137 FERC ¶ 61,216
FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

Before Commissioners: Jon Wellinghoff, Chairman;
Philip D. Moeller, John R. Norris,
and Cheryl A. LaFleur.

PJM Interconnection, L.L.C. Docket No. ER11-4106-000

ORDER ON COMPLIANCE FILING

(Issued December 15, 2011)

I. Introduction

1. On July 22, 2011, PJM Interconnection, L.L.C. (PJM) submitted a compliance filing and proposed tariff changes addressing the demand response compensation requirements established by the Commission in Order No. 745.[1] To comply with Order No. 745, PJM proposes revisions to its open access transmission tariff (OATT) and the Amended and Restated Operating Agreement of PJM Interconnection, L.L.C. (Operating Agreement).[2] PJM requests that its proposed revisions take effect on the first day of a calendar month that is at least 90 days after the date of the Commission's order.

2. For the reasons discussed below, we accept PJM's compliance filing, subject to conditions, to become effective, as requested, on the first day of the calendar month that is at least 90 days after the date of the Commission's order. We also require PJM to make an additional compliance filing, within 90 days of the date of this order.

[1] *Demand Response Compensation in Organized Wholesale Energy Markets*, Order No. 745, 76 FR 16,658 (Mar. 24, 2011), FERC Stats. & Regs. ¶ 31,322 (2011) (Order No. 745), *order on reh'g*, 137 FERC ¶ 61,215 (2011).

[2] PJM's market rules appear in identical form in both Schedule 1 to the Operating Agreement and the Appendix to Attachment K to the OATT. For convenience, in this order, we cite only to the Operating Agreement.

II. Background

A. Order No. 745

3. In Order No. 745, the Commission amended its regulations under the Federal Power Act (FPA), regarding compensation for demand response resources participating in wholesale energy markets, that is, the day-ahead and real-time markets, administered by Regional Transmission Organizations (RTO) and Independent System Operators (ISO). Specifically, Order No. 745 requires each RTO and ISO to pay a demand response resource the market price for energy, that is, the locational marginal price (LMP), when two conditions are met. First, the demand response resource must have the capability to balance supply and demand as an alternative to a generation resource. Second, dispatching the demand response resource must be cost-effective as determined by a net benefits test in accordance with Order No. 745. The net benefits test, as described more fully below, is necessary to ensure that the overall benefit of the reduced LMP that results from dispatching demand response resources exceeds the costs of dispatching and paying LMP to those resources.

4. In order to implement the net benefits test, the Commission directed each RTO and ISO to develop a mechanism to approximate the price level at which dispatching demand response resources will be cost-effective. The Commission required each RTO and ISO to make a compliance filing by July 22, 2011, proposing tariff revisions necessary to implement the compensation approach adopted in Order No. 745, including the net benefits test, a cost allocation mechanism, and an assessment of their demand response measurement and verification protocols and any modifications to those protocols that may be necessary to ensure adequate baseline measurement and verification of demand response performance. This order addresses PJM's compliance filing.

B. PJM's Compliance Filing

5. PJM states that to comply with Order No. 745, its proposed tariff revisions modify its existing compensation provisions under its Economic Load Response program.[3] PJM notes that, currently, Economic Load Response participants are compensated at LMP less certain generation and transmission charges (LMP-(G+T)). To comply with Order No. 745, PJM proposes to compensate these participants at LMP only when cost-effective. PJM also

[3] *See* Operating Agreement at Schedule 1, Section 1.5A. The Economic Load Response program is designed to facilitate the participation of demand response in the PJM energy markets. Under PJM's Economic Load Response program, participation is voluntary and market participants have the option to participate in both the day-ahead and real-time energy markets.

proposes to remove corollary provisions addressing the identification and verification of generation and transmission charges applicable to Economic Load Response participants.

6. In addition, PJM proposes to make conforming changes addressing compensation for end-use customers that have retail contracts indexed to PJM's LMP.[4] PJM notes that, currently, these customers are compensated only if they participate in PJM's real-time energy market and are dispatched by PJM. PJM adds that end-use customers meeting these participation and dispatch conditions are currently compensated in PJM's markets, but only in an amount equal to the difference between the accrued value of their retail savings and the total offer value PJM accepted to dispatch that customer. PJM argues that the compensation revisions required by Order No. 745 effectively supplant these existing rules. PJM states that, as such, there is no longer any need to rely on separate compensation rules for this type of demand response.[5]

7. PJM states that, to implement Order No. 745's requirement that compensable demand response be capable of balancing supply and demand, and be cost-effective, as determined by the net benefits test, revisions are also required to other portions of the Operating Agreement addressing its Economic Load Response program. Specifically, PJM proposes that only demand reduction offers submitted in the day-ahead, or real-time, energy markets that satisfy the net benefits test and that follow PJM's dispatch signals be compensated.[6] PJM also states that Economic Load Response resources that participate in its markets must be subject to balancing operating reserves deviation charges if these resources do not follow PJM's dispatch instructions, in the same manner as other resources that are dispatched by PJM.

8. PJM also proposes to require curtailment service providers (CSPs) to maintain, or ensure that participants maintain, the capability to receive and act upon an electronic dispatch signal, in order to improve communications between PJM dispatchers and demand response providers. Additional issues addressed by PJM, in its compliance filing, are summarized below.

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[4] PJM notes that these end-use customers tend to be larger and more sophisticated energy users, with larger and more predictable loads.

[5] *See* PJM's Transmittal Letter at 21.

[6] *See* proposed Operating Agreement at Schedule 1, Section 3.3A.1.

III. Notice of Filing and Responsive Pleadings

9. Notice of PJM's compliance filing was published in the *Federal Register*, 76 Fed. Reg. 45,787 (2011), with interventions and protests due on or before August 12, 2011. Notices of intervention and timely-filed motions to intervene were filed by the entities noted in the appendix to this order. In addition, motions to intervene out-of-time were submitted on August 16, 2011, by Hess Corporation (Hess), and on September 7, 2011, by Wal-Mart Stores, Inc. (Wal-Mart).

10. Protests and/or comments were submitted by the Demand Response Supporters;[7] PJM Power Providers Group (P3); Constellation Energy Commodities Group, Inc. and Constellation NewEnergy, Inc. (Constellation); PSEG Companies (PSEG); Comverge Inc. (Comverge); FirstEnergy Solutions Corp. (FirstEnergy); Dominion Resources Services, Inc. (Dominion); Energy Curtailment Specialists, Inc. (ECS); and Electric Power Supply Association (EPSA). Answers were submitted on August 29, 2011, by PJM and Demand Response Supporters, and on September 23, 2011, by EPSA.

IV. Discussion

A. Procedural Matters

11. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2011), the notices of intervention and timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding. In addition, given the early stage of this proceeding and the absence of undue prejudice or delay, we grant the unopposed late-filed interventions of Wal-Mart and Hess.

12. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2011), prohibits an answer to a protest and an answer to an answer unless otherwise ordered by the decisional authority. We will accept the answers filed by PJM, Demand Response Supporters and EPSA, because they have provided information that assisted us in our decision-making process.

B. Substantive Matters

13. The Commission accepts PJM's compliance filing, subject to conditions, to become effective, as requested, on the first day of the calendar month that is at least 90 days after the

[7] Comverge, Inc.; EnergyConnect by Johnson Controls, Inc.; EnerNOC, Inc.; the PJM Industrial Customer Coalition; Wal-Mart; American Forest & Paper Association; and Viridity Energy, Inc.

date of the Commission's order. The specific issues raised by this filing are discussed below.

1. Elimination of LMP-(G+T)

14. In Order No. 745, the Commission determined that when a demand response resource has the capability to balance supply and demand as an alternative to a generation resource, and when dispatch of a demand response resource is cost-effective as determined by a net benefits test, that demand response resource must be compensated at LMP for the service it provides to the energy market.

15. PJM's current tariff provides for a payment of LMP minus certain generation and transmission charges, LMP-(G+T), to Economic Load Response participants that choose to reduce loads in day-ahead and real-time energy markets. Thus, currently, Economic Load Response participants can be paid LMP-(G+T) in all hours. PJM, in its filing, proposes to eliminate the payment of LMP-(G+T).

16. As discussed below, we accept PJM's compliance revisions with respect to the circumstances under which PJM will pay LMP to Economic Load Response participants. However, we find that PJM's proposal to eliminate its existing LMP-(G+T) program in the day-ahead and real-time energy markets is beyond the scope of the Commission's directives in Order No. 745 because it addresses PJM's existing tariff provisions that pay LMP-(G+T) to demand response providers. As we explain in the concurrently-issued order on rehearing of Order No. 745, the Commission's action in Order No. 745, undertaken pursuant to section 206 of the FPA, was limited to situations where a demand response resource has the capability to balance supply and demand as an alternative to a generation resource, and where dispatch of the demand response resource is cost-effective as determined by a net benefits test.[8] Under these circumstances, the Commission required RTOs to pay LMP to demand response providers. The Commission's section 206 action required no changes to demand response programs paying less than LMP in situations where the LMP is not greater than or equal to the threshold price. Accordingly, because PJM proposed tariff revisions that go beyond what is required to comply with Order No. 745, PJM is required to make a compliance filing within 90 days of the date of this order, to reinstate its existing tariff provisions for payment of LMP-(G+T) in circumstances not addressed in Order No. 745. If PJM wishes to propose changes with respect to circumstances that were not addressed by the Commission's section 206 action in Order No. 745, the appropriate forum for such a proposal would be a separate section 205 filing.

[8] Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 133.

2. Self-Scheduling

a. PJM's Proposal

17. PJM states that under its existing rules, Economic Load Response participants that choose to reduce load in real time are not required to submit an offer in the real-time market; instead, they can simply reduce load on a self-scheduled basis and then provide PJM with data, within 60 days, showing that they have done so. PJM notes that these participants are permitted to wait until five minutes before the operating hour to notify PJM of their reductions. PJM adds that self-scheduled demand reductions are not dispatched and are not currently considered in determining LMP.

18. PJM asserts that its existing rules fail to comply with Order No. 745, given that self-scheduled demand response is compensated at less than LMP and occurs without input or direction from PJM. PJM argues that, as such, its existing rules cannot be relied upon to balance supply and demand and/or to provide an alternative to generation. PJM adds that self-scheduled demand reductions do not currently provide an energy market service, as contemplated by Order No. 745.

19. PJM therefore proposes to revise its existing LMP-(G+T) compensation scheme to give PJM the minimum amount of notice and information needed to make a self-scheduled load reduction compensable at the LMP, under Order No. 745, while preserving substantial control and flexibility for demand response providers seeking to participate in the real-time market. Specifically, PJM proposes to require that all offers for demand reduction into the real-time market be submitted by 6:00 p.m. the day before each operating day, accompanied by the same offer data required for day-ahead market offers.[9] PJM also proposes that all Economic Load Response providers be permitted to revise the hourly quantity of their offers (whether up or down) up to three hours prior to the operating hour.[10]

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[9] PJM states that to provide a minimum amount of advance notice to ensure that the eligibility criteria can be satisfied, offers for demand reduction into the real-time market must be submitted by 6:00 p.m. the day before each operating day. PJM asserts that this offer deadline mirrors the current deadline for the generation rebidding period, which it characterizes as the opening round of real-time offers. PJM explains that it posts the day-ahead scheduled quantities and prices by 4:00 p.m. each day before the operating day and allows generators to review those results and submit offers for their uncommitted units by 6:00 p.m. Generator bids submitted in the rebidding period are paid the real-time, not day-ahead, price if the bid is accepted and dispatched. *See* Transmittal Letter at 8.

[10] PJM argues that its proposed three-hour notice requirement is the minimum time allowance possible, based on the needs of PJM's dispatchers, who rely on a two-hour "look

(continued…)

b. Protests and Comments

20. Intervenors object to PJM's proposal to the extent it will allow Economic Load Response participants to make offers after the close of the day-ahead market. FirstEnergy argues that just as generation resources are required to participate in this market before submitting an offer into the real-time market, so too should a demand response resource. FirstEnergy adds that there is no operational, or other basis, for allowing demand response resources to pick and choose between energy markets in a manner that is not similarly permitted for other resources, namely generation. PSEG agrees that demand response resources should have a "must offer" obligation to participate in the day-ahead market to the same extent as generation resources. PSEG argues that in the absence of such a requirement, demand response resources cannot be characterized as capable of balancing supply and demand as an alternative (that is, in a manner that is comparable) to a generation resource.

21. FirstEnergy also objects to PJM's proposal to permit Economic Load Response participants to change the hourly quantity of their real-time offers, including reducing the quantity to zero, up to three hours prior to the operating hour. FirstEnergy argues that this allowance is not afforded to any other resource and that PJM has not otherwise supported its proposed preference.

22. ECS and Demand Response Supporters object to PJM's proposed revisions to PJM's existing rules regarding self-scheduled demand response. ECS challenges PJM's assertion that PJM's self-scheduling rules require revision because, PJM claims, self-scheduled demand response, under PJM's existing tariff, would otherwise be ineligible for LMP-based compensation under Order No. 745. Demand Response Supporters argue the PJM's existing self-scheduling rules comply with the demand response characteristics required by Order No. 745.

23. ECS also argues that Order No. 745 does not make dispatch (PJM's proposed replacement to self-scheduling) a condition applicable to the Commission's requirement regarding the balancing of supply and demand.[11] ECS adds that there is no mention in Order No. 745's detailed requirements for the net benefits test (nor should there have been mention) of removing self-scheduled demand response or self-scheduled generation from the supply stack used to develop the net benefits test. ECS concludes that because self-

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ahead" tool to make their final resource selections for PJM's least-cost security constrained dispatch.

[11] *See also* Demand Response Supporters Protest at 4.

scheduled demand response is included in the supply stack used to determine the LMP threshold, it should be eligible for LMP compensation.

24. ECS argues, in the alternative, that even if the Commission determines that dispatchability is a legitimate requirement for LMP-based compensation in PJM, consideration must be given to Order No. 745's reference to "committed or dispatched" as an eligibility criterion. ECS argues that, given this alternative allowance, PJM's self-scheduling rules should be retained, given that PJM accepts (or "commits") self scheduled reductions based on system conditions. ECS argues that while Order No. 745 is silent on the issue of compensation for demand response that does not satisfy Order No. 745's two conditions (regarding resource capability and net benefits), PJM's proposal to offer no compensation for non-compliant demand response is unjust and unreasonable, given that these load reductions have been committed by PJM in its supply mix and provide a service to the system, including the reduction of real-time LMPs.

25. Demand Response Supporters also object to PJM's proposed three-hour advance notice requirement, arguing that a more reasonable requirement would be a one-hour rule, consistent with PJM's existing rule providing for a one-hour notice requirement for generators that choose to adjust their schedules.[12] Demand Response Supporters add that, because self-scheduled demand response is, by definition, not subject to a PJM dispatch, self-scheduled demand response should not set market-clearing prices but should be paid the LMP when the net benefits test is met.

c. PJM's Answer

26. PJM responds to the argument raised by Demand Response Supporters and ECS that, under PJM's scheduling proposal, the existing flexibility associated with demand response scheduling is lost. PJM argues that its proposal leaves in place an Economic Load Response resource's ability to self-schedule in a manner also available to generation resources, that is, by submitting a zero-dollar offer in PJM's energy markets.

27. PJM also challenges Demand Response Supporters' counter-proposal to allow Economic Load Response participants to receive LMP compensation for their load reductions if the participant gives PJM at least one-hour advance notice of the reduction. PJM responds that its three-hour proposal is based on PJM's operational requirements for dispatch. PJM argues that, nevertheless, Demand Response Supporters' counter-proposal is unsupported by a citation to any of PJM's actual dispatch processes, but rather is based on a

[12] *See* PJM Operating Agreement at Schedule 1, Section 1.10.9(b).

market rule applicable to generators under narrow, carefully-prescribed circumstances that do not include the right to rescind a prior offer.[13]

28. In further defense of its proposed three-hour notice requirement, PJM argues that it will not necessarily commit a resource three hours in advance of the operating hour. PJM states, rather, that it will evaluate demand response resources comparably alongside available generation resources and may dispatch demand resources closer to the operating hour, depending on the time frame specified in each demand response resource's bid for how long it needs to respond to a dispatch instruction.

d. Additional Answers

29. Demand Response Supporters also respond to PSEG's and EPSA's argument that demand response should be subject to a "must offer" requirement. Demand Response Supporters argue that such an obligation is not required by Order No. 745 and would otherwise represent an impermissible and unworkable barrier to demand response participation in PJM's markets.

30. EPSA disputes Demand Response Supporters' assertion that self-scheduled demand response balances supply and demand. EPSA argues that this showing cannot be made because a mere reduction in load does not reduce the need for PJM to dispatch additional generation where (due to the lack of notification) the generation has already been dispatched.

e. Commission Determination

31. We find that PJM's proposal to require three hours notification for real-time demand response is consistent with the requirements of Order No. 745. Order No. 745 emphasized that the net benefits test requires that the "demand response resource clears in the RTO's or ISO's economic dispatch," so that "the demand response resource is a cost-effective alternative to generation resources for balancing supply and demand."[14] We find PJM's

[13] PJM notes that under the provision at issue, Schedule 1, Section 1.10.9(b) of the PJM Operating Agreement, a market participant is permitted to adjust the schedule of a resource under its dispatch control up to an hour before the operating hour only when scheduling a non-firm bilateral transaction, modifying certain self-scheduled resource increments, or upon the receipt or delivery of non-firm spot market energy.

[14] Order No. 745, FERC Stats. & Regs. ¶ 61,322 at P 3. While Order No. 745 referred to self-schedules (*see id.* P 9), any self-schedules still need to be subject to reasonable scheduling rules in order to ensure that the net benefits test is met.

proposal for a three-hour notice period provides a reasonable amount of time for PJM to determine whether to schedule demand response resources and displace higher priced generation. Only when load reductions are identified on a timely basis will PJM's dispatchers be able to determine whether the load reduction is a cost effective alternative that can displace a generation resource and therefore be appropriately evaluated against other resources and the net benefits test.

32. Demand Response Supporters object to PJM's proposed three-hour notice requirement, arguing, instead, for a one-hour notification allowance, consistent with PJM's existing rule providing for a one-hour notice requirement for generators that choose to adjust their schedules. We do not find sufficient record evidence that PJM's three-hour proposal is unjust and unreasonable or that PJM can perform the necessary scheduling with only one hour's notice. PJM explains that its dispatchers make their final resource selections through the least-cost security constrained dispatch two hours ahead of the operating hour. Indeed, as PJM notes, the current one-hour notice requirement is only for limited circumstances: adjusting a schedule for a non-firm bilateral transaction, receiving or delivering non-firm spot market energy, or certain self-scheduled resource increments.[15] Thus, we do not find that a one-hour notification period would be sufficient to permit PJM to schedule demand resources in the real-time market. We conclude that a three-hour rule, as proposed, is just and reasonable.

33. FirstEnergy and PSEG argue that a demand response resource, like a generation resource, should be subject to a "must offer" obligation and should not be exempt from participation in the day-ahead market. We reject FirstEnergy's and PSEG's arguments and requests as they are beyond the scope of this proceeding. Economic Load Response resources are not currently required to offer in the day-ahead market, and FirstEnergy and PSEG have not shown why it is necessary to require them to do so as part of PJM's compliance with Order No. 745. As PJM noted, in its answer, the compliance filing is solely concerned with Economic Load Response. Whether Economic Load Response, which can be a capacity resource, should have a "must-offer" requirement, is outside the scope of this compliance filing. Furthermore, under PJM's current rules, Economic Load Response can reduce on just five minutes notice. Increasing the required minimum notice to three hours does not constitute undue discrimination in favor of demand response. We find that PJM's proposed rules for demand reductions provide the flexibility to demand response resources that seek to participate in the real-time market in a manner similar to PJM's current self-scheduling rules. This flexibility will allow a demand response resource that satisfies the net benefits test (and thus is shown to be cost-effective) to balance supply and demand as an alternative to a generation resource.

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[15] *See* PJM Answer at 6, n.14.

34. Demand Response Supporters argue that PJM's existing self-scheduling rules comply with Order No. 745. ECS argues that Order No. 745 does not require PJM to remove either self-scheduled demand response or self-scheduled generation from the supply stack used to develop the net benefits test. ECS further argues that committed self-scheduled demand response should be eligible for LMP-based compensation.

35. We reject ECS' and Demand Response Supporters' arguments as explained above. Order No. 745's net benefits test requires that PJM have sufficient time to schedule demand resources so that they can clear in the RTO's economic dispatch. PJM's proposal allows PJM to rely on Economic Demand Response as an operational resource as contemplated by Order No. 745 — a capability unavailable to PJM under a pure (un-dispatched) self-scheduling regime. PJM's proposal to require demand response resources to provide three hours' notice satisfies the Order No. 745 requirement that PJM use these resources to balance supply and demand in the real-time energy market.

3. Net Benefits Test

a. Order No. 745 Requirements

36. In Order No. 745, the Commission recognized that, depending on the change in the LMP relative to the size of the energy market, dispatching demand response resources may result in an increased cost per unit ($/MWh) to the remaining wholesale load, due to the inherent, overall decreased amount of load paying the bill. This is referred to as the "billing unit effect."[16] In order to address this effect, the Commission required each RTO and ISO to implement a net benefits test to determine whether a demand response resource is a cost-effective alternative to generation for balancing supply and demand in any given hour.[17]

[16] Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 3.

[17] Although the Commission noted that integrating the billing unit effect into the RTO/ISO dispatch processes has the potential to more precisely identify when demand response resources are cost effective, the Commission acknowledged the position of several RTOs and ISOs that it may be difficult to modify their dispatch algorithms in the near term. Therefore, the Commission required RTOs and ISOs to perform a net benefits test on a monthly basis to determine under which conditions it is cost-effective to pay the LMP to demand response resources. Additionally, the Commission directed RTOs and ISOs to study the feasibility of developing a dynamic net benefits approach to dispatching demand response resources that takes into account the billing unit effect in the economic dispatch in both the day-ahead and real-time energy markets and file the results of the study with the Commission by September 21, 2012.

37. Specifically, Order No. 745 directed each RTO and ISO to undertake an analysis on a monthly basis, based on historical data and the prior year's supply curve, to identify a price threshold to estimate where customer net benefits would occur. The Commission further explained that the RTO or ISO should determine the threshold price corresponding to the point along the supply stack, for each month, at or beyond which the benefit to load from the reduced LMP resulting from dispatching demand response resources exceeds the increased cost to load associated with the billing unit effect, and update the calculation monthly as new information becomes available.[18]

38. The Commission further explained that the threshold point along the supply stack for each month will fall in the area where the supply curve becomes inelastic,[19] rather than the extreme steep portion at the peak or in the flat portion of the supply curve. In other words, LMP will be paid to demand response resources during periods when the nature of the supply curve is such that small decreases in generation being called to serve load will result in price decreases sufficient to offset the billing unit effect.[20]

b. PJM's Proposal

39. PJM proposes to add to its tariff a statement of the general requirements and objectives of the net benefits test, a specification of the monthly recalculation and posting requirements, and a step-by-step description of the threshold price calculation method. PJM also submits supporting data (supply curves and calculated threshold prices, with supporting details, for the last 12 months). PJM states that its proposed tariff revisions incorporate Order No. 745's formulaic definition of the desired threshold price.[21] PJM adds that it will use a six-step method to calculate the threshold price on a single, region-wide basis.[22]

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[18] Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 79.

[19] Supply elasticity is defined as the percentage change in quantity supplied divided by the percentage change in price. When the elasticity is less than or equal to one, supply is considered inelastic. So, for example, in the inelastic portion of the supply curve, a reduction in quantity supplied by one percent will result in more than a one percent decrease in price. Using the terms related to demand response compensation, the billing unit effect (percentage change in quantity supplied) will be more than offset by lower LMP (percentage change in price), thus resulting in lower prices for wholesale load. *Id.* P 63, n.163.

[20] *Id.* P 80.

[21] *Id.* P 79, n.162. (identifying the threshold price as the point where (Delta LMP x MWh consumed) > (LMP_{new} x DR), where LMP_{new} is the market clearing price after Economic Load Response is dispatched and Delta LMP is the price before Economic Load

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40. PJM states that, first, it will retrieve generation offers from the same calendar month of the prior calendar year for which the calculation is being performed, employing market-based price offers, to the extent available, or the least-expensive cost-based offers, otherwise. PJM states that, second, it will adjust, on a monthly basis, the historic offers for changes in fuel prices. Third, PJM proposes to combine the offers to create daily supply curves for each day in the period to determine the amount of supply available from each generator at each price point. As a fourth step, PJM states that it will average the daily curves for each day in the month to form an average supply curve for the study month to yield the monthly average amount of energy offered at each price point. PJM states that, fifth, it will use a non-linear least squares estimation technique to determine an equation that reasonably approximates and smoothes the average supply curve (thus eliminating steps and plateaus in the raw curve).[23] Finally, PJM states that it will determine the net benefit level as the point at which the price elasticity of supply is equal to 1 for the estimated supply curve equation, thus producing the threshold price.

c. Protests and Comments

41. Rockland objects to PJM's proposed use of a single, region-wide threshold price. Rockland argues that PJM's filing fails to support its proposal or discuss alternatives, including options that would take into account transmission congestion, varying LMPs within PJM, and differing values of demand response across PJM. Rockland argues that the establishment of a single price point will undermine the ability of PJM's price threshold to ensure that demand response is activated in areas where it is producing positive net benefits for load. Rockland adds that, by contrast, defining multiple location price curves can be managed by regionalizing the PJM grid, that is, by combining zones. Rockland concludes that, absent a regionalized approach, PJM will not be able to satisfy the net benefits test's underlying objective of identifying where the benefits of the reduced LMP exceed the cost of dispatching and paying LMP to the resources determined to be eligible.

Response is dispatched minus the LMP_{new}).

[22] PJM states that it is not proposing to conduct the net benefits test on a locational basis. PJM argues that calculations of this sort would be overly complicated, requiring PJM to make numerous administrative assumptions about power flows and other system conditions every month.

[23] PJM states that it will indentify, in its manuals, the general equation form to be used at any particular time, in order to retain flexibility as to which equation form will provide the best fit to the actual supply curve for the month at issue.

d. PJM's Answer

42. PJM responds to Rockland's argument that a single, region-wide threshold price should be replaced by a locational approach combining zones. PJM argues that Rockland's proposal is unworkable. PJM explains that generation in one area can supply load in another and that, to account for this, PJM would need to make assumptions about transfer capability and include generation from outside a given region only up to the level of the assumed transfer capability into the given region. PJM adds that each zone combination could not be evaluated in a vacuum and that all events would need to be considered simultaneously among all zone combinations. PJM argues that Rockland's approach would require PJM to replicate the complicated system modeling necessary to run its capacity market auctions for every day of the year rather than on an annual basis, as currently operated. PJM further argues that it then would need to develop some acceptable means for averaging the daily assumed system flows, conditions, and capabilities across each month, which would increase the complexity of the net benefits test calculation.[24]

e. Commission Determination

43. We accept PJM's proposed provisions implementing the Commission's net benefits test. Order No. 745 directed ISOs and RTOs to identify a monthly price threshold, that is, the point on a representative supply curve where the price elasticity of supply is equal to one.[25] We find that both PJM's calculation of the net benefits test and the determination of the threshold price level comply with the Commission's directive. PJM's proposed provision implementing the Commission's net benefits test, and establishing a single price point RTO-wide, are sufficient to enable PJM to estimate where customer net benefits will occur, as contemplated by Order No. 745.

44. We reject Rockland's argument that absent a regionalized approach, PJM will not be able to satisfy the net benefits test as determined by Order No. 745. In Order No. 745, the Commission recognized that the net benefits test to be implemented in this compliance filing would be only an "approximation" to determine a price threshold at which the

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[24] *See* PJM Answer at 22.

[25] The monthly threshold price corresponds to the point along the supply stack at or beyond which the overall benefit from the reduced LMP resulting from dispatching demand response resources exceeds the cost of dispatching and paying LMP to those resources. This price level is to be updated monthly, by each ISO or RTO, as the historic data and relevant supply conditions change. *See* Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 4 n.7.

dispatch of demand response resources will be cost-effective.[26] As PJM explains, data for the calculation of multiple locational net benefits price threshold are simply not reasonably available on a more localized basis, and attempting such an analysis would require even more complicated assumptions. PJM explains that generation in one area can supply load in another and that, to account for this scenario, PJM would need to make assumptions about transfer capability and include generation from outside a given region only up to the level of the assumed transfer capability into the given region. PJM further argues that it did not propose numerous different locational determinations of net benefits price threshold because they are too complicated and would require PJM to make numerous administrative assumptions about power flows and other system conditions on a monthly basis. In addition, PJM notes that while individual resources go in and out of service at various times, when viewed on a region-wide basis, the net effect on the estimated average supply curve of all outages for all resources should not vary greatly from one year to the next. For these reasons, we agree with PJM's explanation and confirm that Order No. 745 does not require PJM to establish multiple locational supply curves and price thresholds for the formulation of the net benefits test and the determination of the threshold price level.

4. Measurement and Verification

a. Order No. 745 Requirements

45. In Order No. 745, the Commission noted concerns that compensating demand response resources at the LMP during all hours could make it difficult to determine baselines for demand response providers. However, because Order No. 745 required payment of LMP for demand response subject to a net benefits test -- and not during all hours -- the Commission found that implementation of Order No. 745 would not appear to prevent the determination of appropriate baselines.[27] Nonetheless, noting that measurement and verification protocols are critical to the integrity and success of demand response programs, the Commission directed each RTO and ISO to include in its compliance filing an explanation of how its current measurement and verification procedures will continue to ensure that appropriate baselines are set, and that demand response will continue to be adequately measured and verified as necessary to ensure the performance of each demand response resource. The Commission directed each RTO and ISO to propose, if necessary, any changes needed to ensure that measurement and verification of demand response will

[26] *Id.* P 4.

[27] *Id.* P 94.

adequately capture the performance (or non-performance) of each participating demand response market participant to be consistent with the requirements of Order No. 745.[28]

b. PJM's Proposal

46. PJM states that revisions to its tariffs are required to meet Order No. 745's objectives to "ensure that [customer's] baselines remain accurate and that they can verify that demand response resources have performed."[29] PJM also states that in 2010, generation and transmission charges represented more than half of the LMPs for settled Economic Load Response reductions. Therefore, paying full LMP, under Order No. 745, without the generation and transmission offset, could more than double the compensation paid to Economic Load Response. Because an Economic Load Response that qualifies under the requirements of Order No. 745 will be able to set price in both the day-ahead and the real-time energy markets, scheduled quantities in both day-ahead and real-time must be accurate. If the scheduled quantities are not accurate, the resulting prices that incorporate quantities in the LMP calculations would be incrementally less accurate.

47. Under PJM's current market rules, the Customer Baseline Load (CBL) calculation is the PJM's primary means of securing accurate information for its LMP calculations. PJM asserts that if its CBL is not accurate, there is a risk that: (i) PJM may displace more generation than it expects and degrade the economic efficiency of dispatch; (ii) Economic Load Response may distort LMP calculations; (iii) market participants will game the market to take advantage of increased Economic Load Response compensation; and (iv) PJM will be less able to handle the influx of larger customers with more variable loads.

48. PJM states that it commissioned a study by a consultant to address the effectiveness of different demand response baselines, based on the two most recent years of actual load reduction data in the PJM region.[30] PJM states that, based on the findings of the KEMA Report, the performance of the tested CBL depended on whether the customer load at issue was a variable load or a non-variable load. Specifically, PJM states that measuring CBL using the average of the highest four-out-of-five most recent load days over a defined period, with an additive adjustment (the Symmetric Additive Adjustment), a modification

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[28] *Id.*

[29] *Id.* P 100.

[30] *See* "PJM Empirical Analysis of Demand Response Baseline Methods," KEMA, Inc. (April 20, 2011) (KEMA Report), available on PJM's website at: http://pjm.com/~/media/committees-groups/committees/mic/20110510/20110510-item-09a-cbl-analysis-report.ashx.

which generally corresponds to PJM's existing practice, performed well across all segments, time periods, and weather conditions for loads that were non-variable, but not for loads that were variable.[31] PJM's CBL proposal makes the currently optional Symmetric Additive Adjustment mandatory and eliminates the weather sensitive adjustment, which KEMA found to degrade CBL performance.

49. Based on these findings, PJM proposes to revise its CBL measurements to distinguish between variable and non-variable loads.[32] PJM proposes that for the variable portion of load, PJM and the Economic Load Response participant develop an alternative CBL method subject to the requirement that this alternative be shown to produce results within the accepted range of accuracy, as based on the test utilized in the KEMA Report, that is, based on an hourly relative root mean square error test.[33] If the Economic Load Response participant and PJM cannot agree on a CBL within 30 days, PJM proposes that it be authorized to determine a CBL methodology within 20 days from the expiration of the 30-day period that will be binding upon both interested parties.[34]

50. PJM also proposes to modify its existing CBL rule to remove a possible 15-day extension to an existing 45-day "look back" period. PJM explains that its CBL rule, for weekdays, uses the average of the four highest of the five most recent days that meet certain specified criteria. PJM notes that, to find these days, PJM looks back over the 45 calendar

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[31] To apply this adjustment, a market participant must: (i) calculate the average usage for the three-hour period ending one hour before the start of an event; (ii) calculate the average usage over the three-hour period in the CBL that corresponds to the three-hour period; (iii) subtract the results of (ii) from the results of (i) to determine the Symmetric Additive Adjustment (the resulting usage may be positive or negative); and (iv) add the Symmetric Additive Adjustment (that is, the results from (ii) to each hour in the CBL that corresponds to each event hour. *See* PJM Operating Agreement at Schedule 1, Section 3.3A.3.

[32] PJM notes that "non-variable," in this context, refers to the portion of loads for which the default CBL method was found to be optimal by the KEMA Report, while "variable" means the portion of loads for which the CBL fell outside the range of acceptable accuracy. PJM notes that while the KEMA Report used a ten percent hourly error as the limit of an acceptable average error, PJM is proposing to use a twenty percent hourly error.

[33] This test is based on the median of the relative root mean squared error, a statistic that expresses the baseline's average hourly accuracy as a fraction of average hourly load for the typical customer.

[34] *See* proposed Operating Agreement at Schedule 1, Section 3.3A.2.01(c).

days preceding the load reduction event (and, in certain cases, looks back an additional 15 days). PJM asserts, however, that the farther back this period extends, the less likely it is that it will accurately reflect current consumption levels or patterns. PJM argues that, as such, the possibility of a 15-day extension, increases the possibility of less accurate CBL calculations.[35]

c. Protests and Comments

51. ECS objects to PJM's measurement and verification proposal on procedural grounds, arguing that PJM's reliance on the KEMA Report came without vetting by PJM's stakeholders. ECS requests that the Commission require PJM to maintain its current measurement and verification procedures, absent a Commission determination that these provisions are non-compliant with Order No. 745 and that PJM's proposal satisfies these requirements.

52. Demand Response Supporters argue that PJM's existing measurement and verification rules generally comply with Order No. 745 and thus obviate the need to consider PJM's proposed changes at this time, in advance of PJM's stakeholders' further consideration of the KEMA Report and related issues. Demand Response Supporters request that the Commission reject PJM's proposal, without prejudice to PJM filing changes following the conclusion of the currently-pending stakeholder proceeding.

53. In the alternative, Demand Response Supporters argue that if PJM's proposal is considered on the merits, revisions are required. First, Demand Response Supporters assert that all guidelines applicable to the classification of a load, as variable or non-variable, must be set forth in PJM's tariffs, not the PJM Manuals. In addition, Demand Response Supporters object to PJM's proposed use of the Symmetric Additive Adjustment on all non-variable loads. Demand Response Supporters claim that the Symmetric Additive Adjustment considers only the accuracy of the measured reduction, while ignoring the fact that the Symmetric Additive Adjustment increases uncertainty about the amount of demand response for which a resource will be credited. Demand Response Supporters argue that if a customer cannot be certain about the amount to be offered and the amount that will be credited, it will not know sufficiently in advance how much load it can economically

[35] PJM notes that this look-back option is very rarely used. *See* Transmittal Letter at 27.

reduce.[36] Demand Response Supporters add that universal application of the Symmetric Additive Adjustment may not be appropriate given customers' unique consumption and operational patterns in the hours leading up to interruptions. Demand Response Supporters argue that, if the Symmetric Additive Adjustment is used, the measurement produced by it should be made known to the demand response resource sufficiently in advance of the demand reduction and the Symmetric Additive Adjustment, once determined, should be the final adjustment to the CBL.

54. With respect to PJM's proposal relating to variable loads (and the circumstances presented where the interested parties cannot agree on a CBL), Demand Response Supporters object to PJM's proposal to set the CBL methodology. Demand Response Supporters argue that PJM's proposal includes no guidelines, or parameters, that would govern PJM's unilateral right to set the CBL. Demand Response Supporters asserts that these guidelines, or parameters, be discussed and formulated in a stakeholder proceeding for subsequent filing with the Commission.

55. Comverge protests the proposed measurement and verification protocols as they apply to residential and small commercial customers and urges the Commission to require PJM to maintain its existing protocols to measure and verify the load reductions of residential and small commercial customers. Specifically, Comverge protests the new tariff requirement that each demand response resource supply 60 days of meter data upon registration and requests that PJM continue to use its existing methodologies to measure and verify demand reductions from residential and small commercial customers. In addition, Comverge objects to the requirement that CSPs be responsible for maintaining or ensuring demand response resources have the capability to receive and act upon dispatch instructions from PJM.

d. PJM's Answer

56. PJM argues that the protests recommending the Commission reject PJM's proposed measurement and verification revisions fail to present any evidence contradicting the KEMA Report's finding that PJM's existing rules are not sufficiently accurate. PJM adds that intervenors' arguments also fail to rebut PJM's showing that LMP compensation, as

[36] Demand Response Supporters note, for example, that a customer with a 10 MW CBL may be planning to reduce 5 MWs of load, having determined the price at which the 5 MW reduction may be economical. Demand Response Supporters point out, however, that if the Symmetric Additive Adjustment reduces the CBL by 2 MWs, and the customer proceeds with a 5 MW reduction, the customer will receive credit for only 3 MWs, thus upsetting the economics of the demand response decision.

required by Order No. 745, would only exacerbate these existing shortcomings if not replaced by more accurate CBL measurements.

57. PJM also responds to intervenors' argument that PJM's measurement and verification proposal is premature and should be further vetted in the stakeholder process. PJM argues that its proposal, in this regard, was not discretionary, but was rather required by Order No. 745. PJM asserts that, regardless, it relied on a focused stakeholder process to receive input on its compliance proposal and to determine if a consensus could be reached. PJM adds that while a consensus was not reached, a solid majority of just under 60 percent of PJM's stakeholders supported PJM's proposal. In addition, PJM states that its stakeholders are continuing to consider the PJM Manual changes that will be required, in the event PJM's measurement and verification proposal is accepted.

58. PJM also challenges intervenors' requests for specific changes to PJM's proposed measurement and verification rules. First, PJM disputes Demand Response Supporters' argument that the Symmetric Additive Adjustment will increase a market participant's uncertainty about how much load reduction it is providing at any given moment. PJM argues that, with experience, demand response resources will be able to predict load reductions with a high degree of accuracy. PJM asserts that, in addition, the Symmetric Additive Adjustment will ensure that over time the increases and decreases to the CBL will even out, while good faith deviations from the dispatched reduction quantity will be protected by PJM's proposed 20 percent bandwidth, that is, a load reduction resource will be deemed not to be following PJM's dispatch instructions only if its actual load reduction is less than 80 percent, or more than 120 percent, of the desired reduction.[37]

59. PJM also responds to Demand Response Supporters' recommendation that additional guidelines, or parameters, are required (and should be included in PJM's tariffs) addressing PJM's determination of a variable load CBL (as required when an acceptable CBL cannot be agreed upon). PJM argues that the detail-oriented concerns and implementation details raised by Demand Response Supporters are appropriate for inclusion in the PJM Manuals, consistent with PJM's existing "alternative" CBL rules.

60. PJM also responds to Comverge's argument that PJM's existing measurement and verification rules should be retained as they apply to the load reductions of residential and small customers. PJM clarifies that it only needs meter data from each individual

[37] Under PJM's proposal, economic load response will not accrue balancing Operating Reserve charges so long as actual performance deviates by no more than 20% percent of the dispatched demand reduction. *See* PJM Operating Agreement, Schedule 1 at Section 3.2.3 (o-1). The deviation bandwidth is addressed in further detail below.

residential, or small commercial, customer if it is not a direct load control customer.[38] PJM adds that because most residential and small commercial customers are under direct load control (and because an aggregate CBL will be calculated for all customers on the same registration in accordance with PJM's existing aggregation rules), aggregate data will be sufficient for these customers. PJM argues that its proposed requirement that all other demand response resources supply 60 days of meter data is necessary to ensure that PJM has sufficient data to calculate each demand response resource's CBL. PJM responds that its proposed requirement is appropriate because it will ensure that demand response resources fulfill their dispatch obligation and provide a service to the market. PJM asserts that without this requirement, a demand response resource is not an operational resource that PJM can call upon to balance supply and demand.

e. Commission Determination

61. We accept PJM's proposed measurement and verification provisions, subject to condition. As PJM explained, effective participation of demand response in its economic dispatch requires that PJM have an accurate CBL method in order to calculate the actual demand reduction level that can be expected from that dispatch. As PJM also noted, its existing rules do not require Economic Load Response participants to install telemetering capabilities in order to accurately measure actual load reduction that can be expected from PJM's economic dispatch.[39] Under PJM's existing program, Economic Load Response participants measure their load reductions by comparing metered load data against an estimate of what metered load would have been absent the reduction. As PJM stated, the CBL calculation, in the absence of telemetered data, is the primary means of securing accurate information for its LMP calculations.

62. As the Commission found in Order No. 745, accurate measurement and verification is critical to the integrity and success of demand response programs.[40] PJM's proposal creates a more accurate baseline, which will allow PJM to verify that demand response resources have performed in accordance with the directives of Order No. 745. Thus, we find PJM's proposal in compliance with Order No. 745.

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[38] PJM defines a direct load control customer to include customers that have air conditioning units, water heaters, and/or pool pumps that are cycled by their electric distribution company for demand response purposes. We note that this definition does not preclude such cycling by CSPs.

[39] *See* PJM's Transmittal Letter at 5.

[40] Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 93.

63. We agree, in part, with Demand Response Supporters, however, that PJM must provide guidelines, or parameters, in its tariff, governing PJM's unilateral right to set a CBL when a variable load and PJM cannot reach an agreement. PJM argues that these detail-oriented concerns should be addressed through the stakeholder process and included in the PJM Manuals. We agree that these rules should be developed through the stakeholder process. However, because these rules will inevitably affect rates, we require that these rules be included in PJM's tariff. Accordingly, we direct PJM to submit the appropriate tariff language in a compliance filing to be made within 90 days of the date of this order.

64. We reject ECS's and Demand Response Supporters' argument that PJM's measurement and verification proposal is premature because it was not vetted by PJM's stakeholders. PJM's compliance proposal was reviewed through PJM's stakeholder process. While PJM's proposed tariff changes failed to receive approval in their entirety, PJM's compliance requirement with respect to measurement and verification was not discretionary. PJM was required by Order No. 745 to evaluate the effect of the changes in compensation for demand response on its existing measurement and verification protocols.

65. We also deny Demand Response Supporters' request to reject PJM's proposal based on their claim that PJM's existing measurement and verification rules comply with Order No. 745. PJM expects that, as a result of the Order No. 745 compensation rule, many customers will seek to participate in its markets who had not done so previously. PJM points to end-use customers with LMP-indexed retail contracts who are offered limited compensation under the current rule, but will now have an opportunity to secure increased compensation. These LMP-indexed customers tend to be larger and more sophisticated energy users. As PJM points out, the CBL rules must be modified to accommodate an expected influx of these larger customers that ensure more accurate and reliable measurement of their potentially more variable loads. Further, the proposed rules will set a consistent standard that improves the accuracy of CBLs for both variable and non-variable loads.

66. We also reject Demand Response Supporters' argument that PJM's proposed use of Symmetric Additive Adjustment on non-variable loads is inappropriate, because it would create additional uncertainty about the amount of demand response for which a resource will be credited. As PJM points out, PJM's current rules already include a weather sensitive adjustment and an optional Symmetric Additive Adjustment. The Symmetric Additive Adjustment allows market participants to normalize their CBLs based on their actual usage just before an event. Moreover, if the standard method produces a baseline that does not accurately represent a non-variable loads' usage pattern, the error would be too great and the load would be designated as a variable load. In addition, as noted by PJM, the proposed 20 percent deviation from an electronic dispatch signal bandwidth helps protect economic load response from good faith deviations. If a non-variable resource determines that the uncertainty resulting from the Symmetric Additive Adjustment is too great, PJM's Operating Agreement allows that resource to propose an alternative methodology for determining its baseline so long as it results in an hourly relative root mean square error of

20 percent or less.[41] As noted above, we approve of PJM's move towards a results-oriented measurement and verification methodology. We find that the proposed revisions provide adequate flexibility for both non-variable and variable loads.

67. We address Comverge's argument that PJM's 60-day data requirement makes it difficult for residential and small commercial participation in PJM's demand response markets. In its answer, PJM clarifies that these requirements apply only if the residential and small commercial participants are not part of a direct load control program. As PJM's answer further notes, most of these small participants are enrolled in direct load control programs and will therefore be aggregated under the current Economic Load Response aggregation rules. Accordingly, we direct PJM to submit the appropriate tariff change in a compliance filing to be made within 90 days of the date of this order. The 60-day data requirement is put in place to allow PJM to separate the variable loads from the non-variable loads, a distinction that PJM argues will improve the accuracy of CBLs. Under the proposed rules, Comverge may propose an alternative data submission method for the minority of residential and small commercial participants who may have trouble meeting the data requirements.

68. Finally, Comverge objects to the requirement that CSPs "be responsible for maintaining or ensuring" demand response resources have the "capability to receive and act upon" dispatch instructions from PJM. This requirement ensures that demand response resources fulfill their dispatch obligation and provide a "service" to the market. With the capability to receive and act upon dispatch instructions, a demand response resource is an operational resource that PJM can call upon to balance supply and demand. We note that PJM already has a requirement, in its tariff, regarding metering. Specifically, Schedule 1, Section 1.5A.4(a) of the Operating Agreement states "[t]he Curtailment Service Provider is responsible to ensure that the Economic Load Response Participants have metering equipment that provides integrated hourly kWh values on an electric distribution company account basis." Thus, we find the requirement reasonable.

5. Cost Allocation

a. Order No. 745 Requirements

69. The Commission explained in Order No. 745 that while dispatching demand response resources results in lower LMPs, transmission constraints may affect which customers benefit from that lower LMP. In hours without transmission constraints, RTOs establish a single LMP for their entire system, in which case demand response would result in a benefit to all customers on the system. In hours when transmission constraints exist, LMPs may

[41] *Id.* at Section 3.3A.2.01.

vary by zone or other geographic area and dispatching a demand response resource in a particular geographic region may not reduce LMPs system-wide and, consequently, not all system customers would benefit.[42]

70. For these reasons, the Commission determined that it is just and reasonable to allocate the costs associated with demand response compensation proportionally to all entities that purchase from the relevant energy market in the area(s) where the demand response reduces the market prices for energy at the time the demand response resource is committed or dispatched.[43] Thus, the Commission required each RTO and ISO to make a compliance filing that either demonstrates that its current demand response cost allocation methodology appropriately allocates costs to those that benefit from the demand reduction or proposes revised tariff provisions that conform to this requirement.[44]

b. PJM's Proposal

71. PJM states that when the LMP is at, or above, the net benefits threshold price and loads are reduced in response, any area where the price is at or above this threshold price can reasonably be deemed to have been affected by the load reduction. Accordingly, PJM proposes to allocate the cost of demand response to all load in each area where the LMP exceeds the threshold price.[45] Specifically, PJM proposes to allocate costs to market participants with real-time exports and to load serving entities with real-time loads (within a zone) on a ratio-share basis, respectively.

72. PJM asserts that because the threshold price used in the net benefits test is calculated on a region-wide basis (rather than on a locational basis), it is appropriate to allocate the costs of paying for load reductions on a similarly broad basis. PJM adds that the comparatively low threshold price means that it is likely the LMPs in higher-priced zones benefited from the price effect of the load reduction, even if those zones subsequently separate, at a higher price, from the zone where the compensable load reduction occurred.

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[42] Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 100.

[43] *Id.* P 102.

[44] *Id.*

[45] PJM states that, under its current market rules, Economic Load Response is compensated at LMP, minus certain generation and transmission charges, that is, at LMP-(G+T). PJM adds that it currently allocates the cost of payments for load reductions made by Economic Load Response participants to the load serving entity that is responsible for serving the load that was reduced.

73. PJM states that its proposed tariff revisions simplify the allocation process by using transmission zones as the smallest relevant area. PJM states that while constraints can arise within zones, the areas affected by such constraints are dynamic and not fixed in advance. PJM notes that there is not likely to be much intra-zone price separation below the comparatively low threshold price.

c. Protests and Comments

74. Constellation supports PJM's cost allocation proposal, noting that while an argument could be made that the broad development of the net benefits threshold price would mean allocating across all load and exports in PJM proportionally, without regard to settlement zones, the general practice has been that all loads settle on a zonal basis with a single energy price. Constellation adds that, because this is the price where benefits would arguably manifest themselves under the net benefits test, it is consistent that the costs should be allocated to the zones where the LMP is above the overall threshold and not to zones where the prices have not reached the threshold level.

75. By contrast, Rockland argues that PJM's cost allocation proposal fails to comply with Order No. 745's requirement that costs be allocated where the demand response resource reduces the market price.[46] Rockland argues that PJM's proposal incorrectly assumes that when demand response is activated anywhere within the PJM region, it will reduce LMPs on a region-wide basis, if the LMP is higher than the threshold. Rockland responds that if a region is experiencing a higher LMP as a result of a constraint and demand response is activated upstream of that constraint, there is no reason to expect that demand response is benefiting the constrained region. Rockland adds that PJM's proposal to allocate costs to regions with higher LMPs without showing that these regions are benefitting from demand response activation is discriminatory and contrary to Order No. 745.

d. PJM's Answer

76. PJM responds to Rockland's argument against a regionalized approach to cost allocation. PJM argues that Rockland's proposal is unworkable for the same reasons, summarized above, regarding Rockland's proposed regionalized application of the net benefits test.[47] PJM argues that the assumptions required to determine, on a regional basis,

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[46] Rockland Protest at 7, *citing* Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 100.

[47] *See supra* P 42 (summarizing PJM's answer to Rockland's argument that a single, region-wide threshold price should be replaced by a locational approach combining zones) .

the exact areas to which costs for compensating demand response should be allocated are significant in both number and scope. PJM concludes that until it is able to adopt a dynamic approach (and evaluate the relevant metrics, as envisioned by Order No. 745), its proposed allocation is reasonable and should be accepted.[48]

e. Commission Determination

77. We accept PJM's proposed method of allocating the costs associated with demand response compensation, subject to conditions. PJM proposes to allocate the cost of demand to all load in each area where the LMP exceeds the threshold price. However, Order No. 745 requires that this allocation be made when the LMP is equal to or greater than the threshold price.[49]

78. Order No. 745 requires that the costs of load reductions made by Economic Load Response participants be allocated to "the areas where the demand response resource reduces the market price for energy at the time when the demand response resource is committed and dispatched."[50] As PJM points out in its answer, determining which areas benefit from a particular load reduction requires numerous assumptions, many of which are similar to the assumptions required when designing the net benefits test. PJM's proposal, as modified herein, will allocate the costs to all areas where the load-weighted average LMP is equal to or greater than the price determined under the net benefits test. Areas with LMPs below the net benefits threshold cannot attribute their low price to commitment or dispatch of demand response resources by PJM, and will not be allocated the costs for demand reductions. We find that PJM's proposed cost allocation methodology broadly satisfies the requirement of Order No. 745. As Order No. 745 explained, the RTOs and ISOs need to look at their systems and determine what methodology best allocates cost to the customers benefitting from the lower LMP resulting from demand response. As noted above, under Order No. 745, the net benefits test is met when LMPs are greater than or equal to the net benefits threshold price. As such, we order PJM to update their proposal to allocate costs to areas where the load-weighted average LMP is greater than or equal to the price determined

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[48] *See* Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 66 ("In addition to requiring each RTO and ISO to construct the net benefits test described herein, the Commission also imposes a second requirement for each RTO and ISO to undertake a study, examining the requirements for and impacts of implementing a dynamic approach to determine when paying demand response resources LMP results in net benefits to customers.").

[49] *Id.* P 79.

[50] *Id.* P 100.

under the net benefits test in a compliance filing to be submitted within 90 days of the date of this order.

6. Behind-the-Meter Generation

a. PJM's Proposal

79. PJM's existing tariff and a single clarification proposed by PJM in its filing permit demand response resources to submit meter data from an on-site generator as evidence of a load reduction in certain circumstances. Section 3.3A.2.02(i) of the PJM Operating Agreement currently provides that "[t]he On-Site Generator shall be used solely to enable an Economic Load Response Participant to provide demand reductions in response to the [LMP] in the Real-time Energy Market and/or the Day-ahead Energy Market." PJM proposes to add the following language at the conclusion of this subsection (i): "and shall not otherwise have been operating."[51] Additionally, subsection (ii) of this same provision currently provides that if subsection (i) does not apply, the amount of energy from the on-site generator used to provide demand reductions in response to LMP "shall be capable of being quantified in a manner that is acceptable to [PJM]."

b. Protests and Comments

80. Demand Response Supporters state that the proposed additional language in subsection (i) is ambiguous and that the intent of the proposed language is unclear. Demand Response Supporters request that the Commission direct PJM to clarify the intent behind the proposed language.

81. Additionally, Demand Response Supporters assert that the plain reading of subsection (ii), read in tandem with subsection (i) and PJM's proposed additional language, leaves to PJM's discretion the quantification of a load reduction where a customer is already operating its on-site generation and decides to ramp up in response to high LMPs. Demand Response Supporters state their concern that this language could enable PJM to deprive a customer operating on-site generation from receiving demand response compensation under certain circumstances. Demand Response Supporters protest the amount of discretion that PJM has reserved for itself to determine the quantity of a load reduction for which a

[51] PJM's Operating Agreement, section 1.3.21A, defines "On-Site Generators" as "generation facilities (including Behind The Meter Generation) that (i) are not Capacity Resources, (ii) are not injecting into the grid, (iii) are either synchronized or non-synchronized to the Transmission System, and (iv) can be used to reduce demand for the purpose of participating in [PJM's energy market]."

customer may be eligible to receive compensation when the customer ramps up its on-side generator.

82. Demand Response Supporters also note that in periods of high LMP, a customer that owns behind-the-meter generation that is eligible to export energy to the PJM system may take steps to curtail its own consumption at the same time that it is running its behind-the-meter generation for export purposes. Demand Response Supporters assert that a load reduction that occurs as a result of the customer's efforts to reduce consumption should be eligible for full LMP compensation, because it is a measured and legitimate demand response reduction from the CBL. Demand Response Supporters argue that PJM's compliance filing is not sufficiently clear to require full LMP compensation to a customer for this type of demand reduction. Accordingly, Demand Response Supporters request clarification that if a customer owning a behind-the-meter generator reduces consumption from its CBL when prices are at, or above, the net benefits threshold, it will be entitled to receive LMP compensation for the demand reduction, irrespective of the fact that the customer also happens to own and be operating behind-the-meter generation at the same time.

83. P3, on the other hand, argues that PJM's compliance filing should, but fails to, prohibit behind-the-meter generation from receiving LMP-based compensation. P3 asserts that PJM's tariff must be revised to preclude payment of demand response compensation to demand response resources that use behind-the-meter generation to supply themselves energy rather than actually reducing demand in response to PJM's call for demand response. P3 argues that when behind-the-meter generation is substituted for generation resources that are in the market, there is an increased cost to consumers rather than a net benefit.

c. PJM's Answer

84. In response to Demand Response Supporters, PJM argues that its proposed tariff revision simply clarifies when meter data from an on-site generator can be submitted as evidence of a load reduction, and does not broadly affect the circumstances in which demand reductions supported by on-site generators are compensated. PJM further argues that its proposed tariff revision simply clarifies that the PJM market need not accept the generator's metered output as evidence of a load reduction if the generation would have otherwise been running. PJM notes that if an entity such as an on-site generator capable of operating at 10 MW is running instead at 5 MW and that generator is then called upon by PJM for a load reduction, the generator's full output capacity (10 MWs) would not be the appropriate measure by which to calculate the load reduction that responds to PJM's dispatch; rather, PJM argues, only the added 5 MW increment would properly be considered as responding to PJM's dispatch. PJM concludes that its proposed tariff revision is appropriate to make clear that the Economic Load Response provider will only be permitted to submit load reduction data for the second 5 MW increment.

85. PJM also argues that in instances where operation of on-site generation results in a net export to the grid, market participants should receive either a credit for exported energy or a credit for demand response, but not both. PJM explains that a separate bus must be modeled for behind the meter generation that results in a net injection into the grid. PJM states that while demand reduction may be submitted at this bus, demand reduction must be measured against expected demand, rather than the metering of behind the meter generation.

86. In response to P3, PJM argues that P3's proposal to bar all demand response associated with behind-the-meter generation from LMP compensation is inconsistent with Order No. 745. PJM argues that if the Commission, in Order No. 745, had intended to deny LMP compensation to the substantial share of load response that is associated with behind-the-meter generation, it would have done so expressly, but did not. PJM adds that, instead, its approach appropriately (and consistent with Order No. 745) compensates behind-the-meter load reductions that are offered directly into PJM's market, selected as a cost-effective alternative to running generation, dispatched by PJM, and cleared at a price that exceeds the net benefits test threshold price.

d. Additional Answers

87. Demand Response Supporters disagree with P3's argument that paying demand response suppliers that do not reduce their demand for electricity, but only substitute energy behind-the-meter to meet the needs of their loads, compounds inefficiencies and costs to consumers. Demand Response Supporters respond that behind-the-meter generation should receive LMP compensation when it is cost-effective under the net benefits test, given that there is no difference to the grid, and no impact to the balance of supply and demand on the grid, between a customer that reduces metered demand by reducing load behind the meter and a customer that reduces metered demand by increasing its own energy sources behind the meter.

88. EPSA argues that Order No. 745 is somewhat ambiguous on the issue of paying behind-the-meter generation as demand response, but that a literal interpretation of the definition of demand response used in Order No. 745 dictates that behind-the-meter generation should not be considered demand response for purposes of compensation.[52] Instead, EPSA asserts that behind-the-meter generation should be required to participate in wholesale markets as generation. EPSA argues that behind-the-meter generation is not a real reduction in load and creates a perverse economic incentive for generation to move

[52] EPSA Answer at 16-17, *citing* Order No. 745, FERC Stats. & Regs. ¶ 31,322 at P 2 n.2 ("Demand response means a reduction in the consumption of electric energy by customers from their expected consumption in response to an increase in the price of electric energy or to incentive payments designed to induce lower consumption of electric energy.").

behind the meter when possible, even when it is less efficient to do so. EPSA alleges that allowing behind-the-meter generation to participate as a demand response product could create gaming opportunities, create market power and mitigation problems, and permit the payment of LMP to behind-the-meter generation for a phantom reduction in load while allowing it to sell that generation to behind-the-meter load. EPSA alleges such a situation could threaten the integrity of centrally organized electricity markets. EPSA asserts that wholesale generation cannot be discriminated against in order to incent and support generation that is not part of the wholesale market.

89. EPSA requests that the Commission address whether Order No. 745 applies to behind-the-meter generation as well as analyze the impacts of behind-the-meter generation on organized markets and demand response programs. EPSA proposes that RTOs and ISOs determine—and inform the Commission—how much behind-the-meter generation exists in their footprints, how much is participating in their markets, how it is participating, how much demand response is or could be considered behind-the-meter generation, and the range of environmental emissions associated with behind-the-meter generation.

e. Commission Determination

90. We accept PJM's proposed clarification regarding when meter data from an on-site generator can be submitted as evidence of a load reduction as consistent with its prior tariff and with Order No. 745's general framework governing LMP compensation. Section 3.3A (§.2.02(i)) of the PJM Operating Agreement provides that a resource can use "On-Site Generators as the basis for Economic Load Response Participant status" when "the On-Site Generator shall be used solely to enable an Economic Load Response Participant to provide demand reductions [.]"[53] We interpret this to mean that meter data from an on-site generator may be used as evidence of a load reduction only to the extent the on-site generator is operated to facilitate its demand reduction. PJM's proposal to add to this section the phrase "shall not otherwise have been operating"[54] is therefore consistent with the meaning of its existing tariff and merely clarifies that when a generator is otherwise operating, it is not being operated to facilitate a demand reduction.[55]

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[53] *See* PJM Operating Agreement at section 3.3A(§.2.02(i)).

[54] *Id.*

[55] Even when subsection (i) does not apply, the generator may still be used pursuant to subsection (ii) if it "shall be capable of being quantified in a manner that is acceptable to [PJM]." Therefore, if an on-site generator with a capacity of 10 MW, which is currently running at 5 MWs, ramps up to 10 MWs, the energy from the on-site generation may be used to support demand reduction under subsection (ii).

91. We reject Demand Response Supporters' argument that PJM's proposed revision to Section 3.3A(§.2.02(i)) taken together with the unchanged Section 3.3A(§.2.02(ii)) grant PJM an undue amount of discretion to quantify the amount of demand response for which a customer may be eligible to receive compensation. Section 3.3A(§.2.02(ii)) states:

> If subsection (i) does not apply, the amount of energy from an On-Site Generator used to enable an Economic Load Response Participant to provide demand reductions in response to the Locational Marginal Prices in the Real-time Energy Market and/or the Day-ahead Energy Market shall be capable of being quantified in a manner that is acceptable to the Office of the Interconnection.

92. As indicated above, the only proposed revision regarding on-site generation in Section 3.3A(§.2.02(i)) does not change the application of PJM's tariff to on-site generators. Nor does this proposed change enlarge or otherwise change the meaning of Section 3.3A(§.2.02(ii)). Under this section, in order to use meter data from an on-site generator that is operating as evidence of a load reduction, the participant must demonstrate that its generator data is capable of being quantified. PJM, in this proceeding, does not propose to revise or change the parameters under which it will determine whether such generator data is capable of being quantified. As such, Demand Response Supporters' argument is beyond the scope of this proceeding.

93. We further deny Demand Response Supporters' request for changes in PJM's tariff to provide that if a customer owning behind-the-meter generation reduces consumption from its CBL, when prices are at, or above, the net benefits threshold, it will be entitled to receive LMP compensation for demand reduction, even though it is also running its behind-the-meter generation to export energy to the PJM system. Order No. 745 did not change the basis upon which on-site generation would be treated for the purposes of determining demand response reductions and PJM has proposed no changes regarding the eligibility of a resource with on-site generation to receive compensation for a demand reduction when the resource is exporting energy to the PJM system. Demand Response Supporters' request is therefore outside the scope of compliance with Order No. 745.

94. We also reject the arguments of P3 and EPSA that customers should not be compensated at LMP for reductions in demand if such reductions are facilitated by the use of behind the meter generation. Under PJM's existing tariff, a customer with behind-the-meter generation that reduces its metered demand by running its behind-the-meter generation is eligible for demand response compensation for this reduction. Order No. 745 did not require the elimination of such payments.

95. Finally, we deny EPSA's request that we analyze, in this compliance proceeding, the impacts of behind-the-meter generation on organized markets and demand response programs. EPSA's request is beyond the scope of this proceeding.

7. Additional Issues

a. Potential for Demand Response Providers to Withhold Services From PJM's Markets

96. FirstEnergy requests that PJM be required to consider whether specific measures should be taken to address the potential for demand response providers to withhold their services from the marketplace. FirstEnergy notes that generation is prohibited from withholding and that the rationale for this prohibition applies equally to demand response resources. FirstEnergy asserts that if demand response resources are allowed to withhold their supplies from the market these resources may have an opportunity to take advantage of increased market prices affected by their own behavior and create opportunities for artificial arbitrage for financial marketers and other market participants.

97. We reject FirstEnergy's request that PJM be required to address market power issues in this compliance proceeding. The question of which resources should be governed by mitigation and required to offer into the energy market is beyond the scope of compliance with Order No. 745.

b. Deviation Bandwidth of 20 Percent for Economic Load Response Resources

98. PJM proposes to require CSPs to maintain, or ensure that participants maintain, the capability to receive and act upon an electronic dispatch signal in order to be able to participate in its economic dispatch. PJM further proposes to set a deviation bandwidth for Economic Load Response of 20 percent, that is, a load resource will be deemed not to be following PJM's dispatch instructions and will be assessed balancing operating reserve charges, only if its actual load reduction is less than 80 percent, or more than 120 percent, of the desired reduction established through the offer and scheduling process. PJM notes that its proposal provides for a deviation bandwidth equal to the largest deviation bandwidth allowed to generation resources under PJM's existing rules. PJM adds that use of the broadest comparable tolerance level for load response deviations from scheduled quantities will facilitate the transition of load reduction resources to participation in PJM's dispatch and will facilitate that transition. PJM also proposes to modify its Economic Load Response participant review process to provide that a participant's registration will be reviewed if its actual loads frequently deviate from its scheduled quantities, as determined for purposes of assessing balancing operating reserves charges.

99. FirstEnergy objects to PJM's proposal as discriminatory. Specifically, FirstEnergy argues that the 20 percent deviation bandwidth exceeds the bandwidth offered to generation, and requests that this preference be denied, or at least accepted for use for a limited period of time only.

100. EPSA, in its answer, raises concerns regarding the application of balancing operating reserve charges given the lack of telemetry for certain demand response resources and the 60-day lag-time in settlement for demand response resources. EPSA requests that PJM be required to consider options for a more timely and accurate application of operating reserve charges through the stakeholder process. We deny EPSA's request as EPSA has not explained how its request relates to compliance with Order No. 745. EPSA describes the problem in only the broadest of terms and does not indicate how it is connected with demand response compensation.

101. Comverge argues that PJM's proposed bandwidth fails to consider residential and small commercial customer participation in PJM's demand response markets. Specifically, Comverge asserts that thermal load (that is, usage involving air conditioning) will hesitate to place energy bids in the summer season due to risks imposed by PJM's bandwidth. Comverge requests that PJM be required to waive its balancing operating reserve charge where a thermal demand response resource operates with the 20 percent limit in an hour in which it is bid but then deviates outside this range in a subsequent hour due to a weather change.

102. PJM responds, in its answer, that its Operating Agreement provides generators the same deviation bandwidth applied to certain resources.[56]

103. We accept PJM's electronic dispatch signal requirements and deviation proposal. We note that under the section of the Operating Agreement referenced by PJM, generators are similarly provided a 20 percent deviation bandwidth when they do not follow PJM's dispatch. As PJM notes in the context of economic load response, the deviation bandwidth allows that amount for good faith deviations. We reject FirstEnergy's request as they failed to provide an explanation as to why demand resources should not be provided the same deviation bandwidth as is currently provided to generation resources.

104. Finally, we reject Comverge's request to waive balancing operating reserve charges where a thermal demand response resource does not operate within 20 percent of the dispatch signal due to a weather change. In general, demand response resources should be treated comparably to generation resources. Comverge has not sufficiently explained why these resources cannot operate within this bandwidth when they are dispatched. Providing additional latitude to residential and small commercial customers due to weather changes could limit PJM's ability to count on these resources to perform as committed and subsequently dispatched, Comverge's proposal would be better addressed through the stakeholder process.

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[56] PJM Answer at 25, *citing* Schedule 1, Section 3.2.3(o) of the Operating Agreement.

The Commission orders:

(A) PJM's compliance filing is hereby rejected, in part, and accepted, in part, as discussed in the body to this order.

(B) PJM is hereby directed to make an additional compliance filing within 90 days of the date of this order, as discussed in the body of this order.

By the Commission. Commissioner Moeller is dissenting in part with a separate statement attached.

(S E A L)

Kimberly D. Bose,
Secretary.

Appendix

Intervenors

American Electric Power Service Corp.
American Forest & Paper Association * **
American Municipal Power, Inc.
Borough of Chambersburg, PA.
Comverge, Inc. * **
Constellation Energy Commodities Group, Inc.
and Constellation NewEnergy, Inc. *
Delaware Public Service Commission
Demand Response Supporters * **
Dominion Resources Services, Inc. *
Edison Mission Energy
Electric Power Supply Association *
EnergyConnect, Inc. * **
Energy Curtailment Specialists, Inc. *
EnerNOC, Inc. * **
Exelon Corporation
FirstEnergy Solutions Corp. *
GenOn Parties
Hess Corportation ***
Maryland Public Service Commission
Monitoring Analytics, LLC
NRG Companies
New Jersey Board of Public Utilities
North Carolina Electric Membership Corp.
Old Dominion Electric Cooperative
PHI Companies
PJM Industrial Customer Coalition * **
PJM Power Providers Group *
PSEG Companies *
Rockland Electric Company *
Steel Producers
Viridity Energy, Inc. * **

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* protest and/or comment
** intervenor submitting joint protest as Demand Response Supporters
*** motion to intervene out-of-time

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corp.	Docket Nos.	ER11-4100-000
PJM Interconnection, L.L.C.		ER11-4106-000
Midwest Independent Transmission System Operator, Inc.		ER11-4337-000
Midwest Independent Transmission System Operator, Inc.		ER09-1049-000
		ER09-1049-002
		ER09-1049-003

(not consolidated)

(Issued December 15, 2011)

MOELLER, Commissioner, *dissenting in part*:

Demand response plays a very important role in markets by providing significant economic, reliability, and other market-related benefits when properly deployed.

For the reasons set forth in my dissents on Orders No. 745 and 745-A, I respectfully dissent.[1] While consumers may pay lower rates if some consumers voluntarily agree to use less electricity, the Federal Power Act requires this Commission

[1] *Demand Response Compensation in Organized Wholesale Energy Markets*, 134 FERC ¶ 61,187 (2011) (*Moeller Dissenting*) ("Order No. 745") and *Demand Response Compensation in Organized Wholesale Energy Markets*, 137 FERC ¶ 61,215 (2011) (*Moeller Dissenting*) ("Order No. 745-A"), respectively.

to establish just and reasonable rates that are not discriminatory.[2] If the Commission requires the RTOs and ISOs to overcompensate for providing demand response, the resulting rates are both discriminatory and not just and reasonable.

In addition, as stated in my dissent today in Order No. 745-A, rather than impose a nationwide approach to demand response compensation, the Commission's objective of promoting demand response would have been better served if the regions were free to propose compensation methods that recognize the very real differences in the structures of the regional markets.

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Philip D. Moeller
Commissioner

[2] 16 U.S.C. § 824d (2006).

Document Content(s)