The Brattle Group

The Coming Wave of Price-Based Demand Response

Presented by
Ryan Hledik

DR Expo, Santa Clara
May 22, 2008
Historically, most states have had traditional emergency-triggered DR programs

- 234 US electric utilities offer DR programs (FERC)
- DR programs exist in 42 of 50 states (DOE)
- Most of these are traditional emergency-triggered programs

What about price-based DR?
The price-based DR wave is on the horizon...

**Indicators of the wave**

- Increased investment in AMI
- New pricing experiments across the country
- More affordable enabling technologies
- New policy action

**What does this mean for customers?**

**And can they benefit from it?**
Investment in AMI has grown in recent years

AMI will enable new forms of pricing for the mass market

Source: UtiliPoint International, 2007 FERC Assessment of DR & Advanced Metering
Several new pricing experiments have been conducted across North America since 2000

- These experimental pilots have primarily focused on residential and small C&I segments
- We are currently working with utilities in several other states to examine pricing options and to implement and evaluate pilots
  - New England, Mid-Atlantic, Midwest, Southwest, Pacific Northwest
Simultaneously, the cost of DR-enabling technologies is coming down

- **AMI**
  - Cost effective on basis of operational benefits + avoided costs
  - Sometimes operational benefits alone cover costs
- **In-home displays**
  - Real-time electricity consumption information
- **Automated DR**
  - Gateway systems to automate response
- **Programmable Communicating Thermostats (PCTs)**
Policy action could mandate demand response in some regions

The Potential Impact of Load Management Standards in California

The California Energy Commission’s current proceeding on load management standards is one such example
This would mean more options for the customer.
We have simulated the potential impact of dynamic pricing

• Simulations were based on estimates of customer response developed during the California Statewide Pricing Pilot

<table>
<thead>
<tr>
<th>Rate</th>
<th>kWh/hr</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTP</td>
<td>-1.40</td>
<td>-4.5%</td>
</tr>
<tr>
<td>TOU</td>
<td>-1.78</td>
<td>-5.9%</td>
</tr>
<tr>
<td>CPP/TOU</td>
<td>-3.00</td>
<td>-9.9%</td>
</tr>
</tbody>
</table>

The average medium-sized commercial customer could produce a peak reduction of 5% to 10% with dynamic pricing
Load shifting would lead to modest bill savings for the average medium-sized commercial customer.

<table>
<thead>
<tr>
<th>Rate</th>
<th>$/Month</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTP</td>
<td>-7.03</td>
<td>-0.4%</td>
</tr>
<tr>
<td>TOU</td>
<td>-49.05</td>
<td>-1.9%</td>
</tr>
<tr>
<td>CPP/TOU</td>
<td>-57.40</td>
<td>-2.2%</td>
</tr>
</tbody>
</table>

Bill impacts would be larger for “peakier” or “flatter” customers.
Bill impacts for a sample of large commercial customers (> 500 kW) ranged from -7% to +6%.

Bill Impacts for a Sample of Large Commercial Customers

Notes:
RTP bill change is annual average. CPP bill change is summer only.
Impacts are approximate and are for the period from 11/2006 through 10/2007.
Catching the wave…

• Customers can respond to dynamic pricing
  ► Many don’t respond at all
  ► Some respond a little
  ► Some respond a lot

• Enabling technology will facilitate DR
  ► AutoDR, PCTs, …
  ► More load shifting leads to larger customer bill reductions
  ► Greater peak reductions lead to larger utility cost savings
  ► Responsive demand improves grid reliability