

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 WASHINGTON ¹

Human Health and Environmental Benefits of Clear Skies: Clear Skies would protect human health, improve air quality, and reduce deposition of sulfur dioxide (SO₂), nitrogen oxides (NO_x), and mercury.²

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.
-
- There are no counties in Washington currently projected to be out of attainment with the annual fine particle or 8-hour ozone standards. Clear Skies would, however, achieve additional reductions in fine particles and ozone that will further protect human health.
 - Clear Skies delivers significant environmental benefits by 2020:
 - nitrogen deposition would be reduced by up to 15% throughout the state; and
 - under Clear Skies, the Western Regional Air Partnership agreement will be honored, and the WRAP emissions reductions are expected to take effect; this will allow future growth in the West to occur without degrading visibility.

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.

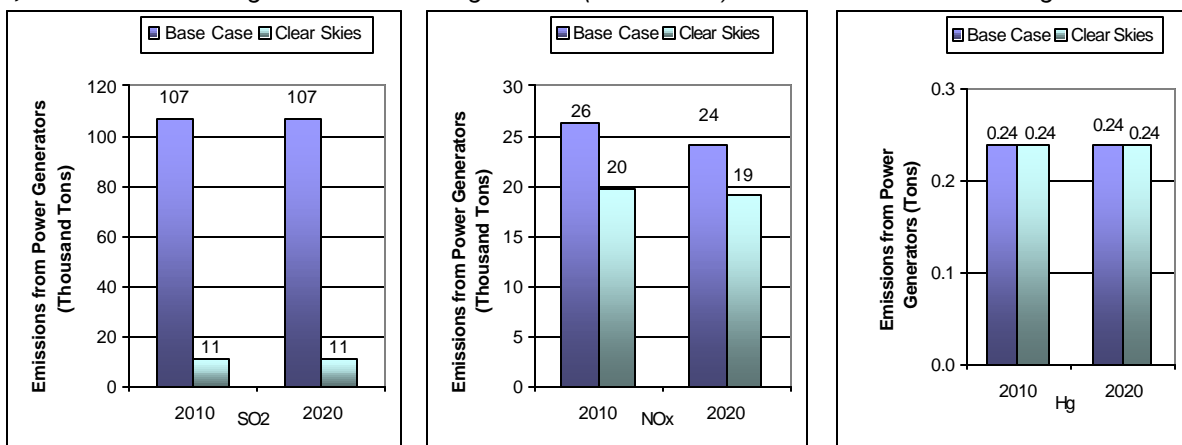
Changes in Emissions Under Clear Skies: Clear Skies is projected to result in significant emissions reductions from power generators by 2020.

- In Washington, Clear Skies is projected to significantly reduce emissions from power generators by 2020 (relative to 2000 emissions):
 - SO₂ emissions would be reduced by 87%⁴; and
 - NO_x and mercury emissions would be maintained at current levels.

Nationwide Emissions under Clear Skies in 2020

- SO₂ 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 SO₂, 67% for NO_x, and 69% for mercury.

Figures 1a, 1b and 1c. Existing Clean Air Act Regulations (base case⁵) vs. Clear Skies in Washington in 2010 and 2020



- Emissions rates in Washington in 2010 and 2020:

Table 1. Projected Emissions Rates in 2010 and 2020 in Washington

Year		SO ₂		NO _x		Hg
		Coal	All	Coal	Gas	Coal
		lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/TBtu
2010	Base Case	2.10	0.16	0.40	0.05	4.70
	Clear Skies	0.21	0.13	0.30	0.04	4.70
2020	Base Case	2.10	0.12	0.40	0.02	4.70
	Clear Skies	0.21	0.09	0.30	0.02	4.70

Costs: Nationwide, the projected annual costs of Clear Skies (in \$1999) are \$3.69 billion in 2010 and \$6.49 billion in 2020.⁶

⁴ Subsequent to the development of the latest version of IPM used to project power plant emissions, SO₂ control equipment has been installed at the Centralia Plant. Because emission reductions resulting from the installation of this control equipment was not accounted for in the base case modeling, the emission reductions expected under Clear Skies, as well as the benefits associated with those reductions, will be less than the projected values.

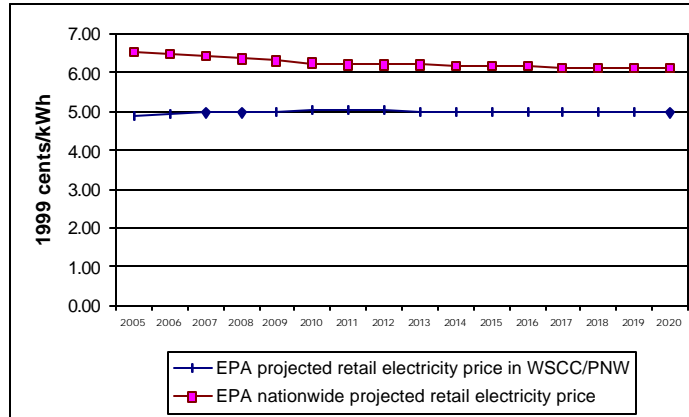
⁵ The base case includes Title IV, the NO_x SIP call and State-specific caps in CT, MO and TX. It does not include mercury MACT in 2008 or any other potential future regulations to implement the current Clean Air Act.

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 State or EPA region boundaries making some compliance options, such as dispatch, and associated costs impractical to differentiate at a State or Regional level.

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

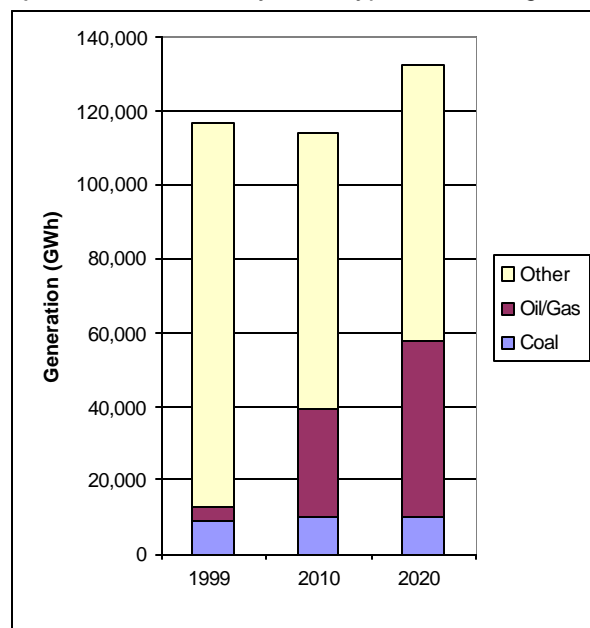
- In 1999, the average retail electricity price in Washington was approximately 4.10 cents/kWh, which was below the average *national* retail price of approximately 6.66 cents/kWh.⁷ As shown in Figure 3, retail prices in WSCC/PNW (the North American Electric Reliability Council (NERC) regions that contain Washington) are projected to increase and remain below the national average between 2005 and 2020.⁸

Figure 2. Projected Retail Electricity Prices in WSCC/PNW under Clear Skies (2005-2020)



Generation in Washington under Clear Skies: Coal-fired power plants currently produce 7% of the electricity used in Washington. Both the level of coal-fired generation and the portion of the total generation contributed by coal-fired generation would remain relatively unchanged under Clear Skies. This level of coal-fired generation is projected to be approximately 9% by 2010 and 7% by 2020.

Figure 3. Current and Projected Generation by Fuel Type in Washington under Clear Skies (GWh)⁹



⁷ Source: 1995 EIA data, available at http://www.eia.doe.gov/cneaf/electricity/page/fact_sheets/retailprice.html.

⁸ State-level retail electricity prices vary considerably across the United States. Variation in prices can be caused by many factors including access to low cost fuels for generating power, State taxes, and the mix of power plants in the States.

⁹ Source: 1999 data from EIA at http://www.eia.doe.gov/cneaf/electricity/st_profiles/washington/wa.html (Table 5).

- EPA does not project that any facilities in Washington would switch from coal to natural gas in response to the Clear Skies emissions caps. Instead, sources in Washington would reduce their emissions through the installation of control technologies.
 - By 2010, coal-fired capacity in Washington is projected to be approximately 1,300 MW under Clear Skies. Approximately 1,200 MW of Washington's coal capacity is projected to scrubbers.
 - Between 2010 and 2020, an additional 100 MW are projected to install scrubbers.
- 98% of Washington's coal-fired generation is projected to come from coal units with emission control equipment in both 2010 and in 2020.¹⁰

Coal Production in Washington: Washington currently produces approximately 0.4% of the nation's coal supply, and has about 0.3% of the nation's coal reserves.¹¹

- EPA projects a *nationwide* 7.2% increase in coal production by 2020, relative to 2000. Preliminary analysis shows a 6% decrease in total coal production in the West between 2000 (510 million tons) and 2020 (479 million tons).¹²
- Based on preliminary analysis, EPA projects a slight decrease in coal mining jobs by 2020 in West relative to the base case.

Major Generation Companies in Washington: The ten largest plants in the State -- each over 900 MW -- are a combination of hydro, nuclear, petroleum, and coal-fired plants. The major generation companies include: Puget Sound Energy, Inc., Bonneville Power Admin, Seattle City Light, PUD No 1 of Snohomish County and Tacoma Power.

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

¹¹ Source: 2000 Coal Industry Annual, Tables 1 and 33.

¹² Because coal supply regions generally do not conform to State boundaries, it is impractical to project coal production at a State-level.