

US EPA ARCHIVE DOCUMENT



# The Clear Skies Act of 2003

Arkansas and Clear Skies



# Highlights of Clear Skies in Arkansas

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- **Arkansas sources would reduce emissions of SO<sub>2</sub> by 83%, NO<sub>x</sub> by 83%, and mercury by 54% by 2020 due to Clear Skies.**
- **The health benefits in Arkansas would total \$1.7 billion annually (\$310 million under the alternative estimate) and include 200 fewer premature deaths (100 under the alternative estimate) and 500 fewer hospitalizations/emergency room visits each year.**
- **In addition, Arkansas would receive environmental benefits including reduced nitrogen loading of waterways and improved visibility, worth \$18 million each year by 2020 for Arkansas residents who visit National Parks and Wilderness areas throughout the country.**
- **Clear Skies does not significantly impact electricity prices. With or without Clear Skies, electricity prices in the electricity supply region that includes Arkansas are expected to remain near or below 2000 prices.**

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

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## Why Clear Skies?

- **Air quality has improved, but serious concerns persist**
  - Arkansas'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**
  - Arkansas sources would substantially reduce emissions of SO<sub>2</sub>, NO<sub>x</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**

# 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

**Note:** Dotted lines indicate a range of possible dates.

<sup>1</sup> Further action on ozone would be considered based on the 2007 assessment.

<sup>2</sup> 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

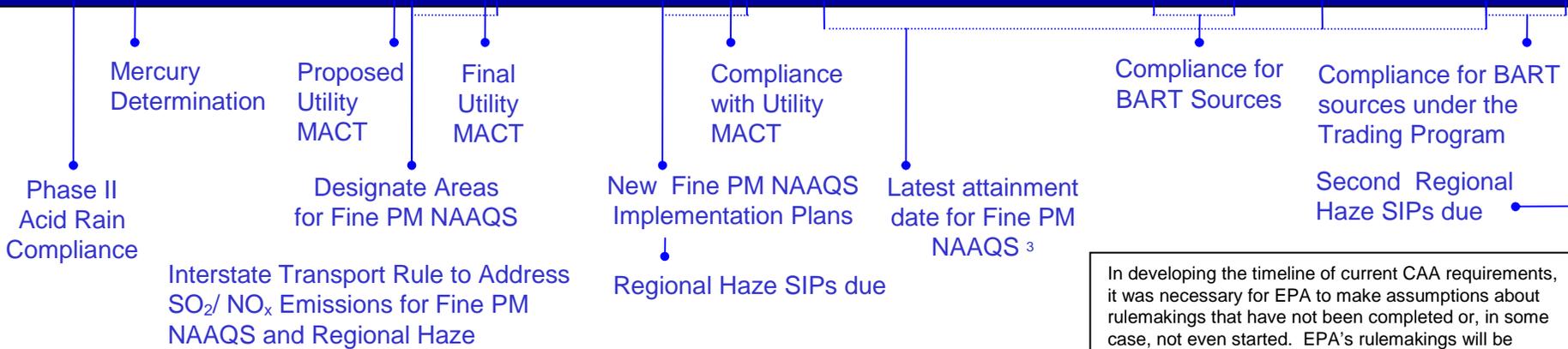
OTC NO<sub>x</sub> Trading

NO<sub>x</sub> SIPs Due

NO<sub>x</sub> SIP Call Reductions

Possible Regional NO<sub>x</sub> Reductions ? (SIP call II)<sup>1</sup>

Serious 8-hr Ozone NAAQS attainment Date



### Acid Rain, PM<sub>2.5</sub>, 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<sub>x</sub> SIP call (summertime NO<sub>x</sub> 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 NO<sub>x</sub> 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 NO<sub>x</sub> 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)**

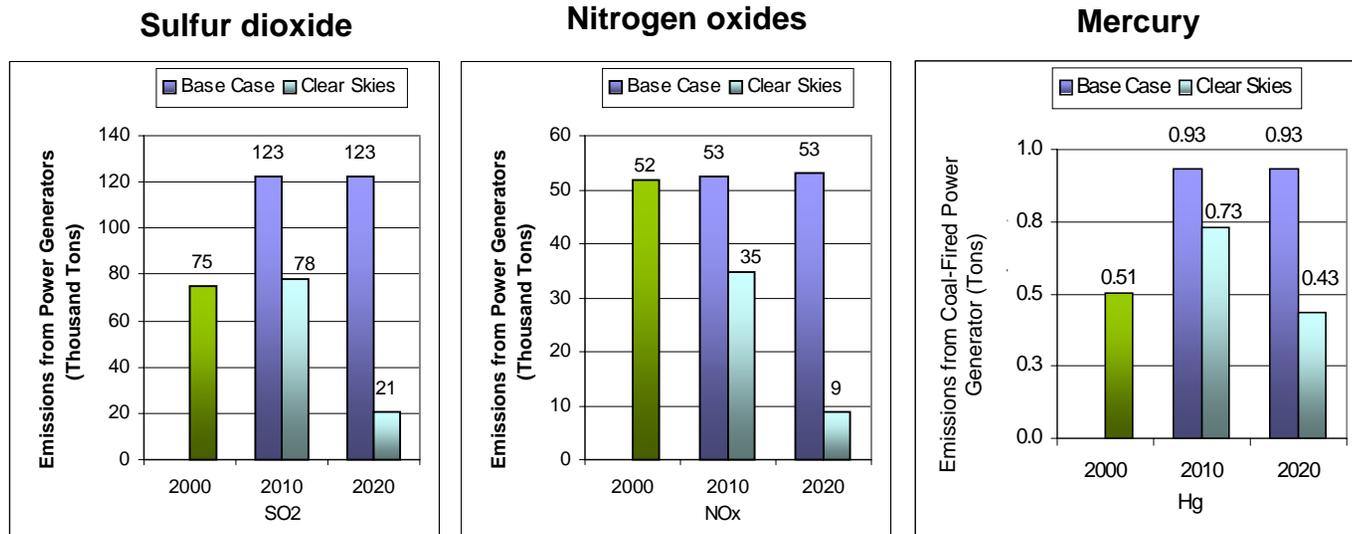
**2018: Clear Skies SO<sub>2</sub> Phase II (3.0 million ton annual cap with a national trading program)**

# Emissions in Arkansas under Clear Skies

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

- 72% reduction in SO<sub>2</sub> emissions
- 83% reduction in NO<sub>x</sub> emissions
- 14% reduction in mercury emissions

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



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.

# Clear Skies Health and Air Quality Benefits in Arkansas

## 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 300 fewer non-fatal heart attacks each year
  - approximately 500 fewer hospital and emergency room visits each year
  - approximately 22,000 fewer days workers are out sick due to respiratory symptoms each year
  - approximately 5,400 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 Arkansas' lakes and rivers.

**By 2020, Arkansas would receive approximately \$1.7 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

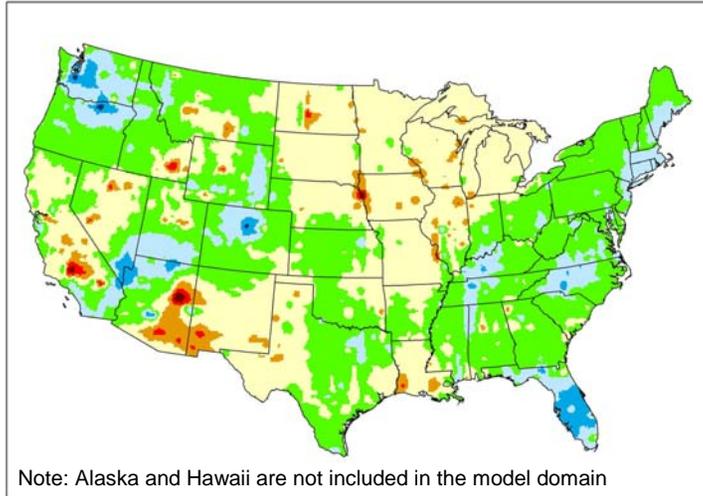
- All counties in Arkansas currently meet the fine particle standard; all but two counties in Arkansas currently meet the 8-hour ozone standard.<sup>2</sup>
- Pulaski and Crittenden counties (population approximately 400,000) would be brought into attainment with the ozone standard under existing programs by 2010.
- Clear Skies would further reduce concentrations of ozone and fine particles in counties throughout Arkansas.

1. An alternative methodology for calculating health-related benefits projects approximately 100 premature deaths prevented and \$310 million in health benefits each year in Arkansas by 2020.

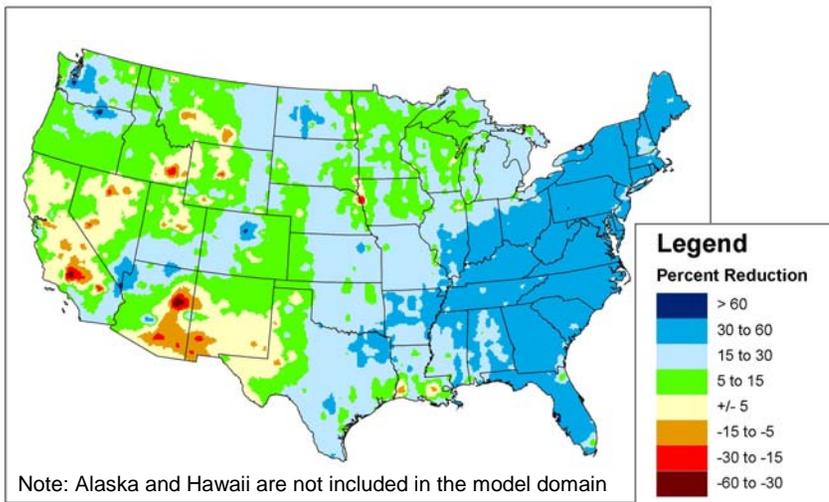
2. Based on 1999-2001 data of counties with monitors that have three years of complete data.

# Clear Skies Environmental Benefits in Arkansas

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



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



## Clear Skies Would Provide Substantial Environmental Benefits in Arkansas

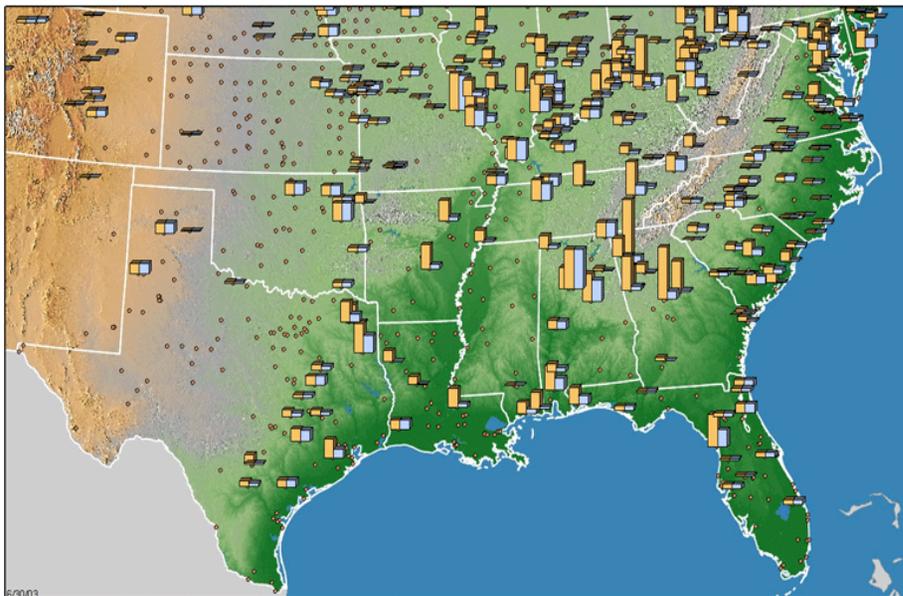
In comparison to existing programs,

- **Visibility would improve** perceptibly in Arkansas.
  - The value of improved visibility for Arkansas residents who visit National Parks and Wilderness areas throughout the country would be \$18 million each year by 2020.
- **Sulfur deposition, a primary cause of acid rain, would decrease** by up to 30% across most of Arkansas, and up to 60% in some northeastern areas of the state.
- **Nitrogen deposition, another significant contributor to acid rain, as well as a cause of damage in nitrogen-sensitive forests and coastal waters, would decrease** by up to 20%.
- **Mercury deposition would decrease** by 5-15% across much of the state, and by 15-30% in some small areas.\*

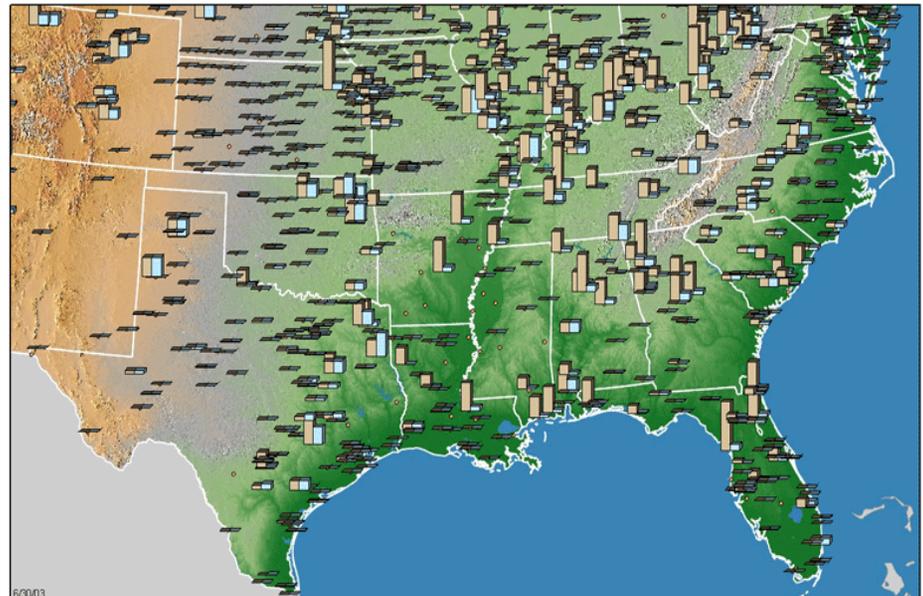
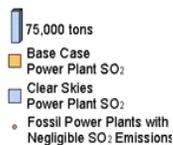
\* These results are based on modeling the Clear Skies mercury cap without triggering the safety valve.

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

Emissions in Arkansas and surrounding states would decrease considerably. These emission reductions would make it much easier for Arkansas 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



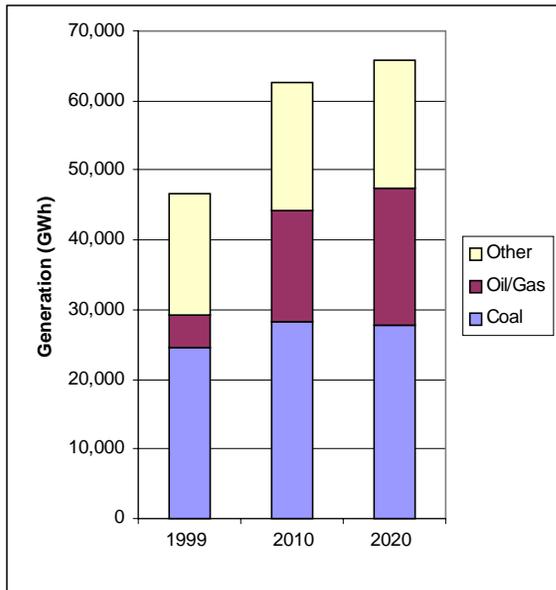
Projected NO<sub>x</sub> Emissions from Power Plants with the Base Case and Clear Skies (2020)  
South



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

# Electricity Generation in Arkansas under Clear Skies

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

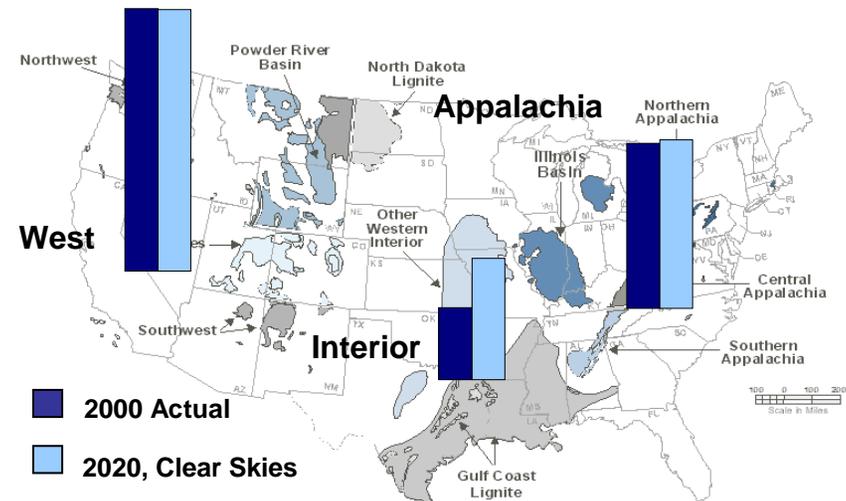


- Arkansas's electricity growth is projected to be met by increases in gas-fired and coal-fired generation. Clear Skies does not significantly alter this projection.

- Electricity from coal-fired generation will increase by 13% from 1999 to 2020.

- Arkansas'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, 33% of Arkansas'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; in 2020, the percentage is projected to increase to 100%.
  - No coal-fired units in Arkansas are projected to be removed from operation as a result of Clear Skies.

Current and Projected Coal Production for Electricity Generation



Scale: Appalachia 2000 = 299 million tons

# Emission Controls in Arkansas under Clear Skies

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

- 100% of coal-fired capacity would install SCR
- 100% would install scrubbers

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

- Entergy Arkansas, Inc.
- Southwestern Electric Power Co.
- Arkansas Electric Cooperative Corp

- **Total coal-fired capacity in Arkansas is projected to be 3,790 MW in 2010.**

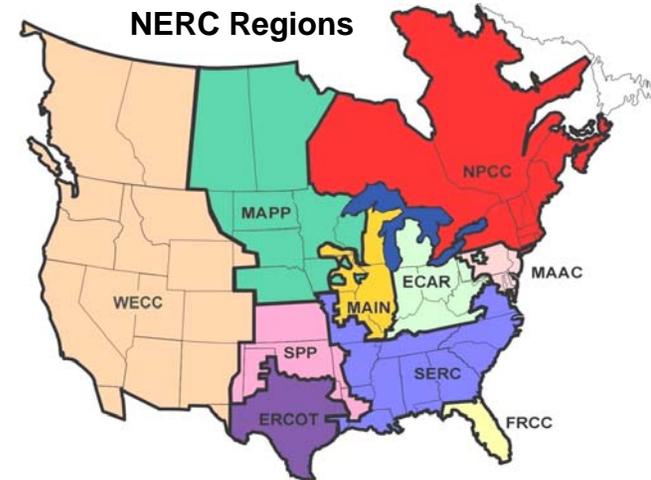
## Units in Arkansas Projected to Be Retrofitted Due to Clear Skies by 2020

<u>Plant Name</u>	<u>Unit ID</u>	<u>Technology</u>
FLINT CREEK	1	Scrubber*/ SCR*
INDEPENDENCE	1	Scrubber/ SCR
INDEPENDENCE	2	Scrubber/ SCR
WHITE BLUFF	1	Scrubber*/ SCR*
WHITE BLUFF	2	Scrubber/ SCR

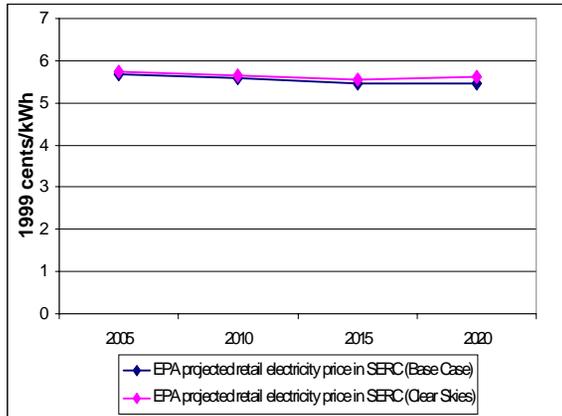
\* Retrofit was installed under Clear Skies by 2010

# Electricity Prices in Arkansas under Clear Skies

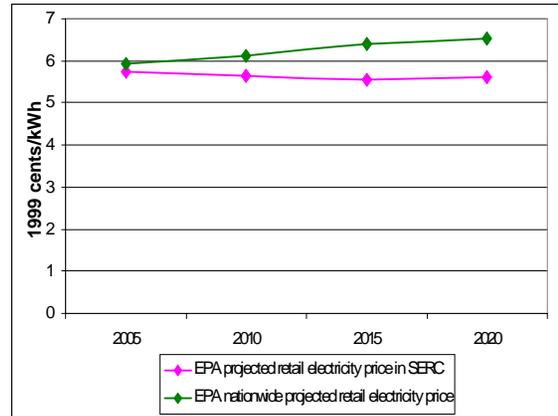
- With or without Clear Skies, retail prices in the North American Electric Reliability Council (NERC) SERC region (the electricity supply region that contains Arkansas) are projected to decrease between 2005 and 2020.
- With Clear Skies, retail prices are projected to be approximately 0.7 – 2.8% higher between 2005 and 2020 than in the absence of the legislation.



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



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



In 2000, the average retail electricity price in Arkansas was approximately 5.8 cents/kWh, which was below the average *national* retail price of approximately 6.7 cents/kWh.

# Costs and Benefits in Arkansas under Clear Skies

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## Benefits Outweigh the Costs

- **In Arkansas, Clear Skies is projected to cost approximately \$162 million annually by 2020 while providing health benefits totaling approximately \$1.7 billion annually.**
- **The increases in production costs under Clear Skies represent only a small percentage of total retail electricity sales revenue in Arkansas.**
  - Retail electricity sales revenue in Arkansas was almost \$2.4 billion in 2000.
  - Adjusting these sales revenues by the same growth rate used for the modeling of costs would result in revenues of over \$3.7 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

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- 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>)

