INDIANA’S NEW AIR QUALITY RULES FOR UTILITIES

Presentation to the IN Center for Coal Technology Research
Advisory Panel Meeting
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CLEAN AIR INTERSTATE RULE (CAIR)

- Federal rule to reduce transported pollution from power plants; assist with ozone/PM$_{2.5}$ attainment
- Applies in 28 states, including Indiana
- Establishes three cap and trade programs for NOx and SO2; reductions in 2 phases (2009/2010 and 2015)
- Annual SO2 program builds on existing Acid Rain trading program
- Ozone season NOx program builds on existing NOx SIP Call trading program
- Adds new annual NOx trading program
CAIR NATIONAL BENEFITS

- In 2010, CAIR will reduce SO2 emissions by 4.3 million tons -- 45% lower than 2003 levels, across states covered by the rule. By 2015, CAIR will reduce SO2 emissions by 5.4 million tons, or 57%, from 2003 levels in these states. At full implementation, CAIR will reduce power plant SO2 emissions in affected states to just 2.5 million tons, 73% below 2003 emissions levels.

- In 2009, CAIR will reduce NOx emissions by 1.7 million tons or 53% from 2003 levels. In 2015, CAIR will reduce NOx emissions by 2 million tons, achieving a regional emissions level of 1.3 million tons, a 61% reduction from 2003 levels.

- Will help bring majority of ozone and fine particulate nonattainment areas into compliance
In 2015 CAIR will cap Indiana power plant emissions of sulfur dioxide (SO2) at 178,219 tons annually, a 78% reduction from 2003 emissions.

<table>
<thead>
<tr>
<th>SO2</th>
<th>2003</th>
<th>2010</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Emissions Without CAIR (thousand tons)</em></td>
<td>805</td>
<td>651</td>
<td>531</td>
</tr>
<tr>
<td>SO2 Caps</td>
<td>N/A</td>
<td>255</td>
<td>178</td>
</tr>
</tbody>
</table>

*U.S. EPA IPM runs
In 2015 CAIR will cap Indiana power plant emissions of nitrogen oxides (NOx) at 90,779 tons annually, a 65% reduction from 2003 emissions.

<table>
<thead>
<tr>
<th>NOx</th>
<th>2003</th>
<th>2009</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Emissions Without CAIR (thousand tons)</td>
<td>261</td>
<td>234</td>
<td>233</td>
</tr>
<tr>
<td>NOx Caps</td>
<td>N/A</td>
<td>109</td>
<td>91</td>
</tr>
</tbody>
</table>

*U.S. EPA IPM runs
IN CAIR BENEFITS

- Regional air quality modeling to date predicts that CAIR plus other “on the books” controls will bring all Indiana counties into attainment with the ozone and PM$_{2.5}$ standards.
- Caveat: current modeling is “SIP quality” for ozone, but not for PM$_{2.5}$. 
IDEM’S CAIR RULE: Applicability

- **All 3 trading programs**: stationary fossil-fueled fired boilers or combustion turbines greater than 25 megawatts producing electricity for sale (“EGUs”); 37 IN sources

- **NOx ozone season trading program only**: “Large affected unit” meaning industrial boilers with a heat input of greater than 250mmBtus per hour, not producing electricity for sale, and cogeneration units greater than 250mmBtus producing electricity for sale and thermal energy for industrial purposes (“non-EGUs”); 8 IN sources
### CAIR FISCAL ANALYSIS

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>IDEM (Scenario 1)</th>
<th>IUG (Scenario 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projection years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td>EGUs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retrofit controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>3 SO2 scrubbers</td>
<td>12 SO2 scrubbers; 10SCRs; 2SNCRs</td>
</tr>
<tr>
<td>Capital cost</td>
<td>413</td>
<td>1,493</td>
</tr>
<tr>
<td>Annual cost</td>
<td>95</td>
<td>329</td>
</tr>
<tr>
<td>Total annual cost (includes all costs)</td>
<td>571</td>
<td>747</td>
</tr>
<tr>
<td>Impact on electricity rates</td>
<td>5.16%</td>
<td>5.97%</td>
</tr>
<tr>
<td>Non-EGUs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual cost</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>Net annual cost</td>
<td>566</td>
<td>741</td>
</tr>
</tbody>
</table>

Note: Retrofit controls and costs in each time interval are cumulative of the previous time interval. Non-EGU costs are negative as revenue is projected from the sale of allowances. SCRs (selective catalytic reduction systems) and SNCRs (selective non-catalytic reduction systems) are post-combustion NOx controls.
Clean Energy Credit Program (CECP) was created with the Energy Efficiency/Renewable Energy Set-aside allowances established in Indiana’s NOx Budget Trading Program (“NOx SIP Call Rule”)

- EE/RE Set-aside is “pool” of NOx allowances for EE/RE projects
- One NOx allowance = one ton of NOx emissions
- Grantees sell NOx allowances and use proceeds to fund projects
Eligible Projects

- Demand side management
- Highly efficient generation
- Renewable energy projects
  - Wind
  - Solar
  - Biomass
  - Methane capture
Demand Side Management

- Lighting efficiency/control projects
- Building retrofits (insulation improvements, window replacements)
- Process equipment efficiency improvements
- Heating and cooling efficiency improvements
- Reducing fuel usage
Highly Efficient Generation

- Combined heat and power at least 60% efficient
- Microturbines (>500 kW) at least 40% efficient
- Combined cycle projects > 500 kW at least 50% efficient
- Fuel cell systems at least 40% efficient
Renewable Energy

- Wind
- Solar
- Biomass combustion
- Methane capture/combustion
  - Sanitary landfills
  - Water or sewage treatment plant
  - Anaerobic digestion - CAFOs
Examples

- Commercial Building Envelope Retrofit
  - Retailer completes variety of energy efficient retrofits including:
    - Compact fluorescent lighting, energy management systems, energy efficient HVAC/windows and LCD exit signs
  - 4 million kWh saved during the ozone season
  - Energy savings = 3 NOx allowances
  - 3 allowances x $1000 x 5 years = $15,000
Examples (continued)

- **Landfill Methane Generation**
  - Landfill captures/compresses methane that fires reciprocating engines driving four 800 kilowatt generators
  - Generators produce 11,750,400 kWh of electricity for distribution to the grid
  - Electricity generated = 9 NOx allowances
  - 9 allowances x $1000 x 5 years = $45,000
Examples (continued)

- Wind Turbine Project
  - Wind development company installs ten turbines with maximum output of 1.5 MW
  - Turbines generate 40% of maximum capacity and 22,032,000 kWh during the ozone season
  - Electricity generated = 17 allowances
  - 17 allowances x $1000 x 5 years = $85,000
Examples (continued)

- **Combined Heat and Power Project**
  - Athletic facility operates two 60 kW microturbines with waste heat used for hot water production and heating two swimming pools
  - Electricity generated and heat used = 1 NOx allowance
  - 1 allowance x $1000 x 5 years = $5000
Applicant Requirements

- Project sponsor must contact U.S. EPA to establish a general account for holding NOx allowances
- Projects must result in at least one ton of NOx reductions/savings
- Projects may be combined to meet the one ton requirement
Going forward - CAIR

- Established EE/RE set-aside in annual CAIR program, adding annual allowances to IN Clean Energy Credit Program
- Added categories for projects that use renewable energy for thermal purposes
- Included IGCC as an eligible category
- Divert portion of unallocated allowances to a grant program under the IN Office of Energy and Defense Development to fund smaller (< 1 ton) projects, instead of returning to EGUs/non-EGUs
CLEAN AIR MERCURY RULE (CAMR)

- U.S. EPA issued this rule on March 15, 2005, to reduce mercury emissions from coal-fired power plants in all states, the largest remaining source of mercury emissions in the country.
- CAMR builds on CAIR, establishing a cap and trade program for mercury emissions in two phases, the first of which takes advantage of the co-benefits for mercury control provided by compliance with CAIR Phase I.
- When fully implemented in 2018, these rules will reduce utility emissions of mercury from 48 tons a year to 15 tons, a reduction of nearly 70 percent.
In 2010 CAMR will cap Indiana power plant emissions of mercury at 2.097 tons annually, a 15% reduction from 1999 emissions, and in 2020 at 0.828 tons, a 66% reduction.

<table>
<thead>
<tr>
<th>Hg</th>
<th>1999</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Emissions Without CAMR</td>
<td>2.442</td>
<td>1.964</td>
<td>2.023</td>
</tr>
<tr>
<td>Hg Caps</td>
<td>N/A</td>
<td>2.097</td>
<td>0.828</td>
</tr>
</tbody>
</table>

* U.S. EPA IPM runs
June 2004: HEC petitioned the Indiana Air Board to adopt a rule requiring a 90% reduction from uncontrolled emissions for power plants.

March 2005: CAMR issued; State Plans due November ‘06.

October 2006: Air Board requested IDEM work with utilities and HEC to develop rule options between the CAMR and the HEC Petition.

December 2006: Air Board formed a study group with representatives from utilities, environmental groups, 3 air board members, facilitated by Dr. Bill Beranek, to identify key factors and principles the board should consider in making a decision.
MERCURY CONTROL TECHNOLOGIES

- CAMR Phase I (2010) cap can be met by utilities installing controls for NOx and SO2 under CAIR (“co-benefits”): FGD, SCR
- CAMR Phase II (2018) cap likely to require direct mercury emission controls such as ACI with Fabric Filter
- HEC 90% rule could require direct mercury controls across-the-board in 2010
## Projected Mercury Control Costs

<table>
<thead>
<tr>
<th></th>
<th>CAMR</th>
<th>IDEM</th>
<th>IUG</th>
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<tbody>
<tr>
<td><strong>Phase 1 (2010)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Annual cost</td>
<td></td>
<td>-26</td>
<td>-1</td>
</tr>
<tr>
<td>(retrofit controls+ emission monitoring) million $</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in electricity</td>
<td>-0.24%</td>
<td>0.14%</td>
<td></td>
</tr>
<tr>
<td>rates (incremental to CAIR), %</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Phase 2 (2018)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total Annual cost</td>
<td>64</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>(retrofit controls+ emissions monitoring + allowance trading+ additional capacity) million $</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Increase in electricity</td>
<td>0.79%</td>
<td>1.06%</td>
<td></td>
</tr>
<tr>
<td>rates (incremental to CAIR), %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HEC Petition (beginning 2010)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total Annual cost</td>
<td>207</td>
<td>373</td>
<td></td>
</tr>
<tr>
<td>(retrofit controls+ emissions monitoring), million $</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in electricity</td>
<td>2.80%</td>
<td>5.00%</td>
<td></td>
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<tr>
<td>rates (incremental to CAIR), %</td>
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</tbody>
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CAMR RULEMAKING SCHEDULE

- Preliminary Adoption: May 2, 2007
- Final Adoption: October 3, 2007
- October 31, 2007: state allocation for 2010 due to U.S. EPA if CAMR adopted
- January 2008: state rule final and effective
- January 1, 2010: Phase I CAMR compliance
- January 1, 2018: Phase II CAMR compliance
“The Climate Registry”: a multi-state GHG registry

- 30 states are in discussion about developing a voluntary greenhouse gas registry, an accounting infrastructure capable of supporting a variety of state-level programs
- IN involved through a grant received by the Lake Michigan Air Directors Consortium to develop a framework for a regional multi-state registry
- LADCO quickly joined with similar efforts in other states
- Proposed startup: 2007; Launch: 2008
THE CLIMATE REGISTRY: Goals

- Establish a common data infrastructure for voluntary and mandatory reporting programs
- Provide opportunity for reporting entities to establish a baseline and document early action
- Develop nationally recognized platform for credible and consistent reporting requirements
- Promote full and public disclosure of GHG emissions while respecting business confidentiality
- Use best practices in GHG emissions reporting
THE CLIMATE REGISTRY: Organization

- Nonprofit organization, eventually self-sustaining from reporting member fees
- Board of Directors made up of member states and tribes
- Small executive staff and support staff, plus staff members at LADCO, WRAP, NESCAUM and SESARM
- Technical Workgroups of state/tribe representatives
- Reporting program will build on and subsume the California and Eastern Registries
THE CLIMATE REGISTRY: Next Steps

- Governors must sign a “Statement of Goals and Principles” to become a member (by April)
- First Board of Directors Meeting May 2007
- Startup activities July-December 2007
- Launch Registry 2008
- IN just received materials, is briefing the governor’s office; no decision yet
CONTACT INFORMATION

- IN Clean Energy Credit Program: www.IN.gov/idem/energycredit
- CAIR Trading Programs: Roger Letterman, IDEM, 317/232-8342
- CAMR rulemaking: Susan Bem, IDEM, 317/233-5697
- The Climate Registry: Kathy Watson, IDEM, 317/233-5694