INDIANA'S NEW AIR QUALITY RULES FOR UTILITIES

Presentation to the IN Center for Coal Technology Research
Advisory Panel Meeting
March 1, 2007

Kathryn Watson
Office of Air Quality, IDEM

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 CAIR BENEFITS

- In 2015 CAIR will cap Indiana power plant emissions of sulfur dioxide (SO2) at 178,219 tons annually, a 78% reduction from 2003 emissions

SO2	2003	2010	2015
*Emissions Without CAIR (thousand tons)	805	651	531
SO2 Caps	N/A	255	178

*U.S. EPA IPM runs

IN CAIR BENEFITS

- In 2015 CAIR will cap Indiana power plant emissions of nitrogen oxides (NOx) at 90,779 tons annually, a 65% reduction from 2003 emissions

NOx	2003	2009	2015
*Emissions Without CAIR (thousand tons)	261	234	233
NOx Caps	N/A	109	91

*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

	IDEM (Scenario 1)			IUG (Scenario 2)		
Time interval	I	II	III	I	II	III
Projection years	2008-2012	2013-2017	2018-2022	2007-2013	2014-2017	2018-2022
EGUs						
Retrofit controls						
Description	3 SO2 scrubbers	12 SO2 scrubbers; 10SCRs; 2SNCRs	17 SO2 scrubbers, 10SCRs, 2SNCRs	11 SO2 scrubbers	11 SO2 scrubbers; 2 SCRs	13 SO2 scrubbers; 6 SCRs
Capital cost	413	1,493	1,853	1,492	1,689	2,296
Annual cost	95	329	406	292	322	424
Total annual cost (includes all costs)	571	747	906	815	1,021	899
Impact on electricity rates	**5.16%**	**5.97%**	**6.34%**	**6.44%**	**8.55%**	**7.63%**
Non-EGUs						
Annual cost	(5)	(6)	(6)	(5)	(6)	(6)
Net annual cost	566	741	900	810	1,015	893

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.

CAIR: REVISIONS TO IN CLEAN ENERGY CREDIT PROGRAM

- 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 a 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 CAMR BENEFITS

- 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.

Hg	1999	2010	2020
*Emissions Without CAMR	2.442	1.964	2.023
Hg Caps	N/A	2.097	0.828

* U.S. EPA IPM runs

HOOSIER ENVIRONMENTAL COUNCIL (HEC) PETITION

- 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

CAMR		
Phase I (2010)	IDEM	IUG
Total Annual cost (retrofit controls+ emission monitoring +allowance trading), million $	-26	-1
Increase in electricity rates (incremental to CAIR), %	-0.24%	0.14%
Phase 2 (2018)		
Total Annual cost (retrofit controls+ emissions monitoring +allowance trading+ additional capacity), million $	64	68
Increase in electricity rates (incremental to CAIR),%	0.79%	1.06%
HEC Petition (beginning 2010)		
	IDEM	IUG
Total Annual cost (retrofit controls+ emissions monitoring), million $	**207**	**373**
Increase in electricity rates (incremental to CAIR), %	2.80%	5.00%

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