

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

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| |) | |
| Electric Storage Participation in Markets |) | Docket No. AD16-20-000 |
| Operated by Regional Transmission Organizations |) | |
| and Independent System Operators |) | Docket No. RM16-23-000 |
| |) | |

COMMENTS OF ADVANCED ENERGY ECONOMY

February 13, 2017

TABLE OF CONTENTS

| | |
|---|----|
| I. EXECUTIVE SUMMARY..... | 2 |
| II. BACKGROUND AND OVERVIEW..... | 4 |
| III. COMMENTS..... | 8 |
| A. Storage and DERs Provide Substantial Reliability and Resiliency Benefits to the Grid, and Substantial Economic Benefits to Consumers | 8 |
| B. <u>Need for Reform (NOPR at PP 9-16):</u> Market Reforms Are Needed Now to Remedy Both Existing and Potential Future Barriers to Participation by Energy Storage and Distributed Energy Resources That Are Unduly Discriminatory and Unjust and Unreasonable | 14 |
| C. <u>Definitions (NOPR at n.1, n.2):</u> The Commission Should Clarify the Definitions of “Electric Storage Resource” and “Distributed Energy Resources” to Ensure That They Capture the Broad Array of Technologies Capable of Providing Wholesale Services..... | 17 |
| 1. The Definition of Electric Storage Resources | 18 |
| 2. The Definition of Distributed Energy Resources | 20 |
| D. Comments on Proposed Energy Storage Reforms..... | 22 |
| 1. <u>Creation of a Participation Model for Energy Storage Resources (NOPR at PP 26-32):</u> Creating a New Participation Model for Energy Storage is an Essential Step to Remedying Barriers to the Participation of Energy Storage Resources in the Organized Markets | 22 |
| 2. AEE Strongly Supports Directing the RTOs/ISOs to Develop Participation Models That Allow Energy Storage Resources to Provide All Services They Are Technically Capable of Providing..... | 23 |
| a. Energy Scheduling and “Must Offer” Requirements Result in Similar Barriers to Participation, and Should Be Reformed or Eliminated for Energy Storage Resources | 25 |
| b. Failing to Provide Compensation to Energy Storage Resources For Services They Can and Do Provide Erects a Barrier to Their Ability to Provide All of the Services They Are Capable of Providing | 29 |
| E. Comments on Proposed Distributed Energy Resource Aggregation Reforms | 31 |
| 1. <u>Eligibility to Participate Through a DER Aggregator (NOPR at P 134):</u> The Commission Should Not Adopt the Proposed Blanket Prohibition on Wholesale Market Participation by DERs Participating in One or More Retail Compensation Programs..... | 32 |
| 2. <u>Coordination Between the RTO/ISO, the DER Aggregator, and the Distribution Utility (NOPR at P 153):</u> The Commission Should Balance Perceived Reliability Concerns With the Benefits Provided by DERs, and Avoid Overly Burdensome Restrictions That Can Prevent These Benefits from Being Realized and Result in Undue Discrimination..... | 37 |

| | | |
|-----|--|----|
| 3. | <u>Eligibility to Participate Through a DER Aggregator (NOPR at PP 128, 133): The Commission’s Proposal to Retain Pre-Existing Eligibility Restrictions, Technical Requirements, and Participation Models May Not Fully Achieve the Goal of Ensuring That Aggregated DERs Will Be Eligible to Participate in All Markets</u> | 40 |
| a. | Reliance on Existing Participation Models May Limit Participation by Aggregated DERs | 42 |
| b. | The Commission Should Not Leave in Place Existing Rules That Impose Prohibitions on Participation by Specific Technologies | 44 |
| 4. | <u>Locational Requirements for DER Aggregations (NOPR at P 138): The Commission Should Adopt the Proposal to Require RTOs/ISOs to Allow Aggregation Across the Broadest Area Possible, and Make Clear that RTOs/ISOs Must Support Location Restrictions With Legitimate Technical Justifications</u> | 45 |
| 5. | <u>Metering and Telemetry System Requirements for DER Aggregators (NOPR at P 150): Requiring DER Aggregators to Adopt the Same Telemetry Used by Conventional Generators Is Not Necessary to Ensure Reliability and Would be Unduly Burdensome</u> | 47 |
| 6. | <u>Modifications to the List of Resources in a DER Aggregation (NOPR at P 148): The Commission Should Adopt Its Proposal to Allow Aggregators to Modify the List of DER Resources in Their Aggregation</u> | 50 |
| 7. | The Commission Should Not Require Demand Response Resources to Participate as DERs..... | 50 |
| 8. | Minimum and Maximum Size Requirements for Individual DERs Are Unnecessary | 51 |
| 9. | The Minimum Size Requirement for DER Aggregations Should be 100 kW..... | 51 |
| F. | Outstanding Barriers to Participation Outside the Scope of This NOPR | 52 |
| IV. | CONCLUSION..... | 52 |

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COMMENTS OF ADVANCED ENERGY ECONOMY

Pursuant to the Federal Energy Regulatory Commission’s (“FERC” or the “Commission”) Notice of Proposed Rulemaking (“NOPR”) dated November 17, 2016,¹ Advanced Energy Economy (“AEE”) submits these comments on behalf of itself and its members. AEE strongly supports the overall direction the Commission has taken in the NOPR, and applauds the Commission’s strong commitment to removing unjust, unreasonable and unduly discriminatory barriers to participation in the wholesale markets by advanced energy technologies like energy storage and Distributed Energy Resources (“DERs”). The Commission’s proposal to require Regional Transmission Organizations and Independent System Operators (“RTOs/ISOs”) to develop a new participation model to ensure that energy storage resources can provide all of the wholesale services they are technically capable of providing, and to permit DER aggregations to participate in wholesale markets, will help address the barriers to participation faced by a wide variety of advanced energy technologies that can provide reliability benefits to the grid and value to consumers.

¹ *Elec. Storage Participation in Mkts. Operated by Regional Transmission Orgs. and Independent Sys. Operators*, 157 FERC ¶ 61,121 (2016) (“NOPR”).

In these comments, AEE provides additional information to the Commission regarding the barriers to participation that advanced energy technologies face, and highlights certain details of the Commission's proposals that should be revised or clarified to ensure that the Final Rule fully realizes the Commission's goal of ensuring just and reasonable rates and improving wholesale market performance by removing such barriers. AEE urges the Commission to adopt a Final Rule in this proceeding as soon as practicable, and to direct the RTOs/ISOs to comply within a reasonable time.

I. EXECUTIVE SUMMARY

AEE is a national organization of businesses making the energy we use secure, clean, and affordable. Thanks to technological advances and innovation, we now have more options for meeting energy needs than ever before in history. We call these options "advanced energy." The advanced energy market is already well-established and growing. This market grew 29 percent in just the last five years, and is now at \$200 billion in revenue, more than the pharmaceutical manufacturing industry and approaching the consumer electronics markets.

Advanced energy technologies offer innovative solutions to the challenges facing our energy system. Yet these technologies face many barriers to offering their services in the wholesale markets and competing with traditional, incumbent technologies. For this reason, AEE is strongly supportive of FERC's efforts in this NOPR to identify and remedy barriers facing two advanced energy technologies: energy storage and DERs. The NOPR is a valuable and critical first step in what must be a comprehensive effort to eliminate unjust, unreasonable, and unduly discriminatory barriers to participation for advanced energy technologies in FERC-jurisdictional wholesale markets.

AEE applauds the Commission's decision to issue a NOPR proposing to comprehensively address many of these barriers to entry for advanced energy technologies, and strongly supports the overall direction the Commission has chosen in the NOPR. To better ensure that the Final Rule will meet the Commission's objective of removing unjust, unreasonable and unduly discriminatory barriers to participation from RTO/ISO tariffs and market rules, however, AEE believes that certain details in the NOPR should be revised or clarified.

In this regard, there are three primary areas where AEE is concerned that the NOPR may not adequately address existing barriers or may potentially create new barriers for advanced energy technologies:

- 1) The Commission should modify the blanket ban it has proposed that restricts DERs participating in retail compensation programs from also participating in wholesale markets. This attempt to avoid potential "double payment" is overly broad, not in line with how DERs are participating in both wholesale and retail markets today, and would undermine the stated goal of the NOPR to allow increased participation by these resources.
- 2) The Commission should revise and limit the broad "gatekeeper" role it has proposed to give distribution utilities regarding reliability risks. AEE fully supports the Commission's goal of ensuring reliability and believes this goal can be accomplished without creating the potential for undue discrimination.
- 3) The Commission should clarify that existing participation models should be reviewed to ensure that DER aggregations can utilize them to provide all services that they are technically capable of providing. The NOPR appears to assume that DER

aggregators will utilize existing participation models without any modifications to account for the unique properties of DER aggregations.

AEE believes that increased participation of advanced energy technologies in the wholesale markets will improve grid reliability while reducing overall costs for consumers. Many of the proposals in the NOPR, if adopted in a Final Rule, will make great strides in breaking down barriers to such increased participation. In these comments, AEE suggests ways in which the NOPR can be improved to fully capture these benefits.

II. BACKGROUND AND OVERVIEW

AEE previously submitted comments on June 6, 2016 (“June 6 Comments”) in response to the Commission’s request for comment on the applicability of RTO/ISO market rules to energy storage resources.² In those comments, AEE described the barriers that its members have experienced in the RTO/ISO markets. We explained that although energy storage is a prime example of the innovative resources that face barriers to participation in RTO/ISO markets, it is not the only advanced energy technology that faces such barriers. Although the removal of barriers to the participation of energy storage might incidentally remove barriers to the participation of other advanced energy technologies, many other barriers to participation would remain without more expansive action by the Commission. Our comments outlined three broad categories of barriers that impair the ability of advanced energy technologies to participate in the wholesale markets. In short, tariffs, market rules, and product definitions create barriers to participation when they:

1. Assume—and effectively require—that all grid resources resemble (and have similar risk profiles to) traditional generation resources, and favor

² Advanced Energy Economy, Comments, Docket No. AD16-20-000 (filed June 6, 2016).

procurement of resources that have characteristics similar to traditional thermal generation.

2. Impose restrictions intended for traditional generation on advanced energy technologies without taking their unique characteristics into account, or limit the eligibility of these resources based on what they are, rather than what they can do.
3. Restrict resources classified as “behind-the-meter” to participating in the markets as “demand response,” creating an artificial barrier to behind-the-meter technologies that are not, or not solely, load reduction measures.

AEE applauds the Commission’s decision to issue a NOPR proposing to comprehensively address many of these barriers to entry for advanced energy technologies, and strongly supports the overall direction the Commission has chosen in the NOPR. The Commission’s choice to act to remove barriers not only to energy storage, but to numerous other advanced energy technologies by allowing DERs (including those behind the customer meter) to aggregate and participate in the wholesale markets, appropriately recognizes that the advanced energy technology industry is rapidly maturing and already making significant contributions to grid reliability. The Commission’s DER aggregation proposal addresses, in significant part, the third category of barriers discussed by AEE in its June 6 Comments: those faced by resources behind the customer meter. By addressing barriers to participation faced by the broad suite of advanced energy technologies that can reliably and cost-effectively provide wholesale services, and not just energy storage, the NOPR is a valuable and critical next step in what must be a comprehensive effort to eliminate unjust, unreasonable, and unduly discriminatory barriers to participation for advanced energy technologies in FERC-jurisdictional wholesale markets. As the Commission rightly recognizes, failing to address these barriers will harm competition in the

markets and lead to rates that are unjust and unreasonable, and result in undue discrimination, requiring action under Section 206 of the Federal Power Act (“FPA”).³

The overall direction of the NOPR and many of its specific proposals represent a major step towards removing barriers to participation facing advanced energy technologies. To better ensure that the Final Rule will meet the Commission’s objective of removing unjust, unreasonable and unduly discriminatory barriers to participation from RTO/ISO tariffs and market rules, however, AEE believes that certain details in the NOPR should be revised or clarified. As explained below, a few of the specific proposals and issues raised in the NOPR may not meaningfully address existing barriers or may potentially create new barriers for advanced energy technologies.

In this regard, AEE has three primary concerns. First, in its laudable effort to address real or perceived concerns regarding the potential for DERs to receive “double payment” for providing the same service, the Commission appears to be proposing an overly broad blanket ban that would prohibit DERs participating in retail compensation programs from also participating in the wholesale markets through aggregation.⁴ Such a ban would erect a new barrier to participation, take a step backwards from how DERs are participating in both wholesale and retail markets today, and undermine the business models of energy storage and DER suppliers and existing aggregators.

Second, to address real or perceived concerns regarding reliability and the need for RTO/ISO operators and distribution utilities to have “visibility” of DER operations, the Commission proposes to give distribution utilities a broad “gatekeeper” role, allowing them to

³ 16 U.S.C. § 824e (2012).

⁴ NOPR at P 134.

prevent DERs from participating based on “risks” to the distribution system. While AEE fully supports the Commission’s goal of ensuring that reliability risks are not created by wholesale market participation, this proposal is overly broad and presents significant risk of undue discrimination. The Commission should recognize that DERs provide significant reliability benefits and that, in fact, their participation in the wholesale market will increase their visibility to the RTOs/ISOs. AEE suggests that if the Commission concludes, based on the record here, that additional measures are needed to ensure visibility and coordination, it should adopt targeted procedures that require distribution utilities to demonstrate that actual, specific reliability concerns are implicated.

Lastly, some of the Commission’s other proposed solutions may simply be insufficient to address the barriers faced by advanced energy technologies. For example, there are many existing barriers in the wholesale markets that arise from existing participation models designed around the attributes of traditional thermal generators. But the Commission’s proposal to allow participation by DER aggregators appears to assume that they will utilize existing participation models without any modifications to account for the unique properties of DER aggregations. The Commission should clarify that existing participation models must be reviewed to ensure that DER aggregations can utilize them to provide all services that they are technically capable of providing. In addition, while the Commission states that energy storage resources should be permitted to provide any services they are technically capable of providing, it specifically declines to ensure that they are compensated. AEE recognizes the complexity of compensation issues, but urges the Commission to address them.

AEE recognizes that addressing all existing and potential barriers to participation by advanced energy technologies is likely to be an iterative process of rulemaking(s) followed by

RTO/ISO implementation, and that not all barriers to participation fall within the scope of this NOPR. However, the Commission should ensure that its Final Rule does not inadvertently create additional barriers to participation, and that the Final Rule and its implementation by the RTOs/ISOs fully address all known barriers that are within its scope. To the extent there are existing barriers that fall outside the scope of this NOPR, AEE is committed to continuing to identify them and bring them to the attention of the Commission and the RTOs/ISOs.

III. COMMENTS

A. Storage and DERs Provide Substantial Reliability and Resiliency Benefits to the Grid, and Substantial Economic Benefits to Consumers

Advanced energy technologies provide numerous benefits to the grid and to consumers. Finalizing the NOPR proposals, with the modifications suggested by AEE, will ensure that those benefits are shared more broadly across both the wholesale and retail markets.

The North American Electric Reliability Corporation (“NERC”) broadly divides bulk power system reliability into two main categories: *resource adequacy*, or the availability of sufficient resources to meet demand at all times; and *operating reliability*, or the ability of the electricity system to withstand disturbances ranging from storms to mechanical failures to voltage disturbances.⁵

DERs enhance resource adequacy and, when used in conjunction with operational techniques, improve operating reliability. With respect to resource adequacy, DERs deliver reliable primary and/or backup power onsite, avoiding transmission costs and bypassing distribution bottlenecks. Technologies such as demand response, energy storage, advanced metering infrastructure, distribution automation, microgrids, and smart grid management

⁵ NERC, *Definition of “Adequate Level of Reliability” 5* (2007), <http://www.nerc.com/docs/pc/Definition-of-ALR-approved-at-Dec-07-OC-PC-mtgs.pdf>.

technologies can not only produce energy (often from renewable resources) but also provide protection against resource shortfalls at times of peak demand. With the continued retirement of inefficient older generating units, these widely-available advanced energy technologies can be developed and deployed quickly to meet resource adequacy needs. Many of these technologies can also be sited strategically to alleviate specific local resource adequacy issues and provide additional reliability to critical loads such as hospitals, while also contributing to bulk power system resource adequacy. For these reasons, Lawrence Berkley National Laboratory (“LBNL”) cites load shifting, energy efficiency, and renewable energy as viable strategies to address resource adequacy and thereby improve overall grid reliability.⁶

Advanced energy technologies are also improving operating reliability. Demand response and energy efficiency improve operating reliability by reducing overall peak demand. In addition, transmission and distribution grid operators can now utilize voltage support from a variety of advanced energy technologies, such as energy storage, variable frequency drives,⁷ solar PV with smart inverters,⁸ and Type Three and Type Four wind turbines.⁹ In a recent study, the National Renewable Energy Laboratory (“NREL”) demonstrated that ancillary services can be provided by solar PV resources.¹⁰ The study showed that advanced-designed solar PV energy

⁶ LAWRENCE BERKLEY NAT’L LAB., RELIABILITY OF THE U.S. ELECTRICITY SYSTEM: RECENT TRENDS AND CURRENT ISSUES xiii-xiv (2001), <http://emp.lbl.gov/sites/all/files/REPORT%20lbnl%20-%2047043.pdf>.

⁷ ERIK ELA ET AL., NAT’L RENEWABLE ENERGY LAB., EFFECTIVE ANCILLARY SERVICES MARKET DESIGNS ON HIGH WIND POWER PENETRATION SYSTEMS (2011), <http://www.nrel.gov/docs/fy12osti/53514.pdf>.

⁸ COLIN SCHAUDER, NAT’L RENEWABLE ENERGY LAB., ADVANCED INVERTER TECHNOLOGY FOR HIGH PENETRATION LEVELS OF PV GENERATION IN DISTRIBUTION SYSTEMS (2014), <http://www.nrel.gov/docs/fy14osti/60737.pdf>.

⁹ DANIEL F. OPILA, ABDI M. ZEYNU, AND IAN A. HISKENS, WIND FARM REACTIVE SUPPORT AND VOLTAGE CONTROL (2010), <http://web.eecs.umich.edu/~hiskens/publications/05563248.pdf>.

¹⁰ VAHAN GEVORGIAN AND BARBARA O’NEILL, NAT’L RENEWABLE ENERGY LAB., ADVANCED GRID-FRIENDLY CONTROLS DEMONSTRATION PROJECT FOR UTILITY-SCALE PV POWER PLANTS (2016), <http://www.nrel.gov/docs/fy16osti/65368.pdf>.

resources can provide services that range from spinning reserves, load following, voltage support, ramping, frequency response, and automatic generation control (“AGC”). With the increased frequency of curtailment, infrastructure reliability will continue to be enhanced if the industry can tap into controllable solar PV resources. Energy storage technologies further improve the operational reliability of the grid by providing frequency regulation, voltage support, and reactive power. Moreover, the fact that DERs can be sited strategically in local areas makes them ideal for resolving operating reliability issues on discrete sections of the grid.

Advanced energy technologies have in fact already proved indispensable in maintaining system reliability during critical periods. For example, during the Polar Vortex, PJM Interconnection (“PJM”) hit a wintertime peak demand record of 141,846 MW.¹¹ In response, PJM called on more than 2,000 MW of demand response to help prevent blackouts.¹² The role of advanced energy technologies in maintaining grid reliability will only increase with technological and operational improvements.

Energy storage, energy efficiency, distributed generation, demand response, and other advanced energy options are rapidly becoming hallmarks of an intelligent, customer-focused 21st century grid, and their costs are rapidly declining, delivering significant benefits to consumers.¹³ For example, energy efficiency today is almost always the lowest-cost resource for meeting

¹¹ PJM INTERCONNECTION, L.L.C., ANALYSIS OF OPERATIONAL EVENTS AND MARKET IMPACTS DURING THE JANUARY 2014 COLD WEATHER EVENTS 9 (2014), <http://www.pjm.com/~media/library/reports-notice/weather-related/20140509-analysis-of-operational-events-and-market-impacts-during-the-jan-2014-cold-weather-events.ashx>.

¹² *Id.* at 19.

¹³ AEE Institute has commissioned a study entitled “Competitiveness of Renewable Energy and Energy Efficiency in U.S. Markets” that demonstrates these benefits. See AEE, *Competitiveness of Renewable Energy and Energy Efficiency in U.S. Markets*, <http://info.aee.net/competitiveness-of-renewable-energy-and-energy-efficiency-in-us> (last visited Feb. 12, 2017).

demand.¹⁴ The levelized cost of energy (“LCOE”) for energy efficiency is between zero and \$0.05/kWh, making it the least-cost option for meeting electricity needs in many cases.¹⁵ In another example, system prices for residential and commercial PV have declined 6-8 percent per year, on average, from 1998 to 2013.¹⁶ Projections by NREL and LBNL show that this sustained price drop over eight years is expected to continue, with solar eventually reaching widespread grid parity.¹⁷ Demand response is also proving to be a cost-effective alternative in both retail and wholesale markets, due in large part to the Commission’s earlier efforts to reduce unjust, unreasonable, and unduly discriminatory barriers to its participation in RTO/ISO markets. In fact, demand response in the PJM wholesale market has resulted in net savings of \$9 - \$12 billion annually in certain recent years.¹⁸

¹⁴ *Id.*

¹⁵ This LCOE for energy efficiency measures the cost of avoided electricity, not the cost of generation, but is an appropriate point of comparison as an alternative to generating a unit of power. LAZARD, LAZARD’S LEVELIZED COST OF ENERGY ANALYSIS – VERSION 8.0 (2014), https://www.lazard.com/media/1777/levelized_cost_of_energy_-_version_80.pdf. Energy efficiency’s cost-competitiveness has also driven growth in energy performance-based contracting services offered by Energy Service Companies (ESCOs). Analysts expect the \$6 billion ESCO market to double in size by 2020. ELIZABETH STUART ET AL., LAWRENCE BERKLEY NAT’L LAB., CURRENT SIZE AND REMAINING MARKET POTENTIAL OF U.S. ESCO INDUSTRY 17 (2013), <https://emp.lbl.gov/sites/all/files/lbnl-6300e-ppt.pdf>.

¹⁶ GALEN BARBOSE ET AL., LAWRENCE BERKLEY NAT’L LAB., TRACKING THE SUN VII: AN HISTORICAL SUMMARY OF THE INSTALLED PRICE OF PHOTOVOLTAICS IN THE UNITED STATES FROM 1998 TO 2013 14 (2014), http://emp.lbl.gov/sites/all/files/lbnl-6808e_0.pdf.

¹⁷ DAVID FELDMAN ET AL., NAT’L RENEWABLE ENERGY LAB. & LAWRENCE BERKLEY NAT’L LAB., PHOTOVOLTAIC SYSTEM PRICING TRENDS: HISTORICAL, RECENT, AND NEAR-TERM PROJECTIONS (2014), http://www.nrel.gov/docs/fy14osti/62558.pdf?utm_source=Solar%20Energy%20Prices%20See. Recent market data indicates that average LCOE of renewable generation has already become cost competitive with conventional sources, particularly in resource-rich regions. According to Lazard, the average LCOE for onshore wind dropped almost 60 percent in 5 years from 2009-2014, while the LCOE for utility-scale crystalline PV dropped almost 80 percent during the same period. *See* LAZARD’S LEVELIZED COST OF ENERGY ANALYSIS – VERSION 8.0 at 9.

¹⁸ MONITORING ANALYTICS, ANALYSIS OF THE 2017/2018 RPM BASE RESIDUAL AUCTION 38 (2014), http://www.monitoringanalytics.com/reports/Reports/2014/IMM_Analysis_of_the_2017_2018_RPM_Base_Residual_Auction_20141006.pdf; MONITORING ANALYTICS, ANALYSIS OF THE 2013/2014 RPM BASE RESIDUAL AUCTION REVISED AND UPDATED 52 (2010), http://www.monitoringanalytics.com/reports/Reports/2010/Analysis_of_2013_2014_RPM_Base_Residual_Auction_20090920.pdf.

Numerous analyses also show DERs, both alone and in aggregation, can improve reliability and decrease costs, for example, by cutting peak demand. For instance, in its Track 1 Straw Proposal in the *Reforming the Energy Vision* proceeding, the New York Department of Public Service estimated that if the 100 hours of greatest peak demand were flattened, long-term avoided capacity and energy savings would range between \$1.2 and \$1.7 billion per year.¹⁹ Another study shows that utilizing a portfolio of technologies—such as an aggregation of DERs—can result in lower cost generation than any single technology can provide.²⁰ Further, DERs can be used to defer or reduce capital expenditures. For example, in New York, Consolidated Edison expects to defer a \$1 billion transmission and distribution upgrade by investing \$200 million in distributed energy resources, including energy storage, demand response and distributed generation.²¹ Similarly, from June 2013 to June 2014, the PJM Internal Market Monitor estimated that demand response and energy efficiency reduced capacity costs in PJM by \$11.8 billion.²²

The Commission’s proposals in the NOPR take a significant step toward capturing even greater reliability and consumer cost benefits from advanced energy technologies. Importantly, the NOPR also appropriately recognizes that these technologies are already here and will continue to grow, and that without reforms now, the RTO/ISO markets could become a barrier to their cost-effective utilization. By removing barriers to participation, the NOPR will facilitate

¹⁹ State of N.Y. Dep’t of Pub. Serv., *Developing The Rev Market In New York: DPS Staff Straw Proposal On Track One Issues*, N.Y. D.P.S. Case No. 14-M-0101, at 9-10 (August 22, 2014).

²⁰ Ceres, *Practicing Risk-Aware Electricity Regulation: What Every State Regulator Needs to Know*, <http://www.ceres.org/resources/reports/practicing-risk-aware-electricity-regulation/view> (last visited Feb. 12, 2017).

²¹ Consolidated Edison Company of New York, Inc., *Petition for Approval of Brooklyn/Queens Demand Management Program*, N.Y. D.P.S. Case No. 14-E-0302 (July 15, 2014).

²² MONITORING ANALYTICS, *ANALYSIS OF THE 2013/2014 PJM BASE RESIDUAL AUCTION REVISED AND UPDATED* at 52.

the incorporation of advanced energy technologies and allow the grid to capture their economic benefits. Those benefits are significant: a 2011 study produced by Google.org, the philanthropic arm of Google Inc., found that by 2030, select advanced energy technologies could annually save consumers over \$900 per household, create 1.1 million new jobs, and increase U.S. Gross Domestic Product by \$155 billion per year.²³

The Commission should proceed with these benefits in mind, both here, and in future proceedings addressing barriers to participation by advanced energy technologies. Eliminating barriers to participation by these technologies in the wholesale markets will allow the system as a whole to capitalize on their reliability and economic benefits, ensuring just and reasonable rates.

AEE and its members recognize that there is a need for visibility of resource operations on the part of the RTO/ISOs and that coordination among the RTO/ISO, the local utility, and service providers (including energy storage and DER aggregators) is necessary to ensure reliable operations. As discussed at length below, in Sections II.E.2-II.E.5, these visibility and operational issues are surmountable and certain RTOs/ISOs—particularly the California Independent System Operator Corp. (“CAISO”) and ISO New England Inc. (“ISO-NE”)—have made great progress in developing standards and rules to address these issues. Fully integrating advanced energy technologies that are already here and growing rapidly will only enhance the ability to quickly address visibility and operational issues.

²³ GOOGLE.ORG, THE IMPACT OF CLEAN ENERGY INNOVATION 1 (2011), http://www.google.org/energyinnovation/The_Impact_of_Clean_Energy_Innovation.pdf.

B. Need for Reform (NOPR at PP 9-16): Market Reforms Are Needed Now to Remedy Both Existing and Potential Future Barriers to Participation by Energy Storage and Distributed Energy Resources That Are Unduly Discriminatory and Unjust and Unreasonable

AEE strongly agrees with the Commission’s preliminary conclusion that barriers to participation in the RTO/ISO markets faced by energy storage and aggregated DERs “unnecessarily restrict competition” and thus “lead to unjust and unreasonable rates,” requiring that the Commission act under Section 206 of the Federal Power Act to remedy such barriers.²⁴ In addition, AEE agrees with the Commission that market rules that create unnecessary barriers preventing DERs from providing certain services represent a classic case of undue discrimination that FERC must remedy pursuant to Section 206 of the FPA.²⁵

The experience of AEE members to date supports the Commission’s preliminary conclusions regarding the need for reform. As explained in our June 6 Comments and throughout these instant comments, existing market rules and market design features erect unnecessary barriers to the ability of energy storage, DERs and other advanced energy technologies to participate in the wholesale market and provide the wholesale services that they are technically capable of providing. AEE has documented that RTO/ISO tariffs often lack participation models that allow for participation by advanced energy technologies (e.g., some RTOs/ISOs force all “behind-the-meter” resources to participate as demand resources), apply unnecessary and burdensome technical requirements originally written for traditional generation technologies (e.g., extensive telemetry requirements imposed on smaller distributed resources), or impose performance requirements that have the effect of arbitrarily excluding advanced

²⁴ NOPR at P 14.

²⁵ *Id.* at P 131.

technologies like energy storage and DERs (e.g., “capacity performance” and must-offer rules that require long run times), among other barriers.²⁶ The Commission correctly concludes in the NOPR that these and other existing barriers to participation inhibit competition, and that effectively integrating energy storage and DERs will allow for more efficient operation of large thermal generators, enhance reliability, relieve transmission congestion, and improve integration of variable energy resources, all of which will, “in turn, help to ensure that these markets produce just and reasonable rates.”²⁷

Even without the concrete examples of barriers to participation described throughout the NOPR and in these comments, the pace of technology development nonetheless supports a conclusion that reforms are needed now to ensure that market rules that do not consider the unique technical and operational characteristics of advanced energy technologies do not pose a barrier to participation in the future. As discussed above, advanced energy technologies are rapidly advancing, and their costs are falling at a dramatic rate.²⁸ In just one example, residential solar installations have experienced year-over-year growth rates above 50% each year since 2012, such that the residential solar industry installed over 1.2 MW of systems in 2014 alone.²⁹ Analysts believe that the market for storage could grow 70% larger, to 145 GWh of total capacity, if barriers to participation are addressed, and expect “exponential” growth in storage technology within the next five years.³⁰ Allowing these resources to provide all the services they

²⁶ June 6 Comments at 11-18.

²⁷ NOPR at PP 12, 14.

²⁸ *See supra* Section II.A.

²⁹ SOLAR ENERGY INDUS. ASS’N, U.S. SOLAR MARKET INSIGHT REPORT: 2014 YEAR IN REVIEW 9 (2015), <http://www.seia.org/sites/default/files/HOIFT6ym3i.pdf>.

³⁰ Andy Colthorpe, *Morgan Stanley and Deloitte pinpoint potential of energy storage*, ENERGY STORAGE NEWS.COM (Feb. 9, 2017, 3:40 PM), <http://www.energy-storage.news/news/morgan-stanley-and-deloitte-pinpoint-potential-of-energy-storage-in-coming>.

are technically capable of providing will result in better market performance, a more reliable and resilient grid, and lower cost-energy for consumers.³¹ The Commission does not need to wait for further growth, or more instances of documented barriers to participation, to act to remedy existing and potential future barriers to participation of advanced energy technologies, and has sufficient evidence to act now based on reasonable expectations of the unjust and unreasonable impact of market rules and tariff provisions that do not accommodate their differing technical and operational attributes.³²

The Commission’s preliminary conclusion in the NOPR that unnecessary barriers to the participation in the markets of energy storage and DERs are unjust and unreasonable and must be reformed is also consistent with a long line of Commission precedent. As the Commission notes in the NOPR, it has consistently acted to require changes to RTO/ISO market rules and utility tariffs designed for traditional generation resources where it finds that they can create barriers to entry for emerging technologies.³³ With respect to energy storage technologies in particular, the Commission has taken action on numerous occasions to address barriers to their participation created by legacy market rules that imposed requirements designed with traditional generation resources in mind.³⁴ The Commission has also taken steps to ensure that generating technologies

³¹ See *supra* Section II.A.

³² See *S.C. Pub. Serv. Auth. v. FERC*, 762 F.3d 41, 64-71 (D.C. Cir. 2014); (holding that FERC may act on the basis of a “theoretical” threat to just and reasonable rates); see also *Associated Gas Distribs. v. FERC*, 824 F.2d 981, 1008 (D.C. Cir. 1987) (“[A]gencies do not need to conduct experiments in order to rely on the prediction that an unsupported stone will fall.”).

³³ NOPR at P 9 (citing *Integration of Variable Energy Resources*, Order No. 764, FERC Stats. & Regs. ¶ 31,331, *order on reh’g*, Order No. 764-A, 141 FERC ¶ 61,232 (2012), *order on reh’g*, Order No. 764-B, 144 FERC ¶ 61,222 (2013); *Wholesale Competition in Regions with Organized Electric Markets*, Order No. 719, FERC Stats. & Regs. ¶ 31,281 (2008), *order on reh’g*, Order No. 719-A, FERC Stats. & Regs. ¶ 31,292 (2009), *order on reh’g*, Order No. 719-B, 129 FERC ¶ 61,252 (2009)).

³⁴ See, e.g., *Preventing Undue Discrimination and Preference in Transmission System Serv.*, Order No. 890, FERC Stats. & Regs. ¶ 31,241, *order on reh’g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh’g*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh’g*, Order No. 890-C, 126 FERC ¶ 61,228, *order on*

with different technical characteristics and attributes—including wind and small solar—do not face unreasonable technical hurdles to accessing wholesale markets caused by rules designed with traditional technologies in mind.³⁵ Further, in just the last month, the Commission took action to ensure that the New York Independent System Operator, Inc. (“NYISO”) buyer-side market power mitigation rules in its capacity market “avoid[] the creation of unnecessary barriers to . . . the participation of demand response in the wholesale markets.”³⁶ This body of precedent provides a strong foundation for the Commission’s proposed actions.

C. Definitions (NOPR at n.1, n.2): The Commission Should Clarify the Definitions of “Electric Storage Resource” and “Distributed Energy Resources” to Ensure That They Capture the Broad Array of Technologies Capable of Providing Wholesale Services

AEE has previously voiced concerns that existing RTO/ISO market rules include overly narrow definitions that can exclude resources from providing services that they are technically capable of providing.³⁷ The Commission acknowledges the problem of resources being arbitrarily precluded from providing services that they are capable of providing, stating that its proposal will “clarify how electric storage resources and [DERs] of all types and sizes may provide services in the organized wholesale electric markets that they are technically capable of providing.”³⁸ However, AEE suggests that the Commission revise or clarify the definitions in the NOPR to ensure that they will encompass all of the advanced energy technologies that might

clarification, Order No. 890-D, 129 FERC ¶ 61,126 (2009) (permitting non-generating resources to provide ancillary services); *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, Order No. 755, FERC Stats. & Regs. ¶ 31,324 (2011), *reh’g denied*, Order No. 755-A, 138 FERC ¶ 61,123 (2012) (requiring a two part payment methodology for providers of regulation service).

³⁵ *See, e.g.*, Order No. 764 at PP 19-23.

³⁶ *N.Y. State Pub. Serv. Comm’n v. NYISO*, 158 FERC ¶ 61,137, at P 34 (2017).

³⁷ June 6 Comments at 10-11.

³⁸ NOPR at P 16.

seek to be recognized as an electric storage resource or participate in DER aggregations, so that they are not excluded from providing all of the services that they are technically capable of providing.

1. The Definition of Electric Storage Resources

In the NOPR, the Commission proposes that:

[E]ach RTO/ISO define the criteria in its tariff that a resource must meet to qualify to use [the electric storage] participation model based on the physical and operational attributes of electric storage resources, namely their ability to both charge and discharge energy. As such, the qualification criteria for the proposed participation model must not limit participation to any particular type of electric storage resource or other technology.³⁹

In addition, the Commission states that its intent in this proceeding is to ensure that all technologies that serve an energy storage function and are technically capable of participating in the markets are allowed to do so:

We are not proposing to limit the use of this participation model exclusively to electric storage resources as defined herein. While the requirements for the proposed participation model set forth here are designed to accommodate the physical and operational characteristics of electric storage resources, we acknowledge that there may be other types of resources whose physical or operational characteristics could qualify under the proposed participation model.⁴⁰

AEE strongly supports the Commission’s proposed participation model, and its stated intent of ensuring that energy storage resources are provided with a path to participating in wholesale markets that recognizes their unique physical and operational attributes, and eliminating arbitrary limits on participation by energy storage technologies. However, AEE notes that the Commission’s proposed formal definition of “Electric Storage Resource” may be

³⁹ *Id.* at P 29.

⁴⁰ *Id.* at P 30.

too narrow to achieve these goals. The Commission proposes to define “Electric Storage Resource” as:

a resource capable of receiving electric energy from the grid and storing it for later injection of electricity back to the grid regardless of where the resource is located on the electrical system. These resources include all types of electric storage technologies, regardless of their size, storage medium (e.g., batteries, flywheels, compressed air, pumped-hydro, etc.), or whether located on the interstate grid or on a distribution system.⁴¹

AEE is concerned that this definition, as written, could itself become a barrier to participation and may not satisfy the Commission’s stated goal and intent. For example, the formal definition specifies capability to store and inject “electric energy” even though elsewhere in the NOPR the Commission states that the electric storage participation model should be based on, among other things, the ability to store and discharge “energy” and “must not limit participation to any particular type of electric storage resource or other technology.”⁴² The use of the word “energy” without the modifier “electric,” and the mention of “other technology” suggest that the Commission intended to consider non-electric forms of storage, such as thermal or kinetic storage technologies, to be “Electric Storage Resources,” but this is not reflected in the relevant definition.

Therefore, to ensure that there is no ambiguity in the Commission’s regulations, AEE respectfully requests that the Commission revise the definition to include *all* forms of energy storage technology that are capable of converting electric energy into stored energy and later supplying electric energy (either back into the grid or to a host customer or site), and *all*

⁴¹ *Id.* at n.1.

⁴² *See id.* at P 29 (“[W]e propose that each RTO/ISO define the criteria in its tariff that a resource must meet to qualify to use this participation model based on the physical and operational attributes of electric storage resources, namely their ability to both charge and discharge energy. As such, the qualification criteria for the proposed participation model must not limit participation to any particular type of electric storage resource or other technology.”).

resources capable of performing as storage. To avoid ambiguity, the Commission may wish to rename the defined term as “Energy Storage Resources.” While AEE recognizes that the definition states that “storage medium” is not determinative of whether an energy storage technology will fit the definition, such revisions would ensure that the definition encompasses such technologies as thermal and kinetic storage, storage co-located with generation resources (including variable resources) on the transmission grid, and other types of technologies that can perform an energy storage function.

AEE also notes that the definition of “Electric Storage Resource,” as proposed, includes the qualifier that such resource be capable of “later injection of electricity *back to the grid.*” This could exclude technologies that can perform a similar function to more typical energy storage resources (i.e., those that absorb and discharge electric energy) but that may not physically “export” electricity back to the wholesale grid. In addition, storage resources co-located with renewable generation resources on the transmission system may charge from generated energy that would otherwise be curtailed, rather than charging from the grid. AEE is concerned that by excluding these resources from the formal definition of energy storage resources in its regulations, the Commission is potentially raising a barrier to participation. In the experience of AEE and its members, broad definitions of resource types are preferable, as such open definitions are less likely to inadvertently exclude innovative technologies that can perform a storage function and provide wholesale services.

2. The Definition of Distributed Energy Resources

The Commission defines “Distributed Energy Resources” as “a source or sink of power that is located on the distribution system, any subsystem thereof, or behind a customer meter. These resources may include, but are not limited to, electric storage resources, distributed

generation, thermal storage, and electric vehicles and their supply equipment.”⁴³ Similar to the proposed definition of “Electric Storage Resources,” AEE requests that the Commission revise or clarify the proposed definition of “Distributed Energy Resources” to ensure that it captures the broadest possible variety of distributed resources, and expressly allows resources of different types to be aggregated together. Doing so will also ensure that the definition does not inadvertently create barriers to participation by innovative combinations of resources (e.g., storage combined with demand response resources and customer-sited distributed generation) as they develop in the future.

Specifically, the Commission should revise the definition of “Distributed Energy Resources” so that energy efficiency and demand response resources of all types are explicitly included as Distributed Energy Resources. In addition, the definition should be reworded so that a “Distributed Energy Resource” includes a source or sink of power, *including a customer site capable of demand reduction*, that is located. . . .”

AEE also asks that the Commission expressly clarify that differing kinds of resources, such as solar, storage and demand response, may be included in the same DER aggregation. Likewise, AEE requests that the Commission expressly clarify that the participation model under which a DER aggregation participates in the markets should be determined by the aggregator and by the characteristics of the aggregation as a whole, even if the aggregation is comprised of diverse technologies. These revisions and clarifications will help to ensure that all DER resources have the opportunity to join aggregations and provide all of the services, including energy, capacity, and ancillary services, that they are technically capable of providing.

⁴³ *Id.* at n.2.

D. Comments on Proposed Energy Storage Reforms

1. **Creation of a Participation Model for Energy Storage Resources (NOPR at PP 26-32): Creating a New Participation Model for Energy Storage is an Essential Step to Remediating Barriers to the Participation of Energy Storage Resources in the Organized Markets**

AEE strongly supports the Commission’s proposal to create a new “participation model” for energy storage resources. The Commission defines “participation model” as a “set of tariff provisions that accommodate the participation of resources with particular physical or operational characteristics.”⁴⁴ A participation model, then, is a tariff framework that accommodates the technical and operational attributes, behavior, and limitations of a category of resources, and therefore facilitates the operation and dispatch of those resources so that they may provide all the services that they are technically capable of providing.

Consistent with this concept of participation models, the proposed energy storage participation model described in the NOPR specifies tariff provisions that are necessary to address the unique technical and operational attributes of energy storage technologies (e.g., their ability to both absorb and supply energy) and account for their innate limitations (e.g., that such resources must “charge”). The Commission’s proposed participation model will address these unique technical and operational attributes and limitations by including, among other things, bidding parameters that take into account the need for energy storage resources to charge, provisions allowing energy storage resources to set wholesale prices when they are either buying (i.e., absorbing) or selling (i.e., injecting) energy, and clear rules for pricing of energy consumed when charging. This, in turn, will help remove barriers to participation that are created by

⁴⁴ *Id.* at n.5.

existing tariff rules that apply technical and operational criteria that were adopted with the characteristics of traditional generation resources in mind. AEE strongly supports this result.

Not only do we believe that creating a new participation model is appropriate in order to remove barriers to participation by energy storage resources, we also believe that the wider application of “participation models” in the mold of the proposed energy storage participation model can help address many of the current barriers to participation facing advanced energy technologies in the wholesale markets. Such a broader application can ensure that the differing technical and operational attributes of advanced energy technologies are accommodated, and that existing rules written with other technical and operational attributes in mind do not place arbitrary limits on their ability to provide wholesale services that they are technically capable of offering. Similar to the proposal here with regard to an energy storage participation model, AEE believes that it would be helpful in the future for the Commission and the RTO/ISOs to review existing market rules and resource categories with an eye to refining existing and new participation models to focus on the critical attributes necessary for filling an operational role, regardless of the underlying technology type used by the resource. AEE hopes that the energy storage participation model proposed here, and as adopted in a Final Rule, will serve as an archetype for other participation models that account for technical and operational attributes of advanced energy technologies and allow them to provide value to wholesale markets.

2. AEE Strongly Supports Directing the RTOs/ISOs to Develop Participation Models That Allow Energy Storage Resources to Provide All Services They Are Technically Capable of Providing

The Commission states that the participation model for energy storage should ensure that energy storage resources are eligible to provide all capacity, energy and ancillary services that

they are technically capable of providing in the organized wholesale electric markets.⁴⁵ AEE strongly supports the principle that *all* technologies should be permitted to participate in the wholesale markets. This should be the Commission’s guiding principle going forward, and as discussed above, it is consistent with the Commission’s legal obligation to ensure that arbitrary barriers to participation do not inhibit competition and produce unjust and unreasonable rates.

In fact, the Commission has already found in the context of the Midcontinent Independent System Operator, Inc. (“MISO”) that limitations on the ability of energy storage technologies to provide wholesale services that they are technically capable of providing are unjust and unreasonable and must be reformed.⁴⁶ The record supports a similar finding here. As the Commission recognized there, and here in the NOPR, in many cases the existing RTO/ISO market rules fail to account for the defining technical attributes of energy storage, effectively preventing such technologies from participating in those markets. For example, many RTO/ISOs do not have tariff provisions in place to account for the state of charge of batteries when dispatching resources. But state of charge is a definitional characteristic of battery storage (and the equivalent of state of charge exists for nearly all kinds of storage). By directing the RTO/ISOs to come up with a participation model designed to account for the characteristics of storage technologies (e.g., their need to “charge”), the Commission is making it possible for these resources to participate in the market on an even playing field with thermal resources that currently enjoy market rules tailored to their characteristics.

As noted above, AEE broadly supports the participation model framework that the Commission proposes for an energy storage participation model, including the specific

⁴⁵ *Id.* at P 48.

⁴⁶ *Indianapolis Power & Light Co. v. Midcontinent Independent Sys.Operator, Inc.*, 158 FERC ¶ 61,107, at P 69 (2017).

requirements each participation model must address (including bidding parameters, wholesale price setting, minimum size requirements, etc.). Below, AEE addresses two issues relevant to the proposed energy storage participation model and whether it will achieve its goal of eliminating barriers to participation: (1) the impact of energy scheduling and must-offer requirements, and (2) the lack of compensation for certain wholesale services. Unless otherwise discussed below, AEE supports the specific aspects of the energy storage participation model outlined in the NOPR, and urges the Commission to adopt a Final Rule incorporating them.

a. Energy Scheduling and “Must Offer” Requirements Result in Similar Barriers to Participation, and Should Be Reformed or Eliminated for Energy Storage Resources

AEE noted in its June 6 Comments that one of the major barriers to participation by advanced energy technologies are market rules that “[i]mpose restrictions intended for traditional generation on advanced energy technologies without taking their unique characteristics into account.”⁴⁷ As an example, AEE highlighted the “must-offer” rules present in the RTO/ISOs, which are intended to mitigate market power by preventing energy suppliers from withholding supplies from the market to drive up prices, but which do so by requiring all resources to offer energy every hour of every day, regardless of their technical and operational characteristics or ability to exercise market power.

The Commission does not address must-offer requirements directly in the NOPR, but it does ask for comment on a related issue: the requirement in many RTO/ISOs that resources must submit an energy schedule if they wish to provide ancillary services.⁴⁸ AEE submits that both energy schedule requirements and must-offer rules erect similar barriers to participation of

⁴⁷ June 6 Comments at 2.

⁴⁸ NOPR at P 51.

energy storage and other advanced energy technologies, because both fail to account for the unique technical and operational attributes of those resources and arbitrarily exclude them from providing wholesale services that they are technically capable of providing.

The Commission preliminary concludes in the NOPR that a market participant's eligibility to provide a service should not be conditioned on requirements developed for synchronous generators, a conclusion AEE strongly supports:

We preliminarily conclude that a market participant's eligibility to provide a particular reserve service should not be conditioned on requirements that were designed for synchronous generators, specifically the requirement to be online and synchronized to the grid to be eligible to provide ancillary services. Newer technologies, particularly electric storage resources, tend to be capable of faster start-up times and higher ramp rates than traditional synchronous generators and are therefore able to provide ramping, spinning, and regulating reserve services without already being online and running. Therefore, we preliminarily find that participation in ancillary service markets should be based on a resource's ability to provide services when it is called upon rather than on the real-time operating status of the resource.⁴⁹

With regard to energy schedule requirements, however, the Commission observes that all RTOs/ISOs co-optimize dispatch of ancillary services and energy, and some of them condition eligibility to provide ancillary services on the resource submitting an energy schedule into the market. The Commission seeks comment on several issues related to such requirements, recognizing that they were developed with synchronous generators in mind and probing whether it is feasible to permit resources to provide ancillary services absent an energy schedule.⁵⁰

AEE strongly supports the removal or revision of any requirement that a resource submit an energy schedule in order to offer to provide ancillary services, and believes that removing or revising such requirements is both feasible and highly desirable. As an initial matter, as the

⁴⁹ *Id.* at P 50.

⁵⁰ *Id.* at P 51.

Commission recognizes, for many advanced energy technologies, there is no operational or technical need for the resource to have an energy schedule, as such resources do not need to be “spinning” and synchronized to the grid to provide many ancillary services.⁵¹ Moreover, as advanced energy technologies like energy storage can provide ancillary services without also supplying energy, they should be permitted to do so in accordance with the guiding principle that resources should be allowed to provide the services they are technically capable of providing. For example, energy storage resources can provide services such as Primary Frequency Response (“PFR”) even while they are charging and unable to supply energy.

For these reasons, AEE requests that the Final Rule require that RTOs/ISOs remove from their tariffs the obligation that a resource must submit an energy schedule in order to offer to provide ancillary services. If an RTO/ISO believes that the energy schedule is necessary for the provision of a particular ancillary service, the burden should be on the RTO/ISO to demonstrate why this requirement is necessary and why, as designed, such a requirement is just and reasonable. To the extent energy schedule requirements are retained for energy storage resources, they should at a minimum include provisions that allow such resources to account for their charge and discharge parameters and assurances that managing their state of charge through their energy offer strategy will not risk mitigation or be deemed “withholding.”

In addition, given the similarity between the requirement that resources have an energy schedule to provide ancillary services and the “must-offer” requirements discussed above (and in AEE’s June 6 Comments), the Commission should also require RTOs/ISOs to address such requirements to the extent they apply to energy storage resources. Because these rules require that capacity resources offer into the energy market every hour of every day, advanced energy

⁵¹ *Id.*

technologies with limited run-times, such as energy storage resources, are unable to meet this requirement. For example, a battery that discharges when dispatched by the RTO/ISO should not be penalized for not offering energy into the market while it is recharging, just as it should not be prohibited from providing ancillary services while it is charging. Similarly, installations comprising a hybridization of storage and renewable energy generation (such as the combination of PV and storage connected at the distribution or transmission level) may be able to provide energy to the grid for a longer duration than storage alone, but are not typically designed to deliver energy during each and every hour of the day.

Moreover, must-offer rules in the energy market were developed to guard against the energy price impacts that could result from the exercise of market power. Energy storage resources and other advanced distributed energy technologies, however, have no incentive or ability to exercise market power. For example, the fact that energy storage resources must purchase charging energy at regular intervals gives them little incentive to artificially raise energy prices. Further, their small size gives them virtually no ability to move prices through withholding.

For these reasons, the Commission should require that the RTOs/ISOs, in developing energy storage participation models, address whether “must-offer” rules are necessary and technically reasonable when applied to these kinds of resources. This may require adjusting must-offer requirements to account for the limitations of storage resources and other advanced technologies (such as those used in DER aggregations) beyond simply allowing them to de-rate their capacity, as the Commission proposes.⁵² This change is just and reasonable, as the primary purpose of “must-offer” rules is to constrain market power; resources that are physically

⁵² *Id.* at P 49.

incapable of offering because they are charging after a previous dispatch are not engaged in withholding, and should not be treated as if they are.

b. Failing to Provide Compensation to Energy Storage Resources For Services They Can and Do Provide Erects a Barrier to Their Ability to Provide All of the Services They Are Capable of Providing

In the NOPR, the Commission states that, even when an RTO/ISO does not procure a particular service through a market mechanism, such as blackstart PFR, energy storage resources should be permitted to provide such services if they are technically capable of doing so.⁵³ The Commission also specifies that, “[w]here compensation for these services exists, electric storage resources should also receive such compensation commensurate with the service provided.”⁵⁴

While AEE strongly supports the fundamental principle that energy storage resources (and all other resources as well, including aggregated DERs) should be permitted to provide any and all services that they are technically capable of providing (as emphasized throughout these comments), we are concerned that the Commission’s decision to avoid compensation issues fails to recognize that lack of payment for services is itself a major barrier to participation. From a business perspective, there is little difference between not being permitted to provide a service and not being paid for doing so. Moreover, it is unjust, unreasonable, and unduly discriminatory to fail to provide compensation to a resource that is providing a needed and valuable service to the grid, and incurring costs to do so. A lack of appropriate compensation for services needed to reliably operate the grid impacts the overall price signals provided by RTO/ISO markets, resulting in prices that may not always accurately reflect the need for given services. That result

⁵³ *Id.* at P 48.

⁵⁴ *Id.*

works against one of the key bases for this proceeding—ensuring that barriers to entry do not negatively impact competition and produce unjust and unreasonable rates.

Compensation for the wholesale services that can be provided by energy storage and other advanced energy technologies is a key barrier to the deployment and market participation of advanced energy technologies like energy storage and DERs. In particular, these technologies have a unique ability to efficiently and cost-effectively provide a wide range of ancillary services, many of which are not currently procured and compensated through a market mechanism. Where there is no effective compensation mechanism, other market participants that have other available revenue streams (such as traditional generation receiving capacity and energy revenues) have a competitive advantage in the provision of such services. Given the greater efficiencies that many advanced technologies like energy storage offer when providing these services, this result is not optimal for the markets or consumers.

AEE recognizes that the issue of compensation is being addressed in several ongoing Commission proceedings, including with respect to compensation for provision of PFR,⁵⁵ the ability of energy storage resources to provide multiple services while receiving cost-based rates,⁵⁶ and the recently-decided complaint regarding compensation for a specific battery resource providing PFR in MISO.⁵⁷ AEE has participated in many of these proceedings. While the Commission reached a case-specific determination in the Indianapolis Power & Light Co. complaint case, and has issued a policy statement regarding the provision of multiple services, it should recognize that compensation continues to pose a barrier to participation by energy storage

⁵⁵ *Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response*, 157 FERC ¶ 61,122 (2016).

⁵⁶ *Utilization of Elec. Storage Resources for Multiple Servs. When Receiving Cost-Based Rate Recovery*, 158 FERC ¶ 61,051 (2017).

⁵⁷ *Indianapolis Power & Light Co. v. Midcontinent Independent Sys. Operator, Inc.*, 158 FERC ¶ 61,107 (2017).

and other advanced energy technologies. The Commission's case- and issue-specific determinations should not preclude continued review of compensation issues, particularly compensation for ancillary services like PFR that in many cases can be more efficiently provided by advanced energy technologies (as discussed above).⁵⁸

AEE urges the Commission to continue to address the issue of compensation for resources that provide valuable services to the grid. Until the issue of compensation is resolved, advanced energy technologies like energy storage may be exposed to unjust and unreasonable rates or undue discrimination when attempting to participate in the ISO/RTO markets. Failure to compensate these resources, in fact, appears to constitute classic undue discrimination, as traditional generators are implicitly compensated for providing many ancillary services as part of their energy or capacity payments.

E. Comments on Proposed Distributed Energy Resource Aggregation Reforms

AEE strongly supports the Commission's decision to also address barriers to participation faced by DERs in the NOPR, and applauds the Commission for its holistic approach to addressing barriers to participation facing a larger segment of the advanced energy industry and the negative competitive impacts those barriers have on competition and rates. Requiring the RTO/ISOs to allow DER aggregations to be market participants will remove a major barrier to the participation of smaller resources that are technically capable of providing wholesale services but otherwise would be unable to participate in the wholesale markets. This is a vital first step to ensuring that the wholesale markets can capture the benefits provided by advanced energy technologies that are smaller in size and distributed across the wholesale and retail grids. AEE also strongly supports the Commission's proposal to expand the types of resources that can

⁵⁸ See *supra* Section II.D.2.a.

participate in the wholesale markets by allowing all kinds of technologies to join DER aggregations (with the clarifications to the definition of DER requested above in Section II.C.2) and removing unnecessary restrictions on how these technologies should be operated within aggregations.

Given the contributions that DERs of all types are already making to ensure that our energy infrastructure is reliable and cost-effective and the rapid pace of DER technology development, as described in detail above in Section II.A, the time is right for the Commission to adopt a Final Rule addressing barriers to their ability to aggregate and participate in the RTO/ISO markets. However, AEE believes that certain details included in the NOPR require revision or clarification to fully achieve the Commission's stated objectives of allowing aggregated DERs to participate fully in the markets and expanding the types of resources and technologies that are eligible to participate in the markets. Perhaps more importantly, these changes to the Commission's proposals are needed to avoid inadvertently creating new unnecessary barriers to participation. The revisions we suggest below ensure that the Commission's market participation goals are achieved and no additional barriers are created, while also ensuring that reliability is maintained and that the RTO/ISO tariffs remain just and reasonable and not unduly discriminatory. Unless otherwise discussed, AEE supports the specific proposals regarding DER aggregations outlined in the NOPR and urges the Commission to adopt them in its Final Rule.

1. Eligibility to Participate Through a DER Aggregator (NOPR at P 134): The Commission Should Not Adopt the Proposed Blanket Prohibition on Wholesale Market Participation by DERs Participating in One or More Retail Compensation Programs

The Commission's proposal to allow aggregated DERs to become market participants is a critical and timely next step to ensuring that wholesale markets capture the reliability and efficiency benefits of rapidly developing DER technologies. However, the Commission's

proposal that DERs that are participating in one or more retail compensation programs would be ineligible to participate in the wholesale markets through aggregation,⁵⁹ if adopted, threatens to codify a new barrier to participation. AEE strongly opposes this blanket limitation on participation, which will arbitrarily exclude many, if not most, existing DERs from the wholesale market, and limit the benefits that the wholesale grid can capture from these resources.

The Commission's rationale for this restriction appears to be that resources might be compensated twice for the same service: "We also propose that it is appropriate for each RTO/ISO to limit the participation of resources in the organized wholesale electric markets through a distributed energy resource aggregator that are receiving compensation for the *same services* as part of another program."⁶⁰ AEE agrees that DERs should not receive overlapping compensation in situations where they do not provide incremental value in both the wholesale and retail markets. However, the Commission's proposed solution to its apparent compensation concerns is overly broad:

[T]o ensure that there is no duplication of compensation, we propose that distributed energy resources that are participating in one or more retail compensation programs such as net metering or another wholesale market participation program will not be eligible to participate in the organized wholesale electric markets as part of a distributed energy resource aggregation.⁶¹

This proposed solution goes well beyond the narrow stated concern of allowing DERs to receive payment from both the retail and the wholesale markets for the "same service," and would instead effectively require DERs to choose between the wholesale and retail markets and bar them from providing incremental value in both markets. Forcing DERs to make this choice threatens to rob DER owners and the system as a whole of important benefits. DERs are

⁵⁹ NOPR at P 134.

⁶⁰ *See id.* (emphasis added).

⁶¹ *Id.*

uniquely capable of providing multiple services with incremental value across retail and wholesale markets over different time periods, and this flexibility can provide significant reliability and consumer cost benefits to the system as a whole.⁶² Prohibiting wholesale market participation by DERs participating in retail compensation programs would mean that the RTO/ISO would be unable to access the unused capacity and capabilities of these resources for reliability purposes, preventing it from accessing a growing pool of resources located close to load (and often in constrained load pockets) that can be cost-effectively dispatched to ensure reliability.

Moreover, customers that install these DERs would lose out on the incremental revenue stream from the wholesale market, making their investments less valuable. That would not only result in higher consumer costs; it would result in severe impacts to the business case for many DERs and DER aggregations, as it would prevent them from stacking revenues by providing multiple services at wholesale and retail at different times, which is often crucial to their economic viability. Unlike a new generator, DERs do not and often cannot recover their full cost in the wholesale market, because their technical attributes make them most efficient when they are wholesale “part-time” and retail “part-time,” depending on their use cases. In sum, allowing these resources to access revenue streams from both the retail and wholesale markets is efficient, because it puts their excess capabilities to work in a manner that benefits both their owners and the grid as a whole and lowers costs for both wholesale and retail customers.

To the extent the Commission’s proposal stems from the premise that it would be difficult to differentiate the incremental value provided by an aggregated DER between wholesale and retail markets, AEE submits that this premise is false. Wholesale participation is

⁶² See *supra* Section II.A.

usually focused on bulk energy system (“BES”) reliability, the balancing of supply and demand on the BES, and meeting peak demand. Retail programs, by contrast, are focused on distribution level reliability concerns, reducing spending on transmission and distribution infrastructure, lowering transmission and capacity charges, and mitigating individual retail customer costs. Therefore, the dispatch triggers are often different for each type of program, and resources are not generally compensated in one market for their dispatch in the other market. Retail programs do not subsidize DERs in the wholesale market; instead, the wholesale and retail markets effectively spilt the cost of the resource as each call on the resource to meet their own needs. For these reasons, the dispatch triggers for retail and wholesale programs usually do not overlap; but to the extent that they do, the burden should fall on the aggregator to account for that in its portfolio.

In this regard, AEE notes that there are existing RTO/ISO programs where DERs currently participate in wholesale and retail programs without causing harm to either market. These programs show that such arrangements are feasible and that they work in practice. The Commission should not implement a policy that forces these markets to move backwards. For example, NYISO programs and state-regulated utility programs (e.g., Consolidated Edison’s Commercial System Relief Program)⁶³ work together to maximize the value of DERs to both the retail and wholesale markets. DERs provide incremental value in both markets, as the triggers for the NYISO and utility programs are completely different, and their dispatches infrequently overlap. Under these programs, a resource must respond at different times to earn each revenue stream, and there are two different incremental value streams (reduced capacity costs for the NYISO program and reduced T&D costs for the utility) to the system and consumers as a whole.

⁶³ See *supra* note 21.

Notably, the Commission recently agreed that Special Case Resources (“SCRs”) (i.e., demand response resources) in the NYISO market do not receive overlapping compensation for the same services when they also participate in New York’s retail-level utility demand response programs.⁶⁴ The Commission explained:

[T]he payments SCRs receive from the retail-level demand response programs are actually for providing services that are separate and distinct from the payments that SCRs receive for participating in NYISO’s ICAP market. While the wholesale- and the retail-level demand response programs may complement each other, they serve different purposes, provide different benefits, and compensate distinctly different services.⁶⁵

Other examples abound. For example, in many RTOs/ISOs resources may participate in state-level renewable or alternative energy programs, and also participate in the wholesale market. For example, in ISO-NE, combined heat and power resources can be compensated under the Massachusetts Alternative Energy Portfolio Standard, and also participate in the ISO-NE wholesale capacity market, because they are offering two distinct services. Likewise, combined heat and power resources and energy efficiency resources in Connecticut are compensated under the Renewable Portfolio Standard while also providing capacity to ISO-NE.

For these reasons, and consistent with its recent findings regarding NYISO’s SCR program, the Commission should not adopt the proposed blanket prohibition on wholesale participation by DERs that are part of a retail compensation program. As explained above, the very nature of how DERs are utilized and dispatched by the wholesale and retail markets already largely addresses the potential concern that DERs could receive overlapping compensation in the wholesale and retail markets. To the extent the Commission believes that additional safeguards are necessary, however, it should adopt requirements that are more narrowly tailored to ensure

⁶⁴ *N.Y. State Pub. Serv. Comm’n v. NYISO*, 158 FERC ¶ 61,137, at P 33 (2017).

⁶⁵ *Id.*

that DER aggregations cannot receive overlapping compensation from both a retail program and the wholesale markets in situations where they do not provide incremental value to both markets. AEE suggests that the presumption should be that retail programs do not overlap with the wholesale market, since (as explained above) these programs usually have fundamentally different goals and dispatch triggers than those used by the wholesale market. Moreover, state regulators also have a strong interest in avoiding double payments, and can be expected to design their retail programs to avoid such a result. The existing examples described above show that overlapping compensation concerns have largely been addressed and can be effectively managed.

2. Coordination Between the RTO/ISO, the DER Aggregator, and the Distribution Utility (NOPR at P 153): The Commission Should Balance Perceived Reliability Concerns With the Benefits Provided by DERs, and Avoid Overly Burdensome Restrictions That Can Prevent These Benefits from Being Realized and Result in Undue Discrimination

To address perceived reliability and coordination issues, the Commission proposes that when a DER aggregator registers a new aggregation, or modifies an existing aggregation to include new DERs, the RTO/ISO must provide the relevant distribution utility or utilities with a list of the individual DERs in the aggregation before they may participate. The distribution utility or utilities would have the ability to review this list to ensure there is no risk to their distribution system or that DERs are not already under a retail compensation program, prior to allowing participation.⁶⁶

As discussed above, advanced energy technologies like energy storage and aggregated DERs provide numerous reliability benefits to the grid.⁶⁷ In fact, facilitating DERs' participation

⁶⁶ *Id.* at P 155.

⁶⁷ *See supra* Section II.A.

in the wholesale markets will actually increase visibility to the RTO/ISO, since doing so will have the effect of integrating these resources into the RTO/ISO's dispatch and operations. Moreover, DERs are interconnected to distribution utility systems pursuant to standards that address reliability and safety concerns. For example, residential rooftop solar PV customers are often connected pursuant to a state-regulated net metering tariff, which gives the distribution utility "visibility" of their operation. Participation in the wholesale markets has the potential to provide the same degree of visibility to the RTOs/ISOs, as these resources bid their capacity, energy, and ancillary services into the wholesale markets.

While AEE believes that reliability and coordination concerns will be minimal, we appreciate that there may, in limited instances, be a need to ensure appropriate coordination and communication with "host" distribution utilities. However, the approach proposed by the Commission inappropriately assumes without evidence that there is a great risk to distribution system reliability, and on that apparent basis, would give distribution utilities unbounded discretion to prevent participation by a DER based on its own finding of a "risk to the distribution system." Because there is no proposed standard for determining "risk," this proposal presents a significant opportunity for undue discrimination against DERs, and would allow distribution utilities to erect unjust and unreasonable barriers to their participation in wholesale markets. The risk of discrimination is particularly high in markets where distribution utilities may own or control DERs themselves, giving them an incentive to discriminate and limit competition.

The Commission has consistently found that it has a legal obligation to ensure that such opportunities for discrimination are not present.⁶⁸ To ensure that it does not inadvertently create such unlawful discrimination opportunities here, the Commission should not adopt its proposal to give distribution utilities an unfettered “gatekeeper” role. To the extent it is shown that additional coordination procedures are necessary—and AEE is not convinced that they are—the Commission should establish clear standards or guidelines for when a distribution utility may prevent a DER from participating in the wholesale market due to concerns about the risk to the distribution system. The distribution utility must bear the burden of proof to demonstrate that participation by a DER will in fact present a risk to reliability.

For example, the Commission could require a signed affidavit from the utility that the customer’s wholesale participation would jeopardize reliability with proof that would have to be confidentially disclosed to the RTO/ISO and the DER aggregator. The DER aggregator should then have the right to appeal this decision to the RTO/ISO, which should make its determination based on whether dispatch of the DER aggregation is likely to violate applicable reliability requirements. The DER aggregator would also have the statutory right to file a FPA Section 206 complaint with the Commission if it disagrees with the RTO/ISO’s decision.

To avoid the potential for undue discrimination and ensure an efficient and fair review process, the Commission should, at a minimum, limit the distribution utility’s right to review the registration of individual DERs to only those that could have the potential to pose a risk to a

⁶⁸ See *Small Generator Interconnection Agreements and Procedures*, Order No. 792, 145 FERC ¶ 61,159, at PP 21-27 (2013), *clarified*, Order No. 792-A, 146 FERC ¶ 61,214 (2014); see also *Standardization of Small Generator Interconnection Agreements and Procedures*, Order No. 2006, FERC Stats. & Regs. ¶ 31,180, at PP 12-15, *order on reh’g*, Order No. 2006-A, FERC Stats. & Regs. ¶ 31,196 (2005), *order granting clarification*, Order No. 2006-B, FERC Stats. & Regs. ¶ 31,221 (2006); *Standardization of Generator Interconnection Agreements and Procedures*, Order No. 2003, FERC Stats. & Regs. ¶ 31,146, at PP 11-12 (2003), *order on reh’g*, Order No. 2003-A, FERC Stats. & Regs. ¶ 31,160, *order on reh’g*, Order No. 2003-B, FERC Stats. & Regs. ¶ 31,171 (2004), *order on reh’g*, Order No. 2003-C, FERC Stats. & Regs. ¶ 31,190 (2005), *aff’d sub nom. Nat’l Ass’n of Reg. Util. Comm’rs v. FERC*, 475 F.3d 1277 (D.C. Cir. 2007).

distribution system. For example, it would be reasonable to limit review to DERs that intend to export power onto the grid. If the DER units are not planning to export (or are not equipped to do so), and instead are going to simply curtail their own load, there is no apparent risk to a distribution system that would require review. Similarly, it would be reasonable to require distribution utilities to identify areas of their network that have demonstrated a limited ability to accommodate additional DERs. If a DER wanted to enroll in that area, then this would trigger a review by the distribution utility and the RTO/ISO. Such an approach would limit both unnecessary reviews and opportunities for discrimination.

The Commission should also consider adopting certain other reasonable procedural limitations on distribution utility review, in addition to those suggested above. To prevent unreasonable delay on the part of the distribution utility, the RTO/ISOs should limit the time for the distribution utility to review a DER enrollment to no more than 10 days. If the distribution utility concludes that a DER would be a threat to reliability, both the DER owner and the RTO/ISO should have the right to review the information on which this conclusion is based. Finally, as an additional safeguard against undue discrimination, if a utility reviews a DER enrollment and reports to the RTO/ISO that a DER on a particular customer premise would be a threat to reliability, then the utility should be prohibited from registering a DER at that customer site in the future without making distribution system upgrades.

**3. Eligibility to Participate Through a DER Aggregator (NOPR at PP 128, 133):
The Commission's Proposal to Retain Pre-Existing Eligibility Restrictions,
Technical Requirements, and Participation Models May Not Fully Achieve
the Goal of Ensuring That Aggregated DERs Will Be Eligible to Participate
in All Markets**

AEE observed in its June 6 Comments that many barriers to participation arise from existing market rules that limit the eligibility of resources based on their technology type, or that

impose restrictions or requirements designed for traditional generation on new technologies. The Commission recognizes these problems in the NOPR when it observes that existing participation models may not adequately accommodate participation of aggregated DERs located on the distribution system or behind-the-meter, or the unique characteristics of such resource aggregations.⁶⁹ Additionally, the Commission acknowledges that restrictions placed on aggregators, such as the types of resources that can participate and the inability to inject energy onto the grid, may limit the effectiveness of RTO/ISO aggregation opportunities.⁷⁰ The Commission further acknowledges that existing participation models may unreasonably limit the ability of DER aggregators to participate.⁷¹

Despite this appropriate recognition of the problems with existing participation models, the NOPR contains other statements and proposals that suggest that the RTOs/ISOs, when reforming their tariffs, should take existing technology eligibility restrictions, participation models, and performance requirements as a given.⁷² If this is indeed the Commission's intention, significant existing barriers to participation currently faced by advanced energy technologies will remain, regardless of these resources' ability to aggregate to participate in the wholesale markets. If the reforms outlined in the NOPR are to fully achieve the Commission's goal of ensuring non-discriminatory market access for advanced energy technologies like DERs, the Commission should clarify its intention that the RTOs/ISOs, in compliance with the Final Rule, must address existing barriers to participation by aggregated DERs created by existing participation models and prohibitions on specific technologies.

⁶⁹ NOPR at PP 125, 131.

⁷⁰ *Id.* at P 127.

⁷¹ *Id.* at P 128.

⁷² *Id.*

a. Reliance on Existing Participation Models May Limit Participation by Aggregated DERs

While the Commission proposes to require that eligibility restrictions in existing participation models be revised to ensure that aggregated DERs can use them, it does not address what specific aspects of these participation models should be reformed because they erect barriers to the ability of aggregated DERs to provide wholesale services. As discussed in AEE's June 6 Comments and in additional detail below, many RTOs/ISOs have performance or technical requirements in their existing participation models that require that resources resemble traditional thermal generation as much as possible, and penalize or exclude resources that do not fit into this mold. These performance and technical requirements discriminate against aggregated DERs (and other resources) that are technically capable of providing needed wholesale services, but may not meet the requirements designed with traditional thermal generation in mind.

Participation in the capacity market is a prime example; performance requirements in existing participation models can make it difficult, if not impossible, for DER aggregations (and energy storage) to participate in capacity markets. The Capacity Performance construct in PJM, and the Pay for Performance Construct in ISO-NE, both require that capacity resources resemble traditional thermal generation. Among other restrictions that impose barriers to participation for advanced energy technologies, these constructs effectively require indefinite run times for capacity resources to avoid significant performance penalties (which can amount to more than a year's worth of capacity revenue). Many types of DER resources, and energy storage resources, cannot run indefinitely, but they are highly reliable for limited periods of time. Utilizing them would provide numerous reliability and market benefits. For example, the advanced energy technologies likely to be included in a DER aggregation can respond quickly to system

emergencies; this quick response time provides numerous benefits despite their shorter duration run time, because they can give other resources time to ramp up or procure fuel. DER aggregations can also be dispatched granularly, providing support to specific portions of the grid and potentially circumventing transmission congestion. However, they are effectively excluded from participating in the capacity market because of the significant economic risk from performance penalties that require them to have operational characteristics that resemble traditional generation.

AEE recognizes that “capacity performance” constructs are new and still developing, and their full impacts on reliability and infrastructure development are still playing out. Nonetheless, the Commission should be aware of these issues and consider whether these capacity participation models need to be revisited to ensure that advanced energy technologies, including DERs, can participate and improve the efficiency of these markets and the system as whole. As discussed in AEE’s June 6 Comments, changes to the capacity construct to achieve this goal certainly might entail differing compensation for short-duration resources to account for reduced run times. However, the current framework essentially excludes reliable DER aggregations from capacity frameworks with performance requirements favoring traditional generation resources, like those in place in PJM and ISO-NE, even though such resources can be extremely valuable in emergency conditions.⁷³

Existing demand resource participation models are another example. In ISO-NE, for instance, the participation model for demand response requires that such resources be settled against five-minute interval meter data, and the resources must be equipped with real-time

⁷³ See *supra* Section II.A (discussing the ability of demand response to prevent blackouts during times of peak demand).

telemetry. But this telemetry is cost-prohibitive for residential and small businesses, because the small load at each customer premise means that the revenue earned from a site would never match the cost of installing and managing five-minute telemetry. This requirement thus effectively excludes residential customers from providing demand response services to the ISO-NE market; in fact, there is virtually no residential demand response in ISO-NE, even in those New England jurisdictions that have invested in “smart” meters. Mass market smart meters do not record data on 5-minute intervals and they cannot perform real-time telemetry. Other RTOs/ISOs permit customers equipped with retail meters to participate in demand response programs, so it is feasible for resources with such meters to participate in wholesale markets. Distribution utilities and their customers that have invested hundreds of millions of dollars should not be excluded from the wholesale markets in which they can provide useful services because of unnecessarily strict telemetry requirements.

As discussed further below, even though the Commission is proposing in the NOPR that RTO/ISO telemetry requirements should not impose “unnecessarily burdensome costs” on DER aggregations and individual resources, DER aggregators may be subjected to such burdensome requirements by existing participation models if the Commission does not clarify that real-time and short interval telemetry is not required for DER aggregations and individual DER resources.

In sum, the Commission should be aware of, and consider revisiting, these kinds of barriers to participation in existing RTO/ISO participation models. AEE will be highlighting such barriers during the RTO/ISO implementation of the Final Rule, and in future proceedings.

b. The Commission Should Not Leave in Place Existing Rules That Impose Prohibitions on Participation by Specific Technologies

In addition, while the Commission proposes that each RTO/ISO revise its tariff so that it does not prohibit the participation of any kind of technology through a DER aggregator, it also

states that to the extent existing rules expressly prohibit the participation of certain technologies, the NOPR does not intend to overturn these rules.⁷⁴ It is unclear what existing rules the Commission does not intend to overturn. However, AEE respectfully requests that the Commission make clear that discriminatory restrictions on technologies and resources that can participate in a DER aggregation should be eliminated in compliance with its Final Rule in this proceeding.

4. Locational Requirements for DER Aggregations (NOPR at P 138): The Commission Should Adopt the Proposal to Require RTOs/ISOs to Allow Aggregation Across the Broadest Area Possible, and Make Clear that RTOs/ISOs Must Support Location Restrictions With Legitimate Technical Justifications

AEE strongly supports the Commission's determination that DERs should be allowed to aggregate in as geographically broad a fashion as possible.⁷⁵ The importance of the ability to aggregate across a broad geographic area cannot be overstated, and is fundamental to the DER business model. Aggregation enables DER aggregators to serve smaller customers at a reasonable cost and to manage a large portfolio, which minimizes the risk of underperformance from a single customer, thus increasing the reliability of the resource delivered to ISOs/RTOs.

Traditionally, most RTO/ISOs, especially PJM and NYISO, have allowed aggregation at a fairly broad geographic level for behind-the-meter resources. CAISO also allows aggregation across nodes, by permitting an aggregator to submit distribution factors which govern the relative dispatch between nodes, preventing cross-node transmission constraints.

⁷⁴ NOPR at P 133.

⁷⁵ *Id.* at PP 138-139.

Unfortunately, in NYISO's latest Distributed Energy Resource Roadmap,⁷⁶ they are proposing to restrict DER aggregation to the transmission node level, which could eventually number approximately 500 statewide. Currently aggregation is allowed at the load zone level, of which there are 11 zones. This would significantly reduce the ability to aggregate, and the expense of managing hundreds of resources would be devastating to the DER business model.

While AEE recognizes that the NYISO DER Roadmap is not the subject of this proceeding, it provides a useful example of the kinds of barriers that can be created by overly limited geographic restrictions. In justifying their proposal to limit aggregation to the nodal level, NYISO explains that by dispatching two DERs located at two different nodes on opposite sides of a transmission constraint, the constraint could be exacerbated. NYISO provides no evidence of real-life examples, so we don't know if this is an actual problem or a hypothetical problem. Regardless, in developing this excessively-restrictive approach to aggregation, the NYISO has failed to consider practical alternatives (such as the CAISO approach noted above) that would not jeopardize reliability or exacerbate transmission constraints. For instance, aggregation could continue to be allowed up to the load zone level, but the NYISO could have the ability to do more granular dispatch if dispatching at the load zone level would exacerbate constraints within the zone. The NYISO, or any other RTO/ISO developing aggregation rules, could simply require that aggregators provide the customer's location and node when enrolling, and then exclude customers from dispatch when that would aggravate constraints.

If ISOs/RTOs adopt policies limiting aggregation to such a narrow geographic area, it would erect the exact type of barrier that the Commission is trying to eliminate with this NOPR.

⁷⁶ NYISO, DISTRIBUTED ENERGY RESOURCES ROADMAP FOR NEW YORK'S WHOLESALE ELECTRICITY MARKETS (2017), http://www.nyiso.com/public/webdocs/media_room/press_releases/2017/Child_DER_Roadmap/Distributed_Energy_Resources_Roadmap.pdf.

In its Final Rule, the Commission should clarify that nodal aggregation is insufficient for meeting the requirement to allow aggregation “in as geographically broad a fashion as possible.” Beyond that clarification, we expect different RTOs/ISOs to have different thresholds for “in as geographically broad a fashion as possible.”

Instead of mandating a certain approach (which might be too broad for some RTOs/ISOs and too narrow for others), the Commission should make clear that RTO/ISO location restrictions must be based in legitimate technical and reliability concerns. Further, the ISOs/RTOs should be mindful that the entire aggregated resource does not always need to be dispatched, and if there are constraints, there can be partial dispatch. At a minimum, however, aggregation should be allowed across entire load zones within an RTO/ISO, with the burden on the RTO/ISO to support more restrictive requirements.

5. Metering and Telemetry System Requirements for DER Aggregators (NOPR at P 150): Requiring DER Aggregators to Adopt the Same Telemetry Used by Conventional Generators Is Not Necessary to Ensure Reliability and Would be Unduly Burdensome

In its June 6 Comments, AEE discussed the barriers that arise when market rules assume, or require, that all resources resemble traditional generation.⁷⁷ These rules can create barriers because they impose requirements that are onerous for advanced energy technologies and largely unnecessary for reliability and market operations. In the NOPR, the Commission makes a proposal regarding telemetry data that unfairly imposes generator-like requirements on DER aggregators:

[An] aggregator should be able to provide to the RTO/ISO the real-time capability of its resource in a manner *similar to the requirements for generators*, so the RTO/ISO knows the operating level of the resource and how much that resource can ramp up or ramp down over its full range of capability, including its charging

⁷⁷ June 6 Comments at 7-9.

capability for distributed energy resource aggregations that include electric storage resources.⁷⁸

For many DER aggregators, this requirement that they “look like” conventional generators with respect to telemetry would be an undue burden, because this level of telemetry is not necessary to ensure the level of visibility required by the RTO/ISOs to maintain reliability.

In most RTOs/ISOs, generators are required to have telemetry with a six-second, or shorter, interval. But such a requirement is prohibitively expensive for DER aggregators, because to get an accurate reading, the aggregator would need to install such telemetry at each DER site. While a generator can distribute the cost of its telemetry across hundreds of megawatts of revenue, a DER aggregator would be forced to spread the costs of more meters over fewer megawatts.

Such a requirement is also unnecessary. The RTO/ISOs need six-second interval data for a generator, since the RTO/ISO must know immediately if a large number of megawatts associated with a specific generator go off-line. A DER aggregation, on the other hand, would be comprised of perhaps dozens of smaller resources that operate independently. If a single customer stopped performing, the overall resource could still perform at its expected capacity (if allowed to aggregate). This reduces the need for immediate notice. Moreover, requiring six second interval data, if submitted directly, would swamp the RTO/ISO with data. Requiring unnecessarily granular data from DER aggregators imposes unnecessary costs on both the aggregator and the RTO/ISO and should be avoided. However, as discussed above in Section II.E.3.a, although ISO-NE has managed to relieve the problem of data overload, its telemetry requirements still exclude most residential and small business demand response. Because of the

⁷⁸ NOPR at P 152 (emphasis added).

nature of aggregations, telemetry requirements that exceed the capacity of modern residential meters are, for the most part, unnecessary.

The issue of telemetry highlights both the problem of treating all resources like generators, and the problem of treating existing “participation models” for various asset classes as a given under the NOPR. A DER aggregation that seeks to act as a supply resource might be required to meet generator-like standards, even though those standards may be inapplicable, impractical, and unnecessary. AEE suggests that the Commission clarify in the Final Rule that telemetry requirements must not be unduly burdensome and must be commensurate with the needs of the RTO/ISO to ensure visibility and reliability. In markets that have capacity-only resources, those RTOs/ISOs should be allowed to continue using their existing telemetry requirements for capacity resources.

With regard to individual DERs within an aggregation, AEE requests that the Final Rule accommodate resources that use less sophisticated telemetry, such as smart meters. For example, the Final Rule could allow the DER aggregators to submit information on behalf of the individual resources where it is impractical or impossible to install advanced telemetry, similar to the system used by CAISO.⁷⁹ In CAISO, DERs are required to meet the metering standards of the local regulatory authority and the applicable distribution company tariff. But CAISO does not directly meter the DERs; that is the responsibility of the DER aggregator’s scheduling coordinator, which bids into the market using generation distribution factors. As CAISO explains in its submission to FERC:

[T]he scheduling coordinator will submit schedules and bids for an aggregation based on the aggregation’s generation distribution factors. CAISO market awards

⁷⁹ CAISO, Distributed Energy Resource Provider Initiative Filing, Docket No. ER16-1085-000, at 12-19 (filed Mar. 4, 2016) (“CAISO DER Filing”); *Ca. Independent Sys. Operator Corp.*, 155 FERC ¶ 61,229 (2016) (accepting CAISO’s DER Provider Initiative).

and dispatch instructions will then reflect these distribution factors that correlate to individual pricing nodes. Scheduling coordinators will submit aggregated meter data to the CAISO. . . . If meter data reflects that a distributed energy resource aggregation did not accurately respond to its dispatch instructions, the resource will face financial consequences in the form of uninstructed imbalance energy charges.⁸⁰

CAISO observes that: “[t]his approach allows for scheduling coordinators to reflect the dynamic operating nature of some of the distributed energy resources comprising an aggregation.”⁸¹

Because of the large numbers of individual DERs in an aggregation, this approach is sufficiently accurate for dispatch and reliability purposes. FERC recently approved this approach to DER metering and telemetry.⁸²

6. Modifications to the List of Resources in a DER Aggregation (NOPR at P 148): The Commission Should Adopt Its Proposal to Allow Aggregators to Modify the List of DER Resources in Their Aggregation

AEE strongly supports the Commission’s proposal to allow modifications to an aggregator’s list of DERs without being required to de-register and re-register all of the DERs in the aggregation. The alternative would not only be unduly burdensome for aggregators, but it would quickly become an inconvenience to the RTOs/ISOs as well. There is simply no reliability or coordination justification for burdening DER aggregators with de-registering and re-registering all of their DERs each time they make a change.

7. The Commission Should Not Require Demand Response Resources to Participate as DERs

Although AEE believes that the existing participation models for demand response in the RTO/ISO markets need reforms, we are concerned that the Commission might seek to fold existing demand response programs and resources into its new rules for DER aggregations.

⁸⁰ CAISO DER Filing at 12.

⁸¹ *Id.* at 13.

⁸² 155 FERC ¶ 61,229 (2016).

However, demand response is now a mature resource in several of the RTOs/ISOs, with rules developed over a decade to accommodate the technical requirements of resources that operate entirely behind-the-meter by reducing consumption. Although demand response resources should be able to join a DER aggregation if they choose, existing demand response aggregators should not be required to conform to rules designed for DER aggregators. Existing market rules, in fact, recognize a distinction between demand response and DER aggregations. For example, in CAISO, there are separate programs for exporting DERs and non-exporting DERs that operate as demand response.⁸³

8. Minimum and Maximum Size Requirements for Individual DERs Are Unnecessary

The Commission seeks comment regarding whether it should establish a minimum or maximum capacity requirement for individual resources seeking to participate in DER aggregations.⁸⁴ AEE believes that such restrictions are unnecessary. The DERs in the aggregation will interact with the wholesale market as one unit. Moreover, the aggregation as a whole must meet the capacity minimum for the participation model it is using in the wholesale market. To the extent that the RTO/ISOs believe a size requirement for DERs are necessary, the Commission should require them to provide a sufficient justification in their compliance filings, rather than adopting a one-size fits all rule.

9. The Minimum Size Requirement for DER Aggregations Should be 100 kW

AEE suggests that the Commission set the minimum size requirement for DER aggregations to 100 kW, rather than allowing the minimum size for an aggregation to vary with the participation model pursuant to which the aggregation is interacting with the market. As the

⁸³ NOPR at P 3.

⁸⁴ *Id.* at P 135.

Commission explained when proposing the minimum size requirement for the energy storage participation model: “requiring that the minimum size requirement not exceed 100 kW balances the benefits of increased competition with the ability of RTO/ISO market clearing software to effectively model and dispatch smaller resources often located on the distribution system.”⁸⁵ This rationale applies equally to the balance of considerations that should be applied to DER aggregations under any participation model.

F. Outstanding Barriers to Participation Outside the Scope of This NOPR

AEE notes that the proposals in the NOPR to create a participation model for energy storage and allow aggregated DERs to participate under existing participation models, while a major step forward, will not resolve all barriers to participation facing advanced energy technologies. Performance requirements designed for thermal generation, inconsistent rules among different RTOs/ISOs, lack of price transparency, and lack of compensation for unbundled ancillary services are all examples of barriers that will remain. AEE is committed to continuing to document these barriers and bring them to the attention of the Commission and the RTOs/ISOs, and to working collaboratively to resolve them.

IV. CONCLUSION

AEE thanks the Commission for the opportunity to submit these comments and the Commission’s commitment to removing unjust, unreasonable and unduly discriminatory barriers to participation in the wholesale markets by advanced energy technologies like energy storage and DERs. AEE strongly supports the overall direction taken in the NOPR, and urges the Commission to move forward and adopt a Final Rule addressing these barriers, but we hope the Commission will reconsider specific aspects of its proposals that are either insufficient to address

⁸⁵ *Id.* at P 94.

existing barriers or may even create new ones. We look forward to working with the Commission and the RTOs/ISOs, both in this and future proceedings, to remove barriers to participation in the wholesale markets and ensure a level playing field for advanced energy technologies.

Respectfully submitted,

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Dated: February 13, 2017

CERTIFICATE OF SERVICE

I certify that I have this day served the foregoing document by email upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, D.C. this 13th day of February, 2017.

/s/ Suedeem G. Kelly

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