INDIANA UTILITY DEMAND & RATES FORECAST

Presented to:
Solar Energy Applications for Agriculture Workshop
Rochester, IN

Presented by:
Douglas Gotham

November 12, 2014
Forecast Highlights

- 2013 forecast growth is lower than in previous forecasts due to increases in efficiency
  - Higher prices reduce customer usage
  - Utility DSM
  - Efficiency standards

- Resource requirements are lower than in previous forecasts
  - Additional resources needed by 2016
Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Growth rates
  - 2013 forecast: 0.74%
  - 2011 forecast: 1.30%
  - 2009 forecast: 1.55%
Energy Efficiency Programs

- SEA 340 will affect the forecast
- If the utility DSM programs are added back in, energy grows at 1.17% per year
- This does not include the impact of prices changing
Indiana Peak Demand Requirements

- Peak demand is net of DSM (Energy Efficiency and Demand Response loads)

- Growth rates
  - 2013 forecast: 0.90%
  - 2011 forecast: 1.28%
  - 2009 forecast: 1.61%
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.
<table>
<thead>
<tr>
<th>Year</th>
<th>Uncontrolled Peak Demand</th>
<th>Demand Response</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>2011</td>
<td>23,326</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>19,888</td>
<td>1,205</td>
<td>18,683</td>
<td>23,406</td>
<td>80</td>
<td>20</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>2013</td>
<td>19,777</td>
<td>1,296</td>
<td>18,481</td>
<td>23,899</td>
<td>493</td>
<td>10</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>2014</td>
<td>19,718</td>
<td>1,329</td>
<td>18,389</td>
<td>23,781</td>
<td>-119</td>
<td>10</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>2015</td>
<td>19,769</td>
<td>1,357</td>
<td>18,412</td>
<td>22,034</td>
<td>-1747</td>
<td>20</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>2016</td>
<td>19,823</td>
<td>1,371</td>
<td>18,452</td>
<td>21,512</td>
<td>-523</td>
<td>130</td>
<td>160</td>
<td>120</td>
</tr>
<tr>
<td>2017</td>
<td>20,011</td>
<td>1,381</td>
<td>18,631</td>
<td>21,512</td>
<td>0</td>
<td>200</td>
<td>220</td>
<td>210</td>
</tr>
<tr>
<td>2018</td>
<td>20,208</td>
<td>1,390</td>
<td>18,818</td>
<td>21,568</td>
<td>56</td>
<td>190</td>
<td>240</td>
<td>460</td>
</tr>
<tr>
<td>2019</td>
<td>20,375</td>
<td>1,400</td>
<td>18,975</td>
<td>21,615</td>
<td>47</td>
<td>230</td>
<td>260</td>
<td>570</td>
</tr>
<tr>
<td>2020</td>
<td>20,663</td>
<td>1,407</td>
<td>19,256</td>
<td>21,590</td>
<td>-25</td>
<td>320</td>
<td>310</td>
<td>650</td>
</tr>
<tr>
<td>2021</td>
<td>20,814</td>
<td>1,414</td>
<td>19,401</td>
<td>21,569</td>
<td>-21</td>
<td>370</td>
<td>340</td>
<td>740</td>
</tr>
<tr>
<td>2022</td>
<td>20,944</td>
<td>1,416</td>
<td>19,528</td>
<td>21,619</td>
<td>50</td>
<td>390</td>
<td>360</td>
<td>790</td>
</tr>
<tr>
<td>2023</td>
<td>21,076</td>
<td>1,418</td>
<td>19,658</td>
<td>21,476</td>
<td>-143</td>
<td>480</td>
<td>420</td>
<td>920</td>
</tr>
<tr>
<td>2024</td>
<td>21,281</td>
<td>1,419</td>
<td>19,861</td>
<td>21,469</td>
<td>-7</td>
<td>510</td>
<td>480</td>
<td>1,060</td>
</tr>
<tr>
<td>2025</td>
<td>21,567</td>
<td>1,420</td>
<td>20,147</td>
<td>21,469</td>
<td>0</td>
<td>590</td>
<td>590</td>
<td>1,190</td>
</tr>
<tr>
<td>2026</td>
<td>21,896</td>
<td>1,420</td>
<td>20,476</td>
<td>21,428</td>
<td>-41</td>
<td>690</td>
<td>680</td>
<td>1,420</td>
</tr>
<tr>
<td>2027</td>
<td>22,222</td>
<td>1,420</td>
<td>20,801</td>
<td>21,400</td>
<td>-28</td>
<td>930</td>
<td>750</td>
<td>1,530</td>
</tr>
<tr>
<td>2028</td>
<td>22,520</td>
<td>1,421</td>
<td>21,099</td>
<td>21,381</td>
<td>-19</td>
<td>1,040</td>
<td>860</td>
<td>1,670</td>
</tr>
<tr>
<td>2029</td>
<td>22,833</td>
<td>1,421</td>
<td>21,413</td>
<td>21,108</td>
<td>-273</td>
<td>1,160</td>
<td>970</td>
<td>2,090</td>
</tr>
<tr>
<td>2030</td>
<td>23,210</td>
<td>1,421</td>
<td>21,790</td>
<td>20,093</td>
<td>-16</td>
<td>1,280</td>
<td>1,100</td>
<td>2,300</td>
</tr>
<tr>
<td>2031</td>
<td>23,558</td>
<td>1,421</td>
<td>22,138</td>
<td>21,085</td>
<td>-7</td>
<td>1,360</td>
<td>1,200</td>
<td>2,520</td>
</tr>
</tbody>
</table>

1. Uncontrolled peak demand is the peak demand prior any load reduction from demand response programs being called upon.
2. Demand response is all the measures designed to shift load away from peak demand periods. These include interruptible and direct load control programs affecting peak demand.
3. Net peak demand is the peak demand after load reductions from demand response programs are taken into account.
4. Existing/approved capacity includes installed capacity plus approved new capacity plus firm purchases minus firm sales.
5. 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.
6. Projected additional resource requirements is the cumulative amount of additional resources needed to meet future requirements.
7. Total resource requirements are the total statewide resources required including existing/approved capacity and projected additional resource requirements.
8. Resources may be required by individual utilities even if the state as a whole meets or exceeds the statewide reserve margin. Individual utility reserve margins are not allowed to fall below 6 percent.
Indiana Real Price Projections (2011 $)

- Effect of inflation removed
- Includes the cost of new resources
- Includes expected cost of finalized EPA rules
  - MATS
- Non-finalized rules are not included
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 Trends (Annual Percent Change)

- Households
- Electricity Rates
- Income
- Electricity Sales

1965-1974: 2.0%
1974-1984: 4.7%
1984-1999: 3.1%
1999-2005: 1.2%
2005-2011: 0.1%
Residential Drivers

- Households grow at an average of 1.17 percent per year (was 1.00 percent in 2011 forecast)
- Real personal income grows at an average rate of 2.73 percent per year (was 2.80 percent in 2011 forecast)
- Real electric rates increase at an average of 1.34 percent per year (increase occurs in first ten years)
Residential Electricity Sales

• Estimated from:
  – demographics
  – households
  – energy prices

• Growth rates
  – 2013 forecast: 0.37%
  – 2011 forecast: 0.71%
  – 2009 forecast: 1.75%
### Commercial Trends (Annual Percent Change)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Rates</td>
<td>-3.8</td>
<td>1.3</td>
<td>-2.9</td>
<td>-2.2</td>
<td>-2.3</td>
</tr>
<tr>
<td>Energy-weighted Floorspace</td>
<td>4.3</td>
<td>2.9</td>
<td>3.1</td>
<td>1.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Intensity</td>
<td>4.7</td>
<td>2.5</td>
<td>2.4</td>
<td>2.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Electric Sales</td>
<td>9.0</td>
<td>1.3</td>
<td>3.3</td>
<td>1.5</td>
<td>0</td>
</tr>
</tbody>
</table>

Legend:
- **Electric Rates**
- **Energy-weighted Floorspace**
- **Intensity**
- **Electric Sales**
Commercial Drivers

- Energy-weighted floor space grows at an average rate of 0.90 percent per year (was 1.18 percent in 2011 forecast)
- Non-manufacturing employment grows at an average rate of 0.97 percent per year (was 1.31 percent in 2011 forecast)
- Real electric rates increase at an average of 1.43 percent per year (increase occurs in first ten years)
Commercial Electricity Sales

- Estimated from:
  - floor space inventory
  - end use intensity
  - employment
  - energy prices

- Growth rates
  - 2013 forecast: 0.33%
  - 2011 forecast: 0.89%
  - 2009 forecast: 1.18%
Industrial Trends (Annual Percent Change)

1965-1974: -2.8, 3.3, 7.5
1974-1984: -2.2, 3.8, 0.9
1984-1999: -3.1, 4.3, 3.1
1999-2005: -2.2, 2.2, 0.3
2005-2011: 3.5, 0.2, -0.3

Legend:
- Electric Rates
- Real Gross State Product Manufacturing
- Electric Sales
Industrial Drivers

• Manufacturing GSP grows at an average rate of 2.86 percent per year (was 3.95 percent in 2011 forecast)
• Real electric rates increase at an average of 1.56 percent per year (increase occurs in first ten years)
<table>
<thead>
<tr>
<th>SIC</th>
<th>Name</th>
<th>Current Share of GSP</th>
<th>Current Share of Electricity Sales</th>
<th>Current Intensity</th>
<th>Forecast Growth in GSP Originating by Sector</th>
<th>Forecast Growth in Electricity Intensity by Sector</th>
<th>Forecast Growth in Electricity Sales by Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Food &amp; Kindred Products</td>
<td>4.73</td>
<td>5.83</td>
<td>0.58</td>
<td>3.40</td>
<td>-1.16</td>
<td>2.24</td>
</tr>
<tr>
<td>24</td>
<td>Lumber &amp; Wood Products</td>
<td>2.63</td>
<td>0.66</td>
<td>0.12</td>
<td>3.40</td>
<td>-0.94</td>
<td>2.45</td>
</tr>
<tr>
<td>25</td>
<td>Furniture &amp; Fixtures</td>
<td>3.09</td>
<td>0.47</td>
<td>0.07</td>
<td>1.57</td>
<td>-1.09</td>
<td>0.49</td>
</tr>
<tr>
<td>26</td>
<td>Paper &amp; Allied Products</td>
<td>1.83</td>
<td>2.94</td>
<td>0.76</td>
<td>3.40</td>
<td>-0.88</td>
<td>2.52</td>
</tr>
<tr>
<td>27</td>
<td>Printing &amp; Publishing</td>
<td>3.44</td>
<td>1.24</td>
<td>0.17</td>
<td>3.40</td>
<td>-2.19</td>
<td>1.21</td>
</tr>
<tr>
<td>28</td>
<td>Chemicals &amp; Allied Products</td>
<td>16.41</td>
<td>19.98</td>
<td>0.58</td>
<td>3.40</td>
<td>-1.59</td>
<td>1.81</td>
</tr>
<tr>
<td>30</td>
<td>Rubber &amp; Plastic Products</td>
<td>3.66</td>
<td>5.76</td>
<td>0.74</td>
<td>2.85</td>
<td>-1.03</td>
<td>1.82</td>
</tr>
<tr>
<td>32</td>
<td>Stone, Clay, &amp; Glass Products</td>
<td>3.13</td>
<td>5.08</td>
<td>0.77</td>
<td>1.57</td>
<td>-0.77</td>
<td>0.80</td>
</tr>
<tr>
<td>33</td>
<td>Primary Metal Products</td>
<td>7.59</td>
<td>27.01</td>
<td>1.68</td>
<td>0.76</td>
<td>0.59</td>
<td>1.35</td>
</tr>
<tr>
<td>34</td>
<td>Fabricated Metal Products</td>
<td>5.95</td>
<td>6.39</td>
<td>0.51</td>
<td>3.20</td>
<td>-1.27</td>
<td>1.92</td>
</tr>
<tr>
<td>35</td>
<td>Industrial Machinery &amp; Equip.</td>
<td>10.42</td>
<td>4.62</td>
<td>0.21</td>
<td>2.74</td>
<td>-1.20</td>
<td>1.54</td>
</tr>
<tr>
<td>36</td>
<td>Electronic/Electric Equipment</td>
<td>5.18</td>
<td>5.87</td>
<td>0.54</td>
<td>0.71</td>
<td>-0.62</td>
<td>0.09</td>
</tr>
<tr>
<td>37</td>
<td>Transportation Equipment</td>
<td>20.01</td>
<td>8.97</td>
<td>0.21</td>
<td>3.61</td>
<td>-1.07</td>
<td>2.54</td>
</tr>
<tr>
<td>38</td>
<td>Instruments/Related Products</td>
<td>4.20</td>
<td>1.01</td>
<td>0.11</td>
<td>1.57</td>
<td>-1.86</td>
<td>-0.29</td>
</tr>
<tr>
<td>39</td>
<td>Miscellaneous Manufacturing</td>
<td>2.27</td>
<td>1.20</td>
<td>0.25</td>
<td>1.57</td>
<td>-3.32</td>
<td>-1.75</td>
</tr>
<tr>
<td></td>
<td><strong>Total Manufacturing</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
<td><strong>0.47</strong></td>
<td><strong>2.86</strong></td>
<td><strong>-1.20</strong></td>
<td><strong>1.66</strong></td>
</tr>
</tbody>
</table>
Industrial Electricity Sales

- Estimated from:
  - GSP by industry
  - energy prices
- Growth rates
  - 2013 forecast: 1.29%
  - 2011 forecast: 2.11%
  - 2009 forecast: 1.63%
Further Information

• Doug Gotham
  – 765-494-0851
  – gotham@purdue.edu

• www.purdue.edu/discoverypark/energy/SUFG/