RETHINKING REAL-TIME PRICING

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RTP: Basic Issues

- The gains from RTP depend on how price elastic consumers are. How responsive are residential consumers to RTP?
- Is RTP risky for consumers?
- Policy implications
Are Consumers Responsive to RTP?

- ComEd Energy-Smart Pricing Plan (ESPP)
  - Summer 2003 in Chicago
- Price = Distribution Charge + Day-Ahead Price
  - Nine “High Price Alert” days during summer
- Lower bound on elasticity:
  - Residential customers
  - Short-run: no technology adoption
  - Relatively small variation in prices during pilot
  - But: self-selected group may be more price elastic compared to other ComEd households.

ESPP Demand Response

Summer Hourly ATEs: Non-High Price Days

Price (cents/kilowatt-hour) vs. Hour:

- Hourly ATEs for Summer Non-High Price Days
- Mean Price
- Average Treatment Effect
- 95% Confidence Interval

Graph showing the relationship between price and quantity (Watts) over different hours.
Incremental Response: Alert Days

Incremental ATEs on High Price Days

Price (cents/kilowatt-hour)

Hour: 0 3 6 9 12 15 18 21

Quantity (Watts)

Mean Price
Incremental ATE
95% Confidence Interval
Takeaways from ESPP

- Average savings: $13/household-year (2.7%)
- Compensating Variation: $10/household-year
- Information provision massively increases elasticity
  - High Price Alert phone calls
  - Energy Orb
- More advanced info technologies could be even more effective
Most discussion of RTP relates to short run effects.

“Given the current capital stock, how will consumers and markets respond?”

Keynes: “In the long run, we’re all dead.”

But we also should care more about long-run effects

Supply side: Reduced entry of new power plants


Demand side:

New houses/buildings/appliances with new technologies will eventually increase elasticities
Is RTP “Risky” for Consumers?

- RTP will increase bill volatility for consumers.
- Is this effect large?
- Use PJM average LMP and aggregate load data for NERC Peak days.
- Compare two different price structures:
  - RTP
  - Hourly TOU based on quarterly load-weighted average prices
Substantial Price Volatility

TOU vs. RTP in PJM

10th Percentile
TOU Price
90th Percentile
Volatility in Hourly Expenditures

Histogram of RTP to TOU Hourly Expenditures
Volatility in Daily Expenditures

Histogram of RTP to TOU Daily Expenditures

Ratio of RTP to TOU Expenditures

Density
Volatility in Monthly Expenditures

Histogram of RTP to TOU Monthly Expenditures
Many utilities installing residential smart meters for reasons other than RTP.

Once smart meters installed, there are substantial aggregate efficiency gains possible from moving consumers to RTP.

Argument obviously stronger for C&I customers.

RTP does not materially increase bill volatility.
Policy Implications

- **Competitive retailers**
  - Consumers can decide whether they want RTP or slightly higher average prices.
  - Not clear why regulators should have much to say about how competitive suppliers should set prices.
  - But: Role for regulator in requiring clear information disclosure about prices and average bills.

- **Regulated retailers/standard offer**
  - Once smart meters installed, no clear reason to avoid RTP.
  - If policymakers, utilities, and advocates choose not to encourage RTP for regulated utilities/standard offer, they should be clear with consumers about how this increases everyone’s electricity bills.