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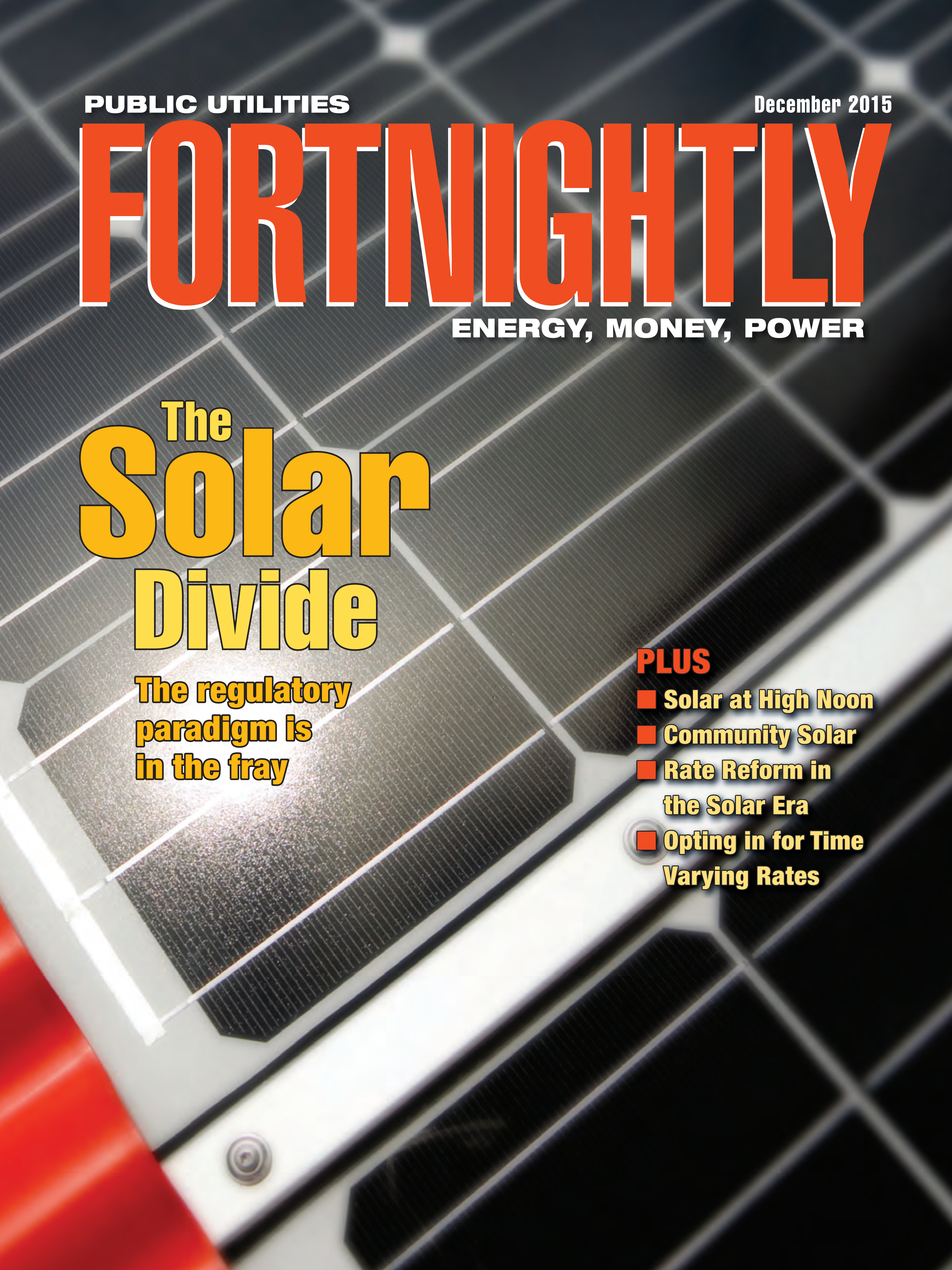

The Solar Divide

The regulatory paradigm is in the fray

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The Price is Right?

Demand response on appeal before the U.S. Supreme Court.

BY STEVE ISSER AND BOB KING

The Supreme Court recently heard legal arguments on the fate of FERC Order 745, one of the most highly contested cases on electric utility regulation to come before the High Court in years, if not decades.

Order 745 is the controversial ruling, issued in March 2011 by the U.S. Federal Energy Regulatory Commission, in which FERC decided to treat the resource of demand response as if it were the same as generated power. That is, to pay the full wholesale market price of energy to those electric customers (or their agents) that offer to sell demand response as an economic resource in wholesale energy markets. Such customers forego consumption of electricity to reduce strain on the bulk power grid by helping to balance supply and demand, to assure that power supply resources will prove adequate to meet needs.

The case has come before the Supreme Court on appeal from the U.S. Court of Appeals for the D.C. Circuit, which had vacated FERC Order 745 as an unlawful attempt by the commission to extend its regulatory reach to activities outside its jurisdiction.

EPSA, the Electric Power Supply Association, and other interveners had challenged the FERC decision before the D.C. Circuit, claiming essentially that a customer must first pay for energy before he can offer to sell it back into the market. The decision of the D.C. Circuit to vacate Order 745 revolved around two issues: whether FERC's rule entails direct regulation of the retail market – a matter exclusively within state control – and thus exceeds the Commission's authority, and whether market pricing for demand response resources was "arbitrary and capricious" because Order 745 would result in unjust and discriminatory rates.[1]

> There's been too much effort to find the 'perfect' theoretical formula. And not enough research on the efficacy of various price incentives.

The case before the Supreme Court is particularly rich. It raises issues concerning the nature of and differences between retail and wholesale electric service: what is physical, what is financial, what is energy, what is capacity, and how risk, incentives, and operational limits should govern the business of providing electric utility service.

DR's Function: Wholesale or Retail?

Economic demand response can potentially make a significant contribution to price moderation in wholesale electricity markets, and therefore should be thought of as a wholesale transaction.[2] This characterization is appropriate for a number of reasons, including price elasticity, price spikes, availability of advanced metering, and certain technical considerations that can make it easier for some customers, but more difficult for others, to engage in demand response activities.

Historically, short-term demand for electricity has been relatively inelastic. This meant that as higher-cost units were dispatched, the resulting higher prices would have little impact on demand. Prices can also spike during "off-peak" periods. If there is an unexpected outage or peak in demand, prices may spike for an hour or two while off-line resources ramp up. These price spikes are more difficult for

1. *Demand Response Compensation in Organized Wholesale Energy Markets*, Order No. 745, FERC Stats. & Regs. ¶ 31,322, *order on reh'g & clarification*, Order No. 745-A, 137 FERC ¶ 61,215 (2011), *reh'g denied*, Order No. 745-B, 138 FERC ¶ 61,148 (2012), *vacated*, *Elec. Power Supply Ass'n v. FERC*, 753 F.3d 216 (D.C. Cir. 2014) (*EPSA*), *cert. granted*, 83 U.S.L.W. 3835 (U.S. May 4, 2015) (No. 14-840) *& consolidated sub nom. EnerNOC, Inc. v. Elec. Power Supply Ass'n*, 83 U.S.L.W. 3835 (U.S. May 4, 2015) (No. 14-841).

2. Brattle Group, *The Power of Five Percent; How Dynamic Pricing Can Save $35 Billion in Electricity Costs*, Discussion Paper, May 16, 2007; Ahmed Faruqui and Lisa Wood, *Quantifying the Benefits of Dynamic Pricing in the Mass Market*, Brattle Group for Edison Electric Institute, January, 2008; *SPEER Incremental Demand Response Report*, May 2015, available at https://eepartnership.files.wordpress.com/2014/07/speer-incremental-demand-response-report.pdf.

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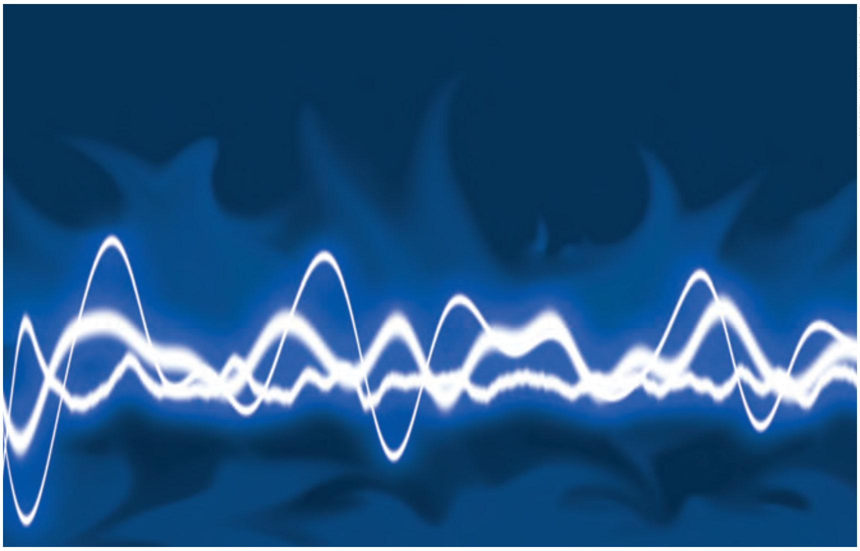
consumers to anticipate and avoid without some sort of automated demand control and market signal.

Time-of-use rates, combined with smart meters and modern communications technology, were thought to be a means to encourage customer response to price. For a variety of reasons, however, these advances have had only a modest impact on consumption patterns.

Large sophisticated customers, especially those in energy intensive industries, generally engage in demand management.[3] However, other large consumers of electricity have loads that are expensive to curtail on short notice, as the opportunity cost of stopping revenue-producing business activities far exceeds the cost of paying a high electricity price for a couple of hours.[4] Many large customers avoid time-of-use rates, preferring cost certainty to the opportunity to reduce costs. For smaller commercial and retail customers, the transactions cost of monitoring and responding to electricity prices often exceeds the available savings. Most load resources require substantial lead times (30 minutes to 2 hours) because, unlike generators whose business is producing energy, electricity buyers produce services *with* energy, and the opportunity costs of curtailment can be extremely high in the very short-run.

3. Customers most likely to participate in real-time pricing programs tend to be large industrial customers with batch process that can be rescheduled, those with high levels of electricity expenditures and those with on-site generation. Galen Barbose, Charles Goldman and Bernie Neenan, *A Survey of Utility Experience With Real Time Pricing*, Lawrence Berkeley National Laboratory (December 2004).
4. See Jay Zarnikau and Ian Hallett, "Aggregate Industrial Energy Consumer Response to Wholesale Prices in the Restructured Texas Electricity Market," *Energy Economics* 20 (2008): 1798-1808.



Demand response is physical, not financial. It faces real costs and technical constraints.

Given these constraints, the job of providing demand response service has fallen largely to entrepreneurial intermediaries. These DR providers often act as aggregators of large blocks of customer demand. They can invest in both the equipment and operational knowledge to help customers to respond to prices, and the marketing savvy to entice these customers to participate in markets. While retail decisions not to consume are made by consumers on various time scales, Dr. Alfred Kahn made the point that this emerging class of aggregator companies justifies the view of demand response as a wholesale market resource.[5]

DR's Nature: Physical or Financial?

The core of the debate over Order 745, however, is on compensation, and centers on a number of conflicting perspectives.

Consider the regional grid manager, or ISO (Independent System Operator), for whom a megawatt (MW) of demand response is equivalent to a MW of generation, at least in terms of balancing the energy market. But the ISO is faced with a gap in funding between what is paid to demand resources and what is collected for power consumed. And this shortfall in revenue must be billed to load-serving entities whose sales were reduced, and may or may not be in a position to pass on the increased cost.

Enter the DR aggregator. These DR providers receive the payment for DR deployed in the market, and the end-use customer avoids the cost of the payment for energy never consumed. Together the DR provider and its customer receive both savings for consumption forgone and an LMP payment for the same action.[6] If one views LMP as a double-payment, then paying LMP will in theory result in more

5. Reply Comments of DR Supporters, Demand Response Compensation in Organized Markets, Docket No. RM10-17-000, August 30, 2010, Kahn Affidavit at p. 2 (Kahn Reply Affidavit).

6. Motion For Leave to Answer and Answer of the Electric Power Supply Association and White Paper by Professor William W. Hogan, Attachment A, Providing Incentives for Efficient Demand Response, Docket No. EL09-68-000, October 29, 2009.

demand response than is economically efficient.[7]

Next consider the question of compensation – what demand response is worth. The primary error made by the supporters of what has come to be styled "LMP - G"[8] is to equate the opportunity cost of the customer with the lost value of electricity consumption. Ignoring efficiency claims, and focusing on the incentive effects on demand response providers, the issue becomes whether LMP or LMP - G will provide the optimal incentive to supply demand response. If indeed, the customer was merely reselling electricity in a purely financial transaction, then LMP - G would be the optimal payment. However, if there are costs of providing demand response in addition to the lost opportunity cost, then LMP - G will be below the optimal payment, because the customer does not receive the full benefit of reducing its consumption. And such costs and constraints may very well be important enough to make a difference.

That's because demand response in reality is a physical, not a financial product. In a manner similar to generation, demand response incurs real costs and faces technical constraints. For aggregated retail customers, part of the payment is received by the demand response aggregator in return for its capital investment in equipment, operating costs and assumption of the risk of nonperformance. Many industrial customers face similar risks in curtailing operations as a generator does on start-up.[9] That suggests that the optimal price for demand response resources lies somewhere between LMP and LMP - G.

Furthermore, requiring payment of LMP - G would require tracking and predicting retail consumption and rates for the multiple participating loads, as well as for their LSEs. If the administrative costs of attempting to implement LMP - G are similar or greater in magnitude to G, the best solution may be to charge LMP and uplift the cost on a load-proportionate basis.[10]

> Those who support 'LMP - G' make a key error: they equate the opportunity cost with the value of foregone consumption.

The existence of administrative costs and demand response related uplift provide an argument for limiting demand response payments to periods when the benefit to consumers is likely to exceed any deadweight[11] costs transferred to consumers. The adoption of FERC Order 745 also included direction to markets to use a net benefits test to assure this was the case. Net benefits are most likely to be positive and greatest when the supply curve is steepest, which typically occurs in highest-cost, peak hours. Limiting the hours in which demand response resources are paid LMP can also help establish better baselines for measuring whether a DR provider has, in fact, responded.[12]

Market Effects: Capacity and Energy

A concern of some stakeholders is that economic demand response will reduce peak energy prices, increasing the "missing money" problem that is at the core of the resource adequacy issue in electricity markets.

As a matter of fact, demand response in practice should flatten the load profile, which would reduce capacity clearing prices. To what extent energy price reductions will result in compensating capacity price increases over the longer term, however, becomes an empirical question. For purposes of long-run reliability, as long as compensation is sufficient to induce new investment and reflects market value, demand response in the bid stack will only push out high cost generators. It could well be that demand response results in a more stable pricing environment that seems less risky to investors.

In an energy-only market, such as ERCOT, the question is slightly different. Because there is no capacity market, the issue becomes whether the expected long-run energy price will justify investment in new facilities. If price spikes are highly variable, then they will be discounted by investors

7. See Comments of the Federal Trade Commission, Demand Response Compensation in Organized Markets, Docket No. RM10-17-000, May 13, 2010; Comments of Potomac Economics, Ltd., Demand Response Compensation in Organized Markets, Docket No. RM10-17-000, May 13, 2010.
8. Locational Marginal Price less the retail price to the load of the energy not consumed by the load offering the load reduction.
9. See Comments of Verso Paper Corp. in Support of the Notice of Proposed Rulemaking, Demand Response Compensation in Organized Markets, Docket No. RM10-17-000, May 13, 2010.
10. ERCOT staff and stakeholders are still struggling to develop procedures to implement LMP-G for third-party providers. It turns out that implementing LMP-G presents complex issues that will result in significant administrative costs. "LMP-G in ERCOT" White Paper of the Loads in SCED2 Subgroup of the Demand Response Working Group of ERCOT, July, 2015.
11. Deadweight loss is a net loss of total (consumer plus producer) surplus, so these are costs that neither add value to consumers or producers. Robert Pindyck and Daniel Rubinfeld, *Microeconomics, Eighth Edition* (Pearson Education 2013): 321.
12. See Comments of the State of New York Department of Public Service, The New England Conference of Public Service Commissioners, Maryland Public Service Commission, New York Public Service Commission, in Demand Response Compensation in Organized Markets, Docket No. RM10-17-000, May 13, 2010.

(because of the increased risk due to the uncertain timing of revenues streams). To the extent that demand response moderates price spikes and makes energy revenues more predictable, investors will accept a lower rate of return given the same expected energy revenue. Thus, while long-term energy prices may rise to compensate for lost revenue due to demand response resources, this price increase will be less than that needed to completely recover the lost revenue.

Still another issue concerns competition and the exercise of market power. On that score, the importance of demand response resources as an automatic check on the exercise of market power has generally been understated. A lack of responsive demand at the margin establishes conditions conducive to the exercise of market power, especially in energy only markets, where high price caps incent strategic bidding. Economic demand response does not interfere with mitigation of market power; like forward contracting, it makes it more difficult and less lucrative to attempt to exercise market power.

The Answer? Too Soon to Know

What does this analysis suggest in terms of a ruling from the U.S. Supreme Court?

Importantly, the controversy over the inclusion of demand response resources in wholesale markets, and its compensation, ignores what is to date a general failure to develop significant price responsive demand. The underlying problem is that most customers do not receive and/or respond to real time price signals, and require additional or more predictable incentives. PJM, where the market has allowed demand bidding for years, still sees much less participation in the energy market than in the capacity market, even with the assistance of DR providers. ERCOT, where smart meters and competitive electric retail markets are well established, is not subject to FERC's interstate regulations because its system is wholly within the state. Even here, where price responsive loads are having some impact,[13] it represents a modest fraction of the total demand, and the ISO relies upon supplemental wholesale purchases of demand response capacity to avoid emergency outages.

> The optimal strategy? Perhaps to err on the side of paying excessive compensation.

Thus the optimal compensation for economic demand response resources, and what limitations should be placed on demand response bidding into energy markets, perhaps remains a valid question.

On one hand, the payment to DR providers and participating loads should balance costs, incentives and market benefits. Yet there has been too much effort expended to determine the "perfect" theoretical formula, and too little gathering of empirical data on how demand response resources respond to different incentives.

Given the limited quantity of demand response resources actively participating in energy markets, the optimal short-term strategy may be to err on the side of potentially excessive compensation, gather data, and then revisit the issue when there is sufficient experience to make a reasoned judgment.

13. *Price Responsive Load/Retail DR: RMS Update.* Power Point Presentation by Paul Wattles and Carl Raish. September 1, 2015. Accessed October 1: http://www.ercot.com/content/wcm/key_documents_lists/54219/09.__DSWG_PriceResponsiveLoadERCOT_090115RMS.ppt