Regional Electricity Forecasting

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• Began developing its energy forecasting models 25 years ago
• Released its 12\textsuperscript{th} set of Indiana electricity projections in December
• Does not have a forecasting model for Michigan or the region
Energy information Administration (EIA)

- EIA uses its National Energy Modeling System to produce long-term forecasts on an annual basis.
- Finest level of detail is the census region.
- East North Central region
  - IL, IN, MI, OH, WI
EIA 2010 Annual Outlook

• Electricity consumption forecast for the period 2008-2035 (average compound growth rates) for East North Central region
  – residential 0.49%
  – commercial 1.20%
  – industrial 0.44%
  – all sectors 0.74%
Questions

• How much variation might we expect between individual states in the region?
• What factors are likely to cause those variations?
• How does this forecast compare to recent growth in electricity usage?
Typical Drivers of Electricity Usage

• Residential
  – demographics, personal income, energy prices

• Commercial
  – floor space, employment, demographics, energy prices

• Industrial
  – manufacturing output, employment, energy prices
Data Sources

• Bureau of Economic Analysis (Commerce)
  – personal income, gross domestic product
• Bureau of Labor Statistics (Labor)
  – employment
• Bureau of the Census (Commerce)
  – population
• Energy Information Administration (Energy)
  – electricity prices, electricity sales
Data Presentation

- Historical trends are normalized to 2000 values to show how each state has changed over time
- Most recent year available varies depending on data source
Total Real Personal Income

- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin
Commercial Employment

- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin

Years: 2000 to 2008
Manufacturing Employment

Graph showing the trend in manufacturing employment from 2000 to 2008 for Illinois, Indiana, Michigan, Ohio, and Wisconsin.
Real Gross Domestic Product
Real Electricity Prices

- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin
2008 All Sector Electricity Retail Price (cents/kWh)

MI 8.94, rank #28
EIA Sales Data Caveats

• EIA reports historical sales but forecasts consumption
  – self and co-generation will show up in consumption but not in sales
• EIA reclassified its “other” category in 2003, moving the energy into commercial, industrial, and transportation
• There are questionable data points
Residential Electricity Sales

- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin

Year: 2000 to 2008
2008 Residential Electricity Sales (million MWh)
Commercial Electricity Sales

- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin

Yearly sales data from 2000 to 2008.
2008 Commercial Electricity Sales (million MWh)
Industrial Electricity Sales

- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin
2008 Industrial Electricity Sales (million MWh)
All Sector Electricity Sales

![Graph showing electricity sales for various states over years. The graph includes lines for Illinois, Indiana, Michigan, and Wisconsin, with a range from 0.7 to 1.3. The x-axis represents years from 2000 to 2008.](image-url)
2008 Total Electricity Sales (millon MWh)
## Electricity Sales 2000-2008

<table>
<thead>
<tr>
<th>Region</th>
<th>RES</th>
<th>COM</th>
<th>IND</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>1.93%</td>
<td>2.10%</td>
<td>1.33%</td>
<td>0.89%</td>
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<tr>
<td>Indiana</td>
<td>2.16%</td>
<td>2.31%</td>
<td>0.10%</td>
<td>1.13%</td>
</tr>
<tr>
<td>Michigan</td>
<td>1.39%</td>
<td>1.04%</td>
<td>-1.69%</td>
<td>0.12%</td>
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<tr>
<td>Ohio</td>
<td>1.75%</td>
<td>1.88%</td>
<td>-2.87%</td>
<td>-0.45%</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>1.23%</td>
<td>3.15%</td>
<td>-0.73%</td>
<td>0.92%</td>
</tr>
<tr>
<td>Region</td>
<td>1.74%</td>
<td>1.97%</td>
<td>-0.95%</td>
<td>0.42%</td>
</tr>
</tbody>
</table>

- Average compound growth rates
- Reclassification of “other” sales inflates commercial & industrial growth rates somewhat but does not affect residential & total (Illinois is most significantly affected)
- Development of new self and co-generation deflates industrial & total growth rates (Ohio?)
## Comparison of History to Forecast for the Region

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<thead>
<tr>
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<tbody>
<tr>
<td>- residential</td>
<td>1.74%</td>
<td>- residential</td>
</tr>
<tr>
<td>- commercial</td>
<td>1.97%</td>
<td>- commercial</td>
</tr>
<tr>
<td>- industrial</td>
<td>-0.95%</td>
<td>- industrial</td>
</tr>
<tr>
<td>- total</td>
<td>0.42%</td>
<td>- total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- residential</td>
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<tr>
<td></td>
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