

Impact of EPA Regulations on Coal Burning

CITES Annual Environmental Symposium
April 21, 2011

Stan Pinegar
President and CEO
Indiana Energy Association

Indiana Energy Association

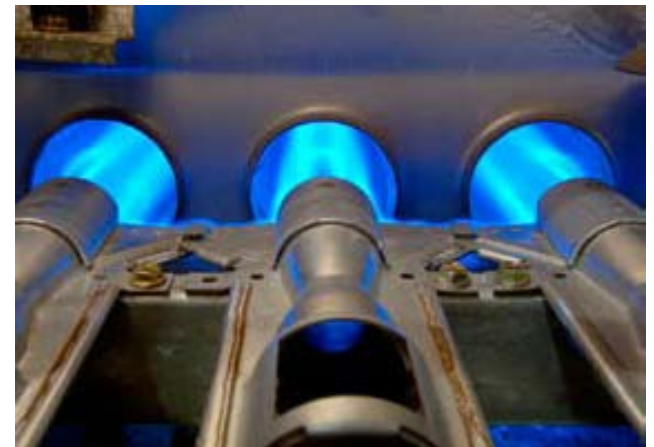


Boonville Natural
Gas Corporation



Hoosiers are Significant Energy Consumers

- Energy Information Administration (EIA) ranks Indiana 10th in total energy consumption per capita
- Indiana consumption is 27% higher than U.S. average per capita usage
- Industrial, commercial & agriculture impacts are significant
- Conservation now a priority for all stakeholders



Hoosiers' Gas & Electric Costs

How Indiana Consumers Compare to Others

Natural Gas—EIA data May 2010

Residential 16th lowest in U.S.

Commercial 21st lowest in U.S.

Industrial 13th lowest in U.S.

Electricity—EIA data May 2010

Residential 15th lowest in U.S.

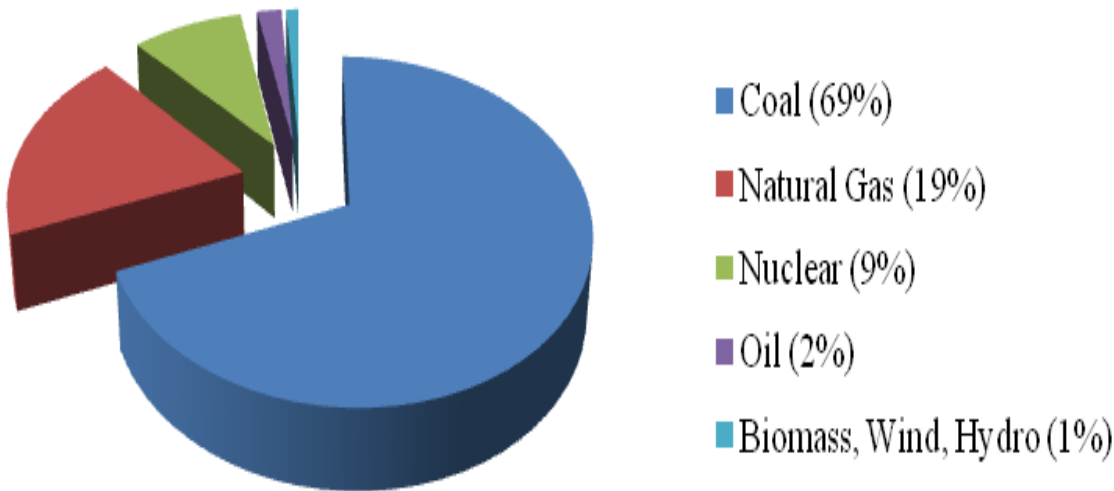
Commercial 19th lowest in U.S.

Industrial 13th lowest in U.S.

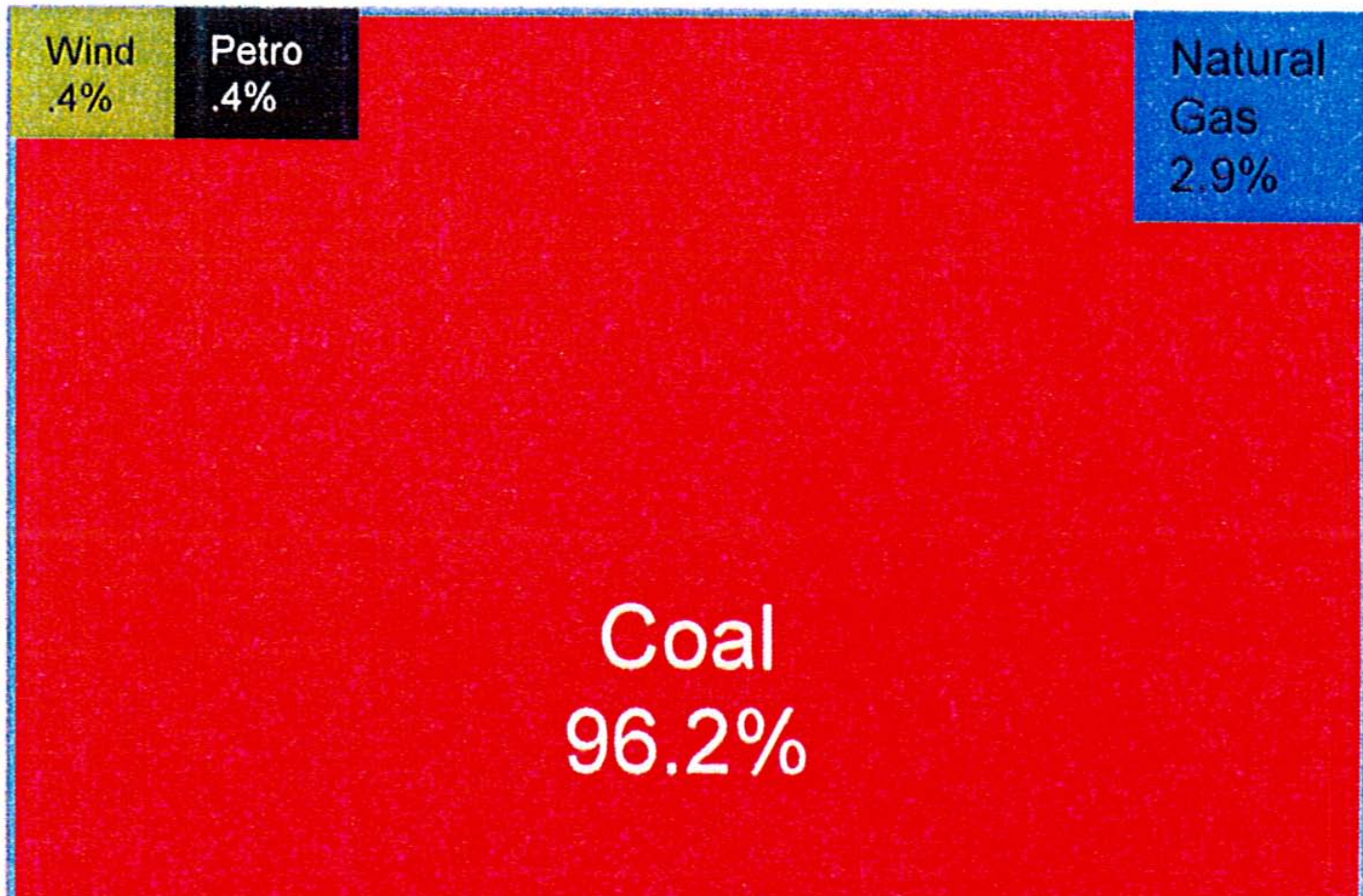
All Sectors 11th lowest in U.S.



Indiana's Electric Generation Capacity Fuel Mix



Indiana Electric Generation Fuel Mix

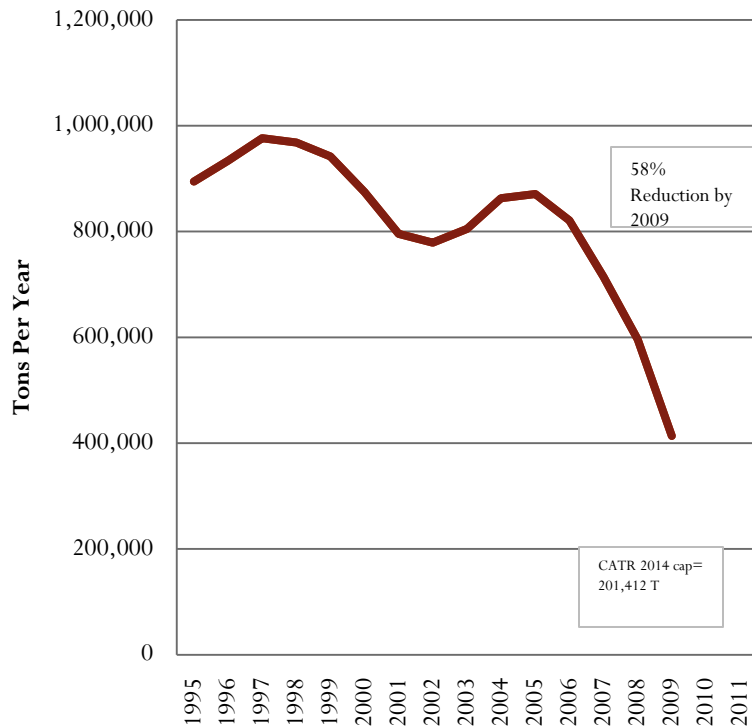


Environmental Compliance by IEA Member Companies

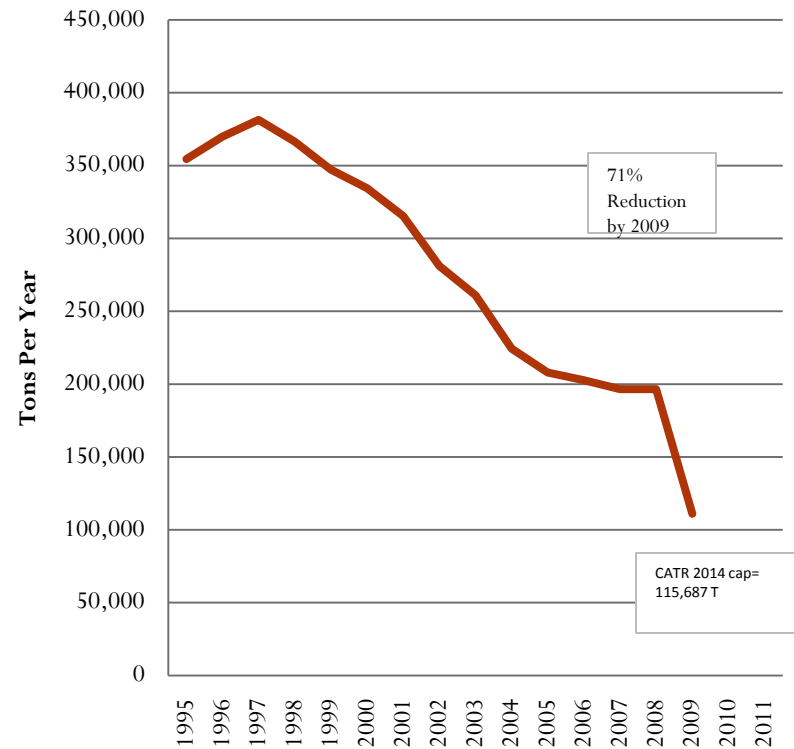
- Acid Rain—Sulfur Dioxide (SO₂) & Nitrogen Oxide (NO_x)
- Ozone—Nitrogen Oxide & Volatile Organic Compounds (VOCs)
- Fine Particulate Matter—Noncombustible mineral material
- Mercury—Naturally occurring at varying degrees in coal

Emissions Trend by IEA Member Companies

Indiana EGU Sulfur Dioxide Emissions Trend



Indiana EGU Nitrogen Dioxide Emissions Trend



Control Technologies

- SO₂—Flue gas desulfurization (FGD) technology, commonly referred to as a scrubber. Typically designed to remove 95% of the SO₂ contained in the exhaust gas. Costs vary from \$300/kW to \$600/kW
- NO_x—Selective catalytic reduction (SCR). Typically removes between 80-90% of NO_x contained in the exhaust gas. Costs range from \$150/kW to \$350/kW.
- PM—Electrostatic precipitator & baghouse technologies. Typically removes more than 99% of certain sized particles contained in exhaust gas
- Mercury—Scrubbers, SCRs & Activated Carbon Injection (ACI) together provide co-benefit of removing significant amount of mercury, estimated at 60-80%

Existing Boiler (within P4*)

Removes 90%
of NOx

SCR
Selective
Catalytic
Reduction
Unit

COAL

ESP
Electrostatic
Precipitator

Removes 99.7%
of Fly Ash

FGD
Flue Gas
Desulfurization

Removes 85%
of SO₂

<1% flue gas from
one boiler unit

Step 1

Chiller

cooling
flue gas

Step 2

CO₂
CAPTURE

isolating
CO₂ from
flue gas

Potential to
remove 90% of CO₂

Two-Step
Carbon Capture Pilot

Continuous
Emission
Monitoring
System

Existing
Chimney

Cost of Compliance Enormous

- Indiana's Regulated Utilities have spent more than \$3 billion since 2002 to meet EPA air quality requirements. Significant air quality benefits at a significant cost to ratepayers.
- Cost to scrub a 400 MW unit to meet SO₂ reduction requirements range from \$120 million - \$240 million



Environmental Compliance by IEA Member Companies

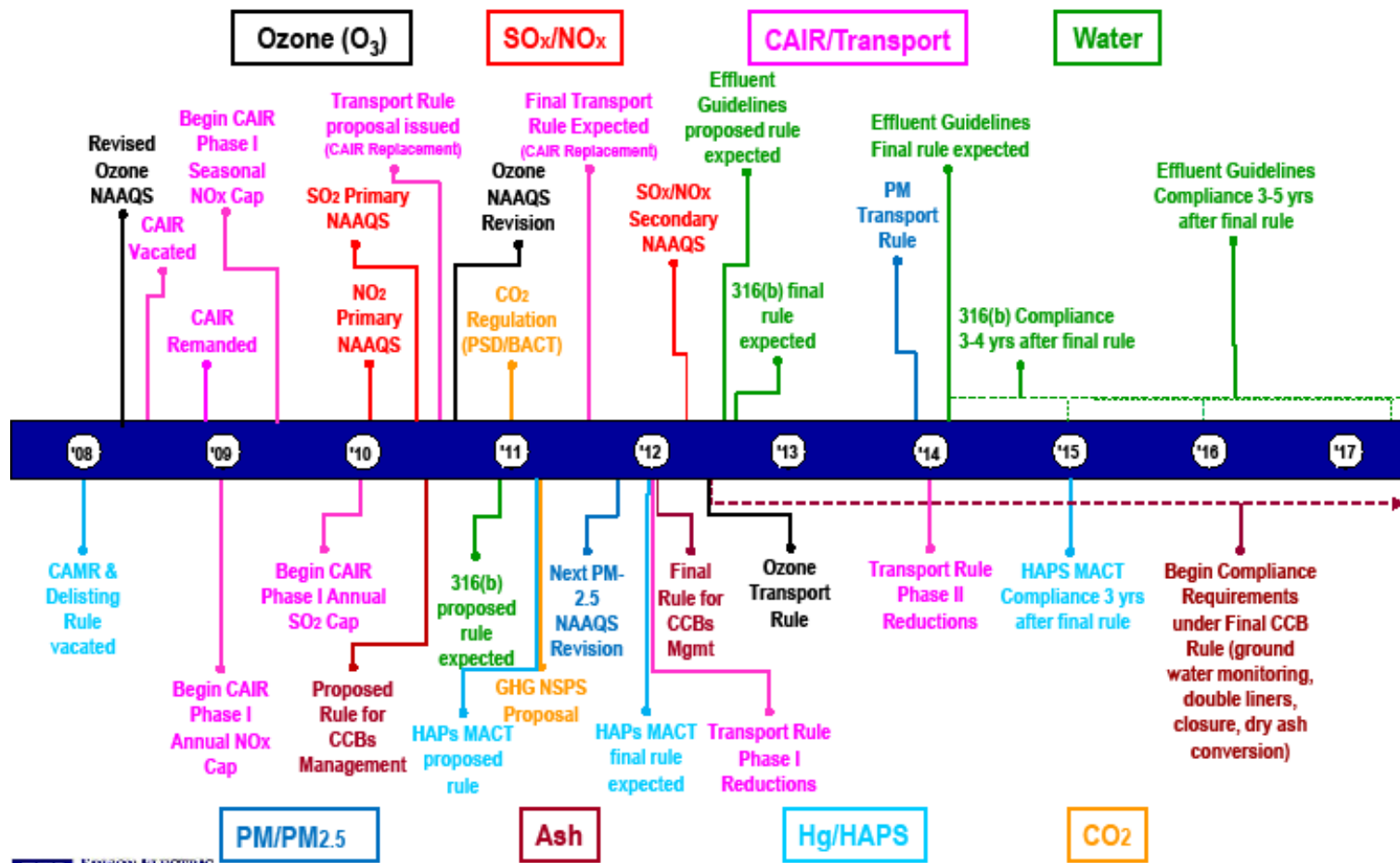
Governor Daniels' April 2010 Press Release

Air quality in all 92 Indiana counties meets national standards for first time in state history

GARY, Ind. (April 30, 2010) - Governor Mitch Daniels today announced that air quality in all 92 Indiana counties in 2009 met all applicable federal air quality standards, the first time this has been achieved since the passage of the 1970 Clean Air Act.



Possible Timeline for Environmental Regulatory Requirements for the Utility Industry



Substantial Threats to Indiana Coal-Fired Electric Generation

Issue	Final Rule
National Ambient Air Quality Standards	
- Nitrogen Dioxide (NO ₂)	1-22-2010
- Sulfur Dioxide (SO ₂)	6-2-2010
- Ozone (O ₃)	7-29-2011
- Fine Particulate (PM _{2.5})	Summer 2012
Hazardous Air Toxics Rule	11-16-2011
Interstate Transport Rule	6-30- 2011
316(b) Entrainment/Impingement Rule	July 2012
Coal Combustion Residuals (Coal Ash) Rule	Spring 2012
Water Effluent Rule	Summer 2014

Which units are at risk?

- General rule of thumb is that an uncontrolled coal-fired generating unit over 40 years old with a capacity between 25 – 400 MW will not be economical to retrofit with SO₂ and NO_x controls
- Indiana has 24 out of a total of 68 units which meet this criteria, representing 13% of our coal fired generation capacity.
- Indiana has an additional 16 units 40 years or older which may find it difficult to economically meet all of the proposed EPA requirements, representing 26% of our coal fired generation capacity.
- A handful of national electric reliability studies are estimating that between 10-33% of coal fired units will retire because of these EPA rules.

Which units are at risk?

Indiana coal-fired generation units WILL be retired due to the economics of control technology and continued regulatory uncertainty, leaving two viable options in the short term:

- Conservation
- Natural gas-fired electricity generation

All of this AND greenhouse gas regulation

Congress has failed to agree on greenhouse gas regulatory program.

EPA has developed Tailoring Rule to permit large sources of greenhouse gas emissions, beginning January 2, 2011. Everyone should prefer a federal legislative solution to this dilemma. Uncertainty creates planning obstacles.

Implications--?

- Greenhouse Gas control options limited
- May have to rely primarily on energy efficiency AND additional gas-fired electric generation while awaiting carbon capture & storage or other technology

Conservation in Indiana

Electricity

- Proposed rate mechanisms
- Utility programs encouraging efficiency
 - Customer interest in conservation

IURC DSM Generic Order #42693

Year	Annual Electric Savings Goal (% based on weather-normalized average electric sales for prior three years)
2010	0.3%
2011	0.5%
2012	0.7%
2013	0.9%
2014	1.1%
2015	1.3%
2016	1.5%
2017	1.7%
2018	1.9%
2019	2.0%

Viability of Natural Gas as a Bridge Fuel for Electricity Generation

Two recent studies present differing views on greater reliance of natural gas for electric generation

MIT Study – *The Future of Natural Gas* (2010)

- Gas reserves can meet demand
- Current combined cycle generation is widely underused and more can easily be added to generation mix
- Natural gas is well positioned economically and logistically to erode coal's market share over time

Viability of Natural Gas as a Bridge Fuel for Electricity Generation

Aspen Environmental Group—*Implications of Greater Reliance on Natural Gas for Electricity Generation* (2010)

- Environmental concerns over shale-based production
 - Huge quantities of natural gas needed for projected electricity generation will cause considerable price pressure
- Transmission and storage infrastructure is insufficient to serve expected surge in natural gas demand
- Unpredictable weather has proven to disrupt gas markets
- “Retrofitting” coal plants = constructing new gas fired units

Conclusion

- EPA regulations are going to drive fuel choices made by Indiana's electric utilities
- These decisions will be made very soon, certainly prior to the full impact of greenhouse gas constraints are known
- Natural gas will be the bridge fuel for Indiana's electricity generation demands

THANK YOU