Indiana Energy Status and
SUFG Electricity Projections

presented to
Indiana Chamber of Commerce
Energy Roundtable
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presented by
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State Utility Forecasting Group
2006 Residential Electricity Sales (MWh)
2006 Commercial Electricity Sales (MWh)
2006 Industrial Electricity Sales (MWh)
2006 Total Electricity Sales (MWh)
Fuel Sources for Electric Power in 2005

- Indiana numbers do not include out-of-state generators that serve Indiana customers
  - Cook (nuclear) in Michigan
  - Madison (natural gas) in Ohio
  - Trimble County (coal) in Kentucky
In 2006….

• Indiana produced 3.2 percent of the electricity generated in the U.S.
• Indiana produced 6.2 percent of the electricity generated from coal in the U.S.
• Indiana produced 0.3 percent of the electricity generated from natural gas in the U.S.
Coal-fired Generating Capacity by Decade Installed

<table>
<thead>
<tr>
<th>Decade</th>
<th># of units</th>
<th>MW</th>
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<tbody>
<tr>
<td>1940s</td>
<td>1</td>
<td>45</td>
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<tr>
<td>1950s</td>
<td>20</td>
<td>1847</td>
</tr>
<tr>
<td>1960s</td>
<td>12</td>
<td>2275</td>
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<tr>
<td>1970s</td>
<td>17</td>
<td>6938</td>
</tr>
<tr>
<td>1980s</td>
<td>9</td>
<td>5736</td>
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<tr>
<td>1990s</td>
<td>2</td>
<td>289</td>
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Coal Developments

• IMPA share of Prairie State (IL), Trimble County (KY), and Thoroughbred (KY)
• Duke Energy integrated coal gasification unit at Edwardsport
• Proposed syngas facility
Natural Gas Developments

• NIPSCO purchase of Sugar Creek combined cycle facility (IN)

• Hoosier Energy – Wabash Valley Power proposed purchase of Holland combined cycle facility (IL)
## Wind Developments

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Counties</th>
<th>Developer</th>
<th>Rated Capacity (MW)</th>
<th>Construction Schedule</th>
<th>Status</th>
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<tbody>
<tr>
<td>Benton County Wind Farm</td>
<td>Benton</td>
<td>Orion Energy</td>
<td>130</td>
<td>Completed Spring 2008</td>
<td>Completed</td>
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<tr>
<td>Fowler Ridge Phase 1</td>
<td>Benton</td>
<td>BP Alternative Energy &amp; Dominion</td>
<td>400</td>
<td>To be completed by end of 2008</td>
<td>Under construction</td>
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<tr>
<td>Hoosier Wind Project</td>
<td>Benton</td>
<td>enXco</td>
<td>100</td>
<td>2009</td>
<td>Pending w/ PPA</td>
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<tr>
<td>Fowler Ridge Phase 2</td>
<td>Benton</td>
<td>BP Alternative Energy &amp; Dominion</td>
<td>350</td>
<td>Begin early 2009</td>
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<tr>
<td>Tri-County Wind Energy Center</td>
<td>Tippecanoe, Montgomery, Fountain</td>
<td>Invenergy</td>
<td>300-500</td>
<td>Begin 2010</td>
<td>Proposed</td>
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<tr>
<td>Meadow Lake Wind Farm</td>
<td>Benton, White</td>
<td>Horizon Energy</td>
<td>600-1000</td>
<td>Begin 2010</td>
<td>Proposed</td>
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<tr>
<td>Randolph</td>
<td>Randolph</td>
<td>Horizon Energy</td>
<td>100-200</td>
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<tr>
<td>Howard</td>
<td>Howard</td>
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<td>200</td>
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## Indiana Utility Wind PPAs

<table>
<thead>
<tr>
<th>Utility</th>
<th>Project</th>
<th>State</th>
<th>MW</th>
<th>Status</th>
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<td>IN</td>
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<td>Operational</td>
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<tr>
<td>SIGECO</td>
<td>Benton County Wind Farm</td>
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<td>30</td>
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<td>WVPA</td>
<td>AgriWind</td>
<td>IL</td>
<td>8</td>
<td>Operational</td>
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<tr>
<td>Indiana Michigan</td>
<td>Fowler Ridge</td>
<td>IN</td>
<td>100</td>
<td>Approved</td>
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<tr>
<td>NIPSCO</td>
<td>Buffalo Ridge</td>
<td>SD</td>
<td>50</td>
<td>Approved</td>
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<tr>
<td>NIPSCO</td>
<td>Barton Windpower</td>
<td>IA</td>
<td>50</td>
<td>Approved</td>
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<tr>
<td>IPALCO</td>
<td>Hoosier Wind</td>
<td>IN</td>
<td>100</td>
<td>Pending</td>
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</table>
2006 CO$_2$ Emissions (metric tons)
2006 NO$_x$ emissions (metric tons)
2006 SO$_2$ emissions
(metric tons)
Emissions Trends for Indiana Electricity Industry
(normalized to 1990 values)
2006 All Sector Electricity Retail Price (cents/kWh)

IN 6.46 - rank #10

U.S. average 8.90
2006 Residential Electricity Retail Price (cents/kWh)

IN 8.22 - rank #13

U.S. average 10.40
2006 Commercial Electricity Retail Price (cents/kWh)

IN 7.21 - rank #17

U.S. average 9.46
2006 Industrial Electricity Retail Price (cents/kWh)

IN 4.95 - rank #16

U.S. average 6.16
Coal Spot Price

Source: Energy Information Administration
Natural Gas Futures
($/mmBtu)
SUFG Forecast Highlights

• Significant real electricity price increase through 2012, then leveling off
• Electricity requirements and peak demand projections are similar to the previous forecast in the first half of the forecast
• Electricity requirements and peak demand projections are higher than the previous forecast in the later years of the forecast
• Industrial electricity consumption is projected to grow faster than previously projected
• Resource requirements are down in the early years primarily due to new purchase contracts
Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Growth rates
  - 2007 forecast: 2.46%
  - 2005 forecast: 2.22%
  - 2003 forecast: 2.16%
Indiana Peak Demand Requirements

- Peak demand is net of DSM and interruptible loads
- Growth rates
  - 2007 forecast: 2.46%
  - 2005 forecast: 2.24%
  - 2003 forecast: 2.07%
Indiana Resource Requirements

- Resources may be provided by conservation measures, contractual purchases, purchases of existing assets, or new construction.
- Existing resources are adjusted into the future for retirements, contract expirations, and IURC approved new resources:
  - Does not include Duke IGCC, NIPSCO purchase of Sugar Creek, and most wind purchases.
Indiana Resource Requirements

<table>
<thead>
<tr>
<th>Year</th>
<th>Uncontrolled Peak Demand 1</th>
<th>Interruptible Demand 2</th>
<th>Net Peak Demand 3</th>
<th>Existing/Approved Capacity 4</th>
<th>Incremental Change in Capacity 5</th>
<th>Projected Additional Resource Requirements 6</th>
<th>Total Resources 7</th>
<th>Reserve Margin</th>
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<tbody>
<tr>
<td>2005</td>
<td>20,933</td>
<td>1,059</td>
<td>21,777</td>
<td>21,777</td>
<td></td>
<td></td>
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<td>90</td>
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<td>1,063</td>
<td>20,803</td>
<td>22,779</td>
<td>260</td>
<td>230</td>
<td>730,170</td>
<td>23,909</td>
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<tr>
<td>2008</td>
<td>22,163</td>
<td>1,065</td>
<td>21,099</td>
<td>22,554</td>
<td>-225</td>
<td>310</td>
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<td>24,274</td>
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<td>2009</td>
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<td>21,541</td>
<td>22,719</td>
<td>165</td>
<td>330</td>
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<td>2010</td>
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<td>1,071</td>
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<td>2012</td>
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<tr>
<td>2018</td>
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<td>2019</td>
<td>29,016</td>
<td>1,096</td>
<td>27,921</td>
<td>21,909</td>
<td>-163</td>
<td>2,530</td>
<td>2,430,5,220</td>
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<tr>
<td>2020</td>
<td>29,746</td>
<td>1,100</td>
<td>28,647</td>
<td>21,909</td>
<td>0</td>
<td>2,700</td>
<td>2,520,5,820</td>
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<td>21,869</td>
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<td>2,940</td>
<td>2,600,6,400</td>
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<td>2022</td>
<td>31,219</td>
<td>1,108</td>
<td>30,112</td>
<td>21,709</td>
<td>-160</td>
<td>3,100</td>
<td>2,700,7,120</td>
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<tr>
<td>2023</td>
<td>31,954</td>
<td>1,112</td>
<td>30,843</td>
<td>21,709</td>
<td>0</td>
<td>3,290</td>
<td>2,820,7,640</td>
<td>35,459</td>
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<tr>
<td>2024</td>
<td>32,678</td>
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<td>31,562</td>
<td>21,628</td>
<td>-81</td>
<td>3,470</td>
<td>2,930,8,290</td>
<td>36,318</td>
</tr>
</tbody>
</table>

1. Uncontrolled peak demand is the peak demand with DSM in place but without any interruptible loads being called upon.

2. Net peak demand is the peak demand after interruptible loads are taken into account.

3. Existing/approved capacity includes installed capacity plus approved new capacity plus firm purchases minus firm sales.

4. Incremental change in capacity is the change in existing/approved capacity from the previous year. The change is due to new, approved capacity becoming operational, retirements of existing capacity, and changes in firm purchases and sales.

5. Projected additional resource requirements is the cumulative amount of additional resources needed to meet future requirements.

6. Total resource requirements are the total statewide resources required including existing/approved capacity and projected additional resource requirements.
Indiana Real Price Projections (2005 $)

- Effect of inflation removed
- Includes the cost of meeting CAIR and CAMR
- Does not include costs associated with CO2 or RPS
- Includes the cost of new resources
Alternative Scenarios

- Any forecast contains uncertainty
- CEMR provides alternative low and high growth econometric forecasts
- Low and high growth scenarios are intended to give a plausible bound to uncertainty
Residential Electricity Sales

• Estimated from:
  – demographics
  – households
  – household income
  – energy prices

• Growth rates
  – 2007 forecast: 2.21%
  – 2005 forecast: 2.22%
  – 2003 forecast: 1.95%
Commercial Electricity Sales

- Estimated from:
  - floor space inventory
  - end use intensity
  - employment
  - energy prices
- Growth rates
  - 2007 forecast: 2.46%
  - 2005 forecast: 2.61%
  - 2003 forecast: 2.71%
Industrial Electricity Sales

- **Estimated from:**
  - GSP by industry
  - Energy prices

- **Growth rates**
  - 2007 forecast: 2.67%
  - 2005 forecast: 1.99%
  - 2003 forecast: 1.97%
Further Information

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  – gotham@purdue.edu

• http://www.purdue.edu/dp/energy/SUFG/