

Dynamic pricing: what can we learn from other jurisdictions?



PRESENTED TO

CPUC - Electricity Rate Design Forum

PRESENTED BY

Ahmad Faruqui, Ph.D.

December 12, 2017



THE **Brattle** GROUP

The views expressed in this presentation are strictly those of the presenter(s) and do not necessarily state or reflect the views of The Brattle Group.

Ontario, Canada

The province started rolling out time-of-use rates for energy to all its residential and small commercial and industrial customers in 2007.

All four million were on these rates within a few years.

Ninety percent are still on these rates. T&D costs are recovered through a fixed charge.

The all-in price ratio is about 1.5 to 1; this has yielded a reduction in peak load between 2% and 3%.

Oklahoma

Oklahoma Gas & Electric (OG&E) has rolled out variable peak pricing to all its residential customers through a program called “Smart Hours.”

Customers are provided free smart thermostats to automate price response.

Some 20% of customers are on the program and the program is yielding significant load reductions during critical times.

The average contribution to peak load for program participants has dropped almost 40 percent, from 4 kilowatts (kW) to 2.5 kW. Also, customers enrolled in the program are more satisfied than other customers.

Maryland

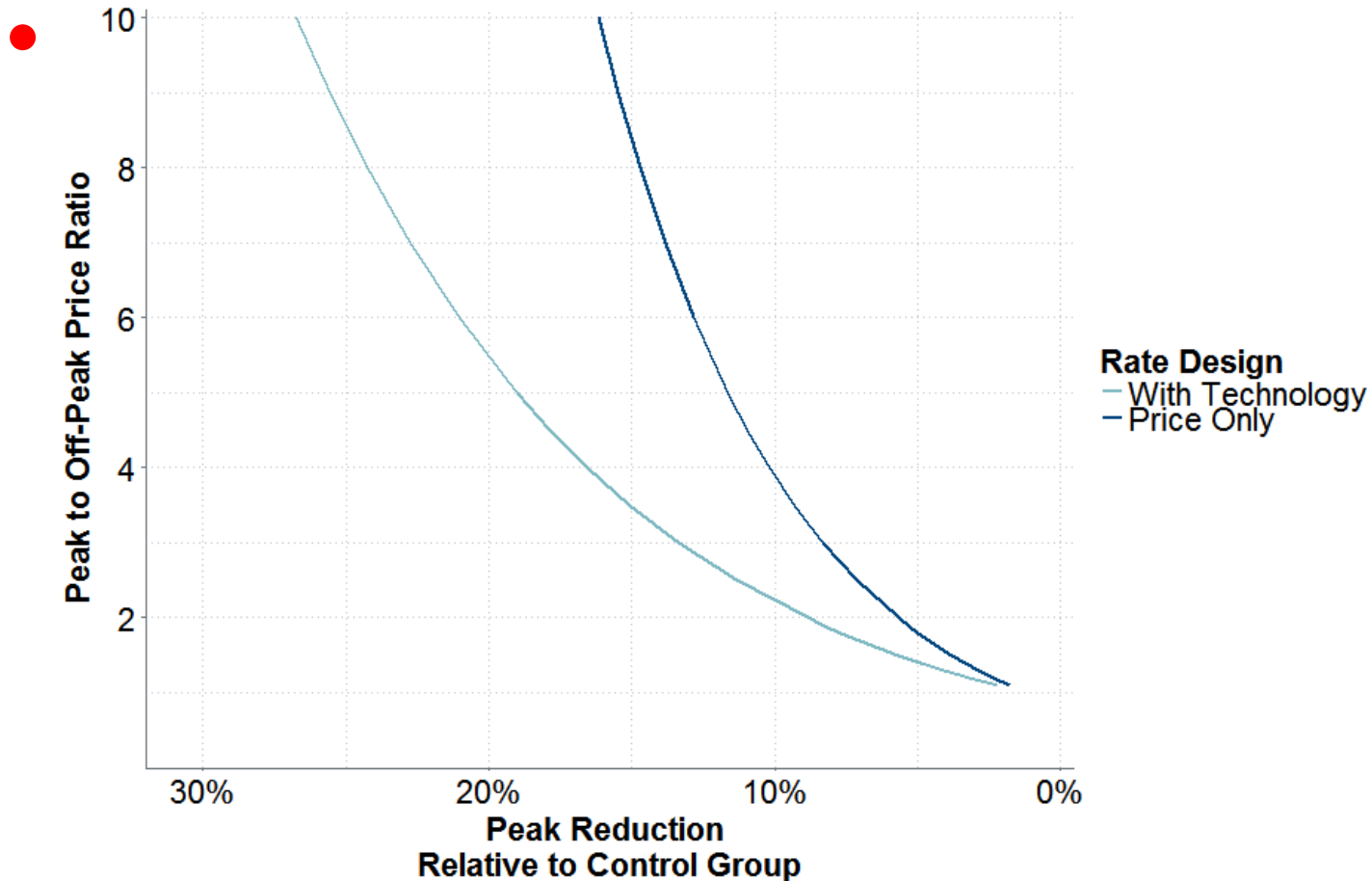
Baltimore Gas and Electric (BGE)' s Smart Energy Rewards® program provides 1.1 million residential customers an opportunity to earn \$1.25 per kilowatt-hour (kWh) on Energy Savings Days.

During events, BGE typically makes 1.3 million phone calls, sends more than 1 million emails, and delivers approximately 50,000 SMS/text messages.

On July 14, BGE called an Energy Savings Day and its customers earned \$4.6 million by reducing their energy usage. From the program's introduction in 2013 to the end of 2016, BGE customers have earned nearly \$40 million from the program.

The company estimates that about 80 percent of its customers reduce their usage on Energy Savings Days.

Customer responses from 337 pricing tests across 9 countries line up on two curves in a single figure



Source: Faruqi, Ahmad, Sanem Sergici, and Cody Warner. "Arcturus 2.0: A Meta-Analysis of Time-Varying Rates for Electricity." *The Electricity Journal* 30, no. 10 (2017): 64-72.

The views expressed in this presentation are strictly those of the presenter(s) and do not necessarily state or reflect the views of The Brattle Group.

Georgia

Georgia Power has 2,300 C&I customers (representing some 20% of retail revenues) on hourly RTP pricing, based primarily on system lambda.

Customers >5 MW are on hour-ahead RTP pricing; customers >250 kW are eligible for day-ahead RTP pricing.

For 300 hours a year, hourly prices are >75 cents/kWh; customers are provided a variety of price protection products.

For all RTP customers, baseline usage is billed on embedded costs, inclusive of a demand charge.

Illinois

Commonwealth Edison has 16,000 residential customers and 9,000 C&I customers on hourly RTP.

Residential customers are on a 4-part rate: fixed charge, kW for coincident peak generation capacity (PJM), RTP for energy, and flat kWh price for T&D.

C&I customers are on a 5-part rate: fixed charge for distribution, NCP demand charge for distribution, demand charge for generation capacity, RTP for energy, flat price per kWh for transmission, and other elements such as RPS and EE.

Primary References

Faruqui, Ahmad and Mariko Geronimo Aydin, "Moving Forward with Electric Tariff Reform," *Regulation*, Fall 2017.

<https://object.cato.org/sites/cato.org/files/serials/files/regulation/2017/9/regulation-v40n3-5.pdf>

Faruqui, Ahmad, "Innovations in Pricing," *Electric Perspectives*, September/October 2017.

[https://mydigimag.rrd.com/publication/?i=435343&ver=html5&p=42#{"page":42,"issue_id":435343}](https://mydigimag.rrd.com/publication/?i=435343&ver=html5&p=42#{)

Faruqui, Ahmad and Henna Trewn, "Enhancing Customer-Centricity," *Public Utilities Fortnightly*, August 2017.

<https://www.fortnightly.com/fortnightly/2017/08/enhancing-customer-centricity>

Faruqui, Ahmad and Henna Trewn, "Rethinking Customer Research in the Utility Industry," *Public Utilities Fortnightly*, July 2017.

<https://www.fortnightly.com/fortnightly/2017/07/rethinking-customer-research>

Faruqui, Ahmad, Wade Davis, Josephine Duh, and Cody Warner, "Curating the Future of Rate Design for Residential Customers," *Electricity Daily*, 2016.

<https://www.electricitypolicy.com/Articles/curating-the-future-of-rate-design-for-residential-customers>

The views expressed in this presentation are strictly those of the presenter(s) and do not necessarily state or reflect the views of The Brattle Group.

Secondary References

“The Impact of Time-of-Use Rates in Ontario,” with Neil Lessem, Sanem Sergici, and Dean Mountain, *Public Utilities Fortnightly*, February 2017.

<https://www.fortnightly.com/fortnightly/2017/02/impact-time-use-rates-ontario>

“Dynamic pricing works in a hot, humid climate: evidence from Florida,” with Neil Lessem and Sanem Sergici, *Public Utilities Fortnightly*, May 2017.

<https://www.fortnightly.com/fortnightly/2017/05/dynamic-pricing-works-hot-humid-climate>

Faruqui, Ahmad, Toby Brown and Lea Grausz, “Efficient Tariff Structures for Distribution Network Services,” *Economic Analysis and Policy*, 2015.

<http://www.sciencedirect.com/science/article/pii/S0313592615300552>

Faruqui, Ahmad, Ryan Hledik and Neil Lessem, “Smart By Default,” *Public Utilities Fortnightly*, August 2014.

<http://www.fortnightly.com/fortnightly/2014/08/smart-default?page=0%2C0&authkey=e5b59c3e26805e2c6b9e469cb9c1855a9b0f18c67bbe7d8d4ca08a8abd39c54d>

Faruqui, Ahmad, Sanem Sergici and Lamine Akaba, “Dynamic Pricing in a Moderate Climate: The Evidence from Connecticut,” *Energy Journal*, 35:1, pp. 137-160, January 2014.

Secondary References II

Faruqui, Ahmad and Sanem Sergici, “Arcturus: International Evidence on Dynamic Pricing,” *The Electricity Journal*, 26:7, August/September 2013, pp. 55-65.

<http://www.sciencedirect.com/science/article/pii/S1040619013001656>

Faruqui, Ahmad, Sanem Sergici, and Lamine Akaba, “Dynamic Pricing of Electricity for Residential Customers: The Evidence from Michigan,” *Energy Efficiency*, 6:3, August 2013, pp. 571–584.

Faruqui, Ahmad, Ryan Hledik, and Jennifer Palmer, *Time-Varying and Dynamic Rate Design*. Global Power Best Practice Series, The Regulatory Assistance Project (RAP), 2012.

Faruqui, Ahmad and Jennifer Palmer, “Dynamic Pricing of Electricity and its Discontents,” *Regulation*, Volume 34, Number 3, Fall 2011, pp. 16-22.

<http://www.cato.org/pubs/regulation/regv34n3/regv34n3-5.pdf>

Faruqui, Ahmad and Sanem Sergici, “Dynamic pricing of electricity in the mid-Atlantic region: econometric results from the Baltimore gas and electric company experiment,” *Journal of Regulatory Economics*, 40:1, August 2011, pp. 82-109.

Secondary References III

Faruqui, Ahmad and Jackalyne Pfannenstiel, “California: Mandating Demand Response,” *Public Utilities Fortnightly*, January 2008, pp. 48-53.

http://www.fortnightly.com/display_pdf.cfm?id=01012008_MandatingDemandResponse.p_df

Faruqui, Ahmad and Stephen S. George, “Quantifying Customer Response to Dynamic Pricing,” *Electricity Journal*, May 2005.

Faruqui, Ahmad, William D. Bandt, Tom Campbell, Carl Danner, Harold Demsetz, Paul R. Kleindorfer, Robert Z. Lawrence, David Levine, Phil McLeod, Robert Michaels, Shmuel S. Oren, Jim Ratliff, John G. Riley, Richard Rumelt, Vernon L. Smith, Pablo Spiller, James Sweeney, David Teece, Philip Verleger, Mitch Wilk, and Oliver Williamson, “2003 Manifesto on the California Electricity Crisis,” May 2003.

<http://www.aei-brookings.org/publications/abstract.php?pid=341>

Faruqui, Ahmad, Hung-po Chao, Vic Niemeyer, Jeremy Platt, and Karl Stahlkopf, “Analyzing California's Power Crisis,” *The Energy Journal* 22, no. 4 (2001): 29–52.

Faruqui, Ahmad and J. Robert Malko, “Residential Demand for Electricity by Time-of-Use: A Survey of Twelve Experiments with Peak Load Pricing,” *Energy* 8, no. 10 (1983): 781–795.

Presenter Information



AHMAD FARUQUI, PH.D.

Principal | San Francisco, CA

Ahmad.Faruqui@brattle.com

+1.415.217.1026

Ahmad Faruqui's consulting practice is focused on the efficient use of energy. His areas of expertise include rate design, demand response, energy efficiency, distributed energy resources, advanced metering infrastructure, plug-in electric vehicles, energy storage, inter-fuel substitution, combined heat and power, microgrids, and demand forecasting. He has worked for nearly 150 clients on 5 continents. These include electric and gas utilities, state and federal commissions, independent system operators, government agencies, trade associations, research institutes, and manufacturing companies. Ahmad has testified or appeared before commissions in Alberta (Canada), Arizona, Arkansas, California, Colorado, Connecticut, Delaware, the District of Columbia, FERC, Illinois, Indiana, Kansas, Maryland, Minnesota, Nevada, Ohio, Oklahoma, Ontario (Canada), Pennsylvania, ECRA (Saudi Arabia), and Texas. He has presented to governments in Australia, Egypt, Ireland, the Philippines, Thailand and the United Kingdom and given seminars on all 6 continents. His research has been cited in *Business Week*, *The Economist*, *Forbes*, *National Geographic*, *The New York Times*, *San Francisco Chronicle*, *San Jose Mercury News*, *Wall Street Journal* and *USA Today*. He has appeared on Fox Business News, National Public Radio and Voice of America. He is the author, co-author, or editor of 4 books and more than 150 articles, papers, and reports on energy matters. He has published in peer-reviewed journals such as *Energy Economics*, *Energy Journal*, *Energy Efficiency*, *Energy Policy*, *Journal of Regulatory Economics* and *Utilities Policy* and trade journals such as *The Electricity Journal* and the *Public Utilities Fortnightly*. He holds B.A. and M.A. degrees from the University of Karachi, an M.A. in agricultural economics and Ph.D. in economics from the University of California at Davis.

The views expressed in this presentation are strictly those of the presenter(s) and do not necessarily state or reflect the views of The Brattle Group.