Demand Response and Order 745 Pricing Revisited

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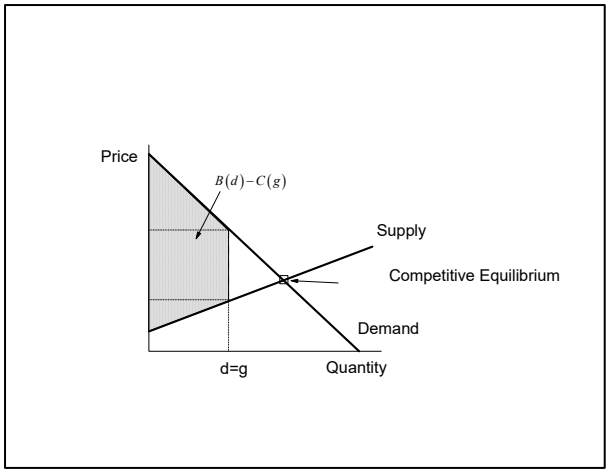
Demand Participation and Efficient Pricing

- The framework for efficient electricity pricing applies the stylized example of competitive equilibrium for supply and demand.
- Demand is charged the market clearing price, and supply is paid the market clearing price.
- Net imbalance between supply and demand is zero.
- A demand quantity reduction and a supply quantity increase create the same effect on net imbalance.
- The quantity equivalence applies to pricing and compensation: Reduced demand should not be charged, and increased supply should be paid, the market clearing price.
- The Order 745 fallacy treats “should not be charged” as the same thing as “should be paid.”



Order 745 Pricing Policy

"In this Final Rule, the Federal Energy Regulatory Commission (Commission) amends its regulations under the Federal Power Act to ensure that when a demand response resource participating in an organized wholesale energy market administered by a Regional Transmission Organization (RTO) or Independent System Operator (ISO) has the capability to balance supply and demand as an alternative to a generation resource and when dispatch of that demand response resource is cost-effective as determined by the net benefits test described in this rule, that demand response resource must be compensated for the service it provides to the energy market at the market price for energy, referred to as the locational marginal price (LMP). This approach for compensating demand response resources helps to ensure the competitiveness of organized wholesale energy markets and remove barriers to the participation of demand response resources, thus ensuring just and reasonable wholesale rates." (FERC Order 745, Preamble March 15, 2011.)

Where Did This Come From?

- In his NOPR reply comments, Alfred Kahn refers "…to the proposition—in principle indisputable—that demand response (DR) is in all essential respects economically equivalent to supply response; and that economic efficiency requires, as the NOPR recognizes, that it should be rewarded with the same LMP that clears the market. Since DR is actually—and not merely metaphorically—equivalent to supply response, economic efficiency requires that it be regarded and rewarded, equivalently, as a resource proffered to system operators, and be treated equivalently to generation in competitive power markets." (Alfred E. Kahn, Affidavit attached to "Reply Comments of the Demand Response Supporters," Docket No. RM10-17-000, August 30, 2010, p. 2. (footnote in original omitted))
- "This is an important premise, critical to the Commission's proposal. Were it true, the present proceeding would not be necessary. But it is not true." (See Hogan submission, https://scholar.harvard.edu/whogan/files/hogan_dr_tech_conf_091310.pdf)

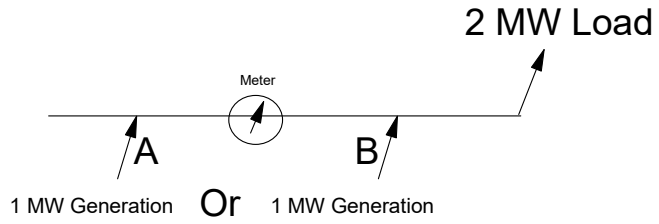
Paying Demand Response is Not Trivial

- A baseline is required and is unobservable. Charging demand for what is purchased is easy. Paying demand for what is not purchased in another matter ripe for abuse.
- The baseline problem is well known, but is not the focus of efficient pricing.
- The conceptual error in Kahn's argument traces back to the "negawatt" proposals from Amory Lovins. (Amory B. Lovins, "Saving Gigabucks with Negawatts," Public Utilities Fortnightly, Vol. 115, No. 6, Mar. 21, 1985, p. 24.)
- The error in paying for a negawatt at the market clearing price was first explained more than three decades ago. (Charles J. Cicchetti and William Hogan, "Including Unbundled Demand-side Options in Electric Utility Bidding Programs," Public Utilities Fortnightly. June 8, 1989, pp. 9-20.)
- The same exposition applied in the Order 745 challenges before the Supreme Court. (https://scholar.harvard.edu/whogan/files/economists_amicus_brief_061312.pdf)
- The Supreme Court decision on Order 745 pricing was based on procedural arguments without addressing the merits of the supporting analysis.

Order 745 Payment Rules Are Inefficient

Order 745 Payment Anomalies

Load Payments at price P
Option A: 2P(load)-1P(generation at A) = 1P
Option B: 1P(load)-1P(negawatt at B) = 0P



Identical physical conditions produce different payments!

Order 745 Payment Rules Are Inefficient

- The Order 745 “net benefits” test is not based on the sum of the generator and load benefits, but is restricted to the load benefits and creates transfers from generators.
- The net benefits test is only an approximation of the actual conditions that will prevail in the dispatch because net benefits cannot be computed without knowing the market and counterfactual prices.
- With efficient pricing and the standard definition of social welfare there would be no net benefits test required.
- There are many ways that have been proposed or adopted that could provide efficient incentives for demand response “negawatts,” and all differ from the mandate in Order 745.
  - Standard demand participation, charging the market price for actual load.
  - Forward contracts for fixed quantities that could be sold back into the dispatch at the market price.
  - Deemed allocation of the negawatt load to the load serving entity at the market price.
  - Paying the difference between the market prices and the energy component of the retail rate.
- Apparently “… the proposition—in principle indisputable—that demand response (DR) is in all essential respects economically equivalent to supply response” is disputable because it is not true.

Disclaimer

William W. Hogan is the Raymond Plank Research Professor of Global Energy Policy, John F. Kennedy School of Government, Harvard University. This paper draws on research for the Harvard Electricity Policy Group and for the Harvard-Japan Project on Energy and the Environment. The author is or has been a consultant on electric market reform and transmission issues for Allegheny Electric Global Market, American Electric Power, American National Power, Aquila, AQUIND Limited, Atlantic Wind Connection, Australian Gas Light Company, Avista Corporation, Avista Utilities, Avista Energy, Barclays Bank PLC, Brazil Power Exchange Administrator (ASMAE), British National Grid Company, California Independent Energy Producers Association, California Independent System Operator, California Suppliers Group, Calpine Corporation, CAM Energy, Canadian Imperial Bank of Commerce, Centerpoint Energy, Central Maine Power Company, Chubu Electric Power Company, Citigroup, City Power Marketing LLC, Cobalt Capital Management LLC, Comision Reguladora De Energia (CRE, Mexico), Commonwealth Edison Company, COMPETE Coalition, Conectiv, Constellation Energy, Constellation Energy Commodities Group, Constellation Power Source, Coral Power, Credit First Suisse Boston, DC Energy, Detroit Edison Company, Deutsche Bank, Deutsche Bank Energy Trading LLC, Duquesne Light Company, Dyon LLC, Dynegy, Edison Electric Institute, Edison Mission Energy, Electricity Authority New Zealand, Electricity Corporation of New Zealand, Electric Power Supply Association, El Paso Electric, Energy Endeavors LP, Energy Security Board Australia, Exelon, Financial Marketers Coalition, FirstEnergy Corporation, FTI Consulting, GenOn Energy, GPU Inc. (and the Supporting Companies of PJM), GPU PowerNet Pty Ltd., GDF SUEZ Energy Resources NA, Great Bay Energy LLC, GWF Energy, Independent Energy Producers Assn, ISO New England, Israel Public Utility Authority-Electricity, Koch Energy Trading, Inc., JP Morgan, LECG LLC, Luz del Sur, Maine Public Advocate, Maine Public Utilities Commission, Merrill Lynch, Midwest ISO, Mirant Corporation, MIT Grid Study, Monterey Enterprises LLC, MPS Merchant Services, Inc. (f/k/a Aquila Power Corporation), JP Morgan Ventures Energy Corp., Morgan Stanley Capital Group, Morrison & Foerster LLP, National Independent Energy Producers, New England Power Company, New York Independent System Operator, New York Power Pool, New York Utilities Collaborative, Niagara Mohawk Corporation, NRG Energy, Inc., Ontario Attorney General, Ontario IMO, Ontario Ministries of Energy and Infrastructure, Pepco, Pinpoint Power, PJM Office of Interconnection, PJM Power Provider (P3) Group, Powerex Corp., Powhatan Energy Fund LLC, PPL Corporation, PPL Montana LLC, PPL EnergyPlus LLC, Public Service Company of Colorado, Public Service Electric & Gas Company, Public Service New Mexico, PSEG Companies, Red Wolf Energy Trading, Reliant Energy, Rhode Island Public Utilities Commission, Round Rock Energy LP, San Diego Gas & Electric Company, Secretaría de Energía (SENER, Mexico), Sempra Energy, SESCO LLC, Shell Energy North America (U.S.) L.P., SPP, Texas Genco, Texas Utilities Co, Tokyo Electric Power Company, Toronto Dominion Bank, Transalta, TransAlta Energy Marketing (California), TransAlta Energy Marketing (U.S.) Inc., Transcanada, TransCanada Energy LTD., TransÉnergie, Transpower of New Zealand, Tucson Electric Power, Twin Cities Power LLC, Vitol Inc., Westbrook Power, Western Power Trading Forum, Williams Energy Group, Wisconsin Electric Power Company, and XO Energy. The views presented here are not necessarily attributable to any of those mentioned, and any remaining errors are solely the responsibility of the author. (Related papers can be found on the web at www.whogan.com).