The Clear Skies Act

Technical Support Package

July 11, 2003

EPA United States Environmental Protection Agency

Introduction

- On February 14, 2002, President Bush proposed the Clear Skies Initiative, a mandatory program for the control of sulfur dioxide (SO_2), nitrogen oxides (NOx) and mercury (Hg) from the electricity generation sector.
- Clear Skies legislation was first introduced in both Houses of Congress in July 2002. On February 27, 2003, Senator James Inhofe and Senator George Voinovich reintroduced the program in the Senate (S.485), and Chairman Joe Barton and Chairman Billy Tauzin reintroduced the legislation in the U.S. House of Representatives (H.999) by request of the Administration.
- Extensive information on the Clear Skies Act of 2002 and the Clear Skies Act of 2003 is currently available on EPA's website at www.epa.gov/clearskies. This package is designed to provide additional technical support to accompany the newly reintroduced legislation.

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Updates from the 2002 Analysis

- **Updated current and future year emission files**
  - New electric generation unit (EGU) controls (e.g., Centralia power plant)
  - New state programs (e.g., North Carolina state law)
  - New federal control programs (e.g., Nonroad Diesel)
  - Updated current year emissions inventory from 1996 to 2001
- **Updated IPM modeling with EPA and EIA assumptions**
- **Updated air quality model (new version of REMSAD)**
- **Updated benefits and air quality modeling approaches**
- **Oklahoma and Kansas now in the Western NOx Zone**

Summary

The 2003 analysis reaffirms previous analytical results – Clear Skies provides substantial benefits to the public at a reasonable cost.

- **Clear Skies delivers approximately $110 billion annually in health benefits by 2020.**
  - An alternative estimate is $21 billion.
    - Many additional benefits are not monetized.
    - Benefits begin right after passage of the Act.

- **Clear Skies yields significant environmental benefits, including important reductions in sulfur, nitrogen, and mercury deposition. Annual monetized benefits of visibility are $3 billion by 2020.**

- **With Clear Skies, by 2020, 35 counties (home to approximately 12 million people) would be brought into attainment with the fine particle standard, leaving only 8 eastern counties in non-attainment. Clear Skies would also bring 3 counties (home to approximately 6 million people) into attainment with the 8-hour ozone standard, and remaining counties closer to attainment.**

- **Clear Skies is projected to cost $6.3 billion annually in 2020 ($1999) and prices of electricity, coal, and natural gas only increase a small amount. Varying key assumptions increases costs by less than 10%.**
  - Technological improvements in emission controls could reduce overall cost of compliance.

Changes to EPA's Air Quality Modeling

- Updated ambient design values used to calculate attainment to 1999-2001 ambient data.
- New current year baseline inventory (2001).
- New Base Case and Clear Skies inventories to reflect revised IPM Base Case and Clear Skies runs.
- New version of REMSAD:
  - Updates and corrections to the dry deposition code and the secondary organic aerosol (SOA) code
  - Updates to mercury chemistry
- Improved method in which modeled percent reduction for **each** of the $PM_{2.5}$ species was applied to the ambient measurements (instead of using total $PM_{2.5}$).
- Built proposed Nonroad Diesel controls into the Base Case.

Changes to EPA's Health Benefits Modeling

- **Used proposed Nonroad Rule methods.**
- **Population exposure**.
  - Ambient PM monitored data adjusted using REMSAD results (instead of using REMSAD results directly)
- **Demographic data.**
  - 2000 Census data (instead of 1990 data)
  - Improved future population projections
- **Health effects incidence/prevalence data.**
  - Updated baseline incidence/prevalence for health endpoints
- **Concentration-Response functions.**
  - Non-fatal heart attacks, school loss days added
  - New epidemiological studies for certain endpoints (hospital admissions, ER visits for asthma)
- **Valuation of changes in health outcome.**
  - New valuation for alternative estimate

Changes to EPA's Economic Modeling

- **Updated EPA 2003 IPM Base Case (Base Case):** The 2003 Base Case includes Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in Connecticut, Massachusetts, Missouri, New Hampshire, North Carolina, Texas, and Wisconsin all finalized before March 2003.

- **Updated EPA 2003 IPM Modeling Assumptions:** EPA has recently enhanced IPM to better reflect the power sector and incorporate the best available information.

  – Some modeling assumptions used in IPM have been updated from the 2000 version used to model the Clear Skies Act of 2002. A summary of these changes are listed on the following slide.

  – The revised assumptions were used in IPM runs completed for analysis of the 2003 reintroduced Clear Skies Act.

Updates to EPA's Economic Modeling Assumptions

Assumption	Change
Cost, performance, emission, and removal rate assumptions for new conventional units and existing nuclear units	Revised to ensure consistency with AEO 2003.
Renewable energy programs and renewable portfolio standards	Updated information largely based on AEO 2003.
Fuel oil assumptions	Incorporation consistent with AEO 2003.
Coal supply curves	Revised to incorporate the coal productivity, labor productivity, and transportation escalators used in AEO 2003.
Existing generation capacity – planned/committed units	159 GW of new capacity by 2005 was added to the model based on information in the RDI database and AEO 2003 inventory.
Inventory of installed SO_2 and NOx controls	Updated inventory of installed SO_2 and NOx controls based on information reported by utilities, vendors, state regulatory agencies, and regional EPA offices.
Updated baseline for state controls	Added state-specific caps in Massachusetts, New Hampshire, North Carolina, Texas, and Wisconsin.
Mercury emissions modification factors (EMFs)	• Mercury EMFs were revised based on latest technical data; the major changes were the SCR+FGD assumptions: – For bituminous coal, the removal rate was changed from 95% to 90%. – For subbituminous coal, smaller (25-85%) removal rates for SCR +FGD are now used. • Also modeled with EIA assumptions.
Annual electricity demand growth	• Annual electricity demand growth rate was changed from 1.2% to 1.55%. • Also modeled with EIA assumptions.
Natural gas supply prices	• Revisions were based on the latest version of ICF's North American Natural Gas Analysis System (NANGAS) model. The impact is an approximate 15% increase in gas prices in the model output, relative to Clear Skies 2002 model output. • Also modeled with EIA assumptions.
Activated carbon injection (ACI) cost and performance data	ACI removal was changed from 80% to 90%, based on the latest full-scale test data. (EIA also uses 90% removal.)
Title IV allowance bank	Updated Title IV bank assumptions based on most current data from ICF, Inc. Private Practice projections.

Notes on EPA's Analysis Using a "Base Case"

- 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.
- 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 2003 Base Case for power sector modeling includes:
    - Title IV, the NOx SIP Call, NSR settlements, and state-specific caps in Connecticut, Massachusetts, Missouri, New Hampshire, North Carolina, Texas, and Wisconsin all finalized before March 2003.
  - For air quality modeling, the Base Case also includes the federal and state control programs in the EPA 2003 IPM Base Case, as well as the Tier II, Heavy Duty Diesel, and Non-Road Diesel rules.