Hitting the mark on missing money: How to ensure reliability at least cost to consumers

Webinar
25 October 2016

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*Hitting the Mark on Missing Money: How to Ensure Reliability at Least Cost to Consumers*
• Lots of ways to ensure resource adequacy...
• ...but how to do so at least cost to consumers?
• Especially in the low-carbon power system?
Legacy: Typical view of “marginal cost pricing”

- Demand for reliability (reserves) ignored
- Marginal balancing costs socialized
- Prices capped below stated value to consumers of continuous service
Representative rank order of *actual* marginal costs

<table>
<thead>
<tr>
<th>System Resource</th>
<th>Full Marginal Cost (€/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation capacity</td>
<td>20-250</td>
</tr>
<tr>
<td>Imports</td>
<td>20-1,000</td>
</tr>
<tr>
<td>Secondary (operating) reserves</td>
<td>250-5,000</td>
</tr>
<tr>
<td>Emergency generation</td>
<td>500</td>
</tr>
<tr>
<td>Primary (regulation) reserves</td>
<td>500-9,000</td>
</tr>
<tr>
<td>30-minute responsive back-up</td>
<td>1,400</td>
</tr>
<tr>
<td>30-minute controllable demand response</td>
<td>2,400</td>
</tr>
<tr>
<td>10-minute controllable demand response</td>
<td>2,600</td>
</tr>
<tr>
<td>10-minute responsive back-up</td>
<td>3,700</td>
</tr>
<tr>
<td>Emergency load-shedding</td>
<td>9,000</td>
</tr>
</tbody>
</table>

Source: Brattle Group
Marginal cost pricing using marginal costs

- Price caps relaxed
- Prices clear at actual marginal cost & total demand (energy & reserves)
Empowering flexible demand at lower cost

- Price caps relaxed
- Prices reflect actual marginal cost, total demand (energy & reserves)
- ...making visible the value of and opportunity for responsive demand
Low prices not the same as missing money
“How much?” depends on “what kind?”

Source: adapted from IEA *The Power of Transformation*
What the value (and benefits) of flexibility look like

Weekly average wholesale energy prices

Source: Ventyx (via Brattle Group)
What the value (and benefits) of flexibility look like

Average annual wholesale prices (2015)

Source: Northbridge Group
Not your father’s demand response

Source: McKinsey & Co., Kema & Imperial College London Roadmap 2050
A “CRM” that values flexibility & innovation

A “CRM” that values flexibility & innovation

Source: ERCOT (Capacity, Demand, and Reserves Reports, May 2013 and May 2016)
A “CRM” that values flexibility & innovation

Source: Electric Reliability Council of Texas
Better pricing vs. CRMs: empirical data

**avg annual new-build as % of 2014 peak**

- ERCOT
- NYISO
- PJM
- ISO-NE
- NEM
- SWIS

**ratio of actual to target reserve margins (2015)**

- North America
- Australia

Source: RAP, from published system operator data
Parting thoughts (1)

Money is not missing by design, it’s missing because of the various ways, both intentional and unintentional, that market operators fail to account for all demand and all marginal costs.
Parting thoughts (2)

Effective energy and balancing markets are essential to value investments in flexibility and spur innovation; administrative measures should target them, not simply pay for capacity.
Parting thoughts (3)

Policy support for renewables deployment is not only compatible with well-functioning energy markets...they are the key to integrating variable renewables reliably at least cost to consumers.
Policy brief is available on RAP website free of charge

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 sector. 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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