



Cross-State Air Pollution Rule: Impacts to Texas

Chief Engineer's Office

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Overview

- Cross-State Air Pollution Rule (CSAPR) implementation details
- Changes from proposal to final
- Inadequacy of notice
- Technical Errors
- Impacts to Texas
- Penalties for noncompliance



CSAPR Implementation Details

- Replaces the Clean Air Interstate Rule
 - Addresses Federal Clean Air Act (FCAA) interstate transport obligations for 1997 ozone and fine particulate matter (PM_{2.5}) and 2006 PM_{2.5} National Ambient Air Quality Standards
- Signed by the United States Environmental Protection Agency (EPA) Administrator on July 6, 2011, published in the *Federal Register* August 8, 2011 (76 FR 48208)



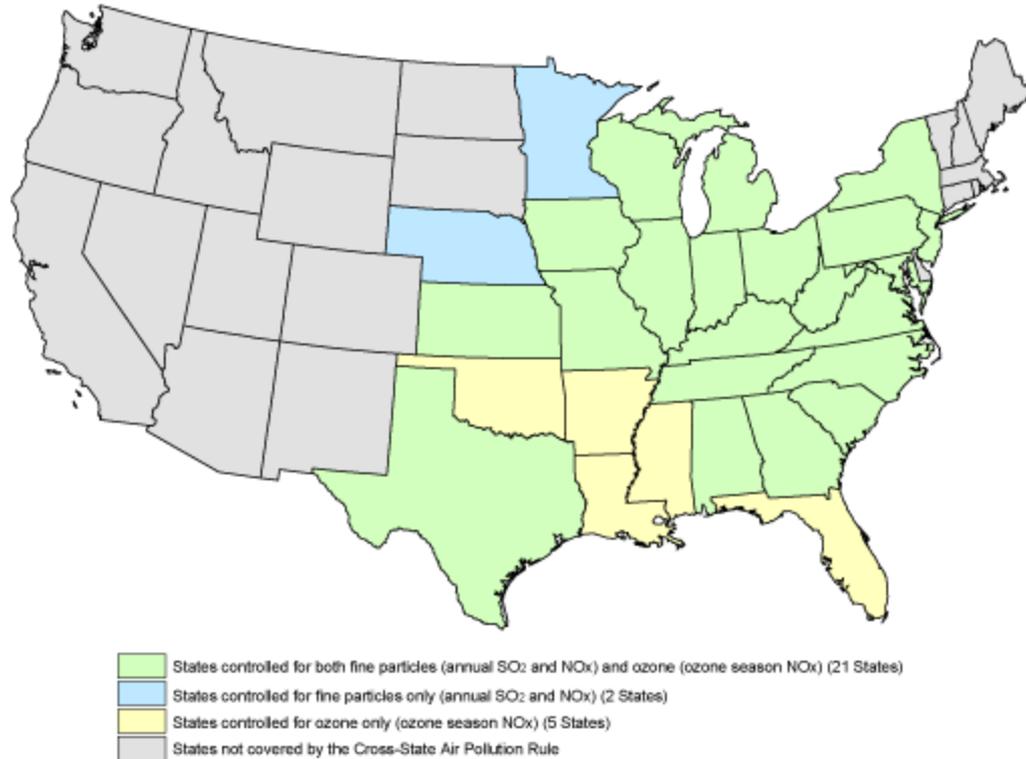
CSAPR Implementation Details

- Requires 27 states in the eastern U.S. to reduce electric generating unit (EGU) emissions that contribute to downwind nonattainment in other states.
- Implemented as a Federal Implementation Plan (FIP) through state-level budget caps (and unit-specific budget allowances)
 - PM_{2.5} program: annual nitrogen oxides (NO_x) and sulfur dioxide (SO₂) budgets
 - Ozone program: ozone season NO_x budget



CSAPR Implementation Details

States Covered by CSAPR





CSAPR Implementation Details

- Compliance date for PM_{2.5} program: January 1, 2012 (“Group 1” states have additional budget step-down for 2014)
- Compliance date for ozone program: May 1, 2012
- One allowance per ton of emissions, with unlimited intrastate trading and limited interstate trading
- “Variability limits” restrict the total allowances that may be traded into Texas each year



CSAPR Implementation Details

- Texas included in both the PM_{2.5} (as a Group 2 state) and ozone programs
 - PM_{2.5}: linked for 1997 and 2006 standards to nonattainment monitor in Madison County, IL
 - Ozone: linked to nonattainment monitor in Baton Rouge, LA, and maintenance monitor in Allegan, MI
- 2012 budgets (fixed for life of program)
 - **Annual SO₂: 243,954 tons**
 - Variability: 43,912 tons (Assurance level 287,866 tons)
 - **Annual NO_x: 133,595 tons**
 - Variability: 24,047 tons (Assurance level 157,642 tons)
 - **Ozone Season NO_x: 63,043 tons**
 - Variability: 13,239 tons (Assurance level 76,282 tons)



CSAPR Changes From Proposal

- Emissions inventories updated
- Assurance provisions begin in 2012 (2014 at proposal)
- Allocations apportioned by historic heat input, capped at maximum historic emissions (emissions-based allocation at proposal)
- Supplemental proposal for six "new" CSAPR states for the ozone program



CSAPR Changes From Proposal

- Texas included in PM_{2.5} program (previously only included for ozone at proposal)
 - EPA emissions inventory update resulted in 2012 base case EGU emissions increase of 118,133 tons SO₂
 - 2012 EGU base case at proposal: 327,873 tons
 - 2012 EGU base case at final: 446,006 tons
 - Base case emissions increase caused new linkage to Madison, IL, nonattainment receptor
 - Contribution at proposal: 0.13 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)
 - Contribution at final: 0.18 $\mu\text{g}/\text{m}^3$



Inadequacy of Notice

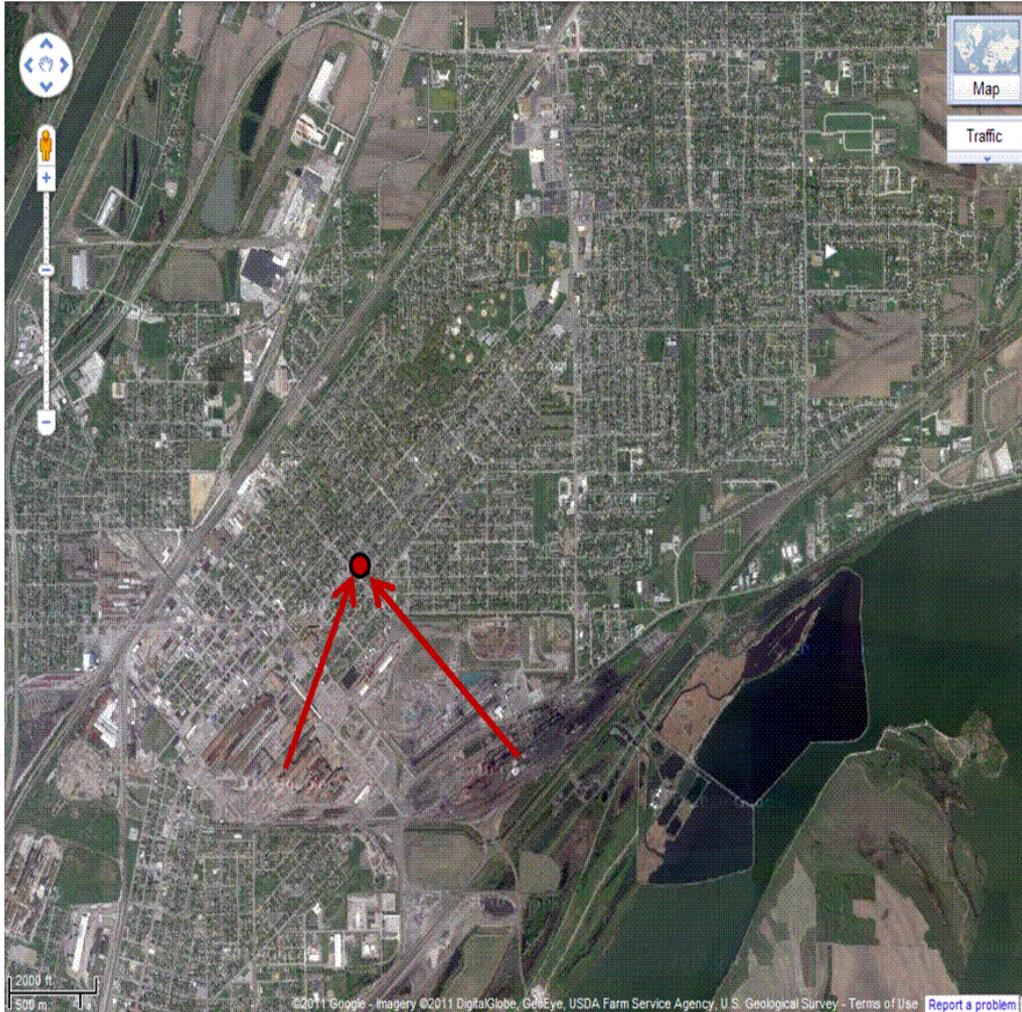
- At proposal, Texas was not linked to any nonattainment or maintenance receptor monitor for PM_{2.5}.
 - EPA requested comment on Texas' inclusion based on a hypothetical future emissions increase caused by speculation of EGU fuel switching.
 - TCEQ and other entities provided comment on the infeasibility of the speculative fuel changes, thereby disproving the possible future emissions increase.
- At finalization, increased 2012 base case emissions resulted in the new linkage to the Madison, IL, monitor.



Inadequacy of Notice

- Texas had no opportunity to comment on the linkage to a specific monitor.
- Texas was not provided proposed potential annual NO_x and SO₂ state budgets (or unit-level allocations) for review and comment.
- Six states with new linkages at rule finalization were provided supplementary notice on their inclusion in the CSAPR ozone FIP.
 - Three of these states were included at proposal (and therefore were proposed potential budgets for review and comment) based on linkages to monitors that were subsequently removed at rule finalization.

Technical Errors: Receptor Monitors



- The single monitor to which Texas links for $PM_{2.5}$ in Madison County, IL, was sited to measure particulate emissions from a nearby steel mill.
- The monitor has shown attainment for $PM_{2.5}$ since 2008, when the mill ceased operations. The mill has since resumed operations under an Memorandum of Understanding with the Illinois Environmental Protection Agency designed to prevent future attainment issues.



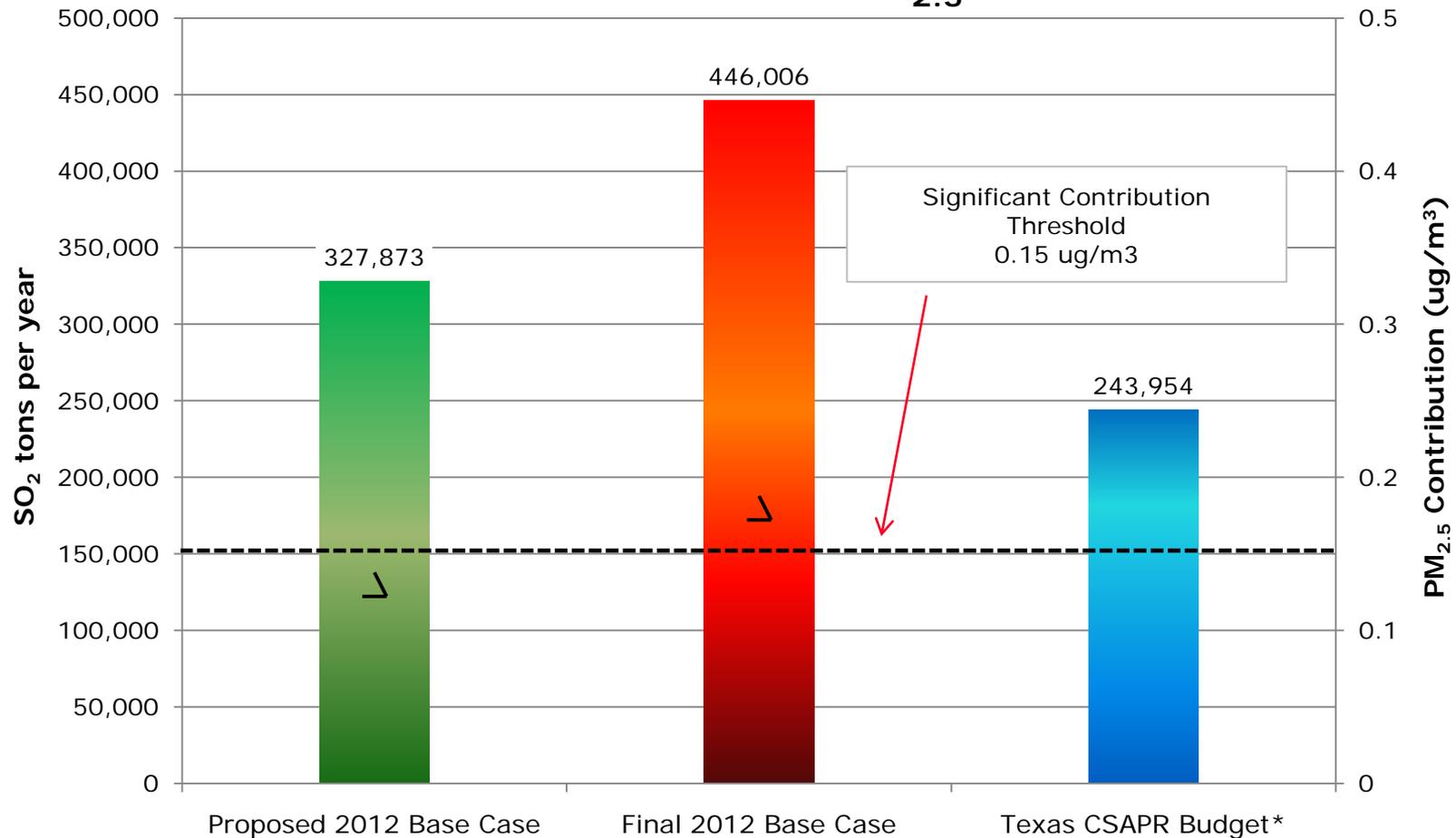
Technical Errors: Significant Contribution

- At proposal, Texas did not exceed the EPA's significant contribution threshold with projected 2012 SO₂ base case emissions of 327,873 tons.
- At finalization, the Texas 2012 SO₂ base case was increased to 446,006 tons.
- The Texas 2012 CSAPR annual SO₂ budget is 243,954 tons, a 46% reduction and nearly 84,000 tons below the level at which Texas is known to not significantly contribute to nonattainment in downwind states.



Technical Errors: Significant Contribution

Texas Emissions and PM_{2.5} Contribution



* CSAPR did not identify a contribution level associated with the Texas SO₂ budget.

■ Tons SO₂ ▽ EPA Modeled PM_{2.5} Contribution



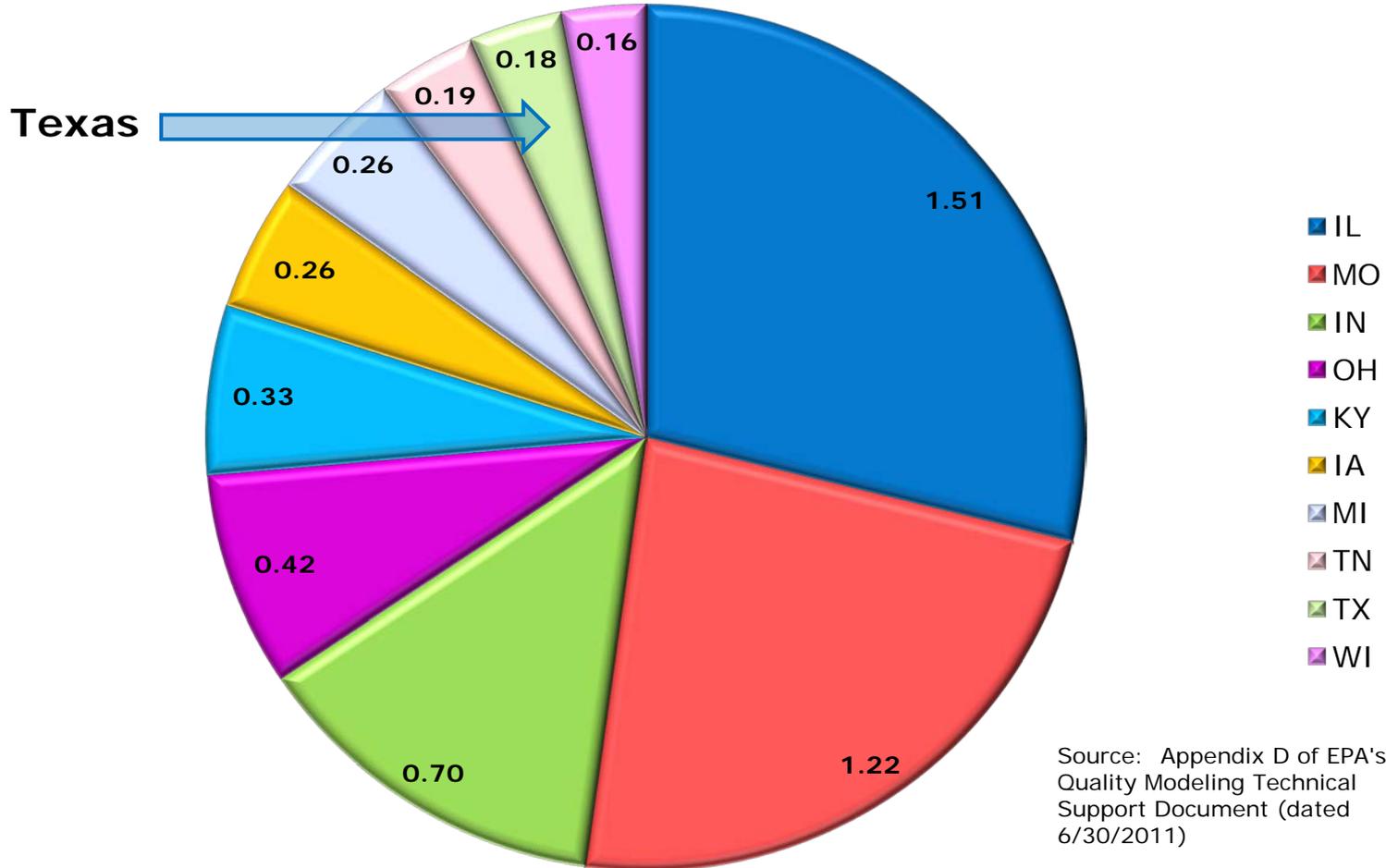
Technical Errors: Significant Contribution

- Texas has a $0.18 \mu\text{g}/\text{m}^3$ linkage to the Madison, IL, monitor and is required to make a 46% reduction, or 202,052 tons, of SO_2 from the 2012 base case.
- Other states with linkages to the same monitor are not required to reduce emissions proportionate to their linkage.
 - Michigan has a $0.26 \mu\text{g}/\text{m}^3$ linkage, but is required to make an overall 43.5% reduction of 111,043 tons of SO_2 from its 2012 base case.
 - Missouri has a $1.22 \mu\text{g}/\text{m}^3$ linkage, but is required to make a 57% reduction of 217,372 tons of SO_2 from its 2012 base case.



Technical Errors: Significant Contribution

Annual PM2.5 Contributions ($\mu\text{g}/\text{m}^3$) to Madison, IL Monitor

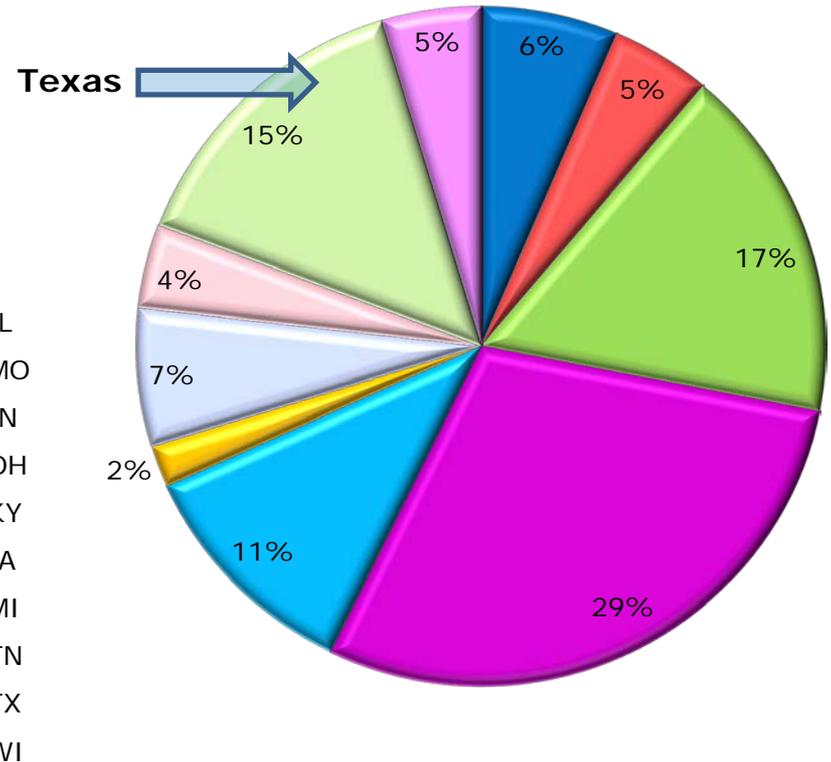
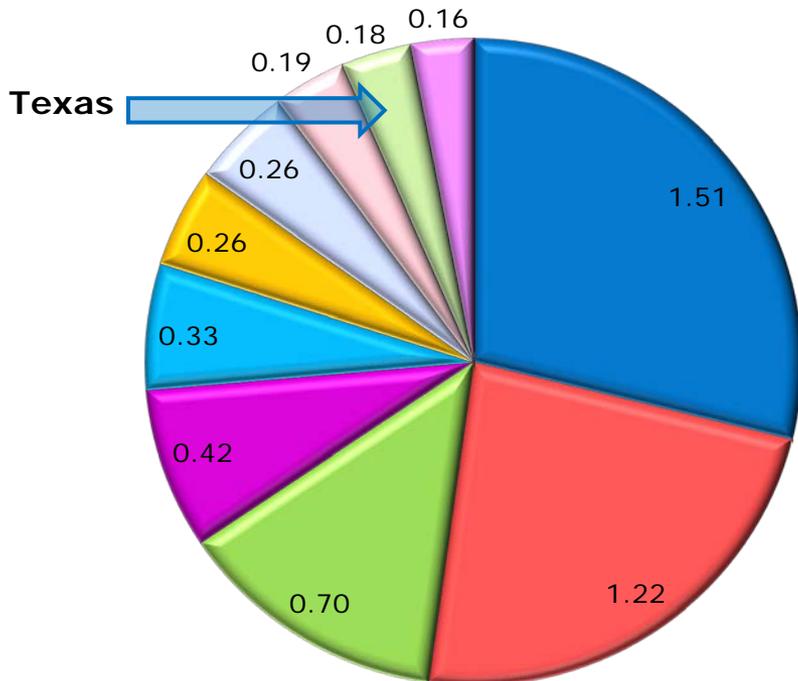




Technical Errors: Significant Contribution

Percentage of Total SO₂ Reductions
Required from States Contributing to
Madison County, Illinois

Annual PM_{2.5} Contributions ($\mu\text{g}/\text{m}^3$) to
Madison, IL Monitor





Technical Errors: Available Controls

- The final rule assumes Texas EGUs can achieve a 46% SO₂ reduction by 2012.
 - Based on \$500/ton
 - EPA, however, presumed six new scrubbers in their 2012 control case modeling.
- EPA's analysis presumes that 75% of Texas coal-fired EGU capacity will be equipped with scrubbers by 2012.
 - TCEQ data projects only 56%
- EPA assumes compliance flexibility through the purchase of excess SO₂ allowances.
 - Trading limited to Group 2 states (7 total states)
 - Average reduction for all Group 2 states is 42%



Technical Errors: Electric Reliability

- The EPA estimates a base generation capacity for Electric Reliability Council of Texas (ERCOT) EGUs of ~ 90,400 MW
 - This estimate includes 100% of Texas' installed wind generation. ERCOT de-rates wind generation to 8.7% due to its unpredictability/unreliability as a generation source.
 - The estimate also includes units currently retired and mothballed.
- ERCOT's estimate of generation capacity is 72,571 MW.



Impact of CSAPR on Texas

EPA estimated generation capacity	90,400 MW
Retired units	-5,790 MW
Mothballed units	-2,644 MW
Wind generation adjustment	-9,400 MW
ERCOT estimated generation capacity	72,571 MW
Announced shutdowns	
Deely Power Plant	-770 MW
ERCOT estimate w/ shutdowns	71,801 MW
Current peak demand record (Aug 4, 2011)	68,294 MW

- ERCOT targets a reserve margin of 13.75% to maintain stable grid operation.



Impact of CSAPR on Texas

- Flawed assumptions regarding surplus reserves in the ERCOT region will lead to reliability issues.
- Luminant has also publicly stated that they will be forced to reduce operations at their coal-fired plants to comply with CSAPR.
 - Big Brown – 1,150 MW
 - Martin Lake – 2,250 MW
 - Monticello – 1,880 MW



Penalties for Noncompliance

- Allowance penalty
 - Surrender of 2 allowances for every ton emitted in excess of allowance holdings.
- Civil penalty
 - \$37,500 per ton in excess per day
 - Penalty would be assessed for every day of the compliance period - 365 days for the annual programs



Penalties for Noncompliance

- Civil penalty example:
 - If each Group 2 state's EGUs made only the SO₂ emissions reductions the EPA has determined are cost-effective at \$500/ton in 2012, including Texas (as based on the EPA's adjusted lignite sensitivity analysis), and all available Group 2 allowances are sold only to Texas, Texas could still have a 23,894 allowance shortage for its emissions.
 - (23,894 ton exceedance)(365 day control period)(\$37,500) = **\$327,049,125,000** civil penalty possible for just the first year of rule implementation.



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