THE FUTURE OF INDIANA COAL

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Responsibility of CCTR is to “develop technologies that can use Indiana coal in an environmentally and economically sound manner” [Senate Bill 29, 2002 Session].

Our opinion is that current clean coal technology options (CCTs), including integrated coal gasification combined cycle power plants (IGCC), show great promise for substantially increasing the use of Indiana coals while at the same time reducing pollution.

...As well as providing a feed-stock for use in processes which produce transportation fuels from these gases.
The present situation regarding the use of Indiana coals:

(a) The enormous increase in the use of Powder River Basin (PRB) low sulfur coals, since the 1970s, has been at the expense of growth in the use of Indiana coals.

(b) Since 1987, coal consumption in Indiana has increased 30%, while Indiana coal production has increased only 3% (First half of 2005 dropped 5%).

(c) In 2003 over half of the 65 Million Tons consumed for all purposes in Indiana were imported.

(d) Over half of the 46 Million Tons of coal used to generate electricity were imported – chiefly PRB coals. Why? Least cost alternative.
Coal by Destination State in 2003 - Indiana

State Total of 64,998 Thousand Short Tons & methods of transportation

- Wyoming: 15,547 Total
  - 15,547 Electricity Generation
    - Rail 13,979  River 1,477
- Montana: 1,600 Total
  - 1,600 Electricity Generation
    - Rail 1,600
- Utah: 167 Total
  - 164 Electrical Generation
    - Rail 164
- Illinois: 5,273 Total
  - 5,271 Electricity Generation
    - Rail 3,777  River 587  Truck 906
  - 1 Coke Plants
    - Truck 1
- Kentucky: 551 Total
  - 368 Electricity Generation
    - Rail 198  Truck 154
  - 57 Coke Plants
    - Rail 57
  - 125 Industrial Plants
    - Rail 32  Truck 93
- Alabama: 811 Total
  - 811 Coke
    - Rail 811
- In state: 31,632 Total
  - 20,526 Electricity Generation
    - Rail 12,028  River 1,280
    - Conveyer 684  Truck 6,535
  - 10,777 Industrial Plants
    - Truck 7,627  River 402  Conveyer 2,748
  - 329 Residential/Commercial
    - Truck 329
- West Virginia: 7,557 Total
  - 1,804 Electricity Generation
    - Rail 1,102  River 550  Truck 151
  - 4,834 Coke Plants
    - Rail 4,267  River 567
  - 906 Industrial Plants
    - Rail 856  River 11  Truck 39
- Ohio: 97 Total
  - 84 Electricity Generation
    - Rail 44  River 14  Truck 39
- Pennsylvania: 127 Total
  - 84 Electricity Generation
    - River 43  Truck 30  Rail 11
  - 11 Residential/Commercial
    - Truck 16  Rail 16
- Virginia: 1,727 Total
  - 628 Electricity Generation
    - Rail 628
  - 529 Coke Plants
    - Rail 529
  - 570 Industrial Plants
    - Rail 570

State Totals: 46,000 Electricity Generation
- 6,213 Coke Plants, 12,411 Industrial Plants, 357 Resid/Com

Source: http://www.eia.doe.gov/cneaf/coal/page/coaldistrib/d_in.html

- 30% increase in use of Indiana coal since 1987 but 3% increase in production
What would be the economic/jobs impact of recapturing the electricity generation market?

(a) CCTR has estimated (1) that current coal production adds almost $1.3 Billion and 14,000 jobs to the State’s economy, (2) that each additional million tons of coal mined would add $60 Million and 800 jobs.

(b) Thus, if Indiana coals were to replace the 22.5 Million Tons of coal now imported to generate electricity, it would add $1.35 Billion and 18,000 jobs to the State’s economy.

(c) If Indiana coals were used to generate the electricity needed to satisfy the State Utility Forecasting Group’s (SUFG) expected growth in Indiana base load electricity consumption:
   ~ $900 Million added to State economy in 2021
   ~ An additional 12,000 jobs created by 2021
The key question: Can we do this, using Indiana coal, without either:-

(a) Further polluting the environment? (Indiana now is the 8th most air polluting State).

(b) Losing our State’s reputation as a low cost producer of electricity? (now only Kentucky and Wyoming have substantially lower electricity costs than Indiana).

The answer to (a) is certainly yes, if we adopt the newest generation of clean coal technologies such as IGCC.

For instance – if all the electricity generated by Indiana power plants were to be generated by technologies similar to the present IGCC at Wabash River, SO$_2$ emissions in these plants would be reduced by 99%!
Power Plant Typical Emissions by Technology Type

Key:
- PC              - Pulverized Coal
- Scrubbers  - SO₂ Removal Unit
- IGCC         - Integrated Gasification Combined Cycle
- NGCC        - Natural Gas Combined Cycle
- SCR           - Selective Catalytic Reduction (Reduction of NOx in the flue gas)
- SCPC        - Super Critical Pulverized Coal
- CFB           - Circulating Fluidized-Bed
- MDEA       - Methyldiethanolamine (CO₂ Separation/Removal)
- Rectisol  - Gas Purification Unit

Basis: ChevronTexaco White Paper (3/03), DOE Report (5/99), and Recent EPA Permit Data
Now – can we adopt CCTs for power generation without increasing the cost of Indiana electricity?

Look at the competition:-

**Natural Gas Fired Combined Cycle (NGCC):** Low plant costs/kW, but prohibitively high operating costs, with the cost of gas at present levels.

**Pulverized Coal (PC):** Higher plant costs than NGCC, but much lower operating costs make it the competition.

**IGCC:** 15% to 20% higher plant costs (with spare gasifier) than PC, roughly the same operating costs.
How can we offset the 15-20% plant cost?

• Federal & State tax breaks
• Indiana incentives
  - SB 29 (2003): up to 3% point adder
  - HB 378: Investment Tax Credits against utility receipts tax for IGCCs
• Develop additional Revenue Streams

• Three Universities (Southern Illinois University, Purdue University, and University of Kentucky), to “…evaluate the commercial and technical feasibility of advanced technologies to convert Illinois Basin coals into Fischer-Tropsch, (FT) and other transportation fuels”

• $85M authorized for research and a test center from DOE

• DOD has immediate need for 400,000 bbls/day for their use
Obama-Lugar Amendment

Less dependence on imported fuels, rising prices of fuel and the most abundant energy source in the U.S. - coal

Coal gasification and liquefaction – over 75 Purdue faculty with interest in working in coal related areas:

“…..shall construct a test center to evaluate and confirm Liquid and gas products from syngas catalysis in order that the system has an output of at least 500 gallons of FT transportation fuels per day…..”

• Role for Wabash River (IN) or GTI (IL)?
• Consider benefits of co-production at off-peak times
Fischer-Tropsch Fuel Technology

No Sulfur – Low NO\textsubscript{X} – Reduced Particulate
Conclusion

• Encouraging the use of clean coal technologies using Indiana coals should be supported:
  (a) For positive environmental reasons
  (b) For economic growth reasons

• “Clean Coal for Transportation Fuels” Workshop
  Friday December 2\textsuperscript{nd}, 2005, West Lafayette

• Registration link for December 2\textsuperscript{nd}, (no fee) go to:
  \texttt{http://dagon.admin.purdue.edu/coal_meet/user_registration.php}