I. Smart Grid penetration
- Data
- Resistance
  - Cost / Privacy / Health concerns

II. Dynamic Pricing
- Varieties
- Pilots
- Tariffs

III. Barriers to Adoption
- Legal / Political
- Behavioral

IV. Conclusions

Smart Grid: Barriers to Dynamic Pricing

David Spence

Searle Center Conference on Energy Regulation
November 13, 2014
Market Penetration

2009-12 incentives

> 50 million installed now

Very high penetration in some states

Resistance
• Who pays
• Privacy
• Health

(Sources: Navigant Research)
Market Penetration

Source: Inst. for Electric Innovation, 2014
## Dynamic Pricing

<table>
<thead>
<tr>
<th>Rate Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOU rates</strong></td>
<td>Typically applies to usage over broad blocks of high-demand hours – e.g., 1pm-6pm, summer / sometimes scheduled based upon past usage</td>
</tr>
<tr>
<td><strong>CPP rates</strong></td>
<td>Typically applies to usage during very high demand periods, when demand can threaten to overtake supply / may be smaller blocks of time / triggered by current conditions</td>
</tr>
<tr>
<td><strong>Real-time (dynamic) pricing</strong></td>
<td>Retail price reflects very short-term fluctuations in cost of supplying power / e.g., may follow changes in wholesale LMP</td>
</tr>
</tbody>
</table>
Dynamic Pricing

Experiments suggest opportunities for peak shaving

Critiques of experiments

FIGURE SOURCE: Faruqui, 2011
Dynamic Pricing’s ‘discontents’

TOU rates

Most common form of variable rate / > 8 million customers participate in some form of TOU rate / Ontario experience

CPP rates

CA: for big 3, commercial customers must opt out of CPP / Some CPP tariffs here and there

Real-time (dynamic) pricing

IL: Utilities must offer RTP tariff; ComEd’s experience with residential RTP / CMP announced tariff
Dynamic Pricing: Why so few tariffs offered?

Theories:

- Misguided public policy concerns prevent offering of tariffs
- Customers with most at stake are not peaky, and to the extent they are, they will take advantage of dynamic prices
- The stakes for peaky consumers are too low relative to the transactions costs (Pecan Street)
- Give it time. Eventually most of us will embrace dynamic pricing (perhaps through Enernoc-style aggregation).
Behavioral Interventions

Issues:

• Size of effect? Durability?
• Consumer heterogeneity
• Can nudges coexist with price signals?
Conclusions
(crystal ball?)

• Fairness concerns seem overstated; problems are tractable
• Transaction costs vs. stakes problems seem real for residential customers, and suggest two ways forward:
  • Dynamic retail pricing with nearly costless automated response (utility control or pre-programmed meter) or third-party control focused on critical peaks, and/or
  • Low-cost behavioral responses to peaks