

A Buyer's Market

Getting the most from demand response—despite a flawed FERC rule.

BY CONSTANTINE GONATAS

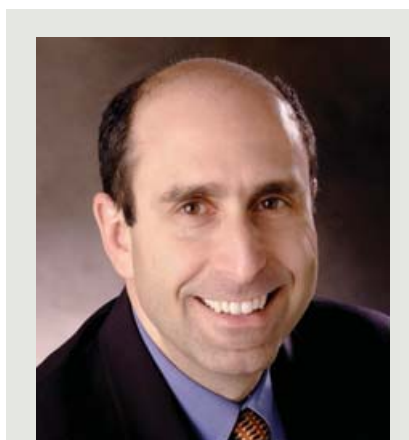
On March 15 the Federal Energy Regulatory Commission (FERC) issued the long-awaited and controversial rule on demand response (DR) compensation—Order 745.¹ As anticipated, the rule held that “comparable” treatment for DR resources with generation requires that they receive the same compensation, the locational marginal price (LMP). The justification cited was this syllogism: that if decreased demand had the same effect on power markets as increased supply, and if supply is paid LMP, then demand response should be paid LMP.

By contrast, several regional market organizations, PUCs and independent economists held that fair economic compensation requires subtracting the retail rate (G) to account for the benefit that load already receives by not paying for energy it doesn't consume. In this view, full LMP compensation discriminates against real-time pricing customers, whose only benefit from curtailing is avoiding payment of LMP. Accordingly, (LMP – G) compensation equalizes treatment with real-time pricing customers while full LMP compensation distorts markets and creates opportunities to game the system.

These concerns are legitimate. However, with some care it actually might be possible to implement full LMP compensation for demand response without distorting markets.

Practical Decisions

Over the objection of nearly all commenters, the order requires a net benefits test limiting the hours in which DR bids would be accepted. This test would ensure that total compensation to DR providers never exceeds the benefits enjoyed by load from reducing LMPs, by restricting DR events to the highest peak hours of a year. Demand responders asserted their service was nothing at all like traditional utility peak-shaving, while generators and independent commenters asserted the test was an artifact of the excess compensation proposed, but that with the economically correct compensation (LMP – G), no restrictions on hours would be required. Grid



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operators expressed concern that implementing the test added a significant administrative burden. Sensitive to this issue, the rule simplified implementa-

tion by allowing regional markets to set a monthly trigger price for DR events.

The New England Conference of Public Utility Commissioners (NECPUC) had advocated limiting hours using a benefits test because compensation at full LMP creates a “missing money” problem. As the cost of “negawatts” is borne by load consuming a reduced quantity of megawatts, without a limit on hours more could be paid to demand responders than saved by load through reduced LMPs. Furthermore, with DR allowed during all hours at full LMP compensation, a customer can game the system by shifting load from one shoulder hour to another without creating a system benefit.

Applying such a test for New England, NECPUC estimated that in 2008, DR would be restricted to the highest-priced 8 percent of annual hours. With the decline in power markets since then, this condition has occurred far less often, so many DR aggregators have been signing up customers to receive free money—capacity payments customers collect with the expectation they rarely will be called. By contrast, generators have incurred substantial fixed costs whose recovery is impaired during weak markets by these casual demand responders. If in implementing this rule, capacity payments are provided to an unlimited quantity of demand responders when reserve margins are high, then incentives to invest in new generation will be lower when reserve margins are tight.

This rulemaking also featured a lively debate between Profs. William Hogan and the late Alfred Kahn on whether “negawatts” are truly comparable to supply.² Commissioner Moeller supported Hogan's view in his impassioned dissent, asserting that the ruling would distort »

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power markets and violate the commission's statutory obligation to provide just, reasonable and non-discriminatory rates. In this view, full LMP compensation is a subsidy to DR providers.

Straightforward economic analysis supports this view. Considering the disparate compensation for demand responders versus a real-time pricing customer, this rule creates a preference for one retail rate over another. It further creates an overt preference for load over generation by instituting a price suppression mechanism.

To say the least, paying customers full LMP for load they switch to a backup generator is troublesome. Here, customers receive full LMP by apparently reducing their load, and they avoid paying for power at the retail rate for the load they continue to operate—but just take off the grid. This discriminates in favor of behind-the-meter generation. For these reasons, full LMP compensation appears to be a subsidy.

However, there are valid reasons to support a carefully targeted subsidy. Commissioner LaFleur made the key point that in her experience leading a utility, DR has an important role and that her vote represented a practical decision. A Brattle Group study for ISO New England indicates that with (LMP – G) compensation there's only one-third as much peak load curtailed compared to full LMP compensation. How much DR is the right amount? EnerNOC commented “there can never be enough DR,” but generators had other views. The ruling itself stated that it wasn't following “textbook economics” but aimed for a practical result.

Because most load isn't aware of real-time prices—consuming more power than it would in a transparent market—paying some load to consume less drives load and price as a whole closer toward the ideal market equilibrium. Second, although above-market payments for reducing demand and LMPs for the

remaining load do institute a buyer's cartel, buyer market power might balance generator market power during peak periods if allowed hours are selected judiciously. Third, although real-time pricing tariffs at a retail level are the economically ideal way to drive demand bidding, experience has been adverse for all but the most sophisticated customers, and progress is lagging.

Overcoming Indifference

In Order 745, FERC held that full LMP compensation was necessary to overcome market barriers, citing the costs associated with smart metering. This is hardly the case for large users, for whom smart meters represent only a small expense. This isn't a good justification for small customers either: it would take 50 years to recover the cost of a \$1,000 smart meter for a 500 kwh/month consumer who would save \$2 a month from load shifting, subsidy or not.

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Many industrial users argued that higher (full LMP) compensation is essential to overcome a market barrier for them, as curtailing power results in revenue loss and business disruption. To this, numerous commenters gave specific examples proving that full LMP compensation for industrial customers results in curtailing economic output worth more than the power saved. It's simply indefensible to disrupt economic activity during a recession by providing an inappropriate incentive.

However, a true barrier exists for residential, many commercial and even large institutional customers: indifference and lack of focus on energy conservation. Greater incentives would motivate action resulting in benefits to society through fuel savings, especially during critical peaks when the least efficient power plants operate. Furthermore, incentive compensation could stimulate innovation in smart grid technology. Today, LED manufacturers and building controls vendors are developing electronics and software to interface with DR signals. The ultimate goal is automating energy conservation and building management so intervention by distracted humans won't be needed. These innovations will take time, and do require incentives to catalyze them.

On the other hand, the cost of aggregating customers and managing DR programs is often cited as a market barrier that requires incentive compensation. In fact, the costs of sales and administration can consume from one-third to one-half of DR payments. If implementation overhead exceeds (LMP – G), energy conservation benefits are simply outweighed. Therefore, DR programs must be automated and dis-intermediated wherever feasible. While aggregators have a useful transitional role, in the long run, the smart grid must facilitate transactions with residential and commercial customers at low cost.

In the short run, regional markets could implement electronic bulletin boards so participants could interact directly with bids in the day-ahead markets. A consumer who wished to avoid the forecast peak LMPs could opt to schedule curtailment of his load and receive compensation directly from the market clearing mechanism. While regional markets might object to the administrative burden, this builds on information systems in operation today that meter production and register renewable attributes (Cont. on p. 60)

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(Cont. from p. 10)

from small-scale distributed generation.

Successful DR implementations must target the real, not perceived barriers and avoid subsidies that distort economic outcomes. They must focus on the commercial, institutional and even residential customers where motivation barriers exist. By contrast, because full LMP compensation for industrials encourages them to curtail production worth more than electricity saved, this customer class should be on a real-time pricing or wholesale tariff instead. They should be disqualified from DR programs with full LMP compensation.

Because full LMP compensation for customers with backup generation also creates a perverse incentive, this class must be disqualified from receiving full LMP as well. Backup generation is usually inefficient, not economical at LMP except in critical reserve conditions, and

typically emits high levels of pollutants (SO_x, NO_x). So allowing this customer class to participate in full LMP demand response programs, other than at system-critical times, harms both air quality and fair markets.

In conclusion, the rule's economic analysis is troubling, confusing comparability between "negawatts" and megawatts. It represents a covert policy decision. Yet, economic and social benefits will result if DR programs are well implemented to avoid gaming the system and market distortions. These can be mitigated by disqualifying industrial load and behind-the-meter generation from receiving full LMP, and through lowering transaction costs.

It isn't obvious how a wholesale tariff could make explicit distinctions among end-user customer classes, taking into consideration retail rate questions FERC

studiously finessed. But these restrictions are essential to avoid market distortions. They must be taken seriously by market organizations together with their respective state utility commissions. If this isn't feasible in a wholesale tariff, states should consider exercising the authority left to them in Order 719 to withdraw from federal regulation in this domain and develop retail DR programs independently. ■

Endnotes:

1. FERC Order 745, "Demand Response Compensation in Organized Wholesale Energy Markets," 134 FERC p61,187, 18 CFR Part 34, Docket No. RM10-17-000
2. See Bruce W. Radford, "One if By Wholesale, Two if By Retail," *Fortnightly*, October 2010; "The Nutty Professors: Bill, Fred and the Strange Case of Demand Response"; "FERC Leaders Appear Split Over Smart Grid"; and "Nutty Professors' Take Two: A Guest Editorial from Dr. Alfred Kahn," *Fortnightly's Outsmarting the Grid* Blog.