



# Impacts of the Cross-State Air Pollution Rule on ERCOT Grid Operations

The Electric Reliability Council of Texas, Inc.  
September 1, 2011

# Background

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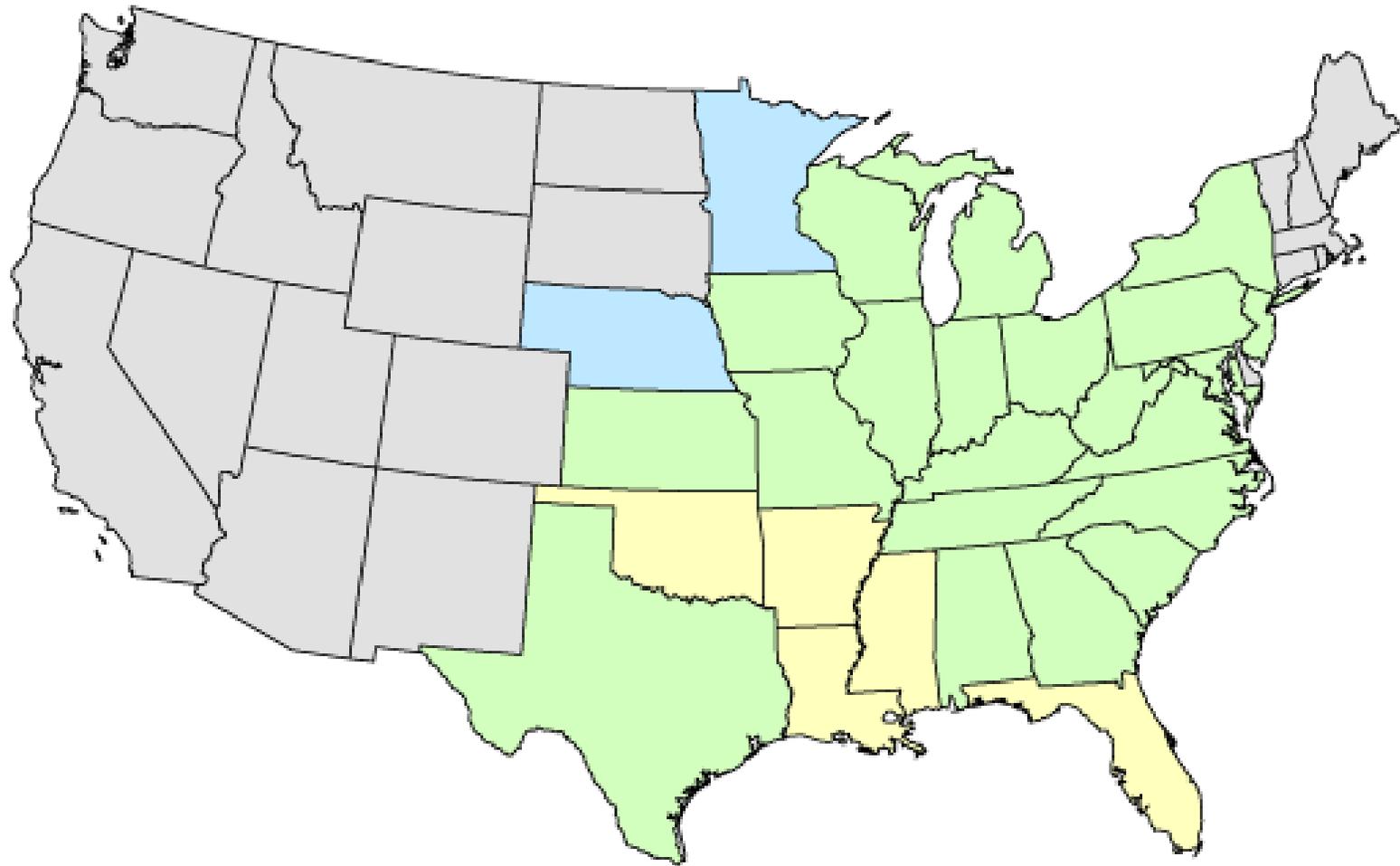
- **ERCOT was asked by the Public Utility Commission of Texas to review the potential impacts of the final Cross-State Air Pollution Rule (CSAPR) on generation resources and transmission system reliability in the ERCOT region.**
- **The CSAPR was released on July 6, 2011, and was published in the Federal Register on August 8, 2011.**
- **In the proposed CSAPR rule, (then known as the Clean Air Transport Rule [CATR]), Texas was only included in the peak season NO<sub>x</sub> program. Based on this proposed rule, an ERCOT study completed on June 21, 2011, did not include any incremental impacts from the CATR.**
- **In the final rule, Texas is included in the annual SO<sub>2</sub> and annual NO<sub>x</sub> programs, as well as the peak season NO<sub>x</sub> program. For Texas, the annual SO<sub>2</sub> limits appear to be the most restrictive.**
- **The rule is effective on January 1, 2012. This initial analysis is focused on near-term reliability implications.**

# Rule Requirements

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- The CSAPR affects generating units in most of the eastern US (depicted on next slide).
- Under the CSAPR, generating units must have CSAPR allowances to match annual emissions of SO<sub>2</sub> and NO<sub>x</sub> and separate allowances for peak season (May – Sept.) NO<sub>x</sub> emissions.
- Units are allocated a number of allowances based on historical generation. These unit allocations have been published.
- Trading of allowances within a state is unlimited. Interstate trading of allowances is allowed, but net state-wide imports of allowances are capped at approximately 18% of a state's total allocation.
- For SO<sub>2</sub> allowances, owners of resources in Texas will be allowed to trade with owners of resources in the “Group 2” states: Kansas, Nebraska, Minnesota, Alabama, Georgia, and South Carolina
- Based on information obtained to date, ERCOT does not anticipate the emergence of an active market for trading of Group 2 SO<sub>2</sub> allowances.

# States Included in the CSAPR



# Penalties

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- Resource owner's penalty for not having sufficient allowances is a two for one forfeit in the next year's allocation (plus the allowances for the actual emissions)
- If total emissions of annual SO<sub>2</sub>, annual NO<sub>x</sub> or peak season NO<sub>x</sub> in the state exceed the amount allocated for units in the state plus the 18% assurance level, then all units that emitted more than their allocation plus 18% will be penalized.
- In addition to program penalties, there are substantial potential monetary penalties for non-compliance, as well as exposure to additional civil and criminal liability.

# Study Methodology

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- **ERCOT met with TCEQ and EPA personnel to determine details of rule implementation.**
- **ERCOT consulted with owners of coal-fired generating resources to determine their plans for rule compliance.**
- **Individual resource owner compliance strategies were reviewed and aggregated to determine implications for system reliability.**
- **ERCOT's analysis did not include a calculation of the costs of compliance for resource owners, or the impact of CSAPR on electricity market prices.**

# Compliance Options

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- **Reduce sulfur content of fuel (switch from lignite to sub-bituminous Powder River Basin (PRB) coal or from PRB coal to ultra-low-sulfur sub-bituminous coal)**
  - Near-term availability of low-sulfur sub-bituminous coals and rail transport capacity is likely to be exceeded by demand
  - Switching from lignite to PRB can require a reduction in unit capacity
- **Dry sorbent injection (injected into flue gas)**
  - Potential operational issues
  - Not tested on a wide range of units
  - May result in need for public notice or permit modification

# Compliance Options (Cont.)

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- **Maximize use and effectiveness of scrubbers**
  - Limited to a small subset of units
  - Scrubber use results in reduction in net unit output
- **Reduce unit output (dispatch down to low sustainable limit or decommit unit)**
  - Daily dispatch of base-load units may increase unit maintenance requirements and decrease unit availability
  - Limited unit availability if fully decommitted - cold start time for most coal plants is several days
  - Increased number and length of unit outages increases the need for ERCOT approval of planned generator outages

# Reliability Implications – Scenario 1

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- **ERCOT has developed three possible scenarios of impacts from the CSAPR.**
- **The first scenario is derived from the compliance plans of the resource owners. In this scenario, the incremental capacity reductions due to CSAPR are expected to be approximately 3,000 MW in the off-peak months (March, April, October and November) and approximately 1,200 – 1,400 MW in the peak months.**
  - Capacity reductions in the off-peak months are expected to be greater because power prices are lower during these periods, making them a more attractive time for resource owners to take extended outages.
- **Had the CSAPR rule taken effect in 2011 instead of 2012, ERCOT would have experienced rotating outages during days in August.**

# Reliability Implications – Scenario 2

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- The resource owners' compliance plans include daily dispatching of base-load coal units from minimum sustainable output at night to maximum output during the peak hours in order to reduce total emissions. Daily ramping will increase the maintenance requirements of some of these units, leading to increased unit outages in the fall of 2012. Scenario 2 includes the impact of these additional outages.
- In this scenario, the incremental capacity reductions due to CSAPR are expected to be approximately 3,000 MW in the spring off-peak months, approximately 1,200 – 1,400 MW in the summer peak months, and approximately 5,000 MW in the fall off-peak months.

# Reliability Implications – Scenario 3

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- **The resource owners' compliance plans also rely on availability of low sulfur western sub-bituminous coals. Near-term availability of these coals may be limited. If this is the case, resource owners may be forced to shut down units in the fall in order to reduce annual emissions. Scenario 3 includes the impact of the maintenance outages from Scenario 2 as well as additional unit outages resulting from the need to use higher sulfur coals.**
- **In this scenario, the incremental capacity reductions due to CSAPR are expected to be approximately 3,000 MW in the spring off-peak months, approximately 1,200 – 1,400 MW in the summer peak months, and approximately 6,000 MW in the fall off-peak months.**

# Rule Implementation Uncertainties

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- **Resource owners have not finalized their compliance strategies. Overall system impacts could be affected by changes in specific unit operations.**
- **ERCOT does not expect a liquid market for Group 2 CSAPR SO<sub>2</sub> allowances in Texas.**
  - If correct, units will be required to comply with limits imposed by annual allocations
  - If there is insufficient allowance liquidity, there may be a need for an administrative price floor for CSAPR allowances for use in ERCOT verifiable cost calculations

# Other CSAPR Considerations

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- **Reliability impacts in 2013 and 2014 will be greater as unit retrofit projects are implemented**
  - Retrofit projects will require Clean Air Act permit modifications which could cause delays
- **CSAPR will have impacts on national fuel markets, increasing demand for natural gas and low sulfur sub-bituminous coals. Near-term demand for low-sulfur coal will likely exceed existing mine and/or railroad capacity.**
- **Resource owners may sell allowances outside ERCOT (in other parts of Texas or out-of-state). A reduction in allowances available in ERCOT will increase reliability impacts.**



# Questions

September 1, 2011