Dynamic Pricing: Opportunities & Challenges

Harvard Electricity Policy Group
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Commissioner
Public Service Commission of the District of Columbia
A “revolution” in electricity pricing

- Smart grid changing the way we think about electricity.
- ‘Dumb’ metering is a century-old technology
  - One price for all kWh, tallied monthly
- Dynamic pricing
  - Reflects hourly variation in value of electricity
  - Customers can save $$ during system peaks
  - Incentive for emerging technologies
- A challenging issue for regulators!
Why dynamic pricing?

- Large potential savings from “price-responsive demand”
  - Control price spikes in power markets
  - Legacy “dumb” metering technology means missed opportunities
    - Traditional retail rate designs blend costs & dampen price signals

- AMI provides new options for utilities, consumers
  - Operational & cost savings for utilities
    - Reduced metering costs
    - Improved outage management
    - Remote connect/disconnect
  - Customers empowered to manage energy bills
    - Choose between economy & comfort
    - Incentive for energy efficiency
Why dynamic pricing? (cont’d)

- New technology options for consumers
  - Smart appliances
  - PEVs
  - Solar PV generation

- Low-income customers are likely winners
  - With traditional blended rates, customers with big A/C loads may be subsidized
  - Even customers who don’t respond to dynamic prices can benefit

- Traditional rate stability has a hidden cost
  - Dynamic prices can avoid hidden “hedge premium”
PowerCentsDC™ pilot

- Tested customer response to dynamic pricing
  - ~900 residential customers selected at random
  - Three distinct dynamic pricing plans tested side by side
  - Live billing July 2008 - October 2009
  - Focus on low-income population

- Facilitated by
  - Advanced meters & two-way communications
  - Enabling technologies (smart T-stats)
  - Energy information feedback for customers

- Pilot run by non-profit w/ broad stakeholder involvement
  * Utility
  * Regulator
  * Consumer advocates
  * Labor
PowerCentsDC participant response by rate plan

- All customer segments reduced peak loads in response to price signals
  - Low-income response only slightly smaller
- Participants on all price plans responded
- Higher price differentials led to greater peak demand reductions
- Findings generally consistent with other smart metering pilots

<table>
<thead>
<tr>
<th>Price Plan</th>
<th>Summer Peak Reduction</th>
<th>Winter Peak Reduction</th>
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<tbody>
<tr>
<td>CPP</td>
<td>33%</td>
<td>13%</td>
</tr>
<tr>
<td>CPR</td>
<td>13% (n/s)</td>
<td>(n/s)</td>
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<tr>
<td>HP</td>
<td>4%</td>
<td>6%</td>
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PowerCentsDC participant response: temperature & T-stat impacts

- Customers reduced peak demand MORE at higher temperatures (~double at 97° vs 85°)
- Customers with smart thermostats had much higher peak reductions

<table>
<thead>
<tr>
<th>Rate Group</th>
<th>No Smart Thermostat</th>
<th>With Smart Thermostat</th>
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</thead>
<tbody>
<tr>
<td>R-CPP</td>
<td>29%</td>
<td>49%</td>
</tr>
<tr>
<td>R-CPR</td>
<td>11%</td>
<td>17%</td>
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<tr>
<td>AE-CPP</td>
<td>22%</td>
<td>51%</td>
</tr>
<tr>
<td>AE-CPR</td>
<td>6%</td>
<td>24%</td>
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PCDC participants liked dynamic pricing!

Would you recommend PowerCentsDC electricity pricing to your friends and family?

- Yes: 89%
- No: 11%

Which price plan did you prefer?

- PowerCentsDC Plan: 93%
- Former Pricing Plan: 7%

Overall, were you satisfied, neutral, or dissatisfied with the PowerCentsDC program?

- Satisfied: 74%
- Neutral: 20%
- Dissatisfied: 6%

PCDC Final Report available from www.powercentsdc.org
Participants speak about PCDC’s smart pricing

- [PowerCentsDC] was extremely well organized and run. Collaterals provided information that was simple, clear, and easy to understand. I can honestly say, for the first in my 45 years, that I am proud of my electric company. It was an awesome experience to participate in this project.

- I LOVED it. The program works on all levels. My monthly bill was reduced significantly.... I changed my laundry and cleaning habits to coincide with cheaper prices. I could track where and when I was "spending" too much energy or too much money for energy. I was very unhappy when the pilot ended with nothing to put in its place.... PowerCentsDC was a complete system and it really helped me. Bring it back!!!

PCDC lessons-learned videos:
- http://www.youtube.com/watch?v=vH6_pbdZ9HQ
- http://www.youtube.com/watch?v=z6alQIdkJws
Implementation of AMI & dynamic pricing in DC

- Pepco deployment of AMI underway
  - Completion scheduled for early 2012
- Customer education/engagement
- AMI cost recovery issue in rate case
- Generic proceeding exploring dynamic pricing options
  - Pricing methods: e.g. CPP, PTR, RTP
  - Mandatory vs. voluntary; opt-in vs. opt-out; transition options
  - Integration of dynamic pricing with default service procurement
  - Third party access to customer data
  - Cost & benefits of smart grid investments; performance metrics
- Regional collaboration via MADRI
Integrating dynamic pricing with wholesale markets

- PJM’s price responsive demand (PRD) initiative
  - Reduced capacity obligations for LSEs whose customers respond to retail price signals
  - Savings require AMI & dynamic retail rates that reflect wholesale prices
  - FERC filing expected Sept 2011; rules effective 2012

- Wholesale incentives for PEVs
  - Avoiding 6 p.m. peak
  - Potential compensation for storage, regulation svcs
Challenges for Utility Regulators

- Due process requirements
- Resource constraints (funding, expertise)
- Utility motivation
- Consumer resistance & political interference
  - Rate impacts
  - Suspicion of utility motives
  - Resistance to change
- Disconnect between wholesale & retail markets
- Coordination with federal policies, initiatives
- Coordination between 51 PUC jurisdictions
- Finding a path forward….
Thank you!
Richard E. (Rick) Morgan began a second four-year term on the District of Columbia Public Service Commission in July 2007. From 2007 through 2010, Commissioner Morgan served as chair of the Task Force on Climate Policy of the National Association of Regulatory Utility Commissioners (NARUC). He is a member of NARUC’s Energy Resources and Environment Committee, its Smart Grid Collaborative, and he serves on the Association’s Board of Directors. Commissioner Morgan currently co-chairs the Electricity Committee of the Mid-Atlantic Conference of Regulatory Utility Commissioners (MACRUC), chairs the Board of the Smart Meter Pilot Program, Inc. (SMPPI), which oversees a smart metering pilot program in the District of Columbia and he serves on the NARUC-FERC Collaborative on Smart Response.

Before joining the PSC as a commissioner, Mr. Morgan spent 12 years with the U.S. Environmental Protection Agency, focused on climate policy and emissions trading. Previously, Mr. Morgan spent five years on the staff of the Public Service Commission, helping develop Commission policies on energy conservation and resource planning. During his more than 40 years in the field of energy policy and utilities, Commissioner Morgan has authored numerous publications on electric power. He holds a Master of Public Policy degree from the University of Maryland and a B.A. in economics from Antioch College.