Skies in Oklahoma in 2010 and 2020

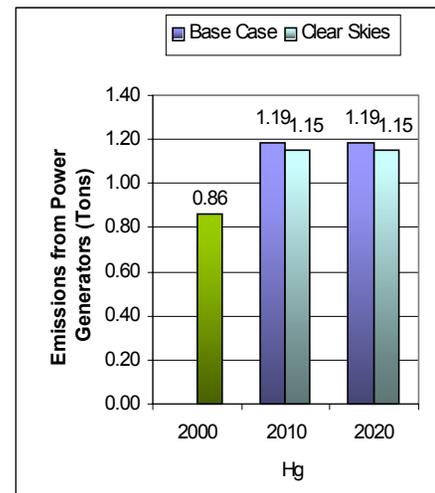
Sulfur dioxide



Nitrogen oxides



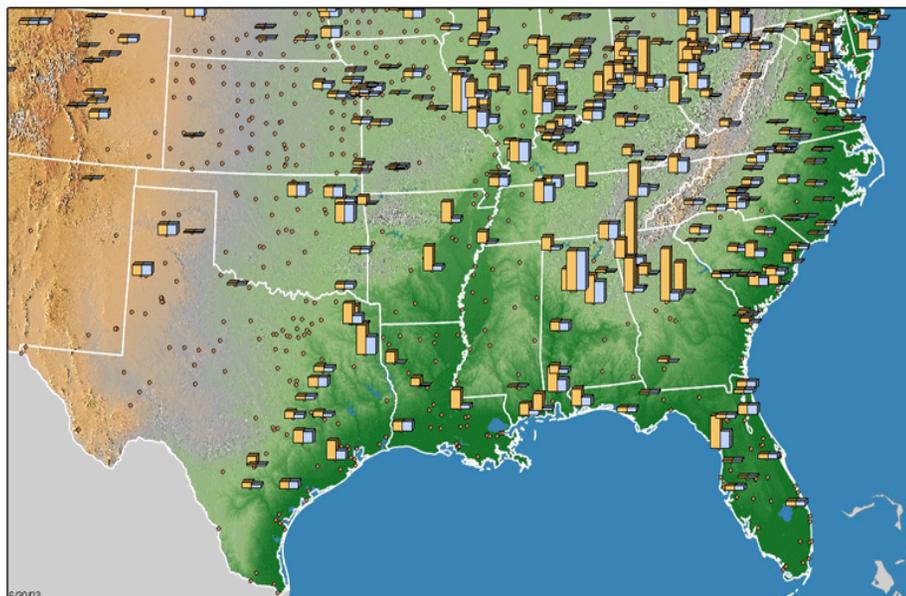
Mercury



Note: The base case using IPM includes Title IV, the NO<sub>x</sub> 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.

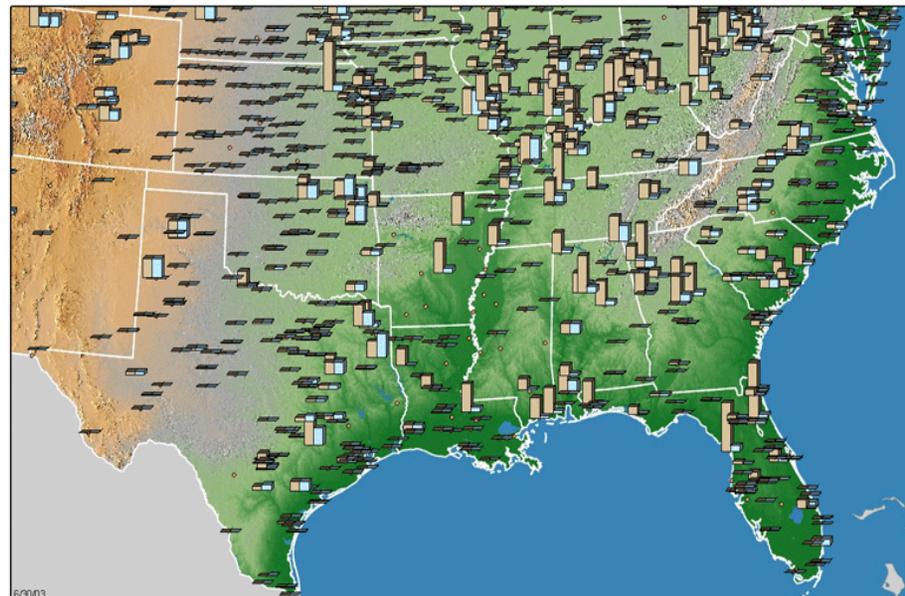
# SO<sub>2</sub> and NO<sub>x</sub> Emissions Reductions under Clear Skies

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



Projected SO<sub>2</sub> Emissions from Power Plants with the Base Case and Clear Skies (2020)  
South

- 75,000 tons
- Base Case Power Plant SO<sub>2</sub>
- Clear Skies Power Plant SO<sub>2</sub>
- Fossil Power Plants with Negligible SO<sub>2</sub> Emissions



Projected NO<sub>x</sub> Emissions from Power Plants with the Base Case and Clear Skies (2020)  
South

- 22,000 tons
- Base Case Power Plant NO<sub>x</sub>
- Clear Skies Power Plant NO<sub>x</sub>
- Fossil Power Plants with Negligible NO<sub>x</sub> Emissions

Note: The base case using IPM includes Title IV, the NO<sub>x</sub> 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 from new sources in 2020 are not reflected.

# Clear Skies Health and Air Quality Benefits in Oklahoma

## 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<sup>1</sup>
  - approximately 100 fewer cases of chronic bronchitis each year
  - approximately 200 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 3,000 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 the nation's many lakes, streams, coastal waters where mercury contamination is a problem.

**By 2020, Oklahoma would receive approximately \$1.3 billion in annual health benefits from reductions in fine particle and ozone concentrations alone due to Clear Skies.<sup>1</sup>**

## Help Maintain Health-Based Air Quality Standards<sup>2</sup>

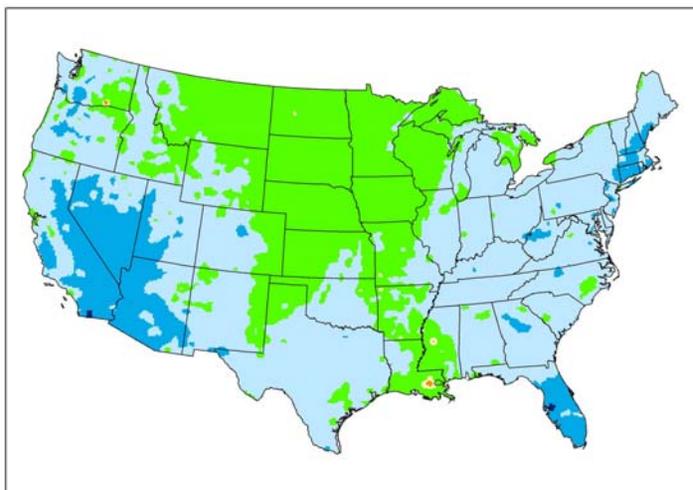
- All counties in Oklahoma currently meet the fine particle standard; all but one county currently meet the 8-hour ozone standard;
- Tulsa county (population approximately 560,000) is expected to come into attainment with the ozone standard by 2010 under existing programs.
- Clear Skies would further reduce concentrations of ozone throughout Oklahoma.

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

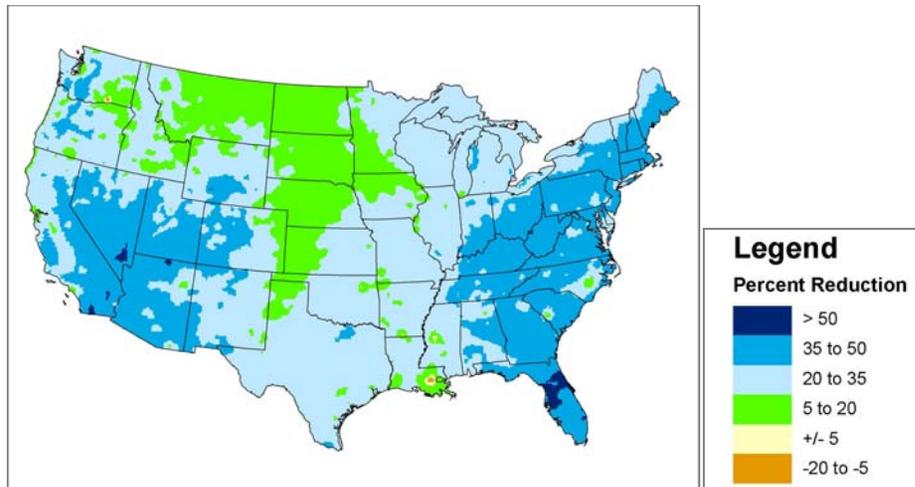
2. Based on 1999-2001 data for counties with monitors that have three years of complete data.

# Clear Skies Environmental Benefits in Oklahoma

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 Oklahoma

In comparison to existing programs,

- **Visibility would improve** perceptibly in eastern Oklahoma.
  - The value of this benefit for Oklahoma residents who visit America's National Parks and Wilderness Areas is \$25 million.
- **Sulfur deposition would decrease** 15-30% in the eastern half of the state and up to 15% in the western half of the state.
- **Nitrogen deposition, a cause of damage to nitrogen-sensitive coastal waters, including the Gulf of Mexico hypoxia zone, would decrease** 5-20% throughout large portions of eastern Oklahoma.
- **Mercury deposition would decrease** by up to 15%\* in the easternmost part of the state, and by 15 - 30%\* in some areas.

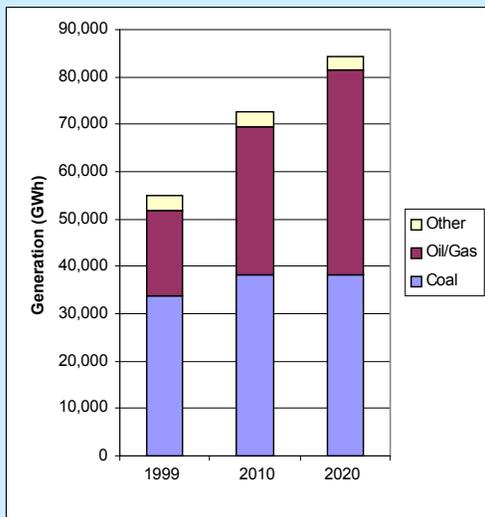
\* These results are based on modeling the Clear Skies mercury cap without triggering the safety valve.

# Electricity Generation and Pollution Controls in Oklahoma under Clear Skies

- Oklahoma'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 13% from 1999 to 2020.

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



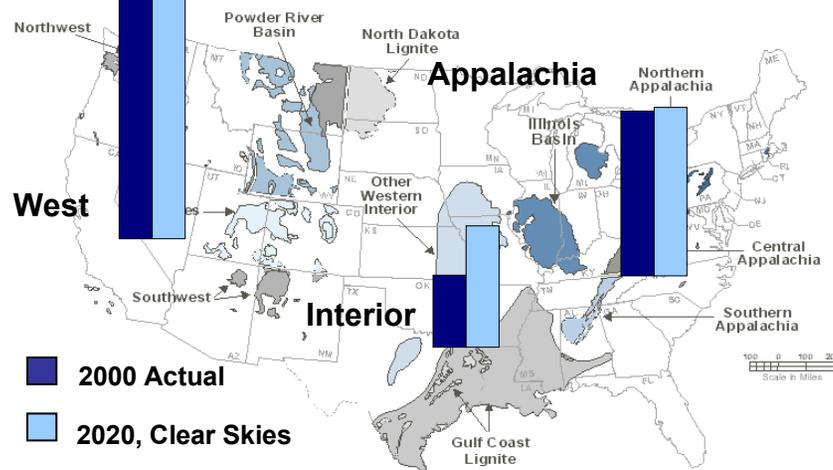
- Oklahoma's sources are projected to reduce their emissions through the use of existing pollution controls, rather than through a switch from coal to natural gas.
  - In 2010 and 2020, 20% of Oklahoma's coal-fired generation is projected to come from units with advanced SO<sub>2</sub> and/or NO<sub>x</sub> control equipment that also substantially reduce mercury emissions.
  - No pollution controls are projected to be installed in Oklahoma under Clear Skies.
  - No coal-fired units in Oklahoma are projected to be removed from operation as a result of Clear Skies.

- The major generation companies in Oklahoma include:

- Oklahoma Gas & Electric Co.
- Public Service Co. of Oklahoma
- Western Farmers Electric Cooperative

- Total coal-fired capacity in Oklahoma is projected to be 5,155 MW in 2010

Current and Projected Coal Production for Electricity Generation



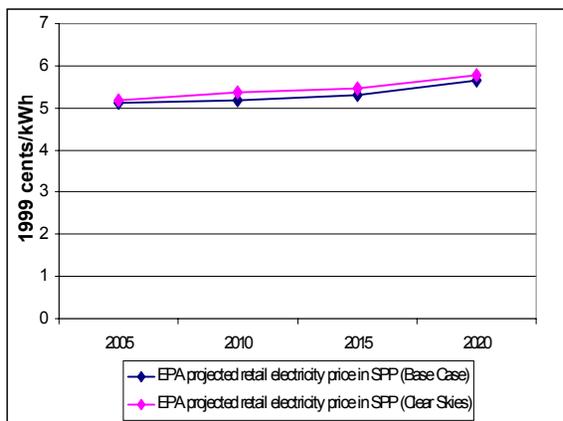
Scale: Appalachia 2000 = 299 million tons

# Electricity Prices in Oklahoma under Clear Skies

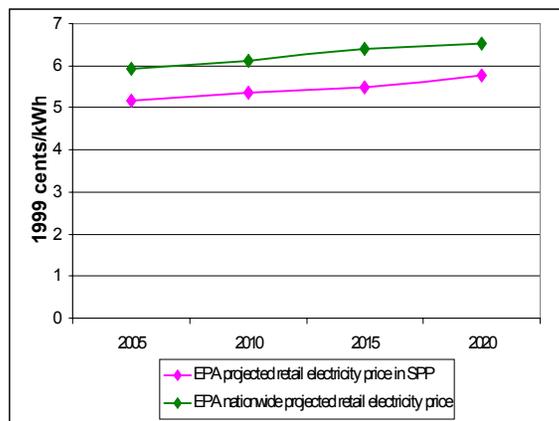
- With or without Clear Skies, retail prices in the North American Electric Reliability Council (NERC) SPP region (the electricity supply region that contains Oklahoma) are projected to increase between 2005 and 2020.
- With Clear Skies, retail prices are projected to be approximately 0.8 – 4.0% higher between 2005 and 2020 than in the absence of the legislation.



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



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



In 2000, the average retail electricity price in Oklahoma was approximately 6.0 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<sub>x</sub> 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 Oklahoma under Clear Skies

---

## Benefits Outweigh the Costs

- In Oklahoma, Clear Skies is projected to cost approximately \$144 million annually by 2020 while providing health and visibility benefits totaling approximately \$1.4 billion annually.
- The increases in production costs under Clear Skies represent only a small percentage of total retail electricity sales revenue in Oklahoma.
  - Retail electricity sales revenue in Oklahoma was over \$2.9 billion in 2000.
  - Adjusting these sales revenues by the same growth rate used for the modeling of costs would result in revenues of almost \$4.5 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<sub>x</sub> 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>)

