A Discussion of Time of Use Rate Designs

Presentation to the U.S. Climate Alliance

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Regulatory Assistance Project

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Beneficial Electrification (BE) - Three Conditions

1. Saves Customers Money Over Long-Term
2. Reduces Environmental Impacts
3. Enables Better Grid Management
Enables Better Grid Management
The Key EV Opportunity: Managing Load

EVs can be a benefit... or a problem for the electric grid.

Drawing high amounts of power for short periods of time.
Managing Load – Maryland PSC

“EV load must be managed effectively, otherwise all ratepayers will share in the expensive costs of upgrading and maintaining the distribution system to accommodate increased load on the system.”

“Pairing EV adoption and EV charging with intelligent rate design can improve electric distribution system utilization and create downward pressure on rates through load management and system peak reduction.”

Avoid High-Cost Hours

- Top 1% of hours = 9% of total spending
- Top 10% of hours = 26% of total spending

Source: Rhode Island Power Sector Transformation, Phase One Report to Governor Gina M. Raimondo (November 2017)
Types of TOU Rates Illustrations

- Two-Period Rates
- (Seasonal) Three-Period Rates
- Critical Peak Pricing (CPP)
- Real-Time Pricing (RTP)
- Alternative: Peak-Time Rebates (PTR)
Example Two-Period Rate
Jacksonville, FL

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Charge</strong></td>
<td>$/month</td>
<td>$7.34</td>
<td>$7.34</td>
</tr>
<tr>
<td><strong>Energy Charge</strong></td>
<td>$/kWh</td>
<td>$0.1072</td>
<td>$0.2156</td>
</tr>
<tr>
<td>On-Peak</td>
<td></td>
<td>$0.1072</td>
<td></td>
</tr>
<tr>
<td>Off-Peak</td>
<td></td>
<td>$0.1072</td>
<td>$0.0628</td>
</tr>
</tbody>
</table>
## Example Seasonal Three-Period Rate
### Southern California Edison

<table>
<thead>
<tr>
<th></th>
<th>Summer</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Charge</strong></td>
<td>$0.94</td>
<td>$0.94</td>
</tr>
<tr>
<td><strong>On-Peak</strong></td>
<td>$0.436</td>
<td>$0.336</td>
</tr>
<tr>
<td><strong>Shoulder</strong></td>
<td>$0.286</td>
<td>$0.282</td>
</tr>
<tr>
<td><strong>Off-Peak</strong></td>
<td>$0.131</td>
<td>$0.135</td>
</tr>
</tbody>
</table>
## Example Critical Peak Rate

**Oklahoma Gas and Electric**

<table>
<thead>
<tr>
<th></th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Charge</strong></td>
<td>$13.00</td>
</tr>
<tr>
<td><strong>Off-Peak</strong></td>
<td>$0.044</td>
</tr>
<tr>
<td><strong>On-Peak</strong></td>
<td>$0.160</td>
</tr>
<tr>
<td><strong>Critical Peak</strong></td>
<td>$0.400</td>
</tr>
</tbody>
</table>

**Critical:** Maximum 80 hours per year

**On-Peak:** 2 - 7 PM Monday - Friday
Real-Time Pricing - Commonwealth Edison

- Customer Charge
- Distribution Charge
- “Personal Capacity Charge”
- Hourly Energy Charge
## Baltimore Gas and Electric Peak Time Rebate

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Charge</td>
<td>$ 7.90</td>
</tr>
<tr>
<td>Distribution Charge</td>
<td>$ 0.035</td>
</tr>
<tr>
<td>Default Supply</td>
<td>$ 0.092</td>
</tr>
<tr>
<td>PTR Credit</td>
<td>$ (1.25)</td>
</tr>
</tbody>
</table>
Recap: Why consider TOU?

• Managed load away from high-cost hours toward low-cost hours.
• Peak load (and cost) reduction
  • Improved reliability
• Reduced emissions from power production
Peak Load Reduction

![Graph showing the relationship between Pilot Impact and Price Ratio](image)

- **Pilot Impact versus Price Ratio (without Enabling Technology)**
- **Best-Fit Curve**

- Peak to Off-Peak Price Ratio vs. Peak Reduction
TOU Rates

![Graph showing average peak reduction from time-varying rate pilots]

The graph illustrates the average peak reduction from various time-of-use (TOU) and real-time pricing (RTP) rate pilots. The x-axis represents different pricing pilots (TOU, TOU w/ Tech, PTR, PTR w/ Tech, CPP, CPP w/ Tech, RTP, RTP w/ Tech), and the y-axis shows the peak reduction percentage from 0% to 60%. The graph visually compares the effectiveness of different rate structures in reducing peak demand.
Technology Can Help
Technology Can Help
Expected Results

• Beneficial shift of flexible load
• Value proposition:
  • Load management technology
  • Smart charging for EVs
  • Consumer engagement
Electrification: Some RAP Resources

- Roadmap for Electric Transportation
- Taking First Steps: Insights for States Preparing for Electric Transportation
- Beneficial Electrification: Ensuring Electrification in the Public Interest
- Beneficial Electrification of Transportation
- Getting From Here to There: Regulatory Considerations for Transportation Electrification
- Blog post: We All Wish We Were More Flexible: Electrification Load as a Grid Flexibility Resource
Thank you for your attention
What does this rate design tell you?

$1.50  $2.25  $2.75
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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