Topics on Electric Utility Regulation: A Workshop

New Jersey Board of Public Utilities

Presented by Richard Sedano

December 3 and 4, 2015
Introducing RAP and Rich

• RAP is a non-profit organization providing technical and educational assistance to government officials on energy and environmental issues. RAP staff have extensive utility regulatory experience. RAP technical assistance to states is supported by US DOE, US EPA and foundations.
  – Richard Sedano directs RAP’s US Program. He was commissioner of the Vermont Department of Public Service from 1991-2001 and is an engineer.
  – David Littell is a principal in RAP’s US Program. He was a Maine PUC Commissioner and Environment Commissioner and is an attorney.
Workshop Topics

- Rate Design Opportunities
  - Presentation and discussion
- Clean Energy Administration
  - Presentation and discussion
- Technology Deployment and Data Management and Access
  - Presentation and discussion
- Utility Performance and Redefining the Utility Role
  - Presentation and discussion
Technology Deployment and Data Management and Access Segment
What are the Goals for Technology and Data?

• Lower prices and bills?
• More customer choice and satisfaction?
• Higher system reliability?
• More resiliency?
Better Load Data is Enabling Traditional Utility Planning to Meet Peak Demands

Source: Integral Analytics
What Data and for What Purpose?

- Adapt to new technologies or facilitate change?
- Traditional utility model to build grid and generation to meet projected customer demands?
- Empower consumers?
- How can data reduce grid costs?
Grid (or Utility)-Centered Data

1. **Distribution infrastructure data**, particularly data pertaining to distribution feeder characteristics.

2. **Transmission infrastructure data**, including from utilities, regulatory agencies, and grid operators, to identify infrastructure and resource needs.

3. **Aggregated consumer behavior data**, including real-time information on adjustments and devices in the home, to improve the implementation of ratepayer-funded efficiency programs.

4. **Aggregated customer energy data**, including data from multiple customers in key geographic or customer areas to help target energy efficiency policies and customer acquisition and service efforts.

Customer-Centered Data

1. **Utility meter data**, at intervals of _minutes_ or hourly levels going back _months_, to allow to verify energy savings after an efficiency measure has been completed.

2. **Energy audit data** generated by auditors, ESCOs, others who assessed the on-site assets of each building and its energy efficiency potential.

3. “**Internet**” data from internet-enabled home devices, such as high-tech “smart” thermostats and appliances, which can help a customer to manage energy usage based on real-time patterns, energy pricing, and needs.

4. **Utility tariff data**, which separate a customer’s charges into fixed charges, variable charges, and taxes, in a computer-readable format allow customers and third parties to access and analyze costs and benefits for various measures without the cost of manually decrypting the tariffs.

5. **Energy efficiency policy data** is required to determine measure-based savings based on efficiency projects.

6. **Customer segmentation for each utility across usage and zones**, would to inform third parties about market potential and lower customer acquisition costs for all sectors.

Source: *Id.*
Primary Barriers to Accessing Data

1) Lack of incentives for utilities to collect and share data;
2) Lack of funding for aggregating and making that data accessible – expense of data management and standardization;
3) Concerns about compromising customer privacy;
4) Difficulties with customer opt-in and
5) Fear of cybersecurity breaches.

Source: Id.
Form of Customer Engagement

- Passive energy efficiency?
- Intelligence efficiency? Home energy management systems?
- Some form of dynamic pricing?
- Traditional demand response construct?
- Customers as grid operations resources?
Contrasting Direct Demand Response and Dynamic Pricing

- With dynamic pricing, concerns regarding a baseline are not in play as rates are based on the price of energy and not on reductions from a baseline.
- With dynamic pricing, pricing depends entirely on customer response to a signal.
- Demand response requires the development of a baseline based on reductions in historical usage.
- Demand response customer responds in a predetermined manner so more useful to operator
Forms of Demand Response

- Demand Response consists of:
  - **Active Demand Response Programs** include load control programs operated by the utility or third party vendor in which customers respond to a specific event through agreement to have their load curtailed.
  - **Dynamic Pricing Programs** are designed to shave the system peaks through price signals to customers.
Is Data for More Cost-Effective Demand-Side Management?

Demand – Side Management

- Energy Efficiency
  - Utility Administered
  - Third-Party Administrator
- Demand Response
  - Active Demand Response
  - Dynamic Pricing
- Distributed Generation
  - Customer Renewables
  - Combined Heat & Power
  - Others
Contrasting Direct Demand Response and Dynamic Pricing

Consider Technology/Metering Needs:

• Some dynamic pricing can be accomplished without AMI, while others will require it.

• Some simple load control programs where the Company is controlling the customer meter can be accomplished with traditional metering whereas two-way communication involving customer action requires AMI for other demand response programs.
Is Data for Dynamic Pricing?

• **Time of Use**: Set rates that include an off-peak, on-peak and sometimes a shoulder rate.

• **Real Time Pricing**: Rates that may vary as frequently as hourly based on a price signal that is provided to the user on an advanced or forward basis, reflecting the utility’s cost of generating and/or purchasing electricity at the wholesale level. When used, usually applies to large customers. Requires Advanced Metering Infrastructure (AMI).

• **Critical Peak Pricing**: A TOU price that has a much higher price for a limited number of peak hours. (Requires AMI)
Is Data for Dynamic Pricing?

- **Variable Peak Pricing:** A hybrid of time-of-use and real-time pricing where the different periods for pricing are defined in advance, however, the price established for the on-peak period varies by utility and market conditions. (Requires AMI)

- **Peak Time Rebates:** Where customers are compensated on an incident by incident basis for reducing their load – voluntary program, no penalty for not participating

- **Industrial Interruptible Contracts:** Customer receives a reduced rate in exchange for providing the utility the opportunity to call on the customer to reduce load during system emergencies
Is Data for Peak Load Reduction?
Contrasting Direct Demand Response and Dynamic Pricing

In determining whether to use a dynamic pricing rate design or a direct demand response program, the question is whether you want to lower the peak demand curve and shift load in which case changes are incorporated through the rate design or whether you want to create a product that can be used to reduce demand when system peaks are getting too high.
Contrasting Direct Demand Response and Dynamic Pricing

- **Dynamic pricing** can result in a steady fairly reliable reduction in peak demand, thereby altering the daily load curve, but it cannot impact the need to reduce demand as a result of a specific event.

- **Active Load Control** can be employed to respond to specific emergency events to maintain reliability.
Enabling Consumer Technology For CPP and RTP

- Installation of energy management devices that automatically adjust energy use when a price signal is received.
  - Air conditioning
  - Process and water heat
  - Cold storage refrigeration
  - Eventually, minor loads like refrigerators, freezers, and laundry equipment
Enabling Technology Improves Price Response
Contrasting Direct Demand Response and Dynamic Pricing

• Dynamic Pricing established through ratemaking either in a regulatory setting or an offering by a competitive supplier. (Here there are issues of whether the LDC has appropriate metering and billing technology to accommodate).

• Demand Response is set through the market price in most cases (exception - industrial curtailment contracts that may be Commission-approved).
Boothbay Pilot

Radial nature of electric service and local distribution circuits on the Boothbay peninsula defines the electrical region for the Pilot Project – Total Peak load – Approx. 30 MW.
# Boothbay Maine NTA Pilot Resource Mix

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<th>RFP I</th>
<th>RFP II</th>
<th>Totals</th>
<th>Pct.</th>
<th>Units</th>
<th>Weighted 3 Year Price</th>
<th>10 Yr. (Levelized) Price</th>
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* RFP I excludes Maine Micro Grid project; Efficiency increased to reflect EMT contract option.

Boothbay Maine NTA Pilot
Cost Comparison of NTA v. Transmission

Energy Efficiency Is the Lowest Cost Resource

Source: Lazard, 2015
Contrasting Direct Demand Response and Dynamic Pricing

- Demand reductions from Demand Response programs can be bid into the competitive market and can be used to create a source of revenue for the utility and the participating customers.
- Demand response programs can create flexibility to respond quickly to the grid system’s needs.
- Demand response that is consistently employed can reduce the need to add peaking capacity.
Contrasting Direct Demand Response and Dynamic Pricing

- Predictable reductions in peak demand from dynamic pricing tariffs can impact utility planning by reducing/deferring the need to add peaking capacity.
- Can lower system costs since the bulk of generation costs are incurred during peak hours and system built to serve peak load.
- Can eliminate interclass subsidies by pricing power more closely with actual costs.
Questions on Consumer Access

• How should customers access their data?
• Should they be able to manipulate it?
• Should they be able to authorize their agent to do the same (in order to help them decide about a PV installation or a building automation system)?
Questions on Utility Obligations?

• Should the utility make system data available that signal better or worse locations for DER deployment?
• And if so, how can the BPU and the utility work together to make that data actionable?
• What kind of information expectations for third party service providers are reasonable?
About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raponline.org

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