Missouri Public Service Commission
Environmental Regulations Overview

October 26, 2011 Staff Workshop

In the Matter of an Investigation of the Cost to Missouri's Electric Utilities Resulting from Compliance with Federal Environmental Regulations

File No. EW-2012-0065

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Discussion Agenda

Environmental Regulations Overview:

- Air Rules
  - Clean Air Interstate Rule (CAIR)
  - Cross-State Air Pollutant Rule (CSAPR)
  - Power Plant Mercury and Air Toxics Standards (Utility HAPs MACT)
  - Sulfur Dioxide, Ozone, and Particulate Matter National Ambient Air Quality Standard (NAAQS)
  - Regional Haze / Best Available Technology Rule (BART)
  - Industrial Boiler Maximum Achievable Control Technology Rule (Industrial Boiler MACT)
  - Green House Gas Rules
- Water Rules
  - Clean Water Act 316(a)
  - Clean Water Act 316(b)
  - Effluent Limitation Guidelines
- Waste Rules
  - Coal Combustion Residuals Rule (CCR)

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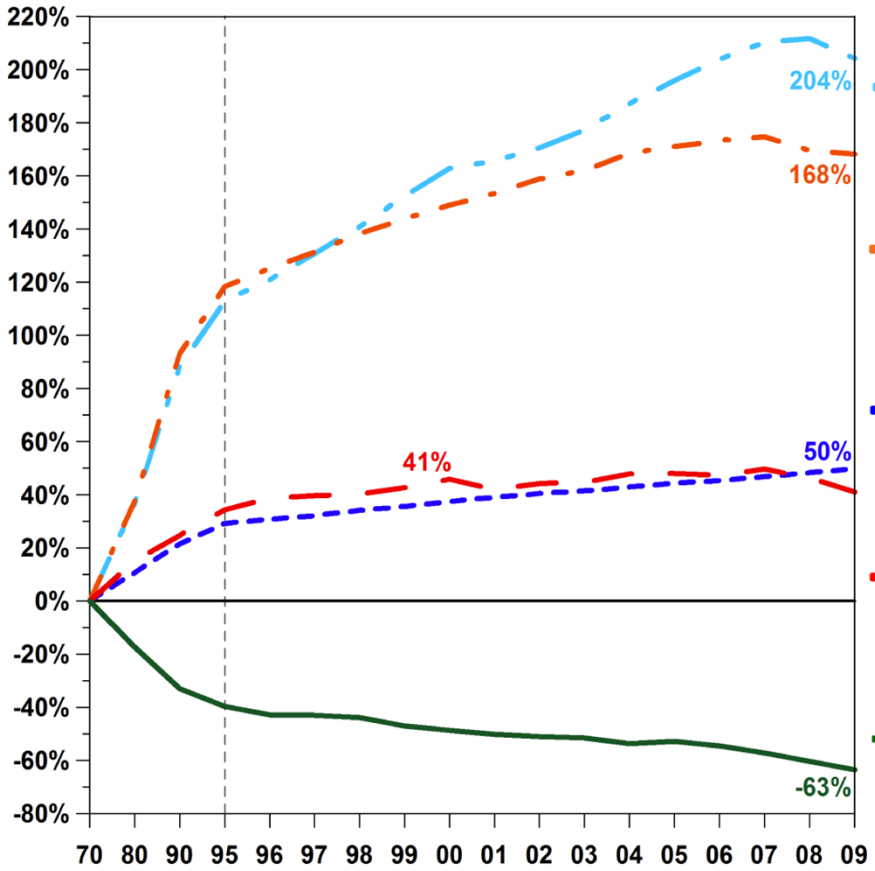
Environmental Terms

SO2 - sulfur dioxide
NOx – nitrogen oxides
CO2 - carbon dioxide
CO – carbon monoxide
VOC – volatile organic carbons
PM - particulate matter
GHG - greenhouse gas
HAP - hazardous air pollutants
LNB - low NOx burner
OFA - over fired air
SCR - selective catalytic reduction
SNCR - selective noncatalytic reduction
ACI - activated carbon injection
CEM – continuous emission monitors

NAAQS - National Ambient Air Quality Standard
CAIR - Clean Air Interstate Rule
BACT - Best Available Control Technology
PSD - Prevention of Significant Deterioration
MACT - Maximum Achievable Control Technology
NSPS - New Source Performance Standards
NSR - New Source Review
BART - Best Available Retrofit Technology
CAMR – Clean Air Mercury Rule
CWA - Clean Water Act
NPDES - National Pollutant Discharge Elimination System
CCP - coal combustion products
CCR – coal combustion residuals
CWA – Clean Water Act

Cleaner Air



Gross Domestic Product

Vehicle Miles Traveled

Population

Energy Consumption

Aggregate Emissions (Six Common Pollutants)

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Air Rules

Clean Air Interstate Rule (CAIR)

Background

- In 2005, EPA finalized the Clean Air Interstate Rule (CAIR) cap and trade program.
- Covered SO_2 and NO_x including Missouri but not Kansas.
- Goal was to reduces SO_2 and NO_x that contribute or interfere with maintenance of fine particulate and ozone National Ambient Air Quality Standards (NAAQS) in downwind states.

Timeline

- Reduce summer and annual NO_x starting in 2009.
- Reduce annual SO_2 starting in 2010.
- CAIR will be replaced by the CSAPR starting in 2012.
- Additional SO_2 and NO_x reductions were to be required by 2015.

Compliance Options

- CAIR was initially vacated in 2008 but ultimately remanded and left program in place until EPA revised rule consistent with the court's opinion.
- Utilities must continue to comply with CAIR and allowances provisions to cover emissions through 2011.

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Cross State Air Pollution Rule (CSAPR)

Background

- In August 2011, EPA finalized the Cross-State Air Pollution Rule (CSAPR) which requires substantial near-term emission reductions in Missouri and Kansas to address each state's significant contribution to nonattainment and interference with maintenance of the National Ambient Air Quality Standards (NAAQS) downwind.
- EPA is promulgating the CSAPR in response to the remand of the Clean Air Interstate Rule (CAIR) by the Court in 2008.
- This final rule includes four air quality-assured trading programs: an annual NOx trading program, an ozone-season NOx trading program, and two separate SO2 trading programs (SO2 Group 1 - Missouri and SO2 Group 2 - Kansas).
- This rule generally only covers electric generating units.
- The CSAPR emission budgets are based on the EPA's state-by-state analysis of each upwind state's significant contribution to nonattainment and interference with maintenance. The CSAPR include assurance provisions specifically designed to ensure that no state's emissions are allowed to exceed that specific state's budget, thus, limits interstate trading.

Timeline

- The first phase of CSAPR compliance commences January 1, 2012 and the second more stringent phase of CSAPR reductions commences January 1, 2014.
- Supplemental Notice of Proposed Rule to include six additional states, including Kansas and Missouri, in ozone season NOx program issued in August 2011 anticipated to be finalized in October 2011.

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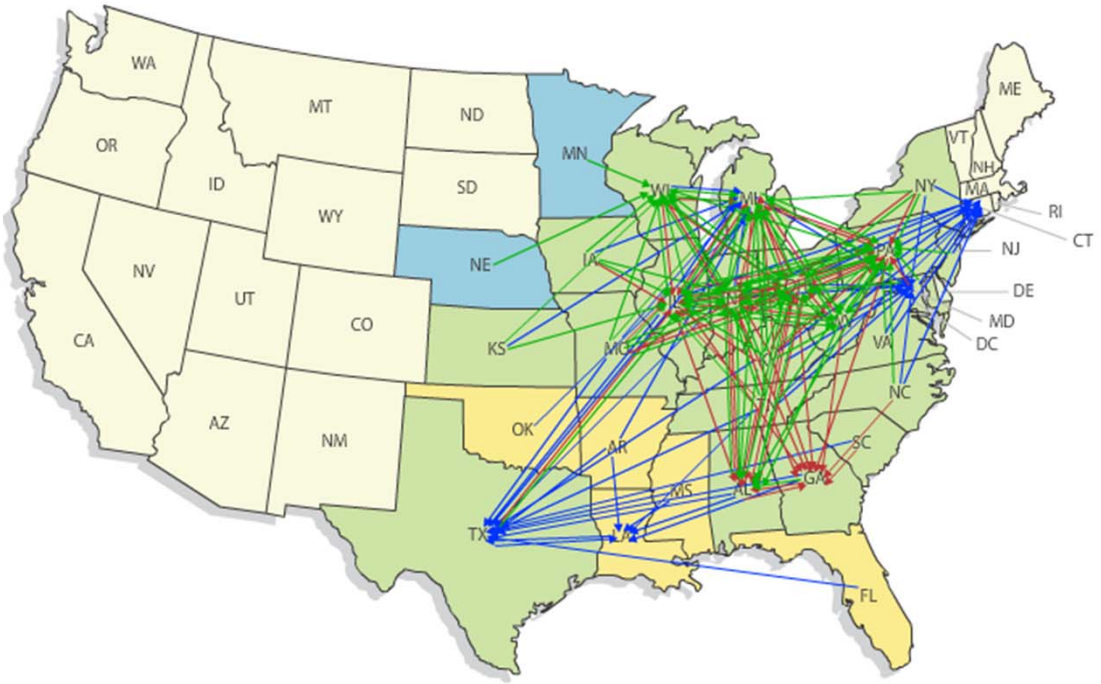
Cross State Air Pollution Rule - Upwind-Downwind Linkages



Legend

- States controlled for both fine particles (annual SO_2 and NOx) and ozone (ozone season NOx) (21 States)
- States controlled for fine particles only (annual SO_2 and NOx) (2 States)
- States controlled for ozone only (ozone season NOx) (5 States)
- States not covered by the Cross-State Air Pollution Rule

Key to Arrows

- Upwind-Downwind Linkage for Ozone
- Upwind-Downwind Linkage for Annual PM2.5
- Upwind-Downwind Linkage for Daily PM2.5

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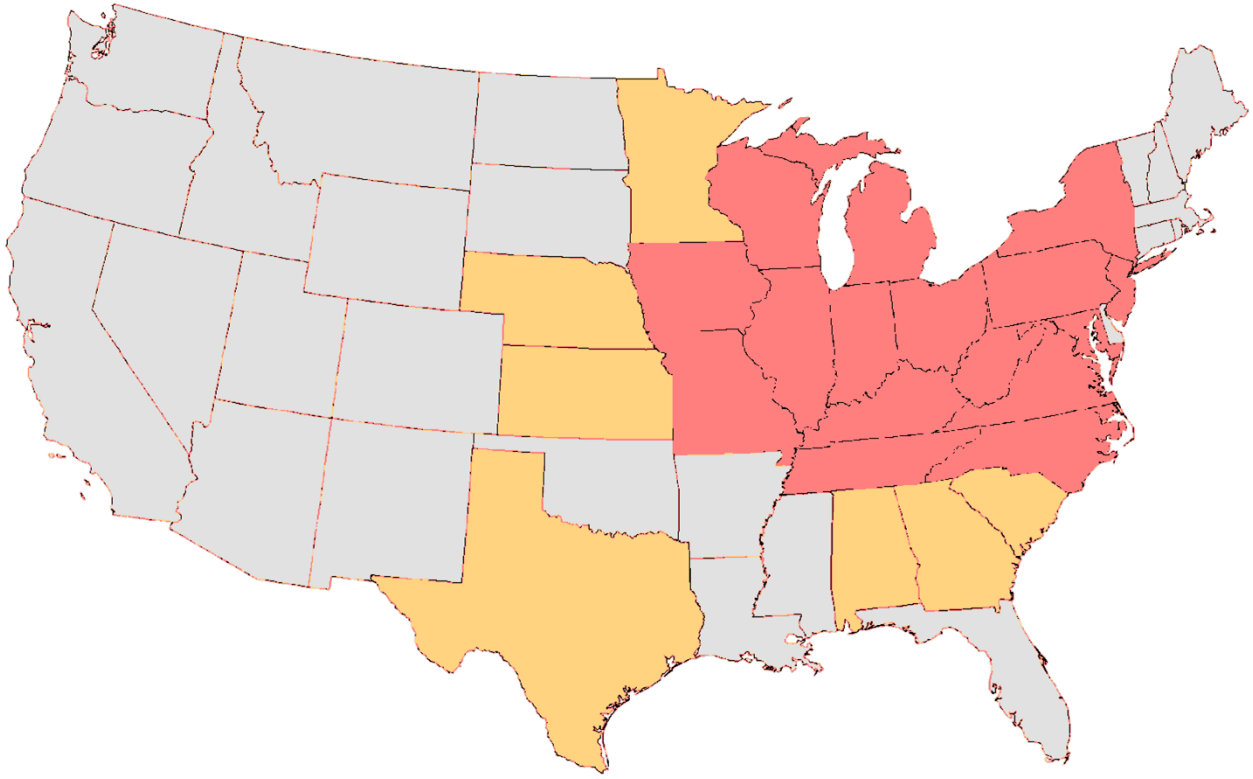
Cross State Air Pollution Rule - SO2 Allowance Group 1 and 2 States



Group 1 States (16 States)

Group 2 States (7 States)

States not covered by the annual Cross-State Air Pollution Rule

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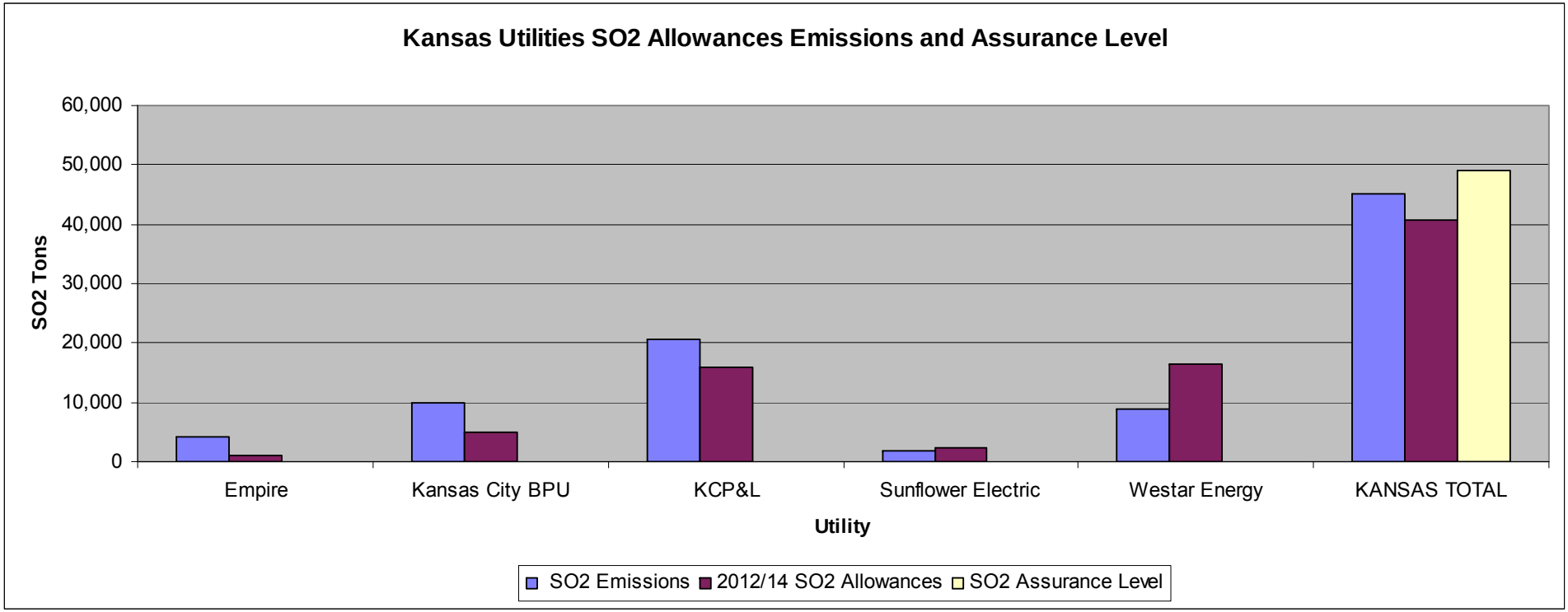
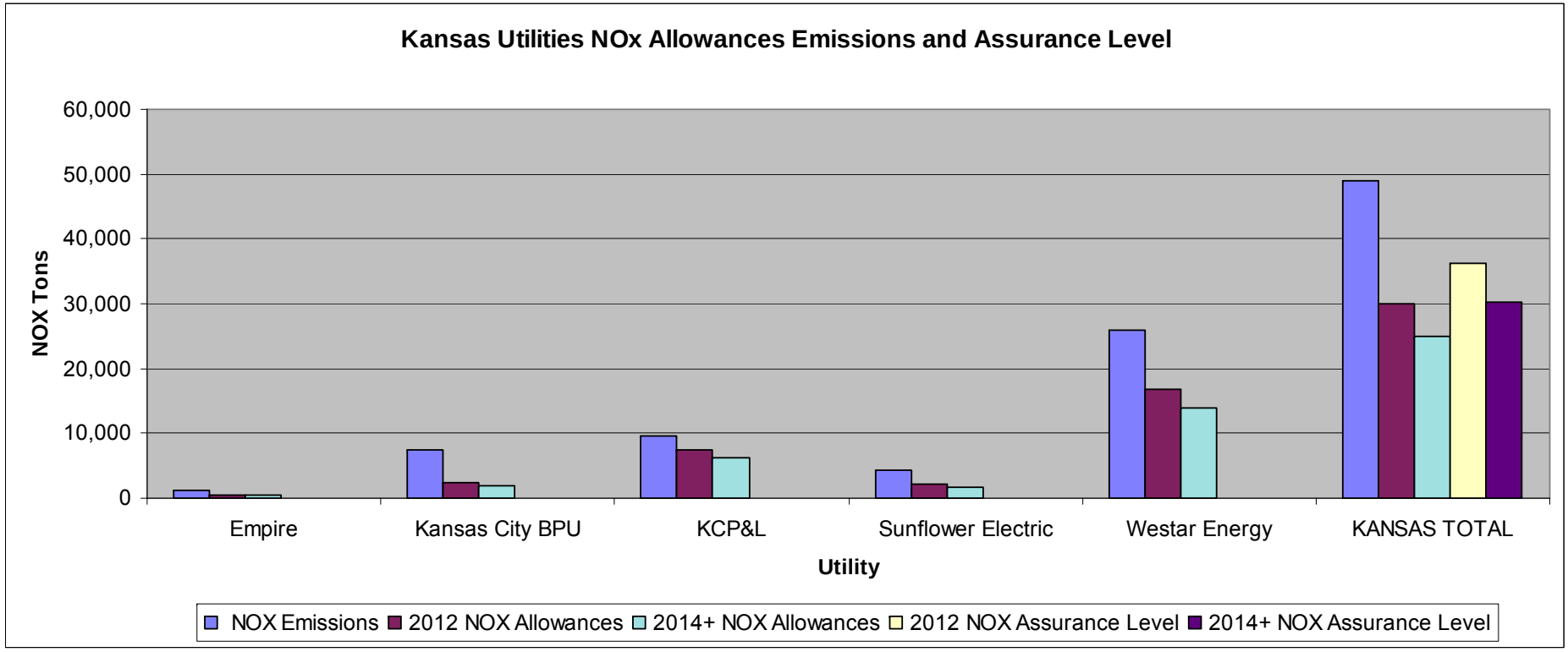
Cross State Air Pollution Rule – SO2 Emissions and Allowances in Kansas



Sources: Emission data from EPA Clean Air Markets website

Allowance and Assurance level data from EPA CSAPR website and resource materials

Cross State Air Pollution Rule – NOx Annual Emissions and Allowances in Kansas



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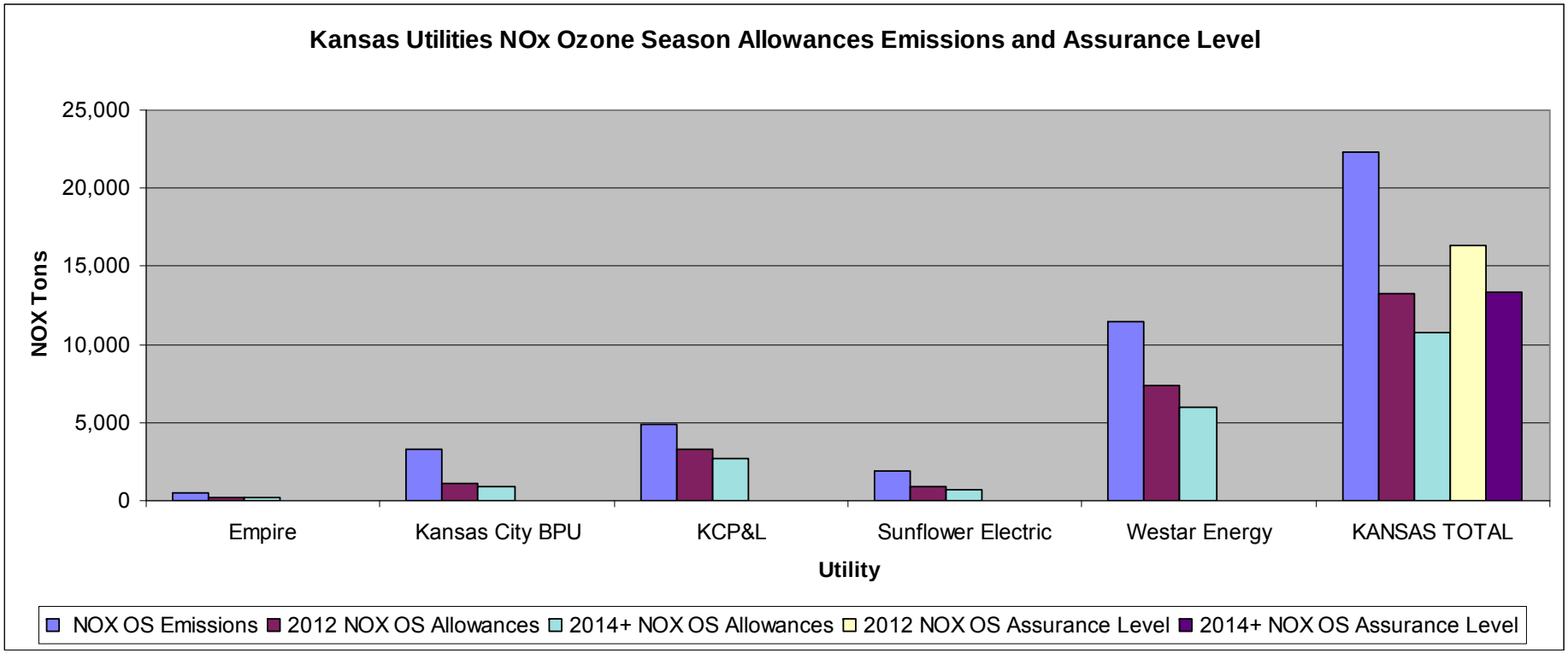
Cross State Air Pollution Rule – NOx Season Emissions and Allowances in Kansas

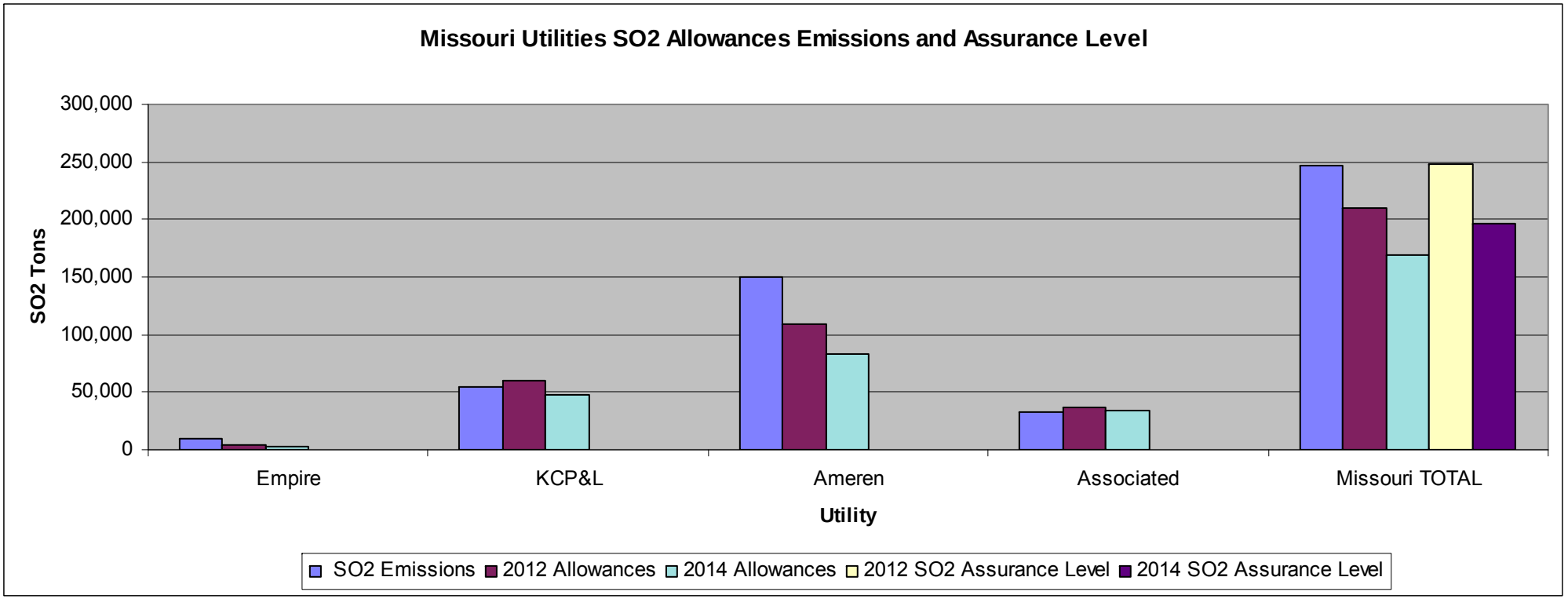


OS=Ozone Season

Sources: Emission data from EPA Clean Air Markets website

Allowance and Assurance level data from EPA CSAPR website and resource materials

Cross State Air Pollution Rule – SO2 Emissions and Allowances in Missouri



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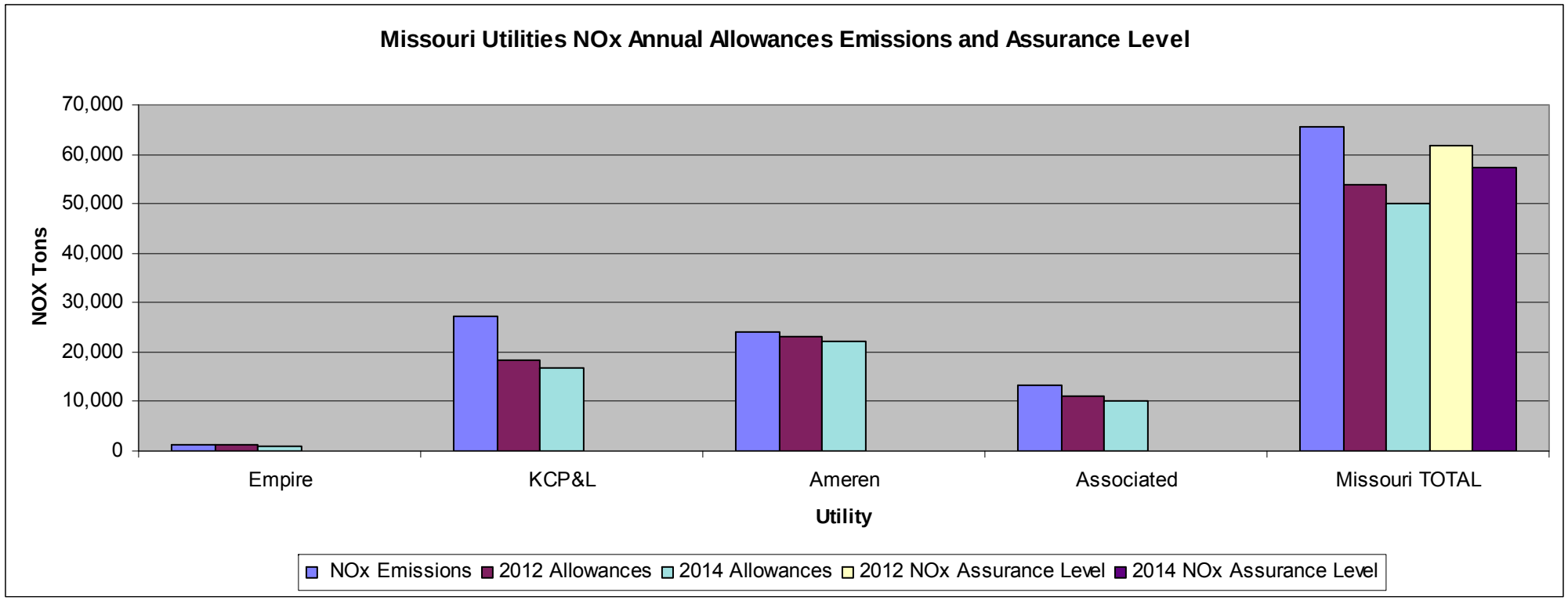
Cross State Air Pollution Rule – NOx Annual Emissions and Allowances in Missouri



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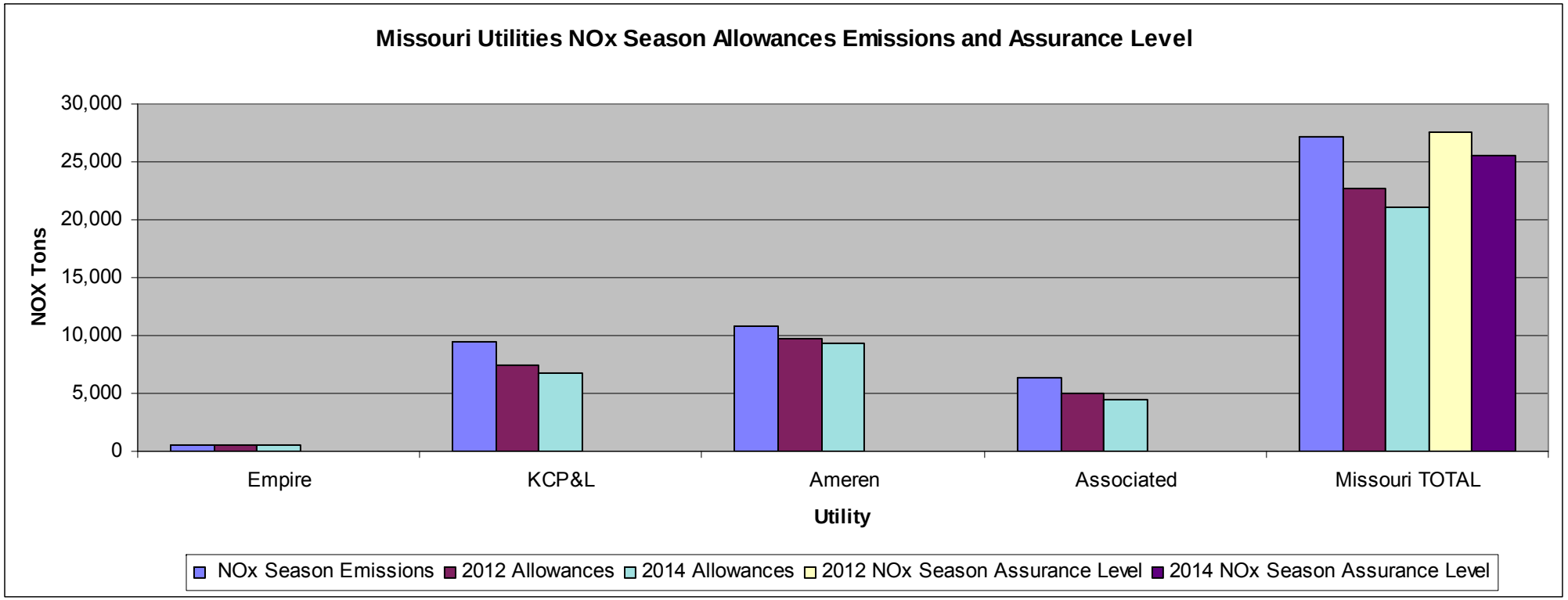
Cross State Air Pollution Rule – NOx Season Emissions and Allowances in Missouri



OS=Ozone Season

Sources: Emission data from EPA Clean Air Markets website

Allowance and Assurance level data from EPA CSAPR website and resource materials

Cross State Air Pollution Rule – EPA Proposed Revisions

Recent EPA proposed Revisions

- In October 2011, EPA proposed technical adjustments to the final CSAPR.
- EPA indicates these revisions provide technical adjustments that will promote the development of allowance market and smooth the transition from the Clean Air Interstate Rule (CAIR) programs to the CSAPR programs in 2012.
- The proposal revises some discrepancies affecting state budgets in Florida, Louisiana, Michigan, Mississippi, Nebraska, New Jersey, New York, Texas, and Wisconsin and new unit set-asides in Arkansas and Texas.
- The proposed rule amends the assurance penalty provisions so they start in 2014, instead of 2012.
- EPA proposed to revise certain unit-level allocations in six states – Alabama, Indiana, Kansas, Kentucky, Ohio and Tennessee – affected by federally enforceable consent decrees.
- In Kansas, EPA has reallocated the Westar Jeffrey Energy Center allowances that pursuant to their NSR Consent Decree would have been unavailable to sources in the state of Kansas.
- EPA made no other revisions to either Kansas or Missouri state budget amounts or new unit set-asides.

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Cross State Air Pollution Rule – Review

Requests for Reconsideration and Stays

- Multiple states, utilities and other parties have filed reconsideration requests and stays with the EPA and/or the court.
- Over 30 lawsuits challenging EPA's Cross-State Air Pollution Rule.
- The challengers are asking D.C. Circuit to overturn EPA's CSAPR or issue a stay of its implementation.
- The lawsuits are being consolidated, and the court has not yet set a briefing schedule.

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Cross State Air Pollution Rule – Compliance Options

Compliance options for SO2

- Potential fuel switches
- Purchase SO2 allowances if they are available
- Unit de-rates or reductions in generation
- Dry sorbent injection
- Install scrubbing equipment

Compliance options for NOx

- Aggressive tuning of existing units
- Low NOx Burners on some units
- Additional Over fired Air (OFA) on some units
- Purchase NOx Allowances if they are available
- Unit de-rates or reductions in generation
- Operate Selective Non-Catalytic Reduction (SNCR) equipment with Over Fired Air (OFA) staging at cyclone units
- Selective Catalytic Reduction (SCR) equipment

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Power Plant Mercury and Air Toxics Standards - (Utility HAPs MACT)

Background

- Pursuant to a consent order, EPA issued a proposed a rule in March 2011 and will finalize by December 2011.
- The proposed rule sets numeric limits for mercury, particulate matter (a surrogate for non-mercury metals), and hydrogen chloride (a surrogate for acid gases).
  - Particulate matter (PM) standard level of 0.03 lbs/MBtu
  - Hydrogen Chloride (HCl) standard of 0.002 lbs/MBtu
  - Mercury (Hg) standard of 1.2 lb/Tbtu
- It establishes work practices, instead of numerical emission limits, for organics including dioxin/furan.
- EPA is proposing to allow facility-wide averaging for all hazardous air pollutants emissions from existing units.

Timeline

- Existing sources have up to three years to comply, with a one year extension possible if technology cannot be installed in time and granted by the state.
- Assuming final rule published in January 2012, compliance could be as soon as 2015 or 2016 with one year extension.

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Power Plant Mercury and Air Toxics Standards - Impacts

Compliance options for MACT:

- Electrostatic precipitator (ESP) upgrades or Baghouses for PM
- Wet or Dry scrubbers, or DSI for HCL
- Activated Carbon Injection (ACI) for Hg control
- Potential Fuel additives for Hg control on scrubbed units
- PM, HCL, and Hg Continuous Emission Monitors (CEM) on all plants

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National Ambient Air Quality Standard (NAAQS)

Background

- Multiple National Ambient Air Quality Standards (NAAQS) in the pipeline.
- Five-year review cycle.
- EPA has broad discretion in deciding standards.
- Required to set standards at a level “requisite to protect public heath with an adequate margin of safety”.
- Not required to set at levels that eliminates all risk.
- Additional compliance requirements in non-attainment areas.

Timeline

- Typical schedule after promulgation of new NAAQS:
  - Within 1 year states must designate attainment, non-attainment or unclassifiable areas in state implementation plans,
  - EPA has 2 years plus 1 year extension to promulgate area designations,
  - States have 3 years to submit state implementation plans, and
  - States much reach attainment in 5 years with potential for extensions.

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Sulfur Dioxide National Ambient Air Quality Standard (NAAQS)

Background

- In June 2010, EPA finalized a new primary National Ambient Air Quality Standard for SO2. EPA established a new 1-hour standard at a level of 75 parts per billion.
- In July 2011, the MDNR recommended three EPA areas in Missouri be designated a nonattainment for the new 1-hour SO2 standard.
  - Part of Jackson County in the Kansas City area.
  - Part of Greene County in the Springfield area.
  - Part of Jefferson County in the St. Louis area.
  - All other counties in Missouri were designated unclassifiable by MDNR and KDHE requiring further modeling and/or monitoring to designate as attainment or nonattainment.

Timeline

- EPA to finalize designations by June 2012.
- KDHE and MDNR will complete refined modeling to determine sources impacting standard that will need additional SO2 controls. States with areas designated nonattainment in 2012 would need to submit state implementation plans (SIPs) to EPA by 2014 outlining additional controls that will to be added to meet the standards as expeditiously as possible, but no later than August 2017.

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Sulfur Dioxide National Ambient Air Quality Standard (NAAQS) – Compliance Options

Compliance Options

- Scrubbers or other SO2 controls with baghouses or upgraded ESPs anticipated.
- Plant specific emission limits.
- Unit de-rates or reduction in level of operation.

Ozone National Ambient Air Quality Standard (NAAQS)

Background

- In 2008, EPA revised the primary and secondary standards to 0.075 parts per million (ppm).
- In 2010, EPA proposed to change the primary standard to 0.06-0.07 ppm and a second standard to protect vegetation during the growing season.
- In September 2011, the President requested that EPA withdraw the proposed rule reconsidering the 2008 NAAQS.
- EPA announced it will proceed with implementation of the 2008 primary eight-hour ozone standard.
- EPA indicated based on the available ozone air quality data that the Kansas City area would meet the standard.
- EPA indicated based on the available ozone air quality data that the St. Louis area would not attain standard.

Timeline

- EPA expects to complete designations by 2013.
- Infrastructure state implementation plans submitted by 2014, nonattainment state implementation plans by 2016.
- Attainment dates by 2016-2018.

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Ozone National Ambient Air Quality Standard (NAAQS) – Compliance Options

Compliance Options

- States implementation plans outline what controls may be necessary to reduce ozone to meet the standards in non-attainment areas.
- Nonattainment may require additional NOx reduction controls to be added to other generation facilities.
- Both MDNR and KDHE will review and potentially require controls on NOx emission sources to achieve attainment of the revised ozone standard.

Particulate Matter National Ambient Air Quality Standard (NAAQS)

Background

- In October 2006, EPA revised the PM NAAQS by lowering the daily PM2.5 standards from 65 µg/m3 to 35 µg/m3 and eliminating the annual 50 µg/m3 PM10 standards. The EPA retained the annual PM2.5 standard of 15 µg/m3. The EPA retained the 150 µg/m3 PM10 standard to control coarse particles.
- Petitions for review of the new PM NAAQS were filed in the D.C. Circuit Court challenging the EPA's decisions to retain the 15 µg/m3 annual PM2.5 NAAQS, to revoke the 50 µg/m3 annual PM10 NAAQS, and not to set a separate secondary NAAQS.
- In February 2009, the court upheld EPA's decisions with regard to the PM10 NAAQS, but remanded significant aspects of the PM2.5 NAAQS decision to EPA.

Timeline

- EPA has folded its response to that court remand into its ongoing review of the PM NAAQS.
- EPA now plans to complete the review on the normal 5-year schedule. Thus, the Agency plans to propose revision of the PM NAAQS in 2011 and to finalize any revisions in 2012.

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Particulate Matter National Ambient Air Quality Standard (NAAQS) – Compliance Options

Compliance Options

- States implementation plans outline what controls may be necessary to meet the standards in non-attainment areas.
- Nonattainment may require additional controls to be added to generation facilities.
- Both MDNR and KDHE will review and potentially require controls on emission sources to achieve attainment of the revised PM standard.

Regional Haze / Best Available Technology Rule (BART)

Background

- In 2005, the EPA finalized the Best Available Retrofit Technology Rule (BART) that directs state air quality agencies to identify whether visibility-reducing emissions from sources subject to BART are below limits set by the state or whether retrofit measures are needed to meet Regional Haze requirements.

Timeline

- KDHE and MDNR submitted Regional Haze Plans for approval to EPA in 2009. In September 2011, EPA proposed to approve the KDHE Plan.
- The BART rule requires the states to submit progress reports every five years showing the progress to meet the regional haze requirements.

Compliance Options

- MDNR's Regional Haze Plan relied on the Clean Air Interstate Rule for compliance. No additional emission controls were identified in the Plan for Missouri units.
- KDHE's Regional Haze Plan is a driver for the emission control installation at KCP&L's La Cygne Generating Station.

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Industrial Boiler Maximum Achievable Control Technology Rule (Industrial Boiler MACT)

Background

- Applies to steam generating units other than electricity.
- Final rule issued February 2011.
- May 2011 EPA announced a stay.

Timeline

- EPA indicated revised proposed rule issued by October 2011, final rule in April 2012.

Compliance Options

- Numeric limits for Mercury, PM, Hydrogen Chloride, Dioxin, and CO.

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Green House Gas Rules – PSD Permitting

Background

- In 2010, the EPA issued a final rule addressing greenhouse gas (GHG) emissions from stationary sources under the Clean Air Act permitting programs.
- This final rule sets thresholds for greenhouse gas emissions that define when permits under the New Source Review (NSR) Prevention of Significant Deterioration (PSD) and title V Operating Permit programs are required for new and existing industrial facilities.
- This final rule "tailors" the requirements of these permitting programs to limit which facilities will be required to obtain PSD and title V permits.

Timeline

- New units and units undergoing major modifications require a PSD permit as of January 2, 2011.

Compliance Options

- CO2 is now a regulated NSR PSD pollutant.
- Any new facility or major modification at an existing facility would trigger PSD permitting requirements if the GHG emission or increased emissions exceed 100,000 tpy CO2e for the new facility and 75,000 for major modification.
- Any new generation facility will likely exceed the threshold and be required to complete a PSD BACT analysis.

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Green House Gas Rules – NSPS GHG Standards

Background

- In 2010, EPA executed settlement agreement with 11 states and NGOs to revise new the New Source Performance Standard (NSPS) for green house gases (GHG).

Timeline

- The settlement agreement require EPA to propose NSPS by July 2011 and final standards by May 2012.
- EPA subsequently indicated the proposed rule would be issued in September 2011 but has not done so.
- Once EPA promulgates the standards, states have 9 months to submit plans to EPA.

Compliance Options

- EPA is currently emphasizing energy efficiency and incremental improvement instead of new technology.
- New and modified sources would have to comply as soon as the new source performance standard is promulgated.
- Existing units would not have to comply until state implementation plans are submitted and approved.

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Water Rules

Clean Water Act 316(b)

Background

- Requires any facilities that utilizes cooling water to use intake structures that reflect “best technology available” (BTA) for minimizing adverse environmental impacts.
- EPA issued proposed rule in April 2011.
- Impingement Mortality (IM) – uniform nationwide standards
  - ≤ 12% annual average (Compliance period establish by permit writer)
  - ≤ 31% monthly average
- Entrainment Mortality (EM) – site specific considerations allowed
  - Must assess benefits of cooling towers and fine mesh screens technology
  - Requires biological studies

Timeline

- Final rule expected July 2012
- Compliance with Impingement and Entrainment Mortality standards approximately 2018-2020

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Clean Water Act 316(b)- Compliance Options

Compliance Options:

- **Impingement**
  - Install fish friendly collection and return systems (new traveling water screens)
  - Meet 0.5 fps through-screen velocity profile
  - Cooling towers
- **Entrainment** – site specific considerations allowed
  - Fine mesh screen upgrades on IM compliant traveling water screens
  - Cooling towers

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Clean Water Act 316(a)

Background

- No federal initiative to revise current rule.
- Current driver - State NPDES permit renewals.
- Limits heat rejection to waters of the state.

Timeline

- Possible changes to NPDES thermal limits to more closely reflect temperature standards in state regulations.
- Changes to permit could require cooling towers or unit de-rates during periods of high and/or critical demand on some plants.

Clean Water Act 316(a)- Compliance Options

Compliance Options:

- Maintain existing NPDES permit limits and commit to additional 316(a) thermal demonstrations within the term of the re-issued permit.
- 316(a) thermal and biological studies.
- Install closed cycle cooling (cooling towers)
- Unit de-rates

Effluent Limitation Guidelines

Background

- In 2009, EPA announced plans for revisions to the steam electric effluent guidelines.
- The rule could include stricter requirements for:
  - FGD wastewater,
  - Wet sluicing for all types of ash, and
  - Dechlorination requirements for cooling water.

Timeline

- Rule to be proposed in July 2012 and finalized by January 2014.
- Usually is effective immediately after issuance or renewal of National Pollutant Discharge Elimination System permit.
- EPA could break down water treatment systems into more subcategories and have different compliance schedule for each category.

Compliance Options

- The revised steam electric effluent guidelines could make more stringent the existing NPDES limits and add additional NPDES limits.

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Waste Rules

Coal Combustion Residuals Rule (CCR)

Background

- In 2010, EPA proposed a rule with two options:
  - Regulate as a hazardous waste under subtitle C or
  - Regulate under subtitle D.
- Both subtitle C & D require:
  - Liner systems for landfills and impoundments,
  - Surface impoundment design, operation and inspection programs,
  - Location restrictions,
  - Groundwater monitoring, and
  - All existing surface impoundments would have to be either retrofitted with a liner or close in 7 years.
- The subtitle C proposal includes more requirements:
  - Special permitting requirements with corrective action provisions overseen by EPA, and
  - Elimination of wet handling of CCRs.

Timeline

- Final rule not anticipate until 2012.
- If subtitle D is adopted, it will have an effective date of 6 months after promulgation.
- If subtitle C is picked, timing will be up to the states on how to incorporate into state RCRA programs. That could take 1-2 years

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Coal Combustion Residuals Rule (CCR) – Compliance Options

Compliance Options

- Existing permitted landfills can continue to operate but with additional requirements.
- Existing CCR ponds will need to cease operation by about 2017 and closed by about 2019 under the subtitle C proposal. Under the subtitle D proposal the existing ponds could continue if the CCRs are removed and a composite liner installed by about 2017 or closed by about 2019.
- Sluicing of CCRs will cease by about 2017 under the subtitle C proposal but could be allowed to continue with specific requirements under the subtitle D proposal.

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