

Case for IGCC



# The Case for IGCC

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Presented to CCTR Advisory Panel  
*June 1, 2006*

# Backdrop

- In 2004, Cinergy/PSI (now Duke Energy Indiana) signed a letter of intent with GE Energy and Bechtel Corporation to study feasibility of an Integrated Gasification Combined Cycle (IGCC) plant
- Duke Energy Indiana is estimated to need 300-500 MW of additional base load capacity in 2010-2015 timeframe
- The 2005 State Utility Forecasting Group report projects electricity usage to grow by 2.22% annually



# IGCC's "Perfect Storm"

- Need for base load
- Abundant coal reserves
- Continuation of stringent emission reduction standards
- Rising energy commodity prices
- Future carbon constraints

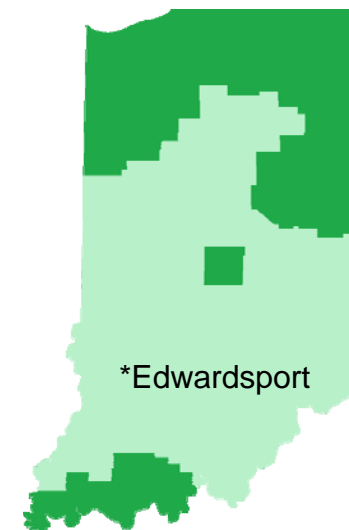
# Edwardsport – Preferred IGCC Site



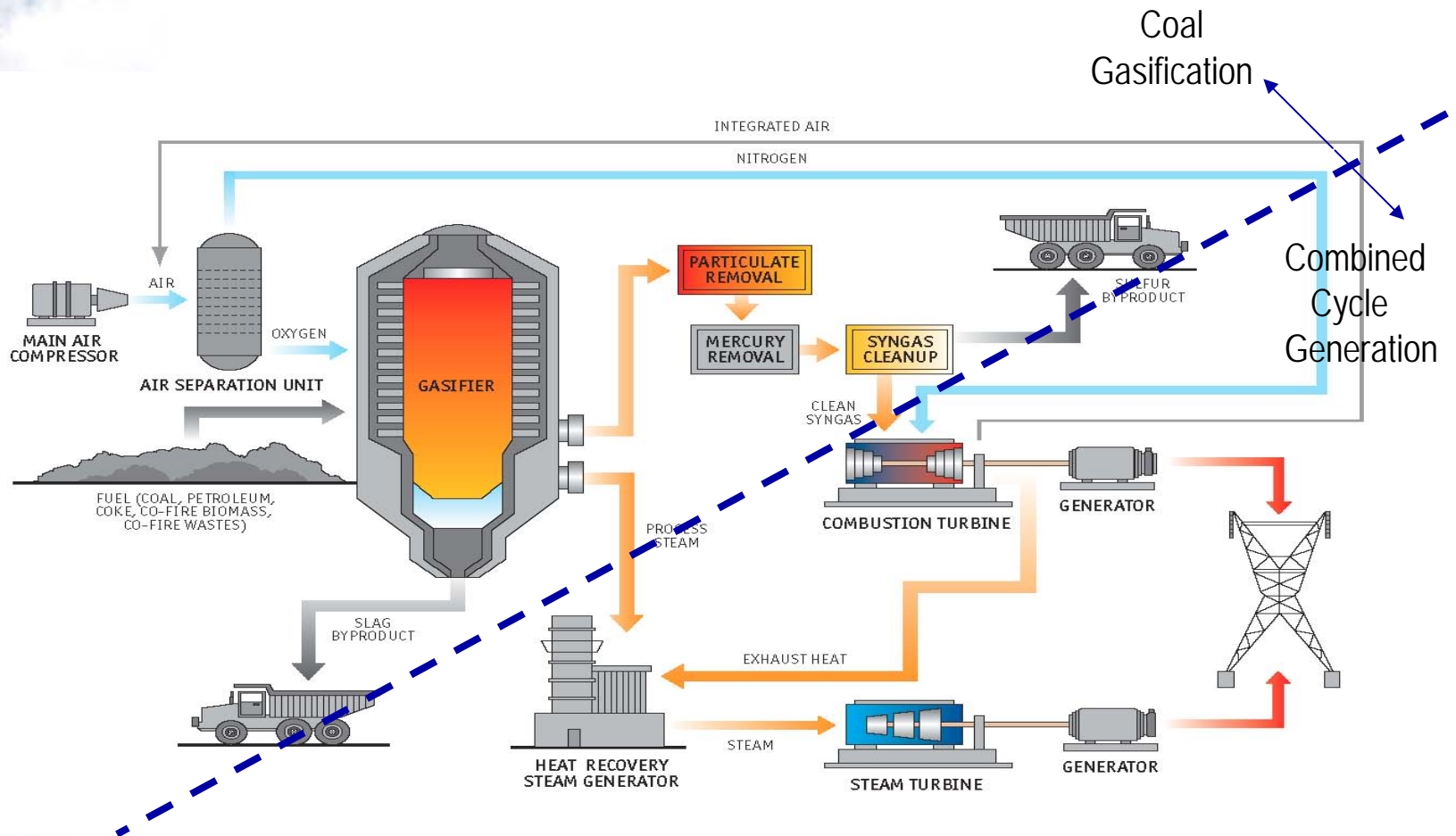
- Existing 160 MW fossil steam plant (units circa 1940s-1950s) Near Edwardsport, IN
- Replace with 600 MW Class IGCC Plant
- Duke Energy Indiana and Vectren have petitioned IURC for study costs

# “Arriving” At Edwardsport

- One of 5 sites in Indiana and 1 in Kentucky included in site study
- GE/Bechtel analysis indicating its feasibility
- Enables use of high sulfur regional coals
- Geologically well-suited for possible carbon sequestration



# IGCC Process Diagram

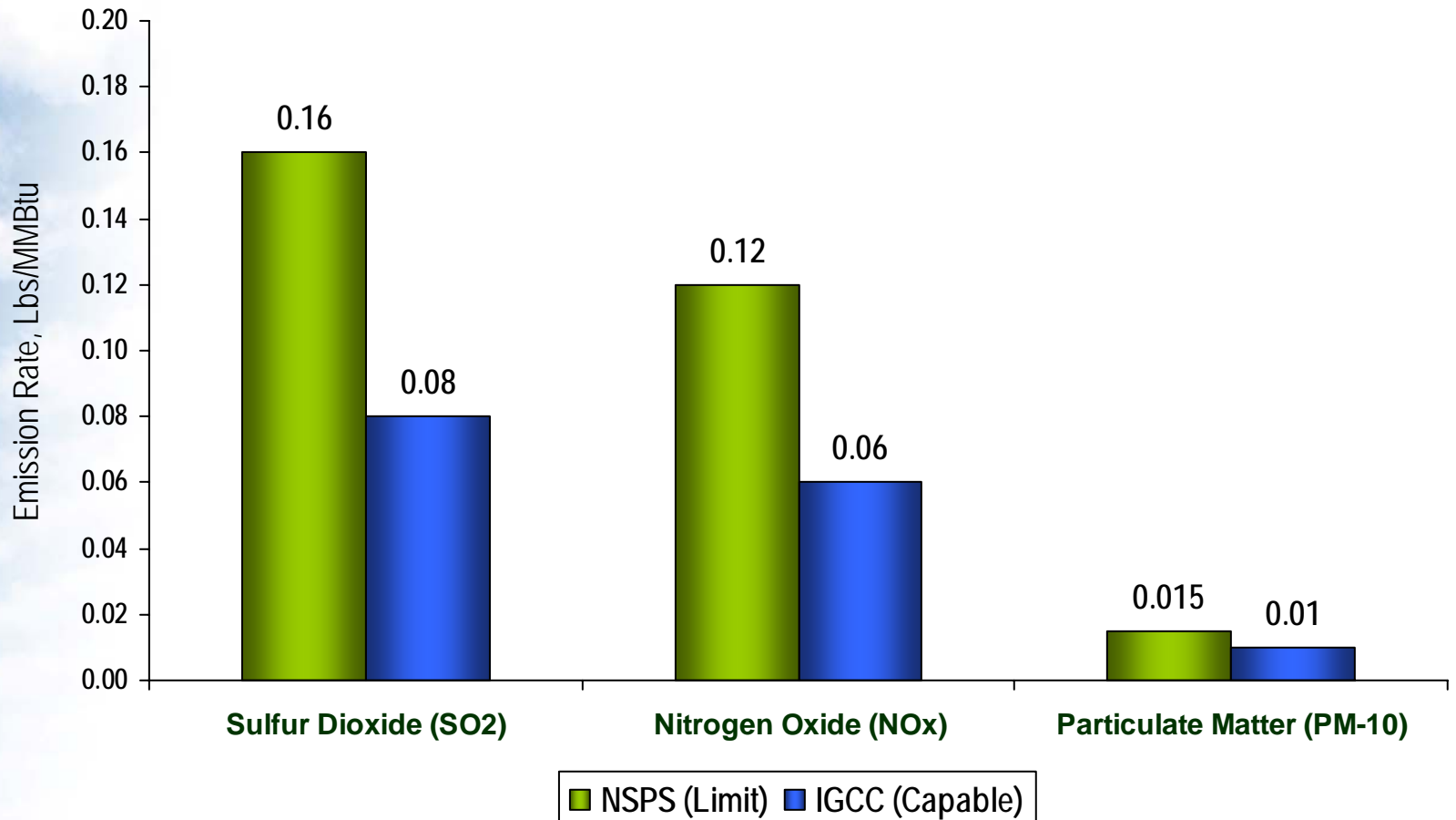


# The Big Deal

- Currently, 160 MW Edwardsport runs about 30% of the time and emits (annually):
  - Approximately 11,000 metric tons of SO<sub>2</sub>, NO<sub>x</sub>, and particulates
- The 600 MW class IGCC plant operating 100% of the time will emit:
  - less than 2,900 tons of these pollutants

**More is Less!**

# General Environmental Performance Comparison New Source Performance Standards (NSPS) vs. IGCC



Actual SO<sub>2</sub> emission rate will depend on type of coal burned, and IGCC emission permit limits may be greater than that shown for operating margin. Approximate conversion of NSPS lb/MWh (gross) to lb/MMBtu for SO<sub>2</sub> and NO<sub>x</sub>.



# Additional Advantages of IGCC

- Less Water Used
- Less Solid Waste Generated
- Overall Higher Efficiency than a Conventional PC Plant with Currently Required Pollution Control Equipment
- Ability to Use Local Indiana and Midwestern Higher Sulfur coals

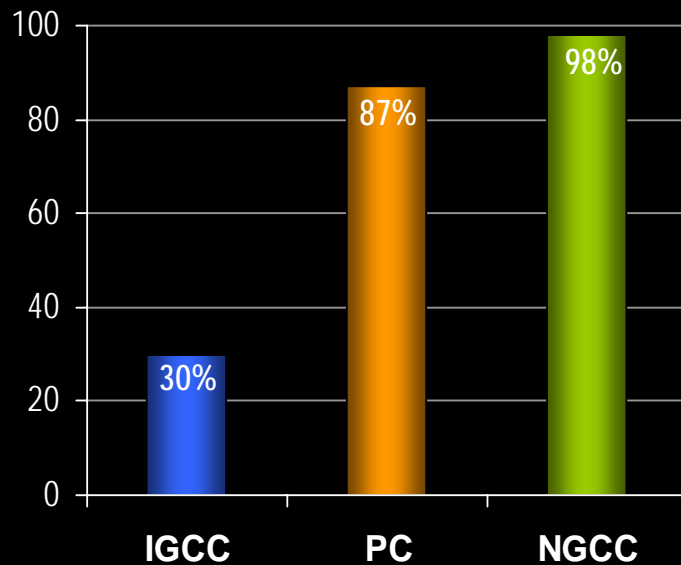
# Advantages of IGCC (cont'd)

- Potential to Control Hg at a Lower Cost than is Possible with Other Coal-Based Generation Technologies
- Potential to Tap into Future Poly-generation Capabilities – Including Production of Fertilizer and Transportation Fuels
- Potential for Future Capture of CO<sub>2</sub> at a Significantly Lower Cost than Conventional PC Because CO<sub>2</sub> can be Separated Prior to Combustion
  - Dependent upon ability to technologically sequester carbon economically in the future

# Potential to Capture CO<sub>2</sub> Economically in the Future

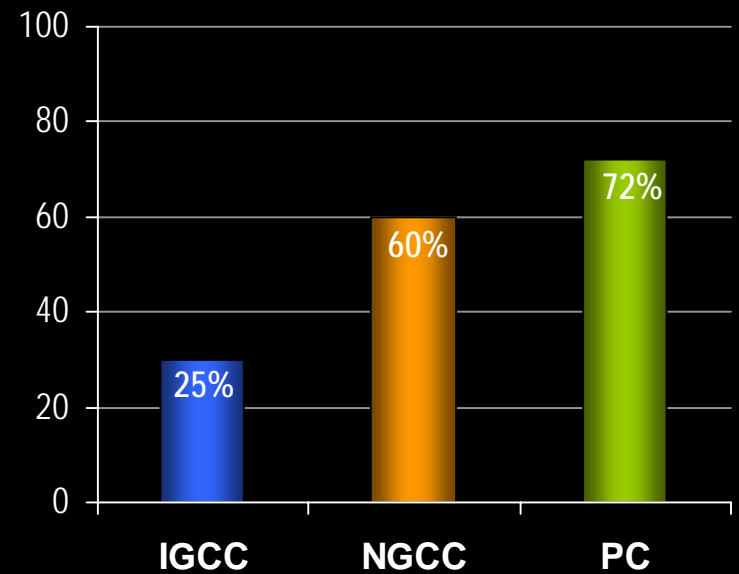
## Estimated Capital Cost

Effect of CO<sub>2</sub> Capture on Capital Cost  
(% Increase Resulting from CO<sub>2</sub> Capture)



## Estimated Cost of Electricity

Effect of CO<sub>2</sub> Capture on Cost of Electricity  
(% Increase Resulting from CO<sub>2</sub> Capture)



Source – National Energy Technology Lab

# Additional Benefits

- Local/regional economy
  - Estimated property taxes years 1-10: \$22.2 M
  - Estimated property taxes years 11-30: \$52.6M
  - 1.5 M tons of coal/year valued at about \$40 M annually
- Jobs
  - An average of 800-900 construction jobs during 3-year period (as many as 2000 during peak)
  - Creation of 77-97 permanent jobs
  - Estimated annual payroll of \$5-7 million
- By-products
  - Elemental sulfur and vitrified slag can be sold

# Costs and Considerations

- Typical 600 MW class IGCC plant is estimated to cost up to \$1.2 billion
- IGCC capital cost is estimated to be 15-20% higher than a PC plant
- Incentives needed to bridge the gap

# Financial Incentives

## ➤ State and Local

- Indiana SB 29 Provides for Timely Recovery of IGCC Construction and Operating Costs
- Indiana SB 378 Provides Investment Tax Credit of 10% of Project Cost for the First \$500 million and 5% of the Remaining Cost Above \$500 million
- 10 year real and personal property tax abatement and a 45% tax increment finance district was approved by the Knox County Council on April 11, 2006

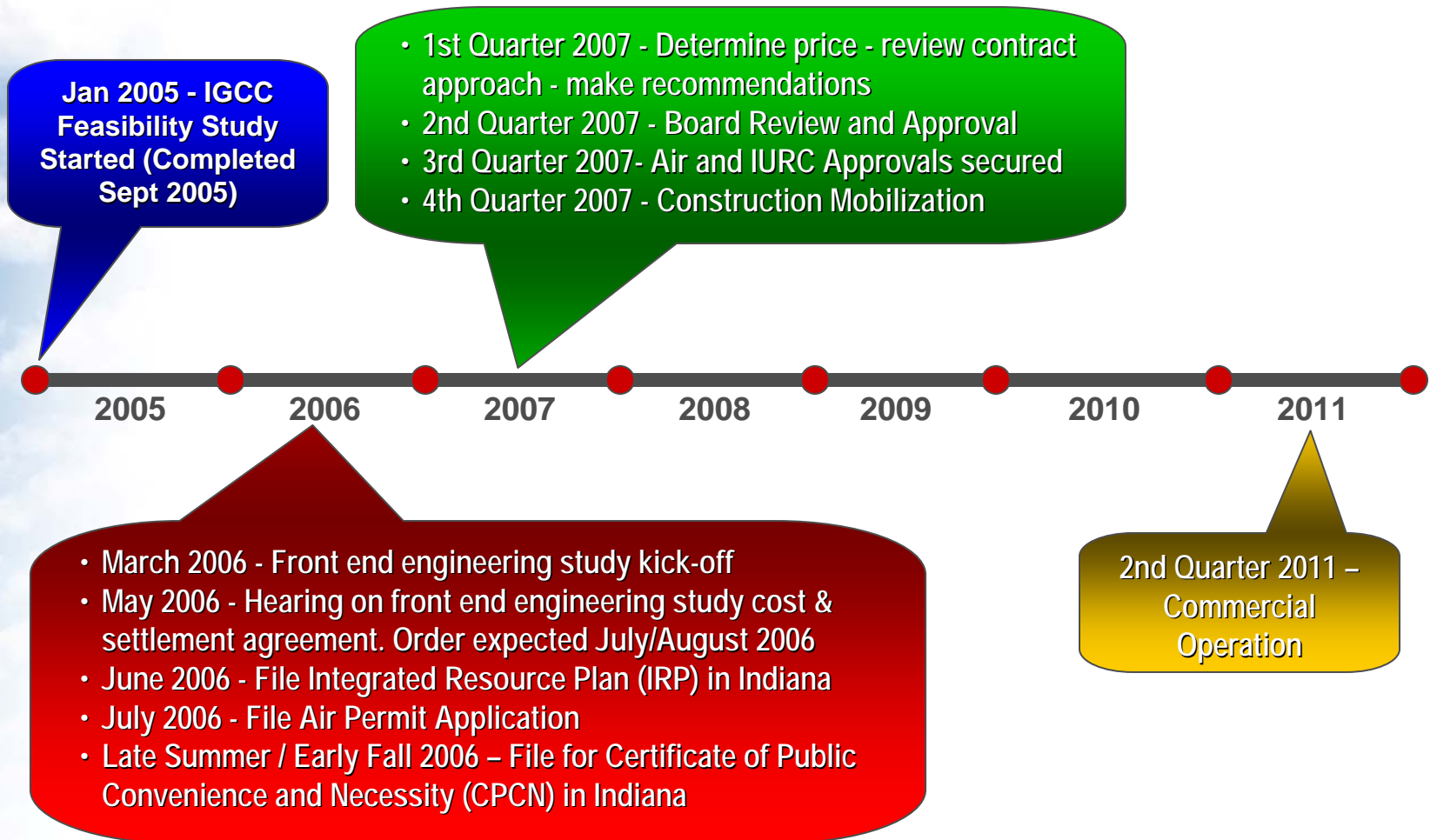
## ➤ Federal – 2005 Energy Bill

- 20% Investment Tax Credit for IGCC Capped at \$800 million and Split Across Three Coal Types. Process will be Very Competitive
- Some Type of Loan Guarantee Program May Also be Available in the future

# Status of Proposed Project

- Vectren participating with Duke Energy Indiana on preliminary studies
- A Feasibility Study was completed in September 2005
- A CPCN filing at the IURC & environmental permits necessary
- The Front-End Engineering and Design (FEED) Study is to be completed around second quarter of 2007
- Decision whether to build by third quarter 2007  
( Dates subject to change)

# Tentative IGCC Timeline



# Conclusions

- Many factors make IGCC a desirable way to meet the need for new capacity
- IGCC enhances our commitment to provide reliable, affordable electricity for customers in an environmentally responsible manner
- If regulatory, engineering and economic factors come together, an IGCC plant at Edwardsport will benefit all stakeholders