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 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.
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