Indiana Energy Status: A View from 30,000 Feet

Presented by:  
Douglas J. Gotham  
State Utility Forecasting Group

Presented to:  
Indiana Conference on Energy Management

October 11, 2006
The View from 30,000 Feet

Source: U. S. Geological Survey
Topics

• Current SUFG Forecast (2005)
  – Indiana electricity requirements
  – Indiana peak demand projections
  – Indiana resource requirements
  – Alternative scenarios
  – Indiana real price projections
• Growth in Electricity Use
• Reserves
• Potential Resources
• Natural Gas
Indiana Electricity Requirements

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

- Peak demand is net of DSM and interruptible loads
- Growth rates
  - 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

• This forecast identifies a relatively balanced need for the three types of resources (peaking, cycling and baseload) in the short term

* Projected Demand includes 15% Reserve margin
# Indiana Resource Requirements

<table>
<thead>
<tr>
<th>Year</th>
<th>Uncontrolled Peak Demand</th>
<th>Interruptible</th>
<th>Net Peak Demand</th>
<th>Existing/Approved Capacity</th>
<th>Incremental Change in Capacity</th>
<th>Projected Additional Resource Requirements</th>
<th>Total Resources</th>
<th>Reserve Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>19917</td>
<td>750</td>
<td>19167</td>
<td>21058</td>
<td>1219</td>
<td>240 410 320 970</td>
<td>22028</td>
<td>16</td>
</tr>
<tr>
<td>2004</td>
<td>20351</td>
<td>761</td>
<td>19659</td>
<td>21355</td>
<td>296</td>
<td>410 470 450 1330</td>
<td>22665</td>
<td>16</td>
</tr>
<tr>
<td>2005</td>
<td>20833</td>
<td>781</td>
<td>20062</td>
<td>21345</td>
<td>-10</td>
<td>490 670 600 1760</td>
<td>23105</td>
<td>15</td>
</tr>
<tr>
<td>2006</td>
<td>21278</td>
<td>792</td>
<td>20486</td>
<td>21273</td>
<td>-67</td>
<td>620 860 750 2230</td>
<td>23508</td>
<td>15</td>
</tr>
<tr>
<td>2007</td>
<td>21624</td>
<td>804</td>
<td>20820</td>
<td>21493</td>
<td>215</td>
<td>760 930 670 2360</td>
<td>23853</td>
<td>15</td>
</tr>
<tr>
<td>2008</td>
<td>22018</td>
<td>817</td>
<td>21201</td>
<td>21493</td>
<td>0</td>
<td>890 1050 880 2620</td>
<td>24313</td>
<td>15</td>
</tr>
<tr>
<td>2009</td>
<td>22541</td>
<td>829</td>
<td>21712</td>
<td>21834</td>
<td>441</td>
<td>860 1170 940 2970</td>
<td>24904</td>
<td>15</td>
</tr>
<tr>
<td>2010</td>
<td>23006</td>
<td>839</td>
<td>22167</td>
<td>21869</td>
<td>-65</td>
<td>930 1190 1420 3540</td>
<td>25409</td>
<td>15</td>
</tr>
<tr>
<td>2011</td>
<td>23474</td>
<td>853</td>
<td>22620</td>
<td>21804</td>
<td>-65</td>
<td>1060 1250 1810 4120</td>
<td>25924</td>
<td>15</td>
</tr>
<tr>
<td>2012</td>
<td>23934</td>
<td>863</td>
<td>23121</td>
<td>21704</td>
<td>-100</td>
<td>1300 1340 2140 4780</td>
<td>26484</td>
<td>15</td>
</tr>
<tr>
<td>2013</td>
<td>24543</td>
<td>876</td>
<td>23666</td>
<td>21704</td>
<td>0</td>
<td>1460 1430 2490 5380</td>
<td>27084</td>
<td>15</td>
</tr>
<tr>
<td>2014</td>
<td>25096</td>
<td>890</td>
<td>24206</td>
<td>21601</td>
<td>-103</td>
<td>1730 1520 2640 6090</td>
<td>27691</td>
<td>15</td>
</tr>
<tr>
<td>2015</td>
<td>25694</td>
<td>903</td>
<td>24780</td>
<td>21601</td>
<td>0</td>
<td>1910 1610 3220 6740</td>
<td>28341</td>
<td>15</td>
</tr>
<tr>
<td>2016</td>
<td>26276</td>
<td>913</td>
<td>25362</td>
<td>21260</td>
<td>-341</td>
<td>2150 1860 3600 7710</td>
<td>29070</td>
<td>15</td>
</tr>
<tr>
<td>2017</td>
<td>26882</td>
<td>928</td>
<td>25864</td>
<td>21206</td>
<td>0</td>
<td>2330 2030 4030 8390</td>
<td>29650</td>
<td>15</td>
</tr>
<tr>
<td>2018</td>
<td>27512</td>
<td>938</td>
<td>26574</td>
<td>21260</td>
<td>0</td>
<td>2430 2110 4520 9060</td>
<td>30320</td>
<td>15</td>
</tr>
<tr>
<td>2019</td>
<td>28153</td>
<td>952</td>
<td>27211</td>
<td>21097</td>
<td>-163</td>
<td>2730 2180 5030 9640</td>
<td>31037</td>
<td>16</td>
</tr>
<tr>
<td>2020</td>
<td>28819</td>
<td>963</td>
<td>27855</td>
<td>21097</td>
<td>0</td>
<td>2860 2250 5540 10650</td>
<td>31747</td>
<td>16</td>
</tr>
<tr>
<td>2021</td>
<td>29503</td>
<td>977</td>
<td>28526</td>
<td>21044</td>
<td>-53</td>
<td>3090 2340 6030 11460</td>
<td>32504</td>
<td>15</td>
</tr>
<tr>
<td>2022</td>
<td>30185</td>
<td>989</td>
<td>29196</td>
<td>21044</td>
<td>0</td>
<td>3240 2420 6560 12220</td>
<td>33264</td>
<td>16</td>
</tr>
</tbody>
</table>

1. Uncontrolled peak demand is the peak demand 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.
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
Indiana Real Price Projections (2003 $)

- Effect of inflation removed
- 2005 forecast did not include cost of CAIR and mercury
  - CAIR (5 to 8.5 percent price increase over 2005 base case)
  - Mercury (6 to 15 percent price increase over 2005 base case)
- Does include the cost of new resources
Growth in Electricity Use

- Historically, electricity use has grown much faster than population
- Per capita sales growth
  - 1960 to 2004: 3.4%
  - 1984 to 2004: 2.1%
- Growth occurs in all 3 customer sectors

Sources: U. S. Census Bureau and Energy Information Administration
Economic Development

• Recent announcements
  – Toyota adds production at Lafayette SIA plant
  – New Honda plant near Greensburg
  – Several new ethanol production facilities

• Suppliers will increase production and the suppliers’ suppliers will increase production
  – e.g., an increase in automobiles may result in an increase in steel which may result in an increase in air separation
Economic Development, cont.

• The employees of these facilities will need places to live
  – Increase in consumption of residential electricity
• A number of these jobs are relatively high paying
  – Larger houses with more gadgets that consume energy
• The employees of these facilities will need places to shop, be entertained, and have their children educated
  – Increase in consumption of commercial electricity
Declining Reserve Margins

Source: Megawatt Daily, January 3, 2006
Impact of Reserves

• High reserves mean high electricity rates
  – See Indiana, circa 1985

• Low reserves mean greater risk
  – Subject to the whims of a volatile wholesale market
    • day ahead prices roughly tripled during the early August heat wave
  – Greater reliance on natural gas-fired generators
    • natural gas prices also went up during the heat wave
  – Reliability
Potential Resources

• Merchant facilities
  – Approximately 3,000 MW of natural gas-fired capacity, some of which is committed to Indiana utilities, some may be committed out-of-state
  – One new merchant plant petition to IURC since 2001 (Orion wind farm, 2006)

• Out-of-state
  – Declining regional reserve margins indicate that there is not a substantial amount of excess capacity in nearby states
  – Michigan PSC released a report last year indicating the state would need additional baseload capacity
Potential Resources, cont.

• New construction
  – Substantial time needed for environmental/regulatory permitting, engineering, and construction work

• Energy efficiency, conservation, DSM
  – Utility efforts over the past few years have focused on load shifting programs rather than efficiency gains (interruptible loads, direct load control, voluntary conservation calls)
Fuel Sources for New Resources

- Coal
  - Environmental permitting, construction time

- Natural gas
  - Fuel cost

- Nuclear
  - Permitting, public opposition, construction time

- Wind
  - Limited resource, intermittent supply

- Solar
  - Limited resource, cost, intermittent supply

- Biogas
  - Limited resource
Natural Gas Prices

- Natural gas prices have increased dramatically and become more volatile over the past decade.

Source: Energy Information Administration
Natural Gas

- Indiana has little direct control of natural gas prices
- In 2004, according to EIA (billion cubic feet)
  - Indiana production 3
  - Indiana imports 2,402
  - Indiana exports 1,889
- Options for reducing exposure to high prices are limited
  - futures prices are high
  - increase production (syngas, biogas)
  - reduce consumption (efficiency)