Indiana Electricity Projections and Renewable Energy

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Presented to:
78th Annual Meeting
Indiana Statewide Association of Rural Electric Coops

December 3, 2012
2011 Forecast

- Electricity demand
- Peak demand
- Resource needs
- Electricity prices
Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Growth rates
  - 2011 forecast: 1.30%
  - 2009 forecast: 1.55%
  - 2007 forecast: 2.46%
Indiana Peak Demand Requirements

- Peak demand is net of DSM and interruptible loads
- Growth rates
  - 2011 forecast: 1.28%
  - 2009 forecast: 1.61%
  - 2007 forecast: 2.46%
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.
Indiana Real Price Projections (2009 $)

- Effect of inflation removed
- Includes the cost of new resources
- Does not include cost of expected EPA regulations
  - unless utility has already taken steps or included costs in data request
Environmental Regulations

- SUFG performed a follow up study of the expected impacts of recent, proposed, and expected EPA regulations
  - Cross-State Air Pollution Rule
  - Mercury and Air Toxics Standards
  - Greenhouse gases
  - Cooling water
  - Coal ash
Cross-State Air Pollution Rule

- Final rule issued in July 2011
- August 2012 - Court of Appeals (D.C. Circuit) vacates rule
- October 2012 - U.S. (EPA) requests rehearing from full Court of Appeals
- Reduces emissions caps for sulfur dioxide ($SO_2$) and nitrogen oxides ($NO_x$) in 2012
- Further reductions in 2014
Mercury and Air Toxics Standards

- Final rule issued in December 2011
- Replaces court vacated Clean Air Mercury Rule
- Reduces emissions from mercury, acid gases, and other pollutants
- Prevents release of 91% of mercury
- Expected to go into effect in 2015-16
Greenhouse Gases

• Final rule issued in March 2012
  – after SUFG study released
• Establishes carbon dioxide (CO₂) emissions standards for new sources
Cooling Water Intake Structures

• Proposed rule issued in April 2011
• Final rule expected in June 2013
• Intended to reduce damage to aquatic life
  – impingement – trapping against inlet screen
  – entrainment – drawn into cooling system
• Compliance actions include enhanced screening, reducing water flow rate, and installing cooling towers
• Uncertainty over timing
Coal Combustion Residuals

• Proposed rule issued in June 2010
• No date has been released for final rule
• In response to concerns over the potential failure of coal ash facilities
• Two options
  – classify as special hazardous waste (~2020)
  – regulate as non-hazardous waste (~2018)
SUFG Study Inputs

• Model inclusion of SO$_2$ scrubbers (wet FGD), NO$_x$ control (SCR), and mercury control (activated charcoal injection with bag house)

• Conversion of cooling water systems to recirculating

• Conversion of ash disposal from wet to dry
Retire vs. Retrofit

• For each unit, if the cost of retrofitting was greater than the cost of replacing it with a natural gas combined cycle facility, the unit was considered retired for the study
• If not, the retrofit costs were included
• Approximately 2,280 MW modeled as retired
Results

EPA Rules

2011 Base

Cents/kWh (2009$)

Year

History

Forecast
Comparison to Base Forecast (2009 cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>2011 Base</th>
<th>EPA Rules</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>7.80</td>
<td>8.14</td>
<td>4.4%</td>
</tr>
<tr>
<td>2020</td>
<td>8.74</td>
<td>9.96</td>
<td>13.9%</td>
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<tr>
<td>2025</td>
<td>8.67</td>
<td>9.76</td>
<td>12.5%</td>
</tr>
</tbody>
</table>
Caveats

- Uncertainty in EPA rules
- Impact on transmission investment
- Fuel switching option
- Accuracy of price elasticity modeled
- Macroeconomic effects
- Technological innovations
- Compliance strategies
- Engineering considerations
- Materials and labor premiums
- Efficiency and outage impacts
Further Information

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