

169 FERC ¶ 61,140
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Neil Chatterjee, Chairman;
Richard Glick and Bernard L. McNamee.

ISO New England Inc.

Docket Nos. ER19-470-000
ER19-470-001
ER19-470-002

ORDER ON COMPLIANCE FILING

(Issued November 22, 2019)

1. On December 3, 2018, ISO New England Inc. (ISO-NE), joined by the New England Power Pool (NEPOOL) Participants Committee, submitted proposed revisions to the Open Access Transmission Tariff (OATT) and Market Rule 1, sections II and III, respectively, of the ISO-NE Transmission, Markets and Services Tariff (Tariff) in compliance with the requirements of Order No. 841,¹ which removes barriers to the participation of electric storage resources in the capacity, energy, and ancillary service markets operated by Regional Transmission Organizations and Independent System Operators (RTO/ISO markets). As ISO-NE states, these proposed revisions along with existing Tariff provisions constitute its compliance filing (Compliance Filing).² In this order, we accept ISO-NE's Compliance Filing, to become effective December 3, 2019, with a limited number of revisions to become effective on December 1, 2019, and January 1, 2024, subject to a further compliance filing, as discussed below.

¹ *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 841, 162 FERC ¶ 61,127 (2018), *order on reh'g*, Order No. 841-A, 167 FERC ¶ 61,154 (2019).

² For revisions to the OATT, ISO-NE and NEPOOL are joined in the Compliance Filing by the Participating Transmission Owners Administrative Committee on behalf of the Participating Transmission Owners. ISO-NE Compliance Filing, Transmittal at 1-2, 4.

I. Background

2. In Order No. 841, the Commission adopted reforms to remove barriers to the participation of electric storage resources in RTO/ISO markets.³ The Commission modified section 35.28 of its regulations⁴ to require each RTO/ISO to revise its tariff to establish market rules that, recognizing the physical and operational characteristics of electric storage resources, facilitate their participation in the RTO/ISO markets. The Commission found that Order No. 841 will enhance competition and, in turn, help to ensure that the RTO/ISO markets produce just and reasonable rates, pursuant to the Commission's legal authority under Federal Power Act (FPA) section 206.⁵

3. Order No. 841 requires each RTO/ISO to revise its tariff to establish a participation model for electric storage resources consisting of market rules that, recognizing the physical and operational characteristics of electric storage resources, will help facilitate their participation in the RTO/ISO markets.⁶ Specifically, for each RTO/ISO, the tariff provisions for the participation model for electric storage resources must: (1) ensure that a resource using the participation model is eligible to provide all capacity, energy, and ancillary services that it is technically capable of providing in the RTO/ISO markets; (2) ensure that a resource using the participation model can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer consistent with existing market rules that govern when a resource can set the wholesale price; (3) account for the physical and operational characteristics of electric storage resources through bidding parameters or other means; and (4) establish a minimum size requirement for participation in the RTO/ISO markets that does not exceed 100 kW. Additionally, each RTO/ISO must specify that the sale of electric energy from the RTO/ISO markets to an electric storage resource that the resource then resells back to those markets must be at the wholesale locational marginal price (LMP).⁷

³ Order No. 841, 162 FERC ¶ 61,127 at P 1.

⁴ 18 C.F.R. § 35.28 (2019).

⁵ 16 U.S.C. § 824e (2018).

⁶ Order No. 841, 162 FERC ¶ 61,127 at P 3. In Order No. 841, the Commission referred to a set of tariff provisions that are created for a particular type of resource as a participation model. *Id.*

⁷ *Id.* P 4.

II. Compliance Filing

4. ISO-NE states that its Compliance Filing is comprised of three distinct sets of rules that, taken together, demonstrate its compliance with Order No. 841.⁸ First, the Compliance Filing references existing, long-standing Tariff provisions which remain unchanged by the Compliance Filing.⁹ ISO-NE explains that these existing rules encompass existing Tariff provisions that establish and govern: (1) the behavior of dispatchable generators, dispatchable load assets, and regulation market resources; (2) the provision of capacity, energy, reserves, and regulation by those resources; and (3) the functioning of the relevant markets themselves.¹⁰ Second, the Compliance Filing references the large number of market rule revisions that ISO-NE and NEPOOL jointly filed pursuant to FPA section 205 on October 10, 2018 (October 2018 Storage Filing),¹¹ and the Commission accepted on February 25, 2019.¹² ISO-NE explains that the October 2018 Storage Filing introduced the electric storage resource rules that “form the backbone of the participation model for electric storage resources mandated by the Commission in Order No. 841.”¹³ Third, the Compliance Filing includes limited additional Tariff revisions needed for full compliance with Order No. 841.¹⁴ ISO-NE states that the Compliance Filing introduces new Tariff revisions that: (1) “allow any qualifying technology type to participate as a Binary Storage Facility (eliminating the restriction that allowed only pumped-storage hydroelectric facilities[¹⁵] to participate pursuant to those rules);” (2) “allow electric storage resources as small as 0.1 megawatts (MW) to provide energy, reserves, and regulation;” and (3) “eliminate the allocation of

⁸ ISO-NE Compliance Filing, Transmittal at 4.

⁹ *Id.* at 4-5.

¹⁰ *Id.* at 5.

¹¹ *Id.* See ISO-NE, Enhanced Storage Participation Revisions, Docket No. ER19-84-000 (filed Oct. 10, 2018).

¹² See *ISO New England Inc.*, 166 FERC ¶ 61,146 (2019).

¹³ ISO-NE Compliance Filing, Transmittal at 5.

¹⁴ *Id.*

¹⁵ Pumped-hydro storage projects move water between two reservoirs located at different elevations (i.e., an upper and lower reservoir) to store energy and generate electricity. See Order No. 841, 162 FERC ¶ 61,127 at P 7, n.12.

transmission charges to electric storage resources in certain circumstances.”¹⁶ ISO-NE explains that these three sets of rules are presented “as a unified package which . . . together fully meet the requirements of Order 841.”¹⁷

5. ISO-NE seeks an effective date of December 3, 2019, for the Tariff revisions included in the Compliance Filing, with a limited number of revisions to become effective on January 1, 2024.¹⁸

6. On April 1, 2019, Commission staff issued a letter informing ISO-NE that additional information was necessary to process its Compliance Filing (Data Request). On May 1, 2019, in Docket No. ER19-470-001, ISO-NE submitted a response to the Data Request, which amended its Compliance Filing (Data Request Response).

7. On September 18, 2019, ISO-NE filed an additional amendment to its Compliance Filing, changing the requested effective date for revisions to the OATT from December 3, 2019, to December 1, 2019 (Effective Date Filing).

III. Notice of Filing and Responsive Pleadings

8. Notice of ISO-NE’s filing was published in the *Federal Register*, 83 Fed. Reg. 63,852 (2018), with interventions and protests due on or before December 24, 2018. On December 14, 2018, the Commission extended the comment period until and including February 7, 2019.¹⁹

9. Timely motions to intervene were filed by Advanced Energy Economy; American Public Power Association; Calpine Corporation (Calpine); EDF Renewables, Inc. (EDF Renewables); Electric Power Supply Association; Energy Storage Association; Exelon Corporation; GlidePath Development LLC; Lincoln Clean Energy, LLC; LS Power Associates, L.P.; National Rural Electric Cooperative Association (NRECA); National Grid; New England States Committee on Electricity; NRG Power Marketing LLC; Penn

¹⁶ ISO-NE Compliance Filing, Transmittal at 5.

¹⁷ *Id.*

¹⁸ *Id.* at 31.

¹⁹ Notice of Extension of Time, Docket Nos. ER19-460-000, ER19-462-000, ER19-465-000, ER19-467-000, ER19-468-000, ER19-469-000, and ER19-470-000 (Dec. 14, 2018).

Oak Services, LLC; RENEW Northeast, Inc. (RENEW Northeast); and Voith Hydro Inc. (Voith Hydro).

10. Timely comments and/or protests were filed by Advanced Energy Economy; Calpine; EDF Renewables; Energy Storage Association; RENEW Northeast; and Tesla, Inc. (Tesla).²⁰ Voith Hydro filed comments out-of-time.

11. On February 22, 2019, ISO-NE, NEPOOL, and NRECA filed answers. On March 21, 2019, Energy Storage Association filed an answer.

12. Notice of ISO-NE's May 1, 2019 Data Request Response was published in the *Federal Register*, 84 Fed. Reg. 20,351 (2019), with interventions and protests due on or before May 22, 2019.

13. Advanced Energy Economy and NEPOOL filed comments on ISO-NE's Data Request Response.

14. Notice of ISO-NE's Effective Date Filing was published in the *Federal Register*, 84 Fed. Reg. 50,026 (2019), with interventions and protests due on or before October 9, 2019.

IV. Discussion

A. Procedural Matters

15. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2019), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.²¹

16. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2019), prohibits an answer to a protest or an answer unless otherwise ordered by the decisional authority. We accept the answers filed in this proceeding because they have provided information that assisted us in our decision-making process.

²⁰ Tesla did not file a motion to intervene in this proceeding.

²¹ Entities that filed comments and/or protests but did not file a notice of intervention or motion to intervene are not parties to this proceeding. *See* 18 C.F.R. § 385.211(a)(2) ("The filing of a protest does not make the protestant a party to the proceeding. The protestant must intervene under Rule 214 to become a party.").

B. Substantive Matters

17. We find that ISO-NE's Compliance Filing, with certain modifications directed below, complies with the requirements that the Commission adopted in Order No. 841. Accordingly, we accept ISO-NE's Compliance Filing, to become effective December 3, 2019, with a limited number of revisions to become effective on December 1, 2019, and January 1, 2024, subject to a further compliance filing as discussed below. We direct ISO-NE to file the compliance filing within 60 days of the date of issuance of this order.

18. As a preliminary matter, we find that ISO-NE has complied with the following requirements of Order No. 841: (1) including a definition of Electric Storage Facility that encompasses resources capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid, regardless of their storage medium, and includes electric storage resources located on the interstate transmission system, on a distribution system, or behind the meter;²² (2) ensuring that a resource using the participation model for electric storage resources can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer, consistent with rules that govern the conditions under which a resource can set the wholesale price;²³ (3) demonstrating that its market design will not allow for conflicting supply offers and demand bids from the same resource for the same market interval or modifying its market rules to prevent conflicting supply offers and demand bids from the same resource for the same market interval;²⁴ and (4) ensuring that resources available for manual dispatch as a wholesale buyer and wholesale seller under the participation model for electric storage resources are held harmless for manual dispatch by being

²² Order No. 841, 162 FERC ¶ 61,127 at PP 29-35; 18 C.F.R. § 35.28(b)(9). *See* ISO-NE Compliance Filing, Transmittal at 5; ISO-NE Tariff, §§ I.2.2 (defining Electric Storage Facility as a storage facility that participates in the New England Markets as described in section III.1.10.6 of Market Rule 1), III.1.10.6.

²³ Order No. 841, 162 FERC ¶ 61,127 at PP 142-150. *See* ISO-NE Compliance Filing, Transmittal at 16-17. *See also* ISO-NE Tariff, §§ I.2.2, III.1.10.3, III.1.10.6(c)(vii), III.1.10.9(f)(i)-(ii), III.1.10.16(c)(v)-(vi), III.2, III.9.4, III.9.5, III.13.2, III.13.4, III.14.8(a).

²⁴ Order No. 841, 162 FERC ¶ 61,127 at PP 162-165. *See* ISO-NE Compliance Filing, Transmittal at 17-18; ISO-NE Data Request Response at 4-5. *See also* ISO-NE Tariff, §§ I.2.2; III.1.10.6(c)(iii), (viii).

eligible for make-whole payments.²⁵ ISO-NE's compliance with these requirements is not contested in this proceeding. All remaining compliance requirements and all comments and protests are addressed below.

1. Creation of a Participation Model

a. Participation Model

19. Order No. 841 adds section 35.28(g)(9)(i) to the Commission's regulations to require that each RTO/ISO have tariff provisions providing a participation model for electric storage resources consisting of market rules that, recognizing the physical and operational characteristics of electric storage resources, facilitate their participation in the RTO/ISO markets.²⁶ Order No. 841 explains that establishing a participation model for electric storage resources does not preclude an RTO/ISO from structuring its markets based on the technical requirements that a resource must meet to provide needed services; it simply requires that each RTO/ISO establish a participation model that ensures eligibility to participate in the RTO/ISO markets in a way that recognizes the physical and operational characteristics of electric storage resources.²⁷ Order No. 841 requires that resources using the participation model for electric storage resources be compensated for the wholesale services they provide in the same manner as other resources that provide these services.²⁸

20. Separate participation models are not necessary for different types of electric storage resources (e.g., slower, faster, or aggregated), and to the extent an RTO/ISO seeks to include in its tariff additional market rules that accommodate electric storage resources with specific physical and operational characteristics, the RTO/ISO may

²⁵ Order No. 841, 162 FERC ¶ 61,127 at PP 174-179. *See* ISO-NE Compliance Filing, Transmittal at 18; ISO-NE Data Request Response at 5-7; ISO-NE, Enhanced Storage Participation Revisions, Docket No. ER19-84-000, at 30-32 (filed Oct. 10, 2018) (extending Net Commitment Period Compensation eligibility to Continuous Storage Facilities in Appendix F). *See also* ISO-NE Tariff, §§ III.F.2.1, III.F.2.2.2-.5, III.F.2.3.10, III.F.2.2.5.3.

²⁶ Order No. 841, 162 FERC ¶ 61,127 at P 51.

²⁷ *Id.* P 52.

²⁸ *Id.*

propose such revisions to its tariff through a separate FPA section 205 filing.²⁹ However, Order No. 841 states that, where an RTO/ISO already has a separate participation model that electric storage resources may use (such as participation models for pumped-hydro resources or demand response), the RTO/ISO is not required to consolidate that participation model with the participation model for electric storage resources required by Order No. 841.³⁰ To the extent that an RTO/ISO modifies existing participation models to comply with Order No. 841, it must ensure that those resulting participation models are available for all types of electric storage resources and comply with all of the Order No. 841 requirements.³¹

21. Lastly, Order No. 841 explains that, while the participation model for electric storage resources should be designed to facilitate the participation of all types of electric storage technologies, the Commission is not requiring all electric storage resources to use that participation model.³² Under section 35.28(g)(9) of the Commission's regulations, section 35.28(g)(9)(i) applies to resources using the participation model for electric storage resources and section 35.28(g)(9)(ii) applies to all electric storage resources that fall under the definition of electric storage resources.³³ Therefore, electric storage resources that elect not to use the participation model for electric storage resources are still able to pay the wholesale LMP for the electric energy they purchase from the RTO/ISO markets and then resell back to those markets.³⁴ This issue is discussed further in the Energy Used to Charge Electric Storage Resources section below.

i. Filing

22. ISO-NE states that its proposal will allow an electric storage resource to participate in the New England markets by registering as an Electric Storage Facility, which recognizes its physical and operational characteristics, particularly its ability to

²⁹ *Id.* P 54 (citing 16 U.S.C. § 824d). In Order No. 841-A, the Commission found that a single participation model can be designed to be flexible enough to accommodate any type of electric storage resource. Order No. 841-A, 167 FERC ¶ 61,154 at P 65.

³⁰ Order No. 841, 162 FERC ¶ 61,127 at P 55.

³¹ *Id.*

³² *Id.* P 56.

³³ *Id.*

³⁴ *Id.*

transition between consuming and injecting electric energy.³⁵ ISO-NE explains that, pursuant to ISO-NE's technology-neutral market constructs, a resource participating via the Electric Storage Facility rules will register under the following existing market constructs: (1) as a dispatchable Generator Asset, to manage injection capability for the provision of capacity, energy, reserves, primary frequency response, blackstart, and reactive power;³⁶ and (2) as Dispatchable Asset Related Demand (DARD), to manage consumption capability for consumption of energy and provision of reserves.³⁷ ISO-NE adds that the existing market rules governing Generator Assets and DARDs will apply to Electric Storage Facility Generator Assets and DARDs.³⁸

23. The Electric Storage Facility market rules divide electric storage technologies into two general categories: Continuous Storage Facilities and Binary Storage Facilities.³⁹ ISO-NE states that the Continuous Storage Facility rules recognize electric storage resources that can transition nearly instantaneously between charging and discharging and can do so at any MW level within their range.⁴⁰ In addition to registering as Generator Assets and DARDs, Continuous Storage Facilities will register under a third market construct, as Alternative Technology Regulation Resources (ATRR), in order to provide regulation service.⁴¹

24. ISO-NE states that the Binary Storage Facility rules recognize the limitations of electric storage resources that cannot seamlessly switch from charging to discharging nor operate continuously across their negative and positive MW ranges, such as pumped-

³⁵ ISO-NE Compliance Filing, Transmittal at 6.

³⁶ *Id.*; see ISO-NE Tariff, § III.1.10.6(a)(i), (iii).

³⁷ ISO-NE Compliance Filing, Transmittal at 6; see ISO-NE Tariff, § III.1.10.6(a)(ii)-(iii).

³⁸ ISO-NE Compliance Filing, Transmittal at 6; see ISO-NE Tariff, § III.1.10.6(a)(i)-(ii); ISO-NE Compliance Filing, Attachment A (McDonough-Parent Test.) at 7.

³⁹ ISO-NE Compliance Filing, Transmittal at 6; see ISO-NE Tariff, § III.1.10.6(a)(iv); McDonough-Parent Test. at 7.

⁴⁰ ISO-NE Compliance Filing, Transmittal at 6.

⁴¹ *Id.*; see ISO-NE Tariff, § III.1.10.6(c)(ii); McDonough-Parent Test. at 8.

storage hydroelectric units.⁴² ISO-NE's proposal extends the Binary Storage Facility treatment of pumped-hydro facilities to any electric storage resources that satisfy the relevant criteria.⁴³ ISO-NE further explains that the Binary Storage Facility rules recognize that electric storage resources that cannot switch between charging and discharging instantaneously may still provide regulation, and allow them to do so while discharging as a Generator Asset or, after January 1, 2024, while consuming as a DARD.⁴⁴

ii. Protests/Comments

25. Energy Storage Association argues that the Compliance Filing does not address the effect on the participation of electric storage resources co-located with generation at a shared point of interconnection, an arrangement Energy Storage Association suggests is increasingly common.⁴⁵ Energy Storage Association states that questions remain as to how such hybrid resources should register, how their participation is modeled in market software, how their capacity values will be determined, and how they interconnect.⁴⁶ Energy Storage Association suggests that such uncertainty may inhibit participation by hybrid resources that include electric storage resources.⁴⁷ To address these uncertainties, Energy Storage Association asks the Commission to open a new docket via a notice of inquiry or technical conference to examine this issue and produce timely guidance for the market participation of hybrid resources.⁴⁸

26. Advanced Energy Economy claims that, because ISO-NE's Compliance Filing requires Continuous Storage Facilities to submit zero values for start-up and no-load costs in their supply offers, electric storage resources that participate as Continuous

⁴² ISO-NE Compliance Filing, Transmittal at 7; McDonough-Parent Test. at 8.

⁴³ ISO-NE Compliance Filing, Transmittal at 7. The Compliance Filing eliminates Tariff Section III.1.10.6(b)(iii) to make the Binary Storage Facility rules technology-neutral.

⁴⁴ *Id.*

⁴⁵ Energy Storage Association Protest at 14. Energy Storage Association refers to these resources as "hybrid resources."

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.*

Storage Facilities are ineligible to recover start-up and no-load costs through an uplift payment.⁴⁹ Advanced Energy Economy states that, while most existing non-pumped-hydro electric storage resources do not incur start-up and/or no-load costs, that may not be true for all existing non-pumped-hydro electric storage resources and future electric storage resources.⁵⁰ Advanced Energy Economy requests that the Commission direct ISO-NE to clarify that electric storage resources are eligible to recover start-up and no-load costs similar to other resources.⁵¹ Otherwise, Advanced Energy Economy argues that ISO-NE's proposal improperly treats electric storage resources differently than other resources.⁵²

iii. Answers

27. In response to Energy Storage Association, ISO-NE explains that an electric storage resource using the Electric Storage Facility participation model can be co-located with other generation.⁵³ ISO-NE states that it has been working with participants interested in this arrangement on interconnection design and operational issues.⁵⁴ Rather than participate in a national rulemaking, ISO-NE would prefer to work with its stakeholders directly because these projects involve unique configurations that do not lend themselves to a general docket, and because RTOs/ISOs and participants have limited operating experience with the capabilities and needs of such projects.⁵⁵ ISO-NE states that it will continue to work with its participants on a project-by-project basis and with its stakeholders to develop rule changes as needed to address the needs of co-located facilities.⁵⁶

⁴⁹ Advanced Energy Economy Protest at 9 (citing ISO-NE Compliance Filing, Transmittal at 25).

⁵⁰ *Id.*

⁵¹ *Id.* at 9-10.

⁵² *Id.* at 9.

⁵³ ISO-NE Answer at 37.

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

28. ISO-NE contends that start-up and no-load costs are associated with commitment and are used along with a resource's incremental energy costs by ISO-NE's commitment software to determine the least-cost commitment solution.⁵⁷ ISO-NE states that electric storage resources have the option to submit these costs if they register as a Binary Storage Facility, which includes a commitment process that allows these costs to be considered in the commitment solution. Therefore, ISO-NE states that, if it is important for the resource to receive these costs, it should participate as a Binary Storage Facility.⁵⁸ ISO-NE explains that it developed the "always on – no commitment" option, the Continuous Storage Facility model, in response to stakeholders' desire for a platform that enables electric storage resources to react immediately to prices.⁵⁹

29. NEPOOL represents that ISO-NE's proposed Tariff revisions develop a new participation model for emerging storage resources in accordance with Order No. 841's directives.⁶⁰ NEPOOL acknowledges the comments and requests for clarifications submitted in this proceeding,⁶¹ and states that the Compliance Filing sufficiently addresses most of them.⁶²

iv. Data Request Response

30. To further clarify issues related to start-up and no-load costs, ISO-NE explains that the Tariff requires it to "determine the least cost security-constrained unit commitment and dispatch," which ISO-NE fulfills by conducting a unit commitment process and a dispatch process.⁶³ The unit commitment process designates the least-cost resource set to commit in a given period, while the economic dispatch process determines

⁵⁷ *Id.* at 9. ISO-NE defines start-up costs as "the cost of coming from an off-line to an on-line state." ISO-NE defines no-load costs as "the hourly cost of being committed and online, regardless of what MW the unit is dispatched to." *Id.*

⁵⁸ *Id.* at 10.

⁵⁹ *Id.*

⁶⁰ NEPOOL Answer at 4.

⁶¹ *Id.* at 4-5, n.13.

⁶² *Id.* at 5, n.14.

⁶³ ISO-NE Data Request Response at 1 (citing ISO-NE Tariff, § III.2.2).

that resource set's least-cost MW dispatch level. ISO-NE states that start-up and no-load costs are incurred when a resource is committed and are related only to commitment.⁶⁴

31. ISO-NE asserts that Continuous Storage Facilities are not committed by ISO-NE and thus are not evaluated by the commitment software. ISO-NE contends that it would be inappropriate to compensate resources for commitment costs when those costs are not evaluated and the resources therefore are not determined economic to commit in light of such costs.⁶⁵ ISO-NE posits that batteries are the technology type most likely to participate as Continuous Storage Facilities and it is unaware of any costs (1) that batteries would incur by coming online to zero MW from an offline state; or (2) if online at a zero MW output, that it would not also incur while offline at a zero MW output. As such, ISO-NE does not believe that the technologies likely to use the Continuous Storage Facility option will incur "meaningful" start-up or no-load costs.⁶⁶ For this reason, ISO-NE expects that a storage technology with substantial start-up and no-load costs would select the Binary Storage Facility option to guarantee recovery of such costs through the Start-Up Fee and No-Load Fee parameters.

32. ISO-NE states that its proposed treatment of Continuous Storage Facility costs will fully and fairly compensate the resources choosing that option, and will do so consistently with other resources. Like all resources, Continuous Storage Facilities will account for any variable costs by including them in their energy supply offer and demand bid prices, which determine when the resource generates and consumes energy. ISO-NE explains that these resources will account for fixed costs through inframarginal energy market rents earned when the clearing price exceeds their offer price, and/or via capacity payments.⁶⁷

v. Commission Determination

33. We find that ISO-NE complies with the requirement in Order No. 841 to create a participation model for electric storage resources that ensures the eligibility of electric storage resources to participate in ISO-NE's markets in a way that recognizes their physical and operational characteristics. We find that ISO-NE's proposal will facilitate the participation of all types of electric storage resource technologies and allow them to

⁶⁴ *Id.*

⁶⁵ *Id.* at 2.

⁶⁶ *Id.* at 1-2.

⁶⁷ *Id.* at 3.

be compensated for the wholesale services that they provide in the same manner as other resources that provide those services.

34. Specifically, we find that ISO-NE's Electric Storage Facility participation model complies with Order No. 841. We find that, by requiring electric storage resources to register as both Generator Assets and DARDs in order to participate in ISO-NE's markets, ISO-NE's participation model recognizes the physical and operational characteristics of electric storage resources. Further, we find that ISO-NE's proposal to provide a bifurcated participation model for both Continuous Storage Facilities and Binary Storage Facilities complies with Order No. 841 because the proposal appropriately integrates electric storage resources that can seamlessly transition between charging and discharging at any MW level within their range, and those that cannot operate in this manner, thereby allowing electric storage resources to provide all of the services that they are technically capable of providing.

35. Regarding electric storage resources that may be co-located with generation, we note that, in Order No. 841, the Commission did not address co-location of electric storage resources with other resources. Therefore, we find commenters' requests regarding the participation of co-located resources in ISO-NE markets to be beyond the scope of this proceeding. Nevertheless, ISO-NE has explained that its Electric Storage Facility participation model is available to any electric storage resource, regardless of whether that resource is co-located with other generation, and that it will work with its stakeholders to develop rule changes as needed to address the needs of co-located facilities.

36. With respect to Advanced Energy Economy's argument regarding Continuous Storage Facilities' inability to recover start-up and no-load costs under ISO-NE's participation model, ISO-NE explains that batteries are the technology most likely to participate as Continuous Storage Facilities. ISO-NE further explains that it is unaware of costs that batteries may incur from coming online to zero MW from an offline state, or if online at an output of zero MW, that batteries would not also incur while offline at an output of zero.⁶⁸ Further, because Continuous Storage Facilities do not participate in the commitment process and they may immediately react to changes in price, we agree with ISO-NE that it would be inappropriate for load to compensate Continuous Storage Facilities for commitment costs when those costs are not evaluated when determining whether it is economic to commit them.⁶⁹ We note that electric storage resources can

⁶⁸ *Id.* at 1-2.

⁶⁹ *See* ISO-NE Answer at 10.

submit start-up and no-load costs if they opt to register as a Binary Storage Facility.⁷⁰ Furthermore, as ISO-NE explains, Continuous Storage Facilities will include variable costs, such as incremental cooling costs associated with charging and discharging, in their energy supply offer and demand prices and will have an opportunity to recover fixed costs, such as baseline cooling costs, through inframarginal energy rents or through capacity payments.⁷¹ As discussed below under section 1.c of this order (Relationship Between Electric Storage Participation Model and Existing Market Rules), we find that ISO-NE's Continuous Storage Facility model allows resources to include relevant costs, including opportunity costs, in their energy market bids, similar to other market participants, when appropriate. Therefore, while ISO-NE's Continuous Storage Facility model does not specify start-up, no-load, or related commitment costs, we find that its treatment of Continuous Storage Facilities is consistent with how it treats other generators with respect to allowable cost recovery.⁷²

b. Qualification Criteria for the Participation Model

37. To ensure that the electric storage resource participation model will accommodate both existing and future technologies, and to implement the new requirement in section 35.28(g)(9)(i) of the Commission's regulations, Order No. 841 requires each RTO/ISO to define in its tariff the criteria that a resource must meet to use the participation model (i.e., qualification criteria).⁷³ These criteria must: (1) be based on the physical and operational characteristics of electric storage resources, such as their ability to both receive and inject electric energy; (2) not limit participation under the electric storage resource participation model to any particular type of electric storage resource or other technology; and (3) ensure that the RTO/ISO is able to dispatch a resource in a way that recognizes its physical and operational characteristics and optimizes its benefits to the RTO/ISO.

38. Order No. 841 provides each RTO/ISO with flexibility to propose qualification criteria that best suit its participation model for electric storage resources.⁷⁴ However, the qualification criteria should not create barriers to the participation of any electric storage

⁷⁰ ISO-NE Data Request Response at 2.

⁷¹ *Id.* at 3.

⁷² *See id.*

⁷³ Order No. 841, 162 FERC ¶ 61,127 at P 61.

⁷⁴ *Id.* P 63.

resource in the RTO/ISO markets and should be inclusive of, at a minimum, those resources set forth under the definition of electric storage resources in Order No. 841.⁷⁵

i. Filing

39. ISO-NE states that, to qualify as an Electric Storage Facility, an electric storage resource must satisfy the criteria of a Continuous Storage Facility, a Binary Storage Facility, or both.⁷⁶ To qualify as a Continuous Storage Facility, an electric storage resource must be able to alternate between charging and discharging “rapidly and continuously” and operate online at all times, unless declared unavailable.⁷⁷ ISO-NE explains that Continuous Storage Facilities are optimized for energy and reserves by being committed at 0 MW in their default state, to enable economic dispatch.⁷⁸ This allows them to respond to shifting system conditions by switching between charging as a DARD and discharging as a Generator Asset, and to provide spinning reserves based on their entire range.⁷⁹ ISO-NE adds that Continuous Storage Facilities may not utilize shared storage capability with other resources, to ensure the feasibility of ISO-NE’s economic dispatch and properly account for reserves.⁸⁰

40. To qualify as a Binary Storage Facility, an electric storage resource must be able to offer as a Rapid Response Pricing asset, which requires that it be able to respond to a

⁷⁵ *Id.*

⁷⁶ ISO-NE Compliance Filing, Transmittal at 8; *see* ISO-NE Tariff, § III.1.10.6(a)(iv); McDonough-Parent Test. at 9.

⁷⁷ ISO-NE Compliance Filing, Transmittal at 8. ISO-NE explains that “rapidly” refers to “the ability to transition between the facility’s maximum consumption capability and its maximum generation capability in 10 minutes or less.” *Id.*; *see* ISO-NE Tariff, § III.1.10.6(c)(iii). “Continuously” connotes “the ability to be dispatched to any MW level in its negative to positive range.” ISO-NE Compliance Filing, Transmittal at 8; *see* ISO-NE Tariff, § III.1.10.6(c)(vi)-(v).

⁷⁸ ISO-NE Compliance Filing, Transmittal at 8; *see* ISO-NE Tariff, § III.1.10.6(c)(vii).

⁷⁹ ISO-NE Compliance Filing, Transmittal at 8.

⁸⁰ *Id.*; *see* ISO-NE Tariff, § III.1.10.6(c)(iv); McDonough-Parent Test. at 9-10.

directive to go on or offline within 30 minutes.⁸¹ ISO-NE asserts that offering as Rapid Response Pricing Assets allows Binary Storage Facilities' DARDs and Generator Assets to be committed in the real-time (rather than day-ahead) unit commitment process, thus committing them to charge or discharge in response to real-time changes in system conditions.⁸² ISO-NE notes that this process acknowledges Binary Storage Facilities' ability to start and stop quickly, as well as to consume and supply energy.⁸³

ii. Data Request Response

41. ISO-NE states that it is not aware of any existing or future electric storage technologies that would not satisfy the qualification criteria of either a Continuous Storage Facility or a Binary Storage Facility.⁸⁴ ISO-NE acknowledges that a resource would not meet these criteria if it: (1) must remain online for more than one hour once committed; (2) must remain offline for more than an hour once shut down; or (3) has long notification or start-up times. Nevertheless, ISO-NE states that there are no such "slow start" resources in its interconnection queue, nor does it know of any such technologies currently in development.⁸⁵

iii. Commission Determination

42. We find that ISO-NE complies with the requirements of Order No. 841 to define in its Tariff the qualification criteria that a resource must meet to use the participation model.⁸⁶ The qualification criteria described in ISO-NE's Compliance Filing are based on the physical and operational characteristics of electric storage resources because they are based on the ability of such resources to both receive and inject electric energy and allow any resource satisfying the Continuous Storage Facility or Binary Storage Facility definitions to participate in the participation model. We therefore find that ISO-NE's qualification criteria are inclusive of those resources set forth under the Commission's

⁸¹ ISO-NE Compliance Filing, Transmittal at 8; *see* ISO-NE Tariff, § III.1.0.6(b)(ii). ISO-NE states that the unit commitment software will consider these facilities in this manner to account for the economic consequences of their physical limitations. ISO-NE Compliance Filing, Transmittal at 8.

⁸² ISO-NE Compliance Filing, Transmittal at 8-9.

⁸³ *Id.* at 9; *see* McDonough-Parent Test. at 10.

⁸⁴ ISO-NE Data Request Response at 3.

⁸⁵ *Id.*

⁸⁶ Order No. 841, 162 FERC ¶ 61,127 at PP 61-65.

definition of an electric storage resource and do not limit participation to any particular type of electric storage resource or other technology. Further, we find that ISO-NE's qualification criteria ensure that ISO-NE is able to dispatch an Electric Storage Facility resource in a way that recognizes its physical and operational characteristics and optimizes its benefits to ISO-NE's operations and markets.

c. **Relationship Between Electric Storage Participation Model and Existing Market Rules**

43. To provide certainty to resources using the electric storage resource participation model about the market rules that will govern their participation in each RTO/ISO market, and to implement the new requirement in section 35.28(g)(9)(i) of the Commission's regulations, Order No. 841 requires each RTO/ISO to propose any necessary additions or modifications to its existing tariff provisions to specify: (1) whether resources that qualify to use the participation model will participate in the RTO/ISO markets through existing or new market participation agreements; and (2) whether particular existing market rules apply to resources participating under the electric storage resource participation model.⁸⁷ Order No. 841 allows the use of one or more existing market participation agreements so long as the agreement(s) complies(y) with the terms of Order No. 841.⁸⁸

i. **Filing**

44. ISO-NE states that the Compliance Filing does not revise ISO-NE's participation agreements and that electric storage resources will participate in ISO-NE markets pursuant to existing market participant agreements.⁸⁹ ISO-NE explains that the current market rules applicable to Generator Assets, DARDs, and ATRRs will generally apply to electric storage resources that register under these frameworks.⁹⁰ Further, ISO-NE asserts that an electric storage resource does not need to utilize the Electric Storage

⁸⁷ *Id.* P 68.

⁸⁸ *Id.* P 69.

⁸⁹ ISO-NE Compliance Filing, Transmittal at 9. ISO-NE states that the Market Participant Service Agreement can be found in Attachment E to the Tariff. *Id.*

⁹⁰ *Id.*; see ISO-NE Tariff, § III.1.10.6(a)(i), (a)(ii), (c)(ii).

Facility participation model, even if it meets the Tariff's definition; instead, the resource may register as any asset combination allowed by the Tariff.⁹¹

45. Regarding Electric Storage Facilities' provision of energy and reserves, ISO-NE explains that, because ISO-NE operates a co-optimized real-time energy and reserves market, it evaluates resources that register as capable of providing reserves in real-time to determine the amount of energy and reserves for which they should be dispatched.⁹² ISO-NE incorporates Northeast Power Coordinating Council (NPCC) standards, which require reserves to be sustainable for at least one hour, by requiring that Economic Maximum Limits be sustainable for at least one hour. ISO-NE states that a Generator Asset associated with a Binary Storage Facility will ensure that reserves are sustainable for at least one hour, as any other resource would, by telephoning the ISO-NE control room to reduce its Economic Maximum Limit when it is no longer capable of sustaining that output level for a full hour.

46. In contrast, ISO-NE software will automatically update the Economic Maximum Limit for Generator Assets of Continuous Storage Facilities prior to each dispatch run based on the Available Energy telemetered to ISO-NE (automatic redeclaration).⁹³ ISO-NE explains that the automation associated with automatic redeclaration will: (1) reduce the number of phone calls Continuous Storage Facilities must make to the ISO-NE control room; (2) enable ISO-NE to count reserves on Continuous Storage Facilities when they are regulating (even when they are clearing all of their capability in the regulation market); and (3) ensure that the facility's operating limits are accurate, that the desired dispatch points issued by ISO-NE are feasible, and that the facility has sufficient energy to follow them.⁹⁴ ISO-NE contends that the requirement that Electric

⁹¹ ISO-NE Compliance Filing, Transmittal at 9. However, ISO-NE states that "a facility registered as a dispatchable Generator Asset, an ATRR, and a DARD that each represent the same equipment must participate as a Continuous Storage Facility." See ISO-NE Tariff, § III.1.10.6(d).

⁹² ISO-NE Compliance Filing, Transmittal at 13; see ISO-NE Tariff, §§ III.1.7.6(a), III.2.2.

⁹³ ISO-NE Compliance Filing, Transmittal at 13; see NPCC Directory Number 5, section 5.13.

⁹⁴ ISO-NE Compliance Filing, Transmittal at 13; see ISO-NE Tariff, § I.2.2 (definition of Economic Maximum Limit).

Storage Facilities update their Economic Maximum Limit based on stored energy is consistent with the Commission's statements in Order No. 841.⁹⁵

47. Further, ISO-NE explains that, if an Electric Storage Facility with less than one hour of Available Energy remaining wishes to be dispatched for energy such that it is not constrained by the 1-hour NPCC requirement for reserve sustainability, it may request a "self-dispatch" by calling the ISO-NE control room to request a self-dispatch to its desired MW level.⁹⁶ ISO-NE states that, under most conditions, a request for a self-dispatch will result in the resource being dispatched to the requested MW level, and when such a request is granted to an Electric Storage Facility, no reserve requirement would be applied to the Electric Storage Facility because any dispatch above the MW level set to comply with the 1-hour duration requirement could not be sustained for one hour.⁹⁷

48. Lastly, to ensure that an Electric Storage Facility would be able to follow a dispatch instruction to consume at its maximum capability for 15 minutes, which is typically the maximum length of time between runs of the dispatch software, ISO-NE states that the Maximum Consumption Limit of its DARD must be revised down if its Available Storage drops below 15 minutes at its bid-in Maximum Consumption Limit.⁹⁸

⁹⁵ ISO-NE Compliance Filing, Transmittal at 13-14; *see* McDonough-Parent Test. at 17-18. ISO-NE states that this requirement aligns with the Commission's statements that "the RTO/ISO should be able to dispatch resources using the participation model for electric storage resources in the same manner as any other market participant," and "[t]o the extent that an RTO/ISO has developed a standard set of technical requirements that all resources must meet to provide a given service, those requirements would also apply to a resource using the electric storage participation model if it wants to provide that service." ISO-NE Compliance Filing, Transmittal at 13-14 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 77, 255).

⁹⁶ ISO-NE Compliance Filing, Transmittal at 14; *see* ISO-NE Tariff, § III.1.10.9(f).

⁹⁷ ISO-NE Compliance Filing, Transmittal at 14; *see* McDonough-Parent Test. at 19-20.

⁹⁸ ISO-NE Compliance, Transmittal at 14. ISO-NE explains that Binary Storage Facilities update their Maximum Consumption Limit by calling the ISO-NE control room, while updates to the Maximum Consumption Limit for Continuous Storage Facilities will be performed automatically by ISO-NE software based on the facility's telemetered Available Storage. *See* ISO-NE Tariff, § 1.2.2 (definition of Maximum Consumption Limit); McDonough-Parent Test. at 18-19. ISO-NE explains that in

ii. Protests/Comments

49. Advanced Energy Economy notes that ISO-NE does not propose changes to its market power mitigation provisions with respect to its electric storage resource participation model, including the calculation of resource reference levels.⁹⁹ Advanced Energy Economy states that maintaining the status quo ignores that opportunity costs factor significantly into an electric storage resource's reference level, and that failure to account for an electric storage resource's opportunity costs in its reference level could result in inappropriate mitigation of an electric storage resource to a reference level offer below its true short-run marginal cost.¹⁰⁰

50. Advanced Energy Economy concedes that ISO-NE's current mechanisms for calculating reference levels account for opportunity costs, but notes that electric storage resources face short-run marginal costs that other resources do not, beyond energy price changes within the day or across multiple days.¹⁰¹ Advanced Energy Economy argues that some electric storage resources co-located with load may face opportunity costs associated with demand charge management. To this end, Advanced Energy Economy asks the Commission to direct ISO-NE to clarify that electric storage resource reference levels could include opportunity costs related to demand charge management.¹⁰²

51. Several parties contend that ISO-NE's automatic redeclaration proposal to meet the NPCC 60-minute sustainability requirement for operating reserves¹⁰³ is inconsistent with Order No. 841.¹⁰⁴ Specifically, these parties contend that ISO-NE's automatic redeclaration proposal: (1) fails to consider a resource's physical and operational

determining the least-cost, security constrained, economic dispatch, the dispatch software assumes that resources can sustain their desired dispatch points for at least 15 minutes.

⁹⁹ Advanced Energy Economy Protest at 8.

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

¹⁰² *Id.* at 8-9.

¹⁰³ Energy Storage Association Protest at 5 (citing NPCC Directory Number 5, section 5.13).

¹⁰⁴ EDF Renewables Protest at 1-2; Energy Storage Association Protest at 2-8; RENEW Northeast Protest at 2-8. EDF Renewables states that it generally supports the protest and comments of Energy Storage Association submitted in this proceeding.

characteristics; (2) removes the electric storage resource's ability to operate effectively in ISO-NE's markets; and (3) precludes a resource from managing its own State of Charge.¹⁰⁵

52. Protestors contend that ISO-NE's automatic redeclaration proposal contravenes the Commission's directive to establish market rules that, "recognizing the physical and operational characteristics of electric storage resources, facilitate[] their participation in the RTO/ISO markets."¹⁰⁶ Energy Storage Association and RENEW Northeast assert that ISO-NE's automatic redeclaration proposal violates Order No. 841's requirement that tariff provisions ensure that an electric storage resource is "eligible to provide all capacity, energy and ancillary services that it is technically capable of providing," and thus prevents electric storage resources from receiving the full energy market revenues they are due.¹⁰⁷ Specifically, Energy Storage Association and RENEW Northeast argue that ISO-NE's design choice imposes an inefficient outcome on electric storage resources by obligating them to provide reserves rather than selling energy from which they can presumably earn positive revenues and margins.¹⁰⁸ Regarding ISO-NE's proposed self-dispatch alternative for electric storage resources constrained by automatic redeclaration, Energy Storage Association and RENEW Northeast contend that this solution is not practical or efficient because it involves a phone call to the control room, is subject to

¹⁰⁵ EDF Renewables Protest at 2; Energy Storage Association Protest at 2-3; RENEW Northeast Protest at 1. In Order No. 841, the Commission defined State of Charge as "the amount of energy stored [by an electric storage resource] in proportion to the limit on the amount of energy that can be stored, typically expressed as a percentage." Order No. 841, 162 FERC ¶ 61,127 at P 213.

¹⁰⁶ EDF Renewables Protest at 2 (citing Order No. 841, 162 FERC ¶ 61,127 at P 32); Energy Storage Association Protest at 5 (citing Order No. 841, 162 FERC ¶ 61,127 at P 3).

¹⁰⁷ EDF Renewables Protest at 2 (citing Order No. 841, 162 FERC ¶ 61,127 at P 19); Energy Storage Association Protest at 3-5 (citing Order No. 841, 162 FERC ¶ 61,127 at P 4); RENEW Northeast Protest at 2.

¹⁰⁸ Energy Storage Association Protest at 3, 5-6 (citing ISO-NE Compliance Filing, Transmittal at 15 ("The ISO-NE markets rules require resources to meet the following minimum run times as previously explained, one hour for the provision of energy and reserves.")); RENEW Northeast Protest at 3-5.

approval, takes time to be implemented, and may need to be repeated often.¹⁰⁹ RENEW Northeast notes that, as the number of electric storage resources grows in the market to potentially hundreds, the ability to handle many manual communications will become arduous, if not impossible, for the control room operators.¹¹⁰

53. Protestors advocate that ISO-NE propose, or that the Commission require, alternative approaches including: (1) prioritizing energy over reserves to de-rate the reserves assignment for Continuous Storage Facilities rather than their energy dispatch, as proposed by NYISO;¹¹¹ (2) economic co-optimization of Continuous Storage Facilities between energy and reserves so they are indifferent to foregone energy sales when providing reserves;¹¹² or (3) permitting Continuous Storage Facilities to opt into or out of providing reserves.¹¹³

iii. Answers

54. In response to Advanced Energy Economy's concerns, ISO-NE states that, because the Tariff already permits opportunity costs associated with demand charge management to be included in reference level calculations, no further action is necessary.¹¹⁴ Specifically, ISO-NE explains that, in 2017, the Commission approved

¹⁰⁹ Energy Storage Association Protest at 7-8; RENEW Northeast Protest at 3. According to RENEW Northeast, ISO-NE reports that this process will take on average twenty minutes to complete and is prone to error and delay.

¹¹⁰ RENEW Northeast Protest at 3.

¹¹¹ Energy Storage Association Protest at 7; RENEW Northeast Protest at 6-8. RENEW Northeast explains that NYISO has proposed a similar mechanism that will adjust the charge/discharge limits of an electric storage resource in order to avoid infeasible real-time dispatch that does not affect the ability of the electric storage resource to continue providing energy at its full rated output level. RENEW Northeast Protest at 6 (citing Whitney Lesnicki, *Scheduling ESRs*, NYISO (August 30, 2018), <https://www.nyiso.com/documents/20142/2179664/Scheduling%20ESRs.pdf/f541b430-e796-c28b-e98e-babe62f4f068>).

¹¹² Energy Storage Association Protest at 7.

¹¹³ *Id.*

¹¹⁴ ISO-NE Answer at 18.

Tariff language that added “reducing electricity consumption” to the non-exclusive list of the types of opportunity costs that may be included in reference level calculations.¹¹⁵

55. In response to protestor concerns regarding automatic redeclaration, ISO-NE explains that it observes the NPCC requirement by limiting the maximum dispatch capability of all resources with less than an hour of energy to a value that they can maintain for an hour.¹¹⁶ In response to Energy Storage Association’s protest, ISO-NE states that it already co-optimizes energy and reserves “so that resources are indifferent to foregone energy sales.”¹¹⁷ ISO-NE states that it cannot accommodate Energy Storage Association’s request to co-optimize energy and reserves using two different maximums (as essentially proposed by NYISO) in a timely fashion because that would require allocating significant resources to upgrade software with limited lifespan, which ISO-NE argues is not optimal.¹¹⁸ Regarding RENEW Northeast’s suggestion that ISO-NE could use the existing “reserve down” flag capability, ISO-NE explains that the “reserve down” flag is set by control room operators when a resource has become ineligible to provide reserves, thereby excluding it from the software’s reserve accounting while continuing to be economically dispatched for energy.¹¹⁹ ISO-NE states that a control room operator typically only sets a reserve down flag for reliability reasons to indicate that a particular resource could not be dispatched up in the event of a contingency.¹²⁰

56. However, ISO-NE agrees with protestors that the need for frequent phone calls to the control room to effectuate a self-dispatch is inefficient and potentially burdensome for market participants and the control room, and suggests that it could implement an

¹¹⁵ *Id.* at 19-20, n.44 (citing ISO-NE Tariff, § III.A.7.5; *ISO New England Inc.*, Docket No. ER17-1565-000 (Nov. 9, 2017) (delegated order)). These revisions have an effective date of October 1, 2019.

¹¹⁶ ISO-NE Answer at 5, n.15.

¹¹⁷ *Id.* at 7, n.19 (citing Energy Storage Association Protest at 7). ISO-NE explains that its software will back a resource down from generating energy when the differential between LMP and reserve prices would keep the resource indifferent (or better off) to the lost energy revenues in a particular interval.

¹¹⁸ *Id.* at 6-7. ISO-NE explains that the relevant difference with NYISO’s system is that ISO-NE’s system assumes that the dispatch maximum is always less than or equal to the reserve maximum.

¹¹⁹ *Id.* at 7.

¹²⁰ *Id.*

alternative approach permitting only Limited Energy Resources with one hour or less of Available Energy to opt-out of providing reserves in certain circumstances to reduce the burden on market participants and the control room.¹²¹ ISO-NE states that, while it believes its automatic redeclaration proposal is compliant with Order No. 841, it could implement a modified approach similar to that described by RENEW Northeast and will work with stakeholders to explore modified implementation approaches “including potential approaches whereby [electric] storage resources with one hour or less of energy could elect to provide only energy and not reserves.”¹²² ISO-NE believes that this modified approach can both be accomplished without further Tariff revisions and be implemented on the date Order No. 841 changes become effective, so the Commission should not direct additional Tariff changes related to this issue.¹²³

57. NEPOOL notes that ISO-NE’s proposed implementation plans with respect to automatic redeclaration are not explicitly part of the Tariff changes and have not yet been presented to NEPOOL in Market Rules or Manuals for a NEPOOL vote.¹²⁴ As such, NEPOOL states that it takes no position on implementation details at this time.¹²⁵ NEPOOL urges the Commission to permit full stakeholder consideration of any implementation proposed by ISO-NE or any alternative approaches proposed by other parties including Energy Storage Association and RENEW Northeast.¹²⁶

58. In its answer, Energy Storage Association contends that ISO-NE’s representation that it currently co-optimizes energy and reserves such that electric storage resources would be indifferent to foregone energy sales is incorrect because for most hours, reserve

¹²¹ *Id.* at 6, n.16; 8, n.24; 8-9.

¹²² *Id.* at 8.

¹²³ *Id.* at 9.

¹²⁴ NEPOOL Answer at 5-7. NEPOOL explains that all changes to ISO-NE Manuals, which will be required to be updated subsequent to the Commission’s approval of ISO-NE’s Compliance Filing, are required to be reviewed within the participant process. During that process, NEPOOL states that its members will have the opportunity to propose alternative implementation details and/or refinements to Tariff provisions to address their concerns, including those raised in this proceeding.

¹²⁵ *Id.* at 6-7.

¹²⁶ *Id.* at 6. NEPOOL notes that many of Energy Storage Association’s and RENEW Northeast’s members are also NEPOOL members and have full rights to propose amendments or alternatives to ISO-NE’s Tariff proposals. *Id.* at n.18.

prices are \$0, whereas energy prices are often much greater than \$0.¹²⁷ Energy Storage Association contends that the current rules violate Order No. 841 because they prevent electric storage resources from providing energy services they are technically capable of providing by forcing operators to lose potential revenues when they are not made indifferent to providing energy or reserves.¹²⁸ Energy Storage Association argues that an alternative approach to the current automatic redeclaration process needs to be implemented by ISO-NE by December 3, 2019, for full Order No. 841 compliance.¹²⁹ Furthermore, Energy Storage Association asserts that the solution should be described clearly in ISO-NE documents (i.e., Tariff, manuals, or operating procedures) to provide transparency to market participants.¹³⁰

iv. Data Request Response

59. Regarding automatic redeclaration, ISO-NE maintains that, despite protestors' repeated assertions, automatic redeclaration does not prevent a resource from selling its energy, but instead, extends the duration of the sale.¹³¹ ISO-NE states that real-time reserve pricing and Capacity Performance Payments might leave a Continuous Storage Facility dispatched to a constrained Economic Maximum Limit as well as or better off than if it were fully discharged at its offered Economic Maximum Limit. Even without reserve payments, ISO-NE contends that energy prices might be such that a resource would be financially better off if dispatched to discharge for a longer duration, at its constrained Economic Maximum Limit, than it would if discharged more rapidly, at its offered Economic Maximum Limit. As such, ISO-NE states, automatic redeclaration may not result in foregone energy profits.¹³²

60. Nevertheless, ISO-NE asserts that its preferred solution for Continuous Storage Facilities that have less than one hour of Available Energy is to allow market participants

¹²⁷ Energy Storage Association Answer at 3.

¹²⁸ *Id.* at 3-4.

¹²⁹ *Id.* at 4. Energy Storage Association suggests that, although ISO-NE prefers to limit the ability of reserve-capable resources to opt in or out of providing reserves, it cautions that an overly narrow solution may not resolve the issue and would not comply with Order No. 841.

¹³⁰ *Id.*

¹³¹ ISO-NE Data Request Response at 7-8. *See* ISO-NE Answer at 5, n.13.

¹³² ISO-NE Data Request Response at 8.

in these circumstances to decide when they would like to be dispatched for only energy versus both energy and reserves.¹³³ ISO-NE states that, while its proposed automatic redeclaration mechanism complies with Order No. 841, it could implement a mechanism to provide Electric Storage Facilities the option to decline to provide reserves when their Available Energy falls below one hour.¹³⁴ ISO-NE states that, under this mechanism, a “reserve down” flag is set by operators in the control room to indicate that a resource has become ineligible to provide reserves, thereby excluding the resource from the software’s reserve counting while allowing the resource to be economically dispatched for energy.¹³⁵ ISO-NE envisions allowing a resource that elects to be designated reserve-ineligible to remain ineligible until the market participant calls the control room to request to become reserve eligible once again, and that market participants would be able to switch states up to two times in a 24-hour period.¹³⁶ ISO-NE states that it plans to discuss the mechanism with stakeholders to refine and codify the process into ISO-NE manuals. ISO-NE asserts that this mechanism can be implemented on December 3, 2019, because it is a manual implementation and requires no software changes.¹³⁷

v. Commission Determination

61. We find that ISO-NE complies with the requirements of Order No. 841 to propose any necessary additions or modifications to its existing Tariff provisions to specify: (1) whether resources that qualify to use the participation model will participate in the RTO/ISO markets through existing or new market participation agreements; and (2) whether particular existing market rules apply to resources participating under the electric storage resource participation model.¹³⁸ First, as ISO-NE describes in its Compliance Filing, resources qualified to use the Electric Storage Facility participation model will participate in ISO-NE’s markets using the existing Market Participant Service Agreement, contained in Attachment E to the Tariff.¹³⁹ Second, ISO-NE demonstrates that existing market rules applicable to Generator Assets, DARDs, and ATRRs will apply

¹³³ *Id.* at 7-8.

¹³⁴ *Id.* at 8-9 (citing ISO-NE Answer at 4-9).

¹³⁵ *Id.* at 9.

¹³⁶ *Id.* at 10.

¹³⁷ *Id.*

¹³⁸ Order No. 841, 162 FERC ¶ 61,127 at P 68.

¹³⁹ *See* ISO-NE Compliance Filing, Transmittal at 9, n.35.

to all electric storage resources that register under those market constructs, whether they participate using the Electric Storage Facility participation model or not.¹⁴⁰

62. We find that ISO-NE's proposal to apply its existing market rules is appropriate because it enables electric storage resources to be eligible to provide market services that they are capable of providing. In response to Advanced Energy Economy, we agree that electric storage resources participating in RTO/ISO markets under the participation model should be able to reflect relevant opportunity costs in their energy market offers and bids, similar to other market participants, when appropriate. We find that ISO-NE's existing Tariff allows electric storage resources to do so, noting that determining whether a resource should be allowed to use opportunity costs in its energy market offers and bids and how such opportunity costs may be calculated can be complex and case-specific.¹⁴¹ As ISO-NE states, Appendix A to section III of the Tariff includes a subsection entitled "Estimation of Incremental Operating Cost," which provides a non-exclusive list of the types of opportunity costs that may be included in reference level calculations, including "reducing electricity consumption," which ISO-NE states allows for the inclusion of demand charge management opportunity costs in reference level calculations.¹⁴² We also note that Tariff Section III.A.3 provides a process through which a market participant may consult with the Internal Market Monitor with respect to the information and analysis used to determine its reference levels.¹⁴³ We therefore find that ISO-NE's existing Tariff reasonably accounts for electric storage resources' potential opportunity costs, such as demand charge management.

¹⁴⁰ See *id.* at 9-10.

¹⁴¹ For example, for electric storage resources to effectively self-manage their State of Charge, RTOs'/ISOs' electric storage resource participation models may need to allow electric storage resources to account for opportunity costs associated with services provided to another entity outside the RTO/ISO markets. See Order No. 841, 162 FERC ¶ 61,127 at PP 251, 256-257. Order No. 841 recognizes that some RTOs/ISOs facilitate the participation of electric storage resources in the capacity market by relying on opportunity costs in incremental energy offer reference levels. Order No. 841 requires each RTO/ISO to demonstrate how such rules are applicable to resources using the participation model. *Id.* P 101.

¹⁴² ISO-NE Answer at 18-20 (citing ISO-NE Tariff, § III.A.7.5.1).

¹⁴³ See ISO-NE Tariff, § III.A.3 (Consultation Prior to Determination of Reference Levels for Physical and Financial Parameters of Resources; Fuel Price Adjustments).

63. With respect to ISO-NE's application of the NPCC 1-hour reserve requirement, we find that ISO-NE has appropriately explained how its existing market rules apply to all resources, including Electric Storage Facilities. ISO-NE explains that it observes the NPCC requirement by limiting the maximum dispatch capability of all resources with less than an hour of energy to a value that they can maintain for one hour.¹⁴⁴ Order No. 841 addresses de-rating of capacity, but does not address the issue of de-rating energy to meet reserve requirements, and we find that ISO-NE's practice of automatic redeclaration to meet the NPCC 1-hour reserve requirement does not conflict with Order No. 841. Therefore we will not require any further compliance related to this issue nor require ISO-NE to implement alternative approaches, as requested by protestors. As to protestors' concerns, we note that ISO-NE has committed in its answer and Data Request Response to address those concerns by developing a modified automatic redeclaration mechanism, to be implemented on the date Order No. 841 changes become effective and we encourage ISO-NE to do so.

2. **Eligibility of Electric Storage Resources to Participate in the RTO/ISO Markets**

a. **Eligibility to Provide all Capacity, Energy, and Ancillary Services**

64. Order No. 841 adds section 35.28(g)(9)(i)(A) to the Commission's regulations to require that each RTO/ISO have tariff provisions allowing a resource using the participation model for electric storage resources to be eligible to provide all capacity, energy, and ancillary services that it is technically capable of providing, including services that the RTOs/ISOs do not procure through an organized market, such as blackstart, primary frequency response, and reactive power services.¹⁴⁵ Where an RTO/ISO has developed a standard set of technical requirements that all resources must meet to provide a given service, such requirements would also apply to a resource using the electric storage resource participation model if it wants to provide that service.¹⁴⁶

65. A resource is "technically capable" of providing a service if the resource can meet all of the technical, operational, and/or performance requirements that are necessary to reliably provide that service, such as minimum run-times to provide energy, or the ability

¹⁴⁴ ISO-NE Answer at 5, n.15.

¹⁴⁵ Order No. 841, 162 FERC ¶ 61,127 at PP 76, 80.

¹⁴⁶ *Id.* P 77.

to respond to automatic generation control to provide frequency regulation.¹⁴⁷ The Commission is not considering in this proceeding the requirements that determine whether resources are technically capable of providing individual wholesale services.¹⁴⁸ To the extent that an RTO/ISO seeks to revise its tariff provisions setting forth the technical requirements for providing any specific wholesale service, the RTO/ISO may propose such revisions to its tariff through a separate FPA section 205 filing.¹⁴⁹ Each individual electric storage resource must still meet the technical requirements of providing any specific service, which would be determined by the RTO/ISO on a case-by-case basis.¹⁵⁰ In Order No. 841, the Commission encouraged each RTO/ISO to consider whether any modifications or additions to the existing technical requirements, testing protocols, or other qualification procedures are necessary to facilitate the participation of electric storage resources in its markets.¹⁵¹

66. Order No. 841-A clarifies that an RTO/ISO that does not have a capacity product in its markets is not required to create such a product to comply with Order No. 841. To the extent that an RTO/ISO has a resource adequacy construct, the RTO/ISO must demonstrate on compliance that the existing market rules governing its resource adequacy construct provide a means for electric storage resources to participate in that construct if electric storage resources are technically capable of doing so.¹⁵²

i. Filing

67. ISO-NE explains that an Electric Storage Facility, like other resources, will be eligible to participate in the Forward Capacity Market through its Generator Asset by qualifying as a Generating Capacity Resource.¹⁵³ ISO-NE states that neither DARDs nor

¹⁴⁷ *Id.* P 78.

¹⁴⁸ *Id.*

¹⁴⁹ *Id.* at n.106.

¹⁵⁰ *Id.* P 79.

¹⁵¹ *Id.* P 81.

¹⁵² Order No. 841-A, 167 FERC ¶ 61,154 at P 68 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 76, 100).

¹⁵³ ISO-NE Compliance Filing, Transmittal at 10; *see* ISO-NE Tariff, § III.7.11 (describing the relationship between the capability of a Generating Capacity Resource and the capabilities of its underlying Generator Asset).

ATRRs can provide capacity or participate in the Forward Capacity Market due to their technical and operational characteristics.¹⁵⁴

68. ISO-NE states that an Electric Storage Facility will be eligible to participate in the energy market through its Generator Asset and DARD as would any other Generator Asset or DARD. ISO-NE states that, because its commitment software will not commit a Binary Storage Facility's Generator Asset and DARD at the same time, the dispatch software will not consider these two resources at the same time, and therefore will not simultaneously issue dispatch signals to charge and discharge.¹⁵⁵ ISO-NE states that, because a Continuous Storage Facility will be issued a single dispatch signal,¹⁵⁶ the facility will not receive conflicting dispatch signals.¹⁵⁷ Further, it states that Continuous Storage Facilities will always provide spinning reserves (rather than non-spinning reserves) because their Generator Asset and DARD are always online.¹⁵⁸

69. In addition, an Electric Storage Facility will be eligible to participate in the Forward Reserve Market through its Generator Asset and DARD as would any other Generator Asset or DARD.¹⁵⁹ An Electric Storage Facility is also eligible to provide blackstart service provided that it meets the associated criteria, and is eligible or required, as applicable, to provide reactive power and primary frequency response.¹⁶⁰ ISO-NE

¹⁵⁴ ISO-NE Compliance Filing, Transmittal at 10; *see* ISO-NE Tariff, § III.13.1 (describing Forward Capacity Auction qualification for generators, import and demand resources, but not for DARDs or ATRRs). ISO-NE explains that DARDs cannot provide capacity because they consume energy and ATRRs are a regulation market construct. *See* McDonough-Parent Test. at 11-12.

¹⁵⁵ ISO-NE Compliance Filing, Transmittal at 17-18.

¹⁵⁶ The single dispatch signal is equal to the desired dispatch point of its Generator Asset minus the desired dispatch point of its DARD plus the AGC SetPoint of its ATRR. *See* ISO-NE Tariff, § III.1.10.6(c)(iii).

¹⁵⁷ *See* McDonough-Parent Test. at 24; ISO-NE Compliance Filing, Transmittal at 17-18.

¹⁵⁸ ISO-NE Compliance Filing, Transmittal at 11; *see* ISO-NE Tariff, §§ III.1.7.19.2.1.1, III.1.7.9.2.2.1; McDonough-Parent Test. at 12.

¹⁵⁹ ISO-NE Compliance Filing, Transmittal at 11; *see* ISO-NE Tariff, § III.9.5.

¹⁶⁰ ISO-NE Compliance Filing, Transmittal at 11; *see* McDonough-Parent Test. at 12.

explains that an Electric Storage Facility is eligible to participate in the regulation market, either as an ATRR (if it is a Continuous Storage Facility) or, if it meets the associated criteria, as a Generator Asset (if it is a Binary Storage Facility).¹⁶¹

70. ISO-NE states that a Continuous Storage Facility's regulation activity will generally have no impact on its state of charge as a result of these requirements.¹⁶² ISO-NE explains that automatically reducing the maximum energy market dispatch limits of a Continuous Storage Facility's DARD and Generator Asset to reflect its cleared regulation high and low limits ensures that the desired dispatch points issued to the Generator Asset or DARD in the energy market will be attainable.¹⁶³ Doing so enables a Continuous Storage Facility to provide energy, reserves, and regulation simultaneously.¹⁶⁴ Likewise, the Generator Asset of a Binary Storage Facility can be selected to provide regulation when it is online, and must follow a conventional AGC signal, which directs the facility to discharge between its high and low regulation limits.¹⁶⁵

ii. Protests/Comments

71. Energy Storage Association states that ISO-NE is the only RTO/ISO that proposes to require electric storage resources to register as both generator and demand asset types.¹⁶⁶ Energy Storage Association states that it is concerned that this requirement may effectively prevent an electric storage resource from participating in ISO-NE's energy,

¹⁶¹ ISO-NE Compliance Filing, Transmittal at 11; *see* ISO-NE Tariff, § III.14.2(a)(ii). ISO-NE states that the ATRR of a Continuous Storage Facility will be required to follow an energy neutral regulation market signal (i.e., AGC SetPoint) and high and low regulation limits will be symmetric around zero (with a slight bias towards charging permitted in order to accommodate the losses that occur in a charge-discharge cycle). *See* ISO-NE Tariff, § III.14.6(a)(i), (a)(iii), (b)(ii).

¹⁶² ISO-NE Compliance Filing, Transmittal at 11; *see* McDonough-Parent Test. at 13.

¹⁶³ ISO-NE Compliance Filing, Transmittal at 11-12; *see* ISO-NE Tariff, § III.1.10.9(h).

¹⁶⁴ ISO-NE Compliance Filing, Transmittal at 12; *see* McDonough-Parent Test. at 13-14.

¹⁶⁵ ISO-NE Compliance Filing, Transmittal at 12; *see* ISO-NE Tariff, §§ III.1.10.9(g), III.14.6(a)(ii), III.14.6(b)(i).

¹⁶⁶ Energy Storage Association Protest at 13.

capacity, and ancillary service markets. For example, according to Energy Storage Association, an electric storage resource could receive conflicting day-ahead schedules if ISO-NE's software fails to relate the resource's Generator Asset with its DARD when it clears the day-ahead market.¹⁶⁷ Energy Storage Association states that it does not object to this Tariff provision, but must determine upon implementation whether it sufficiently allows electric storage resources to fully participate in the wholesale market given their physical and operational requirements.¹⁶⁸

72. Tesla argues that Pay-for-Performance in ISO-NE creates a barrier to the meaningful participation of electric storage resources in the Forward Capacity Market by applying penalties to electric storage resources for not performing beyond their physical ability as dictated by energy capacity.¹⁶⁹ Tesla states that if an electric storage resource is depleted (e.g., due to ISO-NE dispatch) during a Capacity Scarcity event and performs at zero for the remainder of the event, it will be assessed a negative Capacity Performance Payment.¹⁷⁰ While Tesla states that ISO-NE provides a maximum loss exposure that may be assessed from negative Capacity Performance Payments, Tesla contends that these penalties can be significant and pose a barrier to participation in ISO-NE's capacity market because electric storage resources cannot effectively manage this financial risk.¹⁷¹

73. Voith Hydro urges the Commission and the RTOs/ISOs to take into account the technical capability of pumped-hydro resources in providing a number of services in the RTO/ISO markets. For example, it states that pumped-hydro resources have the ability to: (1) provide reliable, long duration generation capacity; (2) deliver energy from all sources (e.g., pumped-hydro resources can store excess energy generated by nuclear plants during off-peak hours and then release the energy back to the grid during peak

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ Tesla Comments at 16-17 (referring to the Commission's approval of ISO-NE's Pay-for-Performance proposal, which is intended to incent capacity suppliers to provide energy during scarcity conditions). *See ISO New England Inc. & New England Power Pool*, 147 FERC ¶ 61,172 (2014).

¹⁷⁰ Tesla Comments at 17.

¹⁷¹ *Id.*

hours); (3) provide spinning and non-spinning reserves; (4) provide blackstart capabilities; and (5) set the wholesale market clearing price.¹⁷²

iii. Answers

74. ISO-NE and NEPOOL argue that the Commission should not grant Tesla's request to require ISO-NE to modify the treatment of electric storage resources in the Forward Capacity Market.¹⁷³ ISO-NE states that Tesla's request for an exemption from negative Capacity Performance Payments for electric storage resources is contrary to its Commission-approved capacity market design.¹⁷⁴ ISO-NE argues that such an exemption, for batteries that were dispatched to fully discharge, is just as problematic as an exemption when non-performance is the "fault" of the supplier.¹⁷⁵ Referring to language submitted in its initial 2014 Pay-For-Performance filing, ISO-NE explains that the risks and costs of non-performance must be assigned either to suppliers or consumers, and the fact that a risk is beyond the control of a supplier does not mean that it should be assigned to the consumer; rather, ISO-NE asserts that suppliers are in the best position to price these risks.¹⁷⁶ ISO-NE contends that granting Tesla's request to limit performance charges for electric storage resources to their physical capability inappropriately places the risk of non-performance on the consumer.¹⁷⁷

¹⁷² Voith Hydro Comments at 2-7.

¹⁷³ ISO-NE Answer at 26-28; NEPOOL Answer at 7-9.

¹⁷⁴ ISO-NE Answer at 27-28.

¹⁷⁵ *Id.* ISO-NE states that "exemptions are equally problematic, and equally inappropriate, in cases where the non-performance is arguably not the fault of the supplier... Exemptions undermine this central role of prices as signals of resources' future performance and reliability." *Id.* (quoting ISO New England Inc., Market Rule Changes To Implement Pay For Performance in the Forward Capacity Market, Docket Nos. ER14-1050-000 & ER14-1050-001 (filed Jan. 17, 2014)).

¹⁷⁶ *Id.* (citing ISO New England Inc., Market Rule Changes To Implement Pay For Performance in the Forward Capacity Market, Docket Nos. ER14-1050-000 & ER14-1050-001 (filed Jan. 17, 2014)).

¹⁷⁷ *Id.* at 28.

75. NEPOOL opposes Tesla's arguments regarding the treatment of electric storage resources in ISO-NE's Forward Capacity Market on process grounds.¹⁷⁸ NEPOOL argues that Tesla fails to justify why ISO-NE's Compliance Filing does not satisfy the requirements of Order No. 841 and that their requested modifications bypass the opportunity for ISO-NE and stakeholders to identify, understand, and address interactions of multiple market provisions.¹⁷⁹ NEPOOL states that it has no substantive position on the Forward Capacity Market changes proposed by Tesla in this proceeding, but NEPOOL urges the Commission to reject these requests until after they can be considered in the Commission-approved stakeholder process.¹⁸⁰

iv. Data Request Response

76. With respect to whether DARDs can provide capacity, ISO-NE explains that DARDs do not receive capacity credit for their ability to refrain from consuming, but they do receive capacity credit in the form of reduced capacity charges because they participate in the energy and capacity markets on the demand side (rather than the supply side). ISO-NE states that DARDs' capacity charges are reduced dependent on their willingness to reduce consumption during Capacity Scarcity Conditions, and clarifies that Storage DARDs pay no capacity charges at all because they can be dispatched to zero during Capacity Scarcity Conditions.¹⁸¹

77. Regarding the potential for conflicting dispatch signals, ISO-NE states that, because a Continuous Storage Facility will be issued a single dispatch signal (equal to the desired dispatch point of its Generator Asset minus the desired dispatch point of its DARD plus the AGC SetPoint of its ATRR),¹⁸² a Continuous Storage Facility cannot receive conflicting dispatch signals to charge and discharge simultaneously.¹⁸³

¹⁷⁸ NEPOOL Answer at 7-8.

¹⁷⁹ *Id.* at 8-9.

¹⁸⁰ *Id.*

¹⁸¹ ISO-NE Data Request Response at 4 (citing ISO-NE Tariff, § III.13.7.5.2.1).

¹⁸² *Id.* at 4-5 (citing ISO-NE Tariff, § I.2.2).

¹⁸³ *Id.* (citing Enhanced Storage Participation Revisions, Docket No. ER19-84-000, at 17 (filed Oct. 10, 2018)). According to ISO-NE, this is codified in Tariff section III.1.10.6(c)(viii).

78. Regarding the potential for conflicting dispatch signals for Binary Storage Facilities, ISO-NE states that, because ISO-NE's real-time commitment process will not commit a Binary Storage Facility's Generator Asset and DARD at the same time, the dispatch process will not consider the Generator Asset and DARD at the same time, and therefore it will not simultaneously issue dispatch signals to charge and to discharge. According to ISO-NE, while this was described in the October 2018 Storage Filing, it is not codified in the Tariff; therefore, with this response, ISO-NE is submitting a new Tariff section III.1.10.6(b)(iii) stating that a Binary Storage Facility shall "be issued Dispatch Instructions in a manner that ensures the facility is not required to consume and inject simultaneously."¹⁸⁴

v. Commission Determination

79. We find that ISO-NE complies with the requirement of Order No. 841 that each resource using the participation model for electric storage resources be eligible to provide all capacity, energy, and ancillary services that it is technically capable of providing.¹⁸⁵ As to Voith Hydro's comments about the capabilities of pumped-hydro resources, we note that ISO-NE has demonstrated that all electric storage resources, including pumped-hydro resources, are eligible to provide all capacity, energy, and ancillary services that they are technically capable of providing. We disagree with Energy Storage Association's argument that requiring electric storage resources to register as both generator and demand asset types could cause those resources to receive conflicting day-ahead schedules, thus preventing those resources from participating in ISO-NE's energy, capacity, and ancillary service markets. ISO-NE's explanation in its filing and data request response, in conjunction with proposed Tariff section III.1.10.6(b)(iii), demonstrate that neither Continuous Storage Facilities nor Binary Storage Facilities will receive conflicting dispatch instructions under ISO-NE's proposed participation model.¹⁸⁶

80. We also accept ISO-NE's proposal to apply its existing Capacity Performance Payment rules to Electric Storage Facilities. We reiterate our finding in Order No. 841 that Electric Storage Facilities must still meet all of the technical, operational, and/or performance requirements that are necessary to reliably provide a service. Order No. 841 does not exempt electric storage resources that are participating in RTO/ISO capacity

¹⁸⁴ *Id.* at 5.

¹⁸⁵ Order No. 841, 162 FERC ¶ 61,127 at PP 76, 80.

¹⁸⁶ ISO-NE Compliance Filing, Transmittal at 17-18; ISO-NE Data Request Response at 4-5.

markets from any applicable penalties for non-performance.¹⁸⁷ We find that ISO-NE has explained how it will apply its existing Capacity Performance Payment rules to Electric Storage Facilities.

b. Ability to De-Rate Capacity to Meet Minimum Run-Time Requirements

81. To implement section 35.28(g)(9)(i)(A) of the Commission's regulations, Order No. 841 requires that each RTO/ISO have tariff provisions providing that resources using the participation model for electric storage resources can de-rate their capacity to meet minimum run-time requirements.¹⁸⁸ Electric storage resources that participate in an RTO/ISO capacity market are not exempt from meeting the performance metrics and criteria that apply to all other resources that participate in that market and are not exempt from any applicable penalties for non-performance.¹⁸⁹

82. Order No. 841 states that an electric storage resource de-rating its capacity to provide capacity or other services is not engaging in physical withholding if it is de-rating to meet minimum run-time requirements. However, each RTO/ISO may request that its market monitor verify whether an electric storage resource de-rated its capacity to meet a minimum run-time requirement to ensure that such resource is not engaging in physical withholding, as defined by the Commission.¹⁹⁰ Additionally, to the extent that market power concerns arise as a result of electric storage resources de-rating capacity to provide capacity or other services, each RTO/ISO may consider whether it is appropriate to update and/or apply existing market power mitigation processes to electric storage resources to alleviate market power concerns.¹⁹¹ Further, electric storage resources may provide services in RTO/ISO markets without de-rating so long as they meet the requirements to provide the particular service that they seek to provide.¹⁹²

¹⁸⁷ *Id.* PP 78, 95.

¹⁸⁸ *Id.* P 94.

¹⁸⁹ *Id.* P 95.

¹⁹⁰ *Id.* P 96.

¹⁹¹ *Id.* P 97.

¹⁹² *Id.* P 98.

83. Order No. 841 provides each RTO/ISO with flexibility to either use its existing rules for must-offer quantities or to modify its existing rules as necessary to reflect the physical and operational characteristics of electric storage resources.¹⁹³ However, if an electric storage resource elects to de-rate its capacity, it must not de-rate its capacity below any capacity obligations that it has assumed, such as any applicable must-offer requirement.¹⁹⁴ Also, the de-rated quantity should be based on the quantity of energy that an electric storage resource can discharge continuously over the minimum run-time set by the RTO/ISO.¹⁹⁵

84. Order No. 841 does not require RTOs/ISOs to make specific changes to minimum run-time or must-offer requirements associated with providing capacity.¹⁹⁶ However, each RTO/ISO must demonstrate on compliance that its market rules provide a means for electric storage resources to provide capacity, including how its capacity market rules are applicable to resources using the participation model.¹⁹⁷ Where an RTO/ISO does not have existing tariff provisions that enable electric storage resources to provide capacity, the RTO/ISO must propose such rules.¹⁹⁸

i. Filing

85. ISO-NE states that its market rules require resources to meet the following minimum run times: one hour for the provision of energy and reserves, and 15 minutes for the consumption (and, in the case of a self-dispatch, the provision) of energy; two hours for the provision of capacity by an electric storage resource in the Forward Capacity Market;¹⁹⁹ and in the regulation market, the ability to follow a regulation signal for one hour.²⁰⁰ Any resource, including Electric Storage Facilities, wishing to provide

¹⁹³ *Id.* P 99.

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

¹⁹⁶ *Id.* P 100.

¹⁹⁷ *Id.* PP 100-101.

¹⁹⁸ *Id.* P 100.

¹⁹⁹ ISO-NE Compliance Filing, Transmittal at 15; *see* ISO-NE Tariff, §§ III.1.5.1.3, III.1.7.11.

²⁰⁰ ISO-NE Compliance Filing, Transmittal at 15; *see* ISO-NE Tariff, § III.14.3(a).

these services must meet the applicable minimum duration requirements. ISO-NE asserts that Electric Storage Facilities are permitted to de-rate their capacity to meet these minimum run-time requirements.²⁰¹

ii. Protests/Comments

86. Calpine asserts that, while it agrees that participation in the ISO-NE capacity, energy, and ancillary services markets should be open to all resources, including electric storage resources as required by Order No. 841, resources that cannot meet operational requirements should not be permitted to participate.²⁰² Calpine states that exceptions to operating standards for capacity resources should not be tolerated.²⁰³ More specifically, Calpine argues that a minimum run time of two hours, which is consistent with ISO-NE's current requirement for pumped-hydro facilities, is not sufficient for system operations and could jeopardize reliability and put the grid at risk.²⁰⁴ Calpine contends that ISO-NE should develop analytically-based capacity counting/qualification criteria for electric storage resources to reflect certain factors such as load shape, generation mix, and saturation of storage.²⁰⁵ Calpine urges the Commission to address the comparability requirements among all capacity resources, asserting that all capacity resources should be treated comparably and should be able to participate based on their level of availability.²⁰⁶

87. In contrast, Tesla supports ISO-NE's proposed 2-hour minimum run time for the provision of capacity by an electric storage resource.²⁰⁷ Tesla contends that the 2-hour minimum run time comports with existing run-time requirements and that ISO-NE has not identified a system need for a longer minimum run time.²⁰⁸ Tesla also recommends

²⁰¹ ISO-NE Compliance Filing, Transmittal at 15; *see* McDonough-Parent Test. at 20-21.

²⁰² Calpine Comments at 3.

²⁰³ *Id.* at 4.

²⁰⁴ *Id.*

²⁰⁵ *Id.*

²⁰⁶ *Id.*

²⁰⁷ Tesla Comments at 16.

²⁰⁸ *Id.*

that RTOs/ISOs with centralized wholesale capacity markets: (1) calculate the effective load carrying capability²⁰⁹ of electric storage resources with various run times at the forecasted level of system load; and (2) establish limits on the maximum amount of capacity that electric storage resources can provide, based on resource run times and forecasted load.²¹⁰ Tesla argues that granting this treatment would ensure just and reasonable results from capacity markets by preventing undue discrimination against electric storage resources, allowing electric storage resources to provide all of the capacity service of which they are technically capable, and accounting for electric storage resources' physical and operational characteristics, as required by Order No. 841.²¹¹

iii. Answers

88. ISO-NE and NEPOOL argue that the Commission should not grant Calpine's request to require ISO-NE to modify the treatment of electric storage resources in the Forward Capacity Market.²¹² ISO-NE states that it will not revisit the minimum run time for electric storage resource capacity market participation at this time, and that preventing electric storage resources from participating in the Forward Capacity Market until ISO-NE revisits this issue violates Order No. 841 and conflicts with Commission-approved capacity market rules.²¹³ ISO-NE asserts that, while it does not object to revisiting the way in which it arrives at Forward Capacity Market run times, the 2-hour requirement is consistent with the Commission-approved run time historically required of electric

²⁰⁹ Tesla states that effective load carrying capability is a method to determine the capacity value of electric storage resources and other energy limited resources and can be defined as the increase in peak load that will give the same system reliability as the original system without the additional resource. *Id.* at 9 (citing GE Energy Consulting, *PJM Renewable Integration Study: Task 3A Part F, Capacity Valuation*, PJM Interconnection, L.L.C., 18-19 (Mar. 31, 2014), <https://www.pjm.com/-/media/committees-groups/subcommittees/irs/postings/pjm-pris-task-3a-part-f-capacity-valuation.ashx?la=en>).

²¹⁰ *Id.* at 8-12.

²¹¹ *Id.* at 8-9.

²¹² ISO-NE Answer at 26-28; NEPOOL Answer at 7-9.

²¹³ ISO-NE Answer at 26-27.

storage resources in the capacity market.²¹⁴ Moreover, ISO-NE contends that Calpine cites no evidence that the existing run time is significantly below that needed to ensure reliability.²¹⁵

89. NEPOOL opposes Calpine's arguments regarding the treatment of electric storage resources in ISO-NE's Forward Capacity Market on process grounds.²¹⁶ NEPOOL argues that Calpine fails to justify why ISO-NE's Compliance Filing does not satisfy the requirements of Order No. 841 and that the requested modifications bypass the opportunity for ISO-NE and stakeholders to identify, understand, and address interactions of multiple market provisions.²¹⁷ NEPOOL states that it has no substantive position on the Forward Capacity Market changes proposed by Calpine in this proceeding, but NEPOOL urges the Commission to reject these requests until after they can be considered in the Commission-approved stakeholder process.²¹⁸

iv. Commission Determination

90. We find that ISO-NE complies with the requirement of Order No. 841 that resources using the participation model for electric storage resources be able to de-rate their capacity to meet minimum run-time requirements.²¹⁹ ISO-NE's Tariff allows Electric Storage Facilities to de-rate their capacity to meet the minimum run times required to provide capacity, energy, and ancillary services.²²⁰ Additionally, ISO-NE has demonstrated that its existing capacity market rules are applicable to electric storage resources using the participation model.

²¹⁴ *Id.* at 26. ISO-NE states that the 2-hour minimum run time results from the 2-hour audit duration for electric storage resources found in Tariff Section III.1.5.1.3. *Id.* at 26, n.63.

²¹⁵ *Id.* at 26.

²¹⁶ NEPOOL Answer at 7-8.

²¹⁷ *Id.* at 8-9.

²¹⁸ *Id.*

²¹⁹ Order No. 841, 162 FERC ¶ 61,127 at P 94.

²²⁰ *See* ISO-NE Compliance Filing, Transmittal at 15; McDonough-Parent Test. at 20-21; *see also* ISO-NE Tariff, §§ III.1.7.11, III.1.5.1.3, III.14.3(a).

91. Regarding Calpine's concern that ISO-NE's 2-hour minimum run-time requirement for capacity market participation might not be sufficient to ensure electric reliability, we find that ISO-NE has demonstrated that the 2-hour minimum run time is an existing technical requirement unmodified by the instant Tariff revisions, and thus does not conflict with Order No. 841. Order No. 841 requires only that resources using the electric storage resource participation model may de-rate their capacity to meet minimum run-time requirements.²²¹ The Commission did not require RTOs/ISOs to make specific changes to minimum run-time or must-offer requirements associated with providing capacity.²²² As the Commission explained, where an RTO/ISO has developed a standard set of technical requirements that all resources must meet to provide a given service, such requirements would also apply to a resource using the electric storage resource participation model.²²³

92. We find, therefore, that arguments concerning the specifics of ISO-NE's minimum run-time requirement, including application of the 2-hour minimum run-time requirement to Electric Storage Facilities, are beyond the scope of ISO-NE's Order No. 841 compliance filing. Further, we find Tesla's recommendations regarding electric storage resource capacity valuation and limits to be outside the scope of this compliance proceeding.

3. Physical and Operational Characteristics of Electric Storage Resources

a. Order No. 841

93. Order No. 841 adds section 35.28(g)(9)(i)(C) to the Commission's regulations to require that each RTO/ISO have tariff provisions providing a participation model for electric storage resources that accounts for the following physical and operational characteristics of electric storage resources through bidding parameters or other means: State of Charge, Maximum State of Charge, Minimum State of Charge, Maximum Charge Limit, Minimum Charge Limit, Maximum Discharge Limit, Minimum Discharge Limit, Maximum Charge Time, Minimum Charge Time, Maximum Run Time, Minimum Run Time, Discharge Ramp Rate, and Charge Ramp Rate.²²⁴ Each RTO/ISO must demonstrate how its proposed or existing tariff provisions account for each of these

²²¹ See *supra* P 81.

²²² See *supra* P 84.

²²³ Order No. 841, 162 FERC ¶ 61,127 at P 77.

²²⁴ *Id.* P 191.

specific physical and operational characteristics of electric storage resources, which are described further below. Order No. 841 provides that, to the extent that an RTO/ISO proposes to comply with the requirement to account for any of the physical and operational characteristics of electric storage resources enumerated herein through its existing bidding parameters or other existing market mechanisms, it must demonstrate in its compliance filing how its existing market rules already account for that particular physical and operational characteristic.²²⁵ This requirement will improve the ability of electric storage resources to provide all of the services that they are technically capable of providing and allow RTOs/ISOs to procure these services more efficiently, which will enhance competition and, in turn, help to ensure that RTO/ISO markets produce just and reasonable rates.²²⁶

94. Order No. 841 does not require RTOs/ISOs to mandate that a resource owner/operator submit any information, but instead, provided flexibility to each RTO/ISO to determine whether resources using the participation model for electric storage resources are required to submit information regarding their physical and operational characteristics, or whether resources using the participation model should be allowed to submit such information at their discretion.²²⁷ This flexibility may help prevent resources using the participation model for electric storage resources from having to submit information that is not applicable given their physical, operational, or commercial circumstances.²²⁸ If an RTO/ISO adopts bidding parameters to account for the physical and operational characteristics set forth in Order No. 841, as specified below, it must permit a resource using the participation model for electric storage resources to submit those bidding parameters in both the day-ahead and the real-time markets.²²⁹

95. Further, Order No. 841 allows each RTO/ISO to propose, in its compliance filing, bidding parameters or other means to account for physical and operational characteristics of electric storage resources besides those set forth in Order No. 841.²³⁰ To the extent that an RTO/ISO includes such a proposal in its compliance filing, it must demonstrate

²²⁵ *Id.* PP 211, 220, 229.

²²⁶ *Id.* PP 211, 220, 230.

²²⁷ *Id.* P 192.

²²⁸ *Id.*

²²⁹ *Id.* P 193.

²³⁰ *Id.* P 235.

that such bidding parameters or other mechanisms do not impose barriers to the participation of electric storage resources in its markets.²³¹

96. Order No. 841-A clarifies that the requirement that each RTO/ISO establish tariff provisions providing a participation model for electric storage resources that accounts for the physical and operational characteristics of electric storage resources through bidding parameters or other means allows for regional flexibility.²³²

i. State of Charge

97. Order No. 841 provides that State of Charge represents the amount of energy stored by an electric storage resource in proportion to the limit on the amount of energy that it can store, typically expressed as a percentage.²³³ The State of Charge as a bidding parameter is the level of energy that an electric storage resource is anticipated to have available at the start of the market interval rather than the end.²³⁴ Order No. 841 provides each RTO/ISO the flexibility to propose telemetry requirements for such resources in its compliance filing and allows the RTOs/ISOs to implement the requirements of Order No. 841 consistent with the telemetry requirements for different services and other market participants in each RTO/ISO.²³⁵

ii. Maximum State of Charge and Minimum State of Charge

98. Maximum State of Charge represents the State of Charge that should not be exceeded (i.e., gone above) when the electric storage resource is receiving electric energy from the grid.²³⁶ This value may either be a static value based on manufacturer specifications or a dynamic value depending on the operational characteristics of the

²³¹ *Id.*

²³² Order No. 841-A, 167 FERC ¶ 61,154 at P 93.

²³³ Order No. 841, 162 FERC ¶ 61,127 at P 213.

²³⁴ *Id.*

²³⁵ *Id.* P 214.

²³⁶ *Id.* P 215.

resource (e.g., if it is providing multiple services and needs to reserve part of its State of Charge for another service).²³⁷

99. Minimum State of Charge represents the State of Charge that should not be exceeded (i.e., gone below) when an electric storage resource is injecting electric energy onto the grid.²³⁸ This value may be either a static value based on manufacturer specifications or a dynamic value depending on the operational characteristics of the resource (e.g., if it is providing multiple services and needs to reserve part of its State of Charge for another service).²³⁹

iii. **Maximum Charge Limit and Minimum Charge Limit**

100. The Maximum Charge Limit for a resource using the electric storage resource participation model is the maximum MW quantity of electric energy that it can receive from the grid.²⁴⁰

101. The Minimum Charge Limit represents the minimum MW level that the resource can receive from the grid.²⁴¹

iv. **Maximum Discharge Limit and Minimum Discharge Limit**

102. The Maximum Discharge Limit is the maximum MW quantity that the resource can inject onto the grid.²⁴² The Maximum Discharge Limit is analogous to, and could be represented by, the economic maximum that traditional generation resources can generally submit with their offers.²⁴³

²³⁷ *Id.*

²³⁸ *Id.*

²³⁹ *Id.*

²⁴⁰ *Id.* P 216.

²⁴¹ *Id.* P 231.

²⁴² *Id.* P 216.

²⁴³ *Id.*

103. The Minimum Discharge Limit represents the minimum MW output level that the resource can inject onto the grid.²⁴⁴

v. **Maximum Charge Time and Minimum Charge Time**

104. The Maximum Charge Time represents the maximum duration that a resource using the participation model for electric storage resources is able to be dispatched by the RTO/ISO to receive electric energy from the grid (e.g., for four hours).²⁴⁵ If the RTO/ISO is not managing the State of Charge of the electric storage resource in real time, then the Maximum Charge Time will prevent it from dispatching the resource to charge for a duration that would exceed the resource's Maximum State of Charge.²⁴⁶

105. The Minimum Charge Time represents the shortest duration that a resource using the participation model for electric storage resources is able to be dispatched by the RTO/ISO to receive electric energy from the grid.²⁴⁷ Minimum Charge Time is similar to the Minimum Run Time for traditional generation resources but represents the minimum time the resource can receive electric energy from the grid, rather than provide electric energy to the grid.²⁴⁸

vi. **Maximum Run Time and Minimum Run Time**

106. The Maximum Run Time reflects the maximum amount of time that a resource using the participation model for electric storage resources is able to inject electric energy to the grid due to physical or operational constraints, such as its State of Charge or potential obligations to provide other services.²⁴⁹

²⁴⁴ *Id.* P 231.

²⁴⁵ *Id.* P 223.

²⁴⁶ *Id.*

²⁴⁷ *Id.* P 222.

²⁴⁸ *Id.*

²⁴⁹ *Id.* P 224.

107. The Minimum Run Time allows the resource to identify the minimum amount of time the resource is physically able to discharge electric energy onto the grid.²⁵⁰

vii. Discharge Ramp Rate and Charge Ramp Rate

108. The Discharge Ramp Rate represents the speed at which electric storage resources can move from zero output to full output, or Maximum Discharge Limit.²⁵¹

109. The Charge Ramp Rate represents the speed at which electric storage resources can move from zero output to fully charging, or the resource's Maximum Charge Limit.²⁵²

viii. Additional Physical and Operational Characteristics

110. Order No. 841 allows each RTO/ISO to propose in its compliance filing bidding parameters or other means to account for physical and operational characteristics of electric storage resources in addition to those set forth in Order No. 841.²⁵³ If an RTO/ISO includes such a proposal in its compliance filing, the RTO/ISO must demonstrate that such bidding parameters or other mechanisms do not impose barriers to the participation of electric storage resources in its markets.²⁵⁴

b. Filing

111. ISO-NE states that State of Charge, Maximum State of Charge, and Minimum State of Charge²⁵⁵ will be accounted for in its Tariff as Available Energy²⁵⁶ and Available

²⁵⁰ *Id.*

²⁵¹ *Id.* P 234.

²⁵² *Id.*

²⁵³ *Id.* P 235.

²⁵⁴ *Id.*

²⁵⁵ ISO-NE Compliance Filing, Transmittal at 19-20 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 213, 215).

²⁵⁶ *Id.* at 20; *see* ISO-NE Tariff, § I.2.2. ISO-NE defines Available Energy as “a value that reflects MWhs of energy available from an Electric Storage Facility for economic dispatch.”

Storage.²⁵⁷ Available Energy is the MWhs of stored energy an Electric Storage Facility has available to be economically dispatched as supply by ISO-NE, and is equal to the Commission's State of Charge value minus the Commission's Minimum State of Charge value.²⁵⁸ Available Storage is the MWhs of unused storage capacity a resource has available to be economically dispatched for consumption, and is equal to the Commission's State of Charge minus the Commission's Maximum State of Charge value.²⁵⁹ ISO-NE states that Available Energy and Available Storage will provide ISO-NE with accurate market information regarding state of charge, prevent ISO-NE from needing to make assumptions regarding state of charge, and reflect the actual operating conditions of storage resources.²⁶⁰

112. ISO-NE asserts that Available Energy and Available Storage will be telemetered to ISO-NE every few seconds,²⁶¹ and participants can constrain both to "place limits on the degree to which the RTO/ISO can charge or discharge the resource."²⁶² For Binary Storage Facilities, ISO-NE states that Available Energy and Available Storage are telemetered to ISO-NE and monitored by the control room to ensure that the participant updates its facility's Maximum Consumption Limit consistent with the 15-minute duration requirement and its Economic Maximum Limit consistent with the 1-hour NPPC requirement for reserves.²⁶³ For Continuous Storage Facilities, ISO-NE states that Available Energy and Available Storage will be telemetered to ISO-NE, but software

²⁵⁷ ISO-NE Compliance Filing, Transmittal at 20; *see* ISO-NE Tariff, § I.2.2; McDonough-Parent Test. at 26. ISO-NE defines Available Storage as "a value that reflects the MWhs of unused storage available from an Electric Storage Facility for economic dispatch of consumption."

²⁵⁸ ISO-NE Compliance Filing, Transmittal at 20. *See* McDonough-Parent Test. at 26-27.

²⁵⁹ ISO-NE Compliance Filing, Transmittal at 20. *See* McDonough-Parent Test. at 26-27.

²⁶⁰ ISO-NE Compliance Filing, Transmittal at 20 (citing Order No. 841, 162 FERC ¶ 61,127 at P 213). *See* McDonough-Parent Test. at 27.

²⁶¹ ISO-NE Compliance Filing, Transmittal at 20. *See* McDonough-Parent Test. at 27.

²⁶² ISO-NE Compliance Filing, Transmittal at 20 (citing Order No. 841, 162 FERC ¶ 61,127 at P 215).

²⁶³ *Id.* at 20-21. *See* McDonough-Parent Test. at 27-28.

will automatically update a resource's Maximum Consumption Limit and Economic Maximum Limit.²⁶⁴ ISO-NE contends that the automation process: (1) eliminates the need for the participant to telephone the control room to update its physical limits to align with state of charge; (2) helps ensure the accuracy of the facility's operating limits such that the ISO-NE-desired dispatch points are feasible; and (3) allows Continuous Storage Facilities to provide reserves while they are regulating.²⁶⁵

113. ISO-NE states that the Commission's observation that "State of Charge as a bidding parameter is the level of energy that an electric storage resources is anticipated to have available at the *start* of the market interval rather than the end" does not apply to ISO-NE because ISO-NE is not representing state of charge as a bidding parameter, but instead via telemetered values.²⁶⁶ Further, ISO-NE argues that the requirement that RTOs/ISOs allow for the submission of State of Charge in both the day-ahead and real-time market does not apply because the requirement only applies to State of Charge as a bidding parameter.²⁶⁷

114. According to ISO-NE, the Maximum Charge Limit is accounted for in the Tariff and ISO-NE software as the Demand Bid parameter "Maximum Consumption Limit."²⁶⁸ Similarly, ISO-NE states that the Minimum Charge Limit is accounted for in the Tariff as the Demand Bid parameter "Minimum Consumption Limit."²⁶⁹

²⁶⁴ ISO-NE Compliance Filing, Transmittal at 21. *See* McDonough-Parent Test. at 28.

²⁶⁵ ISO-NE Compliance Filing, Transmittal at 21. *See* McDonough-Parent Test. at 28.

²⁶⁶ ISO-NE Compliance Filing, Transmittal at 21 (citing Order No. 841, 162 FERC ¶ 61,127 at P 213).

²⁶⁷ *Id.* *See* McDonough-Parent Test. at 28-29.

²⁶⁸ ISO-NE Compliance Filing, Transmittal at 22. *See* McDonough-Parent Test. at 30; ISO-NE Tariff, § III.1.10.1A(d)(ii). ISO-NE defines Maximum Consumption Limit as the maximum amount of energy in MW that is available for economic dispatch from a DARD. ISO-NE Tariff, § I.2.2.

²⁶⁹ ISO-NE Compliance Filing, Transmittal at 23. *See* McDonough-Parent Test. at 31-32; ISO-NE Tariff, § III.1.10.1A(d)(ii). ISO-NE defines Minimum Consumption Limit as the lowest consumption level in MW that is available for economic dispatch

115. ISO-NE states that the Maximum Discharge Limit is accounted for in the Tariff as the Supply Offer parameter “Economic Maximum Limit.”²⁷⁰ Similarly, ISO-NE asserts that the Minimum Discharge Limit is accounted for in the Tariff and ISO-NE software as the Supply Offer parameter “Economic Minimum Limit.”²⁷¹

116. ISO-NE explains that, because electric storage resources participating as Continuous Storage Facilities are fully dispatchable between their Maximum Charge Limit and Maximum Discharge Limit, they will be required to have an Economic Minimum Limit of zero MW and a Minimum Consumption Limit of zero MW.²⁷² ISO-NE states that this requirement reflects the physical capabilities of electric storage resources and also allows ISO-NE to dispatch them between charging and discharging in response to changes in market conditions in a single run of ISO-NE’s dispatch software.²⁷³

117. ISO-NE states that, similar to the State of Charge variables, Maximum Charge Time and Maximum Run Time will be accounted for via the telemetered values Available Energy and Available Storage.²⁷⁴ ISO-NE explains that Available Energy and Available Storage provide ISO-NE with the MWhs of energy and storage at any given time, and provide the maximum amount of time a facility is able to receive or inject energy at the facility’s operating limits and at the facility’s current rate of charge or

from a DARD, and is based on the physical characteristics submitted with the DARD’s Offer Data. ISO-NE Tariff, § I.2.2.

²⁷⁰ ISO-NE Compliance Filing, Transmittal at 22. *See* McDonough-Parent Test. at 30; ISO-NE Tariff, § III.1.10.1A(c)(v). ISO-NE defines Economic Maximum Limit as the maximum output in MW that the market participant offers to supply for economic dispatch in the Day-Ahead Energy Market or Real-Time Energy Market. ISO-NE Tariff, § I.2.2.

²⁷¹ ISO-NE Compliance Filing, Transmittal at 23. *See* McDonough-Parent Test. at 30-31; ISO-NE Tariff, § III.1.10.1A(c)(v). ISO-NE defines Economic Minimum Limit as the lowest sustainable output level that is consistent with the physical design characteristics of the Generator Asset. ISO-NE Tariff, § I.2.2.

²⁷² ISO-NE Compliance Filing, Transmittal at 23. *See* ISO-NE Tariff, § III.1.10.6(c)(v)-(vi).

²⁷³ ISO-NE Compliance Filing, Transmittal at 23. *See* McDonough-Parent Test. at 31-32.

²⁷⁴ ISO-NE Compliance Filing, Transmittal at 21.

discharge.²⁷⁵ ISO-NE claims that Available Energy and Available Storage satisfy the Commission's Maximum Charge Time and Maximum Run Time requirements because Available Energy and Available Storage prevent ISO-NE from dispatching a resource to charge or discharge for a duration that exceeds the participants' maximum or minimum state of charge, and provides ISO-NE with information regarding how long the resource can receive or inject energy from or to the grid.²⁷⁶

118. ISO-NE states that Minimum Charge Time, along with Minimum Run Time, is accounted for in the Tariff and ISO-NE software as the offer and bid parameter Minimum Run Time, which Generator Assets and DARDs must submit in both the day-ahead and real-time energy markets and is used in the unit commitment process.²⁷⁷ ISO-NE explains that Binary Storage Facilities must offer a Minimum Run Time of no more than one hour so they can be considered in the real-time unit commitment process along with other fast-starting resources.²⁷⁸ However, ISO-NE states that Continuous Storage Facilities avoid the commitment process because they are always online and committed, unless unavailable.²⁷⁹ ISO-NE states that this leverages a Continuous Storage Facility's ability to be dispatched between charging and discharging in response to changing system conditions in a single run of the dispatch software.²⁸⁰ Furthermore, ISO-NE contends that, since Continuous Storage Facilities are always committed when available, the Minimum Run Time (used for commitment) for both Generator Assets and DARDs is meaningless and these resources must be offered at zero to avoid software complications.²⁸¹

²⁷⁵ *Id.* at 22. *See* McDonough-Parent Test. at 29.

²⁷⁶ ISO-NE Compliance Filing, Transmittal at 22. *See* McDonough-Parent Test. at 30.

²⁷⁷ ISO-NE Compliance Filing, Transmittal at 23-24. *See* ISO-NE Tariff, § I.2.2; McDonough-Parent Test. at 32.

²⁷⁸ ISO-NE Compliance Filing, Transmittal at 24. *See* ISO-NE Tariff, §§ I.2.2, III.1.10.6(b)(ii).

²⁷⁹ ISO-NE Compliance Filing, Transmittal at 24.

²⁸⁰ *Id.*

²⁸¹ *Id.* *See* ISO-NE Tariff, § III.I.10.6(c)(v)-(vi); McDonough-Parent Test. at 32-33.

119. ISO-NE explains that the Discharge Ramp Rate and Charge Ramp Rate are represented in the Tariff and ISO-NE software by the offer data parameter “Manual Response Rate,” which Generator Assets and DARDs must include in their offer data in the day-ahead and real-time energy markets.²⁸² The Tariff defines “Manual Response Rate” as the rate in MW per minute that the output of a Generating Asset or DARD is capable of changing.²⁸³

120. In addition, ISO-NE explains that the Electric Storage Facility rules rely on several additional parameters.²⁸⁴ In order to allow Binary Storage Facilities to be considered in the real-time unit commitment process along with other fast-start resources, these resources are required to offer a Minimum Down Time of one hour or less and a Notification Time plus Start-Up Time of 30 minutes or less.²⁸⁵ ISO-NE also states that, because Continuous Storage Facilities are always committed when available, the intertemporal parameters described above for Binary Storage Facilities are irrelevant.²⁸⁶ ISO-NE asserts that Continuous Storage Facilities must therefore be offered with a zero time value for Minimum Down Time, Notification Time, and Start-Up Time.²⁸⁷ Further, Continuous Storage Facilities must offer zero for Start-Up Fee and No-Load Fee.²⁸⁸

121. Finally, ISO-NE explains that the proposed Tariff revisions establish additional bidding parameters in the day-ahead energy market that set limits on the number of MWh that an Electric Storage Facility will clear in the day-ahead market for both charging and

²⁸² ISO-NE Compliance Filing, Transmittal at 22-23. *See* McDonough-Parent Test. at 31.

²⁸³ ISO-NE Compliance Filing, Transmittal at 22, n.127. *See* ISO-NE Tariff, § I.2.2.

²⁸⁴ ISO-NE Compliance Filing, Transmittal at 24-25. *See* McDonough-Parent Test. at 33-34.

²⁸⁵ ISO-NE Compliance Filing, Transmittal at 24. *See* McDonough-Parent Test. at 33; ISO-NE Tariff, §§ I.2.2, III.1.10.6(b)(ii).

²⁸⁶ ISO-NE Compliance Filing, Transmittal at 25. *See* McDonough-Parent Test. at 33-34.

²⁸⁷ ISO-NE Compliance Filing, Transmittal at 25. *See* ISO-NE Tariff, § III.1.10.6(c)(v)-(vi).

²⁸⁸ ISO-NE Compliance Filing, Transmittal at 25. *See* McDonough-Parent Test. at 33; ISO-NE Tariff, §§ I.2.2, III.1.10.6(c)(v).

discharging.²⁸⁹ These parameters include the “Maximum Daily Energy Limit,” which specifies the maximum number of MWh that a Limited Energy Storage Resource expects to be able to provide in the next operating day, and the “Maximum Daily Consumption Limit,” which specifies the maximum number of MWh that the DARD expects to consume in the next operating day.²⁹⁰

c. Protests/Comments

122. Energy Storage Association and Advanced Energy Economy raise concerns about ISO-NE’s decision to account for certain characteristics through the two telemetered values, Available Energy and Available Storage. Energy Storage Association states that it is unsure whether the two parameters will be sufficient to address the physical and operational characteristics of electric storage resources until these resources fully participate in the ISO-NE markets.²⁹¹ Energy Storage Association contends that it does not object to the Commission’s approval of this Tariff provision, but states that it will work with ISO-NE and its stakeholders to confirm that ISO-NE’s proposed revisions meet the requirements of Order No. 841 and will seek a Tariff change if ISO-NE’s two-parameter approach is insufficient.²⁹²

123. Advanced Energy Economy argues that ISO-NE’s proposal to account for the commitment-related parameters Minimum Charge Time, Maximum Charge Time, Minimum Run Time, and Maximum Run Time does not comply with the requirements of Order No. 841.²⁹³ Advanced Energy Economy argues that accounting for Maximum Charge Time and Maximum Discharge Time through telemetering Available Energy and Available Storage does not permit electric storage resources to submit this information at their own discretion.²⁹⁴ Advanced Energy Economy argues that this prohibition is inconsistent with how ISO-NE treats other resources, which are permitted to submit minimum and maximum run times through separate bid parameters in their energy offers,

²⁸⁹ ISO-NE Compliance Filing, Transmittal at 25. *See* McDonough-Parent Test. at 34.

²⁹⁰ ISO-NE Compliance Filing, Transmittal at 25. *See* McDonough-Parent Test. at 34; ISO-NE Tariff, § I.2.2.

²⁹¹ Energy Storage Association Protest at 12.

²⁹² *Id.* at 12-13.

²⁹³ Advanced Energy Economy Protest at 10.

²⁹⁴ *Id.* (citing ISO-NE Compliance Filing, Transmittal at 21-22).

and may not allow electric storage resources to manage their state of charge.²⁹⁵ Advanced Energy Economy therefore requests that ISO-NE clarify how electric storage resources can provide this information.²⁹⁶

124. In addition, Energy Storage Association argues that the exclusion of a State of Charge bidding parameter in either the day-ahead or real-time market is likely inconsistent with Order No. 841.²⁹⁷ Energy Storage Association states that ISO-NE accounts for the State of Charge parameter through the two State of Charge-related telemetered values, Available Energy and Available Storage, in real-time; however, these telemetered values provide instantaneous energy levels, which differs from the definition of State of Charge in Order No. 841, namely “the level of energy that the resource is anticipated to have available at the start of the market interval.”²⁹⁸ As a result, Energy Storage Association contends that an electric storage resource cannot submit its State of Charge in both the day-ahead and real-time market through the instantaneously telemetered values.²⁹⁹ While Available Energy and Available Storage may help ISO-NE avoid infeasible dispatch in real-time, Energy Storage Association argues that they cannot help avoid infeasible schedules in the day-ahead market and will lead to a greater chance of infeasible schedules.³⁰⁰ According to Energy Storage Association, this exposes electric storage resources to real-time deviation penalties, therefore creating a “clear barrier to the efficient participation of [electric] storage resources.”³⁰¹

125. With regard to ISO-NE’s claim that the requirement to have State of Charge as a bidding parameter does not apply because ISO-NE accounts for State of Charge as telemetered values rather than a bidding parameter, Energy Storage Association argues that Order No. 841 specifies that some parameters, like State of Charge, may only be represented through bidding parameters.³⁰² In addition, Energy Storage Association

²⁹⁵ *Id.* at 10-11 (citing Order No. 841, 162 FERC ¶ 61,127 at P 251).

²⁹⁶ *Id.* at 11.

²⁹⁷ Energy Storage Association Protest at 8.

²⁹⁸ *Id.* at 8-9 (citing Order No. 841, 162 FERC ¶ 61,127 at P 213).

²⁹⁹ *Id.* at 9-10.

³⁰⁰ *Id.* at 10-11.

³⁰¹ *Id.* at 11.

³⁰² *Id.* at 10 (citing Order No. 841, 162 FERC ¶ 61,127 at P 190).

explains that, even if ISO-NE were to include a State of Charge parameter, ISO-NE's software could not use this parameter in the day-ahead and real-time markets because ISO-NE indicated that Continuous Storage Facilities were neither committed nor de-committed by ISO-NE's commitment software.³⁰³

126. Therefore, Energy Storage Association argues that ISO-NE's inability to use a State of Charge bidding parameter is not compliant with the goal of Order No. 841 to facilitate the participation of electric storage resources in the RTO/ISO markets, and requests that the Commission direct ISO-NE to develop through the stakeholder process a State of Charge parameter and a market design that effectively utilizes a State of Charge parameter.³⁰⁴

127. In addition, Tesla requests that the Commission require RTOs/ISOs to allow electric storage resources to submit separate round-trip efficiency parameters for summer and winter, for purposes of market registration or offers, because round-trip efficiency can be highly dependent on temperature and is sufficient for all uses, including planning processes and cost-based determination.³⁰⁵

d. Answers

128. ISO-NE disagrees with Energy Storage Association's request that the Commission direct ISO-NE to develop a State of Charge parameter for the day-ahead and real-time energy markets to avoid infeasible schedules in the day-ahead market.³⁰⁶ ISO-NE argues that its electric storage resource participation model meets the requirements of Order No. 841, which did not require a State of Charge parameter to avoid infeasible schedules.³⁰⁷ Moreover, ISO-NE states that the parameters Maximum Daily Energy Limit and Maximum Daily Consumption Limit can be used to avoid infeasible schedules in the day-ahead market.³⁰⁸

³⁰³ *Id.* at 11 (citing ISO-NE Compliance Filing, Transmittal at 8).

³⁰⁴ *Id.* at 11-12.

³⁰⁵ Tesla Comments at 23.

³⁰⁶ ISO-NE Answer at 11.

³⁰⁷ *Id.*

³⁰⁸ *Id.*

129. ISO-NE explains that a participant could set its Maximum Daily Energy Limit equal to one discharge cycle and its Maximum Daily Consumption Limit equal to one charge cycle to limit the resource's day-ahead schedule to one full charge-discharge cycle.³⁰⁹ ISO-NE asserts that this day-ahead schedule would tend to clear the resource's Generator Asset in the most expensive hours and clear the resource's DARD in the cheapest hours.³¹⁰ ISO-NE claims that this is similar to the approach used by other Limited Energy Resources in the day-ahead market to ensure a feasible schedule.³¹¹

130. However, ISO-NE states that its day-ahead market architecture does not support a day-ahead optimization of multiple charge and discharge cycles per day, such as charging at night, discharging during the morning peak, charging at mid-day, and discharging during the evening peak.³¹² ISO-NE contends that doing so would require a significant software change and would delay the implementation of this project, but ISO-NE states that it would be willing to explore this type of optimization once the current day-ahead software is replaced and performance concerns can be addressed.³¹³

131. ISO-NE explains that, in the real-time market, Available Energy and Available Storage provide more accurate information and flexibility than a State of Charge bidding parameter, including more accurate information for electric storage resources composed of more than one storage device.³¹⁴ ISO-NE asserts that Available Energy and Available Storage represent the energy that a resource is anticipated to have at the start of a market interval, and explains that the telemetered data update the dispatch limits for Continuous Storage Facilities at the start of each dispatch interval.³¹⁵ ISO-NE argues that, if it received a real-time State of Charge bidding parameter before the bidding window

³⁰⁹ *Id.* at 11-12.

³¹⁰ *Id.* at 12.

³¹¹ *Id.*

³¹² *Id.*

³¹³ *Id.*

³¹⁴ *Id.* at 13-14.

³¹⁵ *Id.* at 13.

closed, the information would be old and not as accurate at the start of market interval as the telemetered data.³¹⁶

132. In response to Advanced Energy Economy's request for clarification regarding Minimum Run Time, ISO-NE explains that the dispatch algorithm does not consider Minimum Run Time because Minimum Run Time is the amount of time a resource must run before it can be shut down again and is only used to commit a resource.³¹⁷ ISO-NE states that Minimum Run Time for a Continuous Storage Facility is irrelevant because a Continuous Storage Facility self-schedules in order to avoid the commitment process, is always committed, and never goes through the commitment or decommitment process.³¹⁸ ISO-NE notes that a Binary Storage Facility must offer a Minimum Run Time of no more than one hour in order to be committed as a "fast-start generator."³¹⁹

133. ISO-NE states that none of its systems rely on a Maximum Run-Time parameter, and no resource type submits one.³²⁰ ISO-NE explains that a Limited Energy Resource's Maximum Run Time is dependent on the rate the resource discharges or charges and claims that a Maximum Run-Time parameter alone would not be useful.³²¹ ISO-NE states that its software uses Available Energy and Available Storage in the real-time market and Maximum Daily Energy Limit and Maximum Daily Storage Limit in the day-ahead market to determine how long a resource will be able to charge or discharge.³²²

134. Energy Storage Association reiterates its argument that ISO-NE's proposal does not comply with Order No. 841's requirements with respect to State of Charge, and that as a result, the proposal could result in infeasible schedules for electric storage resources participating in ISO-NE's market.³²³ Energy Storage Association explains that ISO-NE's proposed capacity market rules would obligate an electric storage resource to make a

³¹⁶ *Id.* at 13-14.

³¹⁷ *Id.* at 16-17.

³¹⁸ *Id.* at 17.

³¹⁹ *Id.*

³²⁰ *Id.* at 17-18.

³²¹ *Id.* at 18.

³²² *Id.*

³²³ Energy Storage Association Answer at 5.

day-ahead offer, which in turn could result in a day-ahead schedule.³²⁴ Therefore, Energy Storage Association states that it is critical that ISO-NE's market provide electric storage resources with the tools needed to avoid infeasible day-ahead schedules.³²⁵ Energy Storage Association explains that ISO-NE's current software could not utilize a State of Charge parameter even if one existed.³²⁶ Energy Storage Association points to two drawbacks of ISO-NE's proposal for electric storage resources. First, Energy Storage Association argues that ISO-NE's proposal would limit electric storage resources to a single charge-discharge cycle each day in the day-ahead market, which would not enable electric storage resources to fully participate in ISO-NE's markets.³²⁷ Second, Energy Storage Association contends that ISO-NE's proposal to telemeter State of Charge data in real-time cannot substitute for a State of Charge bidding parameter, as the bidding parameter is needed to avoid infeasible schedules and resultant penalties.³²⁸ Energy Storage Association argues that a State of Charge bidding parameter can also be used to represent the physical characteristics of aggregations of electric storage resources, contrary to ISO-NE's assertion.³²⁹

135. Energy Storage Association reiterates its request that the Commission direct ISO-NE to undertake a separate stakeholder process to address its concerns on the State of Charge parameter, as well as other commenters' concerns on bidding parameters, but that the Commission not delay acceptance of ISO-NE's proposal.³³⁰

136. In response to Tesla's request that the Commission require RTOs/ISOs to allow electric storage resources to submit separate round-trip efficiency parameters, ISO-NE states that its proposal allows electric storage resources to adjust their Available Energy

³²⁴ *Id.*

³²⁵ *Id.*

³²⁶ *Id.*

³²⁷ *Id.* at 6.

³²⁸ *Id.*

³²⁹ *Id.*

³³⁰ *Id.*

and Available Storage telemetry to account for physical constraints, which includes round-trip efficiency level.³³¹

137. NEPOOL supports ISO-NE's compliance filing, noting that market participants were afforded the opportunity to examine the proposed changes through the stakeholder process.³³²

e. **Data Request Response**

138. ISO-NE reiterates that the telemetered values Available Energy and Available Storage together convey an electric storage resource's State of Charge.³³³ ISO-NE states that these telemetered values are used to update dispatch limits for Continuous Storage Facilities at the start of the 5-minute dispatch interval, and therefore the dispatch software considers the State of Charge at the start of the market interval.³³⁴

139. ISO-NE states that, in the real-time market, Available Energy and Available Storage telemetry prevent infeasible schedules because these values provide ISO-NE with the information needed to create real-time schedules that avoid charging when the facility does not have sufficient available storage and discharging when the facility does not have sufficient available energy.³³⁵ ISO-NE clarifies that, so long as the resource provides telemetry on state of charge through the Available Energy and Available Storage parameters, the automatic redeclaration of the Economic Maximum Limit will prevent the resource from receiving dispatch instructions that are infeasible.³³⁶

140. In addition, ISO-NE reiterates that use of the parameters Maximum Daily Energy Limit and Maximum Daily Consumption will limit the number of MWhs from a facility that will clear in the day-ahead market.³³⁷ ISO-NE states that use of these parameters will tend to result in a day-ahead schedule that maximizes social welfare, which in turn is

³³¹ ISO-NE Answer at 20.

³³² NEPOOL Answer at 4-5.

³³³ ISO-NE Data Request Response at 10.

³³⁴ *Id.* at 10-11.

³³⁵ *Id.* at 11.

³³⁶ *Id.* at 12.

³³⁷ *Id.*

likely to maximize the resource's profit.³³⁸ ISO-NE states that the multi-cycle approach suggested by protestors will not prevent infeasible day-ahead schedules if the resource's state of charge at the beginning of the day is inaccurate.³³⁹

141. ISO-NE reiterates from its answer that optimizing the day-ahead market for multiple charge cycles would require significant changes to a software system with a limited lifespan.³⁴⁰ However, ISO-NE noted two possible alternatives. The first would re-architect the day-ahead dispatch so that it is performed in a single 24-hour run, rather than a commitment process that consists of a single 24-hour run, but a dispatch process that consists of 24 single-hour runs.³⁴¹ ISO-NE states that this alternative would delay the day-ahead clearing process and may cause ISO-NE to be unable to meet day-ahead publishing timelines.³⁴² The second alternative would optimize the day-ahead Electric Storage Facility dispatch separately from the dispatch of all other resources.³⁴³ ISO-NE notes that this alternative may address the timing issues, but electric storage resources would not be able to set prices, and it might not result in an optimal dispatch.³⁴⁴ ISO-NE notes that these revisions would require numerous changes to the day-ahead market structure and involve extensive work and the full stakeholder process.³⁴⁵ Furthermore, ISO-NE states that neither alternative could come before the re-architecture of the day-ahead market, and to do either would affect the completion of other higher-priority projects in ISO-NE.³⁴⁶

³³⁸ *Id.* at 13.

³³⁹ *Id.*

³⁴⁰ *Id.*

³⁴¹ *Id.*

³⁴² *Id.*

³⁴³ *Id.* at 13-14.

³⁴⁴ *Id.* at 14.

³⁴⁵ *Id.*

³⁴⁶ *Id.*

142. Moreover, ISO-NE argues that Order No. 841 does not require the development of a multi-cycle day-ahead clearing process for electric storage resources.³⁴⁷ ISO-NE argues that, while the Commission’s question focuses on the feasibility of day-ahead schedules, ISO-NE’s Tariff requires it to consider optimality.³⁴⁸ ISO-NE claims that if it were to implement a multi-cycle day-ahead clearing process for electric storage resources that was both feasible and optimal, it would be managing an electric storage resource’s State of Charge, which Order No. 841 said RTOs/ISOs are not required to do.³⁴⁹

143. ISO-NE states that it would be willing to explore the feasibility of this optimization after the current day-ahead software is replaced and performance issues can be addressed.³⁵⁰ However, ISO-NE cautions that further changes to the [electric] storage [resource] participation rules should wait because implementing a solution before understanding the problem risks wasted effort and resources, and could delay better solutions after the identification of problems.³⁵¹

144. Lastly, ISO-NE confirms that “Maximum Discharge Time” should instead have been “Maximum Run Time” in its Transmittal.³⁵²

f. Commission Determination

145. We find that ISO-NE partially complies with the requirement of Order No. 841 to provide a participation model for electric storage resources that accounts for the physical and operational characteristics of electric storage resources through bidding parameters or other means.³⁵³ ISO-NE has demonstrated that its Compliance Filing accounts for each

³⁴⁷ *Id.*

³⁴⁸ *Id.* (citing ISO-NE Tariff, § III.1.7.6).

³⁴⁹ *Id.* (citing Order No. 841, 162 FERC ¶ 61,127 at P 254).

³⁵⁰ *Id.* at 15.

³⁵¹ *Id.*

³⁵² *Id.*

³⁵³ Order No. 841, 162 FERC ¶ 61,127 at P 191.

of the specific physical and operational characteristics of electric storage resources enumerated in Order No. 841,³⁵⁴ with limited exceptions, as discussed below.

146. We find that ISO-NE complies with the requirement of Order No. 841 to account for Maximum Charge Limit (through use of the existing demand bid parameter Maximum Consumption Limit);³⁵⁵ Minimum Charge Limit (through use of the existing bidding parameter Minimum Consumption Limit);³⁵⁶ Maximum Discharge Limit (through use of the existing bidding parameter Economic Maximum Limit);³⁵⁷ Minimum Discharge Limit (through use of the existing bidding parameter Economic Minimum Limit);³⁵⁸ and Charge Ramp Rate and Discharge Ramp Rate (through use of the Manual Response Rate parameter)³⁵⁹ of resources using the participation model.

147. For Binary Storage Facilities, we find that ISO-NE's proposal to account for Minimum Charge Time and Minimum Run Time through bidding parameters in the day-ahead and real-time markets complies with Order No. 841.³⁶⁰ In addition, for Continuous Storage Facilities, we find that ISO-NE's proposal to account for the Minimum Charge Time and Minimum Run Time through a fixed parameter equal to zero in the day-ahead and real-time markets complies with Order No. 841, while accounting for the nature of ISO-NE's proposed Electric Storage Facility participation model. Since Continuous Storage Facilities are neither committed nor de-committed by the ISO-NE unit commitment software, these commitment-related parameters established by ISO-NE for electric storage resources are unnecessary for Continuous Storage

³⁵⁴ *Id.* P 211.

³⁵⁵ ISO-NE Compliance Filing, Transmittal at 22. *See* McDonough-Parent Test. at 30, ISO-NE Tariff, §§ I.2.2, III.1.10.1A(d)(ii).

³⁵⁶ ISO-NE Compliance Filing, Transmittal at 23. *See* McDonough-Parent Test. at 31-32; ISO-NE Tariff, §§ I.2.2, III.1.10.1A(d)(ii).

³⁵⁷ ISO-NE Compliance Filing, Transmittal at 23. *See* McDonough-Parent Test. at 30-31; ISO-NE Tariff, §§ I.2.2, III.1.10.1A(c)(v).

³⁵⁸ ISO-NE Compliance Filing, Transmittal at 23. *See* McDonough-Parent Test. at 30-31; ISO-NE Tariff, §§ I.2.2, III.1.10.1A(c)(v).

³⁵⁹ ISO-NE Compliance Filing, Transmittal at 22-23. *See* McDonough-Parent Test. at 31.

³⁶⁰ ISO-NE Compliance Filing, Transmittal at 23-24 (citing ISO-NE Tariff, § I.2.2).

Facilities.³⁶¹ ISO-NE's electric storage resource participation model, which does not represent certain commitment-related parameters for Continuous Storage Facilities, complies with the requirement of Order No. 841 to create a participation model that ensures the eligibility of electric storage resources to participate in ISO-NE's markets in a way that recognizes their physical and operational characteristics. Order No. 841 allows RTOs/ISOs regional flexibility by allowing them to "account for the physical and operational characteristics of electric storage resources through different mechanisms [other than bidding parameters] given their unique market design."³⁶² We find that ISO-NE's participation model, which includes the bidding parameters and other means described above to recognize the physical and operational characteristics of electric storage resources, complies with Order No. 841. The requirement that these parameters be set to a value of zero for Continuous Storage Facilities reflects ISO-NE's approach to require Continuous Storage Facilities to be in an online state unless declared unavailable.³⁶³

148. We also find that ISO-NE's proposal to account for Maximum Run Time, Maximum Charge Time, State of Charge, Maximum State of Charge, and Minimum State of Charge for Binary and Continuous Storage Facilities in the real-time market through the telemetered values Available Energy and Available Storage satisfies the requirements of Order No. 841. We are not persuaded by Advanced Energy Economy's argument that accounting for Minimum and Maximum Charge Time and Minimum and Maximum Run Time through Available Energy and Available Storage prohibits resources from submitting this information at their own discretion or that it is inconsistent with ISO-NE's treatment of other resources, which Advanced Energy Economy claims can submit Minimum and Maximum Run Times. As ISO-NE explains, its software does not contain a Maximum Run Time parameter. Therefore ISO-NE's treatment of electric storage resources is consistent with its treatment of other resources. As previously discussed, Minimum Run Time has no meaning for a Continuous Storage Facility because these facilities are always online and committed (unless the facility is unavailable), and are required to submit a zero value for this parameter.³⁶⁴

149. However, we find that, while ISO-NE complies with the requirement to account for Maximum Run Time, Maximum Charge Time, State of Charge, Maximum State of Charge, and Minimum State of Charge in the real-time market through the telemetered

³⁶¹ *Id.*

³⁶² Order No. 841, 162 FERC ¶ 61,127 at P 190; *see id.* P 189.

³⁶³ ISO-NE Compliance Filing, Transmittal at 8, 24.

³⁶⁴ ISO-NE Answer at 17-18.

values Available Energy and Available Storage, ISO-NE's participation model fails to account for Maximum Run Time, Maximum Charge Time, State of Charge, Maximum State of Charge, and Minimum State of Charge for Binary and Continuous Storage Facilities in the day-ahead market. Furthermore, neither the Maximum Daily Energy Limit nor the Maximum Daily Consumption Limit parameters adequately provide electric storage resources with a mechanism to account for their State of Charge in the day-ahead market. ISO-NE's proposal does not fully comply with Order No. 841 because the limited bidding parameters available to electric storage resources means that, in the day-ahead market, ISO-NE would "make assumptions about the state of charge of an electric storage resource."³⁶⁵

150. We agree with commenters' concerns that ISO-NE has failed to demonstrate how it will account for State of Charge in the day-ahead market, which could result in infeasible schedules, i.e., the scheduling of those charging or discharging MWhs at times when the electric storage resource cannot physically withdraw or inject based on its State of Charge. We disagree with ISO-NE's assertion that setting the Maximum Daily Energy Limit and Maximum Daily Consumption Limit parameters equal to one full charge and discharge cycle will ensure a feasible schedule.³⁶⁶ While the Maximum Daily Energy Limit and Maximum Daily Consumption Limit will ensure that an electric storage resource will not generate or consume more MWhs over the entire operating day than it offered into the day-ahead market, these parameters cannot ensure that those charging or discharging MWhs will be scheduled at times when the electric storage resource can withdraw or inject because ISO-NE's day-ahead market software does not account for the resource's State of Charge at the start of each day-ahead market interval. In addition, ISO-NE's suggestion that electric storage resources should limit themselves to one full charge and discharge cycle in the day-ahead market is at odds with the requirement in Order No. 841 that each RTO/ISO must account for the physical and operational characteristics of electric storage resources, through bidding parameters or other means, in order to improve the ability of electric storage resources to provide all of the services that they are technically capable of providing and allow RTOs/ISOs to procure these services more efficiently.³⁶⁷

151. ISO-NE argues that accounting for State of Charge, Maximum State of Charge, and Minimum State of Charge in the day-ahead market would be tantamount to managing

³⁶⁵ Order No. 841, 162 FERC ¶ 61,127 at P 213; *see also id.* P 211.

³⁶⁶ ISO-NE Answer at 12.

³⁶⁷ Order No. 841, 162 FERC ¶ 61,127 at P 191.

resources' State of Charge.³⁶⁸ While Order No. 841 does not require that RTOs/ISOs *manage* resources' State of Charge (i.e., optimize electric storage resources' charge and discharge schedules over time),³⁶⁹ Order No. 841 does require RTOs/ISOs to *account* for State of Charge so that electric storage resources can participate in the energy market without receiving dispatch points that violate their physical and operational limits, which in turn will enable these resources to provide all of the services that they are technically capable of providing and allow the RTOs/ISOs to procure these services more efficiently.³⁷⁰ We do not agree with ISO-NE's assertion that Order No. 841 only requires RTOs/ISOs to account for State of Charge in both the real-time and day-ahead markets if represented by a bidding parameter.³⁷¹ Order No. 841 requires RTOs/ISOs to account for State of Charge,³⁷² which ISO-NE's proposal fails to do in the day-ahead market. Finally, we note that while ISO-NE contends that accounting for State of Charge in the day-ahead market would require a significant software change, we find that doing so is necessary to allow ISO-NE to procure services from electric storage resources more efficiently, which will enhance competition and help ensure that ISO-NE's markets produce just and reasonable rates, consistent with Order No. 841.³⁷³ Therefore, we direct ISO-NE to file, within 60 days of the date of issuance of this order, a further compliance filing that modifies ISO-NE's proposed electric storage resource participation model to account for Maximum Run Time, Maximum Charge Time, State of Charge, Maximum State of Charge, and Minimum State of Charge through bidding parameters or other means in its day-ahead market, as required by Order No. 841.³⁷⁴

³⁶⁸ ISO-NE Data Request Response at 14 (citing Order No. 841, 162 FERC ¶ 61,127 at P 254).

³⁶⁹ Order No. 841, 162 FERC ¶ 61,127 at P 254.

³⁷⁰ *See id.* P 189.

³⁷¹ *See* ISO-NE Compliance Filing, Transmittal at 21.

³⁷² *See* Order No. 841, 162 FERC ¶ 61,127 at PP 211, 213.

³⁷³ Order No. 841, 162 FERC ¶ 61,127 at P 191.

³⁷⁴ *Id.* P 211 (“[W]e adopt the NOPR proposal . . . to require each RTO/ISO to revise its tariff to include a participation model for electric storage resources that accounts for the following physical and operational characteristics of such resources: State of Charge, Minimum State of Charge, Maximum State of Charge, Minimum Charge Limit and Maximum Charge Limit. . . . [E]ach RTO's/ISO's participation

152. Nevertheless, we find that ISO-NE's proposal to include a participation model that uses the Maximum Daily Energy Limit and Maximum Daily Consumption Limit to account for physical and operational characteristics of electric storage resources, besides those set forth in Order No. 841, does not impose barriers to the participation of electric storage resources in its markets, does not conflict with Order No. 841, and may be of utility to electric storage resources. As ISO-NE states, electric storage resources may choose to utilize the Maximum Daily Energy Limit and Maximum Daily Consumption Limit parameters in the day-ahead market to set a limit on the number of MWhs they expect to supply and consume, respectively, in the next operating day.³⁷⁵ Similarly, we find that ISO-NE's requirement that Binary Storage Facilities submit a Minimum Down Time of no more than one hour and a Notification Time plus Start-Up Time of no more than 30 minutes, neither imposes a barrier to the participation of electric storage resources in ISO-NE's markets nor conflicts with Order No. 841, because it allows Binary Storage Facilities to be considered in the real-time unit commitment process with other fast-starting resources.³⁷⁶ We also find that ISO-NE's requirement that Continuous Storage Facilities submit a zero time value for Minimum Down Time and a zero time value for Notification Time and Start-Up Time and offer zero for Start-Up Fee and No-Load Fee, neither imposes barriers to the participation of electric storage resources in its markets nor conflicts with Order No. 841. As previously discussed, because Continuous Storage Facilities are always committed when available the aforementioned intertemporal parameters are not relevant and must be offered with a zero time value.³⁷⁷

153. Additionally, we find Tesla's request that the Commission require ISO-NE to allow electric storage resources to submit separate round-trip efficiency levels for summer and winter to be outside the scope of this compliance proceeding.

model for electric storage resources must account for these physical and operational characteristics, whether through bidding parameters or other means.”).

³⁷⁵ ISO-NE Compliance Filing, Transmittal at 25. *See* McDonough-Parent Test. at 34; ISO-NE Tariff, § I.2.2.

³⁷⁶ ISO-NE Compliance Filing, Transmittal at 24. *See* ISO-NE Tariff, §§ I.2.2, III.1.10.6(b)(ii); McDonough-Parent Testimony at 33.

³⁷⁷ ISO-NE Compliance Filing, Transmittal at 25. *See* ISO-NE Tariff, § III.1.10.6(c)(v)-(vi); McDonough-Parent Testimony at 33.

4. State of Charge Management

154. Order No. 841 requires each RTO/ISO to allow resources using the participation model for electric storage resources to self-manage their State of Charge.³⁷⁸ Order No. 841 provides that a resource using the participation model for electric storage resources that self-manages its State of Charge will be subject to any applicable penalties for deviating from a dispatch schedule to the extent that the resource deviates from the dispatch schedule in managing its State of Charge.³⁷⁹ Order No. 841 further provides that, to the extent that the provision of a particular wholesale service, such as frequency regulation, requires a resource providing that service to follow a dispatch signal that has the effect of maintaining the resource's ability to provide the service, an electric storage resource that is managing its own State of Charge would still be required to follow such a dispatch signal, just as all other resources providing that same service.³⁸⁰

155. RTOs/ISOs are not required as part of Order No. 841 to manage the State of Charge for resources using the participation model for electric storage resources.³⁸¹ While RTOs/ISOs must permit resources to manage their own State of Charge, RTOs/ISOs may provide an option for the RTO/ISO to manage an electric storage resource's State of Charge for any particular service or circumstance as they deem appropriate in their markets with the consent of the electric storage resource.³⁸² If an RTO/ISO already has a mechanism to manage a resource's State of Charge, then the RTO/ISO must make it optional for the electric storage resource owner/operator to use such mechanism so that the electric storage resource is able to manage its own State of Charge if it elects to do so.³⁸³ Order No. 841 further provides that, where an electric storage resource has the option to allow the RTO/ISO to manage its State of Charge, the electric storage resource is the default manager of the resource's State of Charge.³⁸⁴

³⁷⁸ Order No. 841, 162 FERC ¶ 61,127 at P 253.

³⁷⁹ *Id.*

³⁸⁰ *Id.*

³⁸¹ *Id.* P 254.

³⁸² *Id.* at n.300.

³⁸³ *Id.* P 254.

³⁸⁴ *Id.*

156. Order No. 841 states that RTOs/ISOs should be able to dispatch resources using the participation model for electric storage resources in the same manner as any other market participant to address any reliability challenges and should know that the resources have an adequate State of Charge to perform the service to which they have committed.³⁸⁵ RTOs/ISOs are not precluded from establishing telemetry or other communication requirements necessary to determine the capabilities of an electric storage resource in real time.³⁸⁶ Self-managing electric storage resources, just like all market participants, are subject to any non-performance penalties in the RTO/ISO tariff.³⁸⁷

157. Order No. 841 recognizes that the energy limitations of electric storage resources will need to be factored into their market offers and that misrepresenting those limitations could constitute manipulation if an electric storage resource has an obligation to participate in an RTO/ISO market. However, as discussed in the Ability to De-Rate Capacity to Meet Minimum Run-Time Requirements section above, Order No. 841 requires each RTO/ISO to demonstrate how its existing market rules provide a means for energy-limited resources, including electric storage resources, to provide capacity, including ways to represent their energy limitations through their offer prices, which, if allowed by the RTO/ISO, would not constitute economic withholding.³⁸⁸ As with other resources, market monitors have the ability to review the bids from electric storage resources to detect economic or physical withholding.³⁸⁹ If an RTO/ISO determines that additional rules are needed to ensure electric storage resources are not managing their State of Charge in a way that could manipulate market outcomes through withholding, then the RTO/ISO may propose such rules in its compliance filing or through a separate FPA section 205 filing.³⁹⁰

a. Filing

158. ISO-NE states that a market participant can manage the state of charge of an Electric Storage Facility in several ways. First, the participant can set price-quantity pairs in the facility's Supply Offers and Demand Bids to dictate when and to what extent

³⁸⁵ *Id.* P 255.

³⁸⁶ *Id.*

³⁸⁷ *Id.*

³⁸⁸ *Id.* P 256.

³⁸⁹ *Id.* P 257.

³⁹⁰ *Id.* (citing 16 U.S.C. § 824d).

the Electric Storage Facility charges and discharges.³⁹¹ ISO-NE explains that this information is used to determine hourly schedules in the day-ahead market and dispatch instructions in the real-time market.³⁹² Further, ISO-NE states that all Generator Assets and DARDs can electronically revise the price-quantity pairs prior to each operating day, and in real-time up to 30 minutes prior to the start of each hour.³⁹³ According to ISO-NE, this ability gives Electric Storage Facilities increased control of their State of Charge.

159. Second, ISO-NE states that, even after the electronic offer window closes for a given hour, the participant can request a self-dispatch to override price-quantity pairs in the Supply Offer or Demand Bid, which provides another means of control over the facility's State of Charge.³⁹⁴

160. Third, ISO-NE explains that the Generator Asset of an Electric Storage Facility can offer as a Limited Energy Resource, which allows it to lower its maximum dispatch limit at any time during the current operating hour or future hours to save the facility's energy for a future period, while continuing to provide reserves up to its full capability.³⁹⁵

161. Fourth, ISO-NE states that participants may also manage their State of Charge by setting their Available Energy and Available Storage telemetry in a manner that ensures the Electric Storage Facility is never charged or discharged beyond its design specifications.³⁹⁶

³⁹¹ ISO-NE Compliance Filing, Transmittal at 26. ISO-NE explains that a participant that wants to charge its facility will submit a high-priced Demand Bid for its entire consumption capability, and when it wishes to fully discharge, its facility would submit a Supply Offer at a low price for its entire capability.

³⁹² *Id.*; see McDonough-Parent Test. at 35.

³⁹³ ISO-NE Compliance Filing, Transmittal at 26; see ISO-NE Tariff, §§ III.1.10.9(a), III.1.10.9(c).

³⁹⁴ ISO-NE Compliance Filing, Transmittal at 26; see McDonough-Parent Test. at 34-35.

³⁹⁵ ISO-NE Compliance Filing, Transmittal at 26-27; see ISO-NE Tariff, § III.1.10.1A(c)(v).

³⁹⁶ ISO-NE Compliance Filing, Transmittal at 27; see McDonough-Parent Test. at 35-36.

162. ISO-NE states that it retains the right to posture any resource for reliability purposes. Electric Storage Facilities, like any other postured resource, would be eligible to receive Net Commitment Period Compensation credits for the out-of-merit dispatch of a DARD and the lost opportunity cost of a Generator Asset.³⁹⁷

b. Protests/Comments

163. Energy Storage Association and EDF Renewables argue that ISO-NE's automatic redeclaration proposal to automatically de-rate a Continuous Storage Facility's Economic Maximum limit (discharge capability) to the level it can sustain for one hour³⁹⁸ is inconsistent with Order No. 841 because it precludes a resource from managing its own State of Charge.³⁹⁹

164. Tesla argues that energy neutral signals for the provision of frequency regulation represent ISO-management of an electric storage resource's State of Charge, and that Order No. 841 expressly requires that each RTO/ISO allow electric storage resources to self-manage their State of Charge.⁴⁰⁰ Tesla argues that electric storage resources should have the option to self-manage their State of Charge when providing frequency regulation, and be allowed to provide an asymmetric offer curve for regulation up and regulation down.⁴⁰¹ Tesla explains that an electric storage resource that is fully charged cannot offer its full capacity for frequency regulation with an energy neutral signal, but that it could provide its full capacity if it were allowed to bid only regulation up.⁴⁰² Likewise, Tesla explains that fully discharged electric storage resources cannot provide frequency regulation based on an energy neutral signal, but could provide their full capacity for regulation down service.⁴⁰³ Tesla states that it does not oppose the option to utilize energy neutral signals for frequency regulation, but requests that the Commission

³⁹⁷ ISO-NE Compliance Filing, Transmittal at 27; *see* ISO-NE Tariff, §§ III.F.2.3.8-9; McDonough-Parent Test. at 36.

³⁹⁸ *See supra* PP 45-48, 63.

³⁹⁹ EDF Renewables Protest at 1-2; Energy Storage Association Protest at 2-3, 6 (citing Order No. 841-A, 167 FERC ¶ 61,154 at P 251).

⁴⁰⁰ Tesla Comments at 22.

⁴⁰¹ *Id.*

⁴⁰² *Id.*

⁴⁰³ *Id.*

require the RTOs/ISOs to provide the option for electric storage resources to self-manage their State of Charge during the provision of frequency regulation and allow electric storage resources to submit asymmetrical offer curves for regulation up and regulation down service.⁴⁰⁴

c. Answers

165. ISO-NE states that, while it believes the automatic redeclaration process as proposed is compliant with Order No. 841, it is open to instead implementing a modified approach.⁴⁰⁵

166. In addition, ISO-NE explains that Tesla's concerns do not pertain to ISO-NE because a fully charged or fully empty Continuous Storage Facility can, using an energy neutral signal, provide its full capacity for regulation by simultaneously submitting a Generator Asset or DARD energy market offer with an ATRR regulation market offer.⁴⁰⁶ In doing so, a Continuous Storage Facility's "regulation range would be set by the energy market dispatch, and the energy neutral regulation signal would regulate around that range."⁴⁰⁷ ISO-NE explains that an electric storage resource can offer so that its State of Charge at the end of the hour is predictable, in contrast to its understanding of Tesla's asymmetrical offer curve approach that may leave a battery owner with little or no control over its State of Charge at the end of the hour because the battery's regulation output would depend on system conditions.⁴⁰⁸ ISO-NE contends that symmetric regulation of the ATRR is an important component of the Continuous Storage Facility participation option because if such a facility's ATRR is "regulated in just one direction, it would either positively or negatively impact the resource's energy balance and reserve calculations."⁴⁰⁹ ISO-NE states that this would upend the underlying Continuous Storage

⁴⁰⁴ *Id.* at 23.

⁴⁰⁵ ISO-NE Answer at 8.

⁴⁰⁶ *Id.* at 22.

⁴⁰⁷ *Id.*

⁴⁰⁸ *Id.* at 23.

⁴⁰⁹ *Id.*

Facility design, in which the Generator Asset and DARD are responsible for energy and reserves but not regulation, while the ATRR is used for regulation only.⁴¹⁰

d. Commission Determination

167. We find that ISO-NE complies with the requirements of Order No. 841 to allow resources using the participation model for electric storage resources to self-manage their State of Charge.⁴¹¹ ISO-NE's Compliance Filing allows electric storage resources to manage their State of Charge by affording them several tools, including (1) the ability to set price-quantity pairs in the Electric Storage Facility's Supply Offers and Demand Bids to dictate when and to what extent the Electric Storage Facility charges and discharges, and (2) the ability to electronically revise the price-quantity pairs prior to each operating day, and in real time, up to 30 minutes prior to the start of each hour. Further, the compliance obligation that the Commission is imposing on ISO-NE to account for State of Charge, Minimum State of Charge, and Maximum State of Charge through bidding parameters or other means in the day-ahead market, as discussed above, will improve the ability of electric storage resources to self-manage their State of Charge.⁴¹²

168. We also find that ISO-NE's Tariff complies with the requirement of Order No. 841 that an electric storage resource that self-manages its State of Charge be subject to any applicable penalties for deviating from a dispatch schedule to the extent that the resource deviates from the dispatch schedule in managing its State of Charge.⁴¹³ According to ISO-NE's Tariff, electric storage resources, like all other resources participating in ISO-NE's day-ahead and real-time markets, will be subject to deviation charges for failing to follow ISO-NE's dispatch.⁴¹⁴

169. In response to protestors' concerns regarding the ability of electric storage resources to manage their State of Charge despite ISO-NE's proposed automatic redeclaration process, we note that, as discussed above, ISO-NE explains that if an Electric Storage Facility with less than one hour of Available Energy remaining

⁴¹⁰ *Id.* at 23-24.

⁴¹¹ Order No. 841, 162 FERC ¶ 61,127 at P 253.

⁴¹² *See supra* P 151.

⁴¹³ Order No. 841, 162 FERC ¶ 61,127 at P 253.

⁴¹⁴ ISO-NE Tariff, §§ III.B.3.1.1-.3; III.B, Ex. 1. *See also* ISO-NE, Enhanced Storage Participation Revisions, Docket No. ER19-84-000, at 32 (filed Oct. 10, 2018) (citing ISO-NE Tariff, § III.F.3.2).

wishes to be dispatched for energy such that it is not constrained by the 1-hour NPCC requirement for reserve sustainability, it may request a “self-dispatch” by calling the ISO-NE control room to request a self-dispatch to its desired MW level.⁴¹⁵ Therefore, we find that the provision for “self-dispatch” will enable an electric storage resource to manage its State of Charge in the event that the resource is subject to automatic redeclaration provisions. Additionally, we acknowledge that ISO-NE has committed to work with stakeholders to develop a modified automatic redeclaration mechanism that addresses concerns raised by protestors in this proceeding.

170. Lastly, in response to Tesla’s comments regarding resources providing frequency regulation, we note that Order No. 841 addresses this issue by explaining that, to the extent that the provision of a particular wholesale service, such as frequency regulation, requires a resource providing that service to follow a dispatch signal that has the effect of maintaining the resource’s ability to provide the service, an electric storage resource that is managing its own state of charge would still be required to follow such a dispatch signal, just as all other resources providing that same service.⁴¹⁶ We therefore disagree with Tesla that the Commission must require ISO-NE to allow electric storage resources to submit asymmetrical offer curves for regulation up and regulation down service, as it was not a requirement in Order No. 841, and thus, is outside the scope of this proceeding. As explained above, we find that ISO-NE’s proposal complies with Order No. 841’s requirement to allow resources to self-manage their State of Charge.

5. Minimum Size Requirement

171. Order No. 841 adds section 35.28(g)(9)(i)(D) to the Commission’s regulations to require that each RTO/ISO have tariff provisions providing a participation model for electric storage resources that establishes a minimum size requirement for participation in the RTO/ISO markets that does not exceed 100 kW.⁴¹⁷ This minimum size requirement includes all minimum capacity requirements, minimum offer to sell requirements, and minimum bid to buy requirements for resources participating in these markets under the participation model for electric storage resources. Under this requirement, an RTO/ISO may allow offer and/or bid quantities smaller than or equal to 100 kW, but an RTO/ISO may not require a resource using the electric storage resource participation model to

⁴¹⁵ ISO-NE Compliance Filing, Transmittal at 14; *see* ISO-NE Tariff, § III.1.10.9(f).

⁴¹⁶ Order No. 841, 162 FERC ¶ 61,127 at P 253.

⁴¹⁷ *Id.* P 270.

submit offer and/or bid quantities larger than 100 kW.⁴¹⁸ Order No. 841 finds that minimum size requirements do not need to be resource specific or location-specific.⁴¹⁹

172. In Order No. 841-A, the Commission denied requests for rehearing regarding the minimum size requirement,⁴²⁰ including MISO's request for clarification or, in the alternative, rehearing to phase in the implementation of the minimum size requirement.⁴²¹ In response to MISO's request for clarification that the 100 kW limit does not apply to the Minimum Charge Limit or Minimum Discharge Limit, Order No. 841-A clarifies that the minimum size requirement does not prohibit an RTO/ISO from establishing a minimum size limit that is lower than 100 kW on any minimum capacity requirements, minimum offer to sell requirements, or minimum bid to buy requirements. Order No. 841-A clarifies further that it is possible that the quantities for the Minimum Charge Limit and Minimum Discharge Limit may be smaller than 100 kW for resources using the participation model for electric storage resources. However, Order No.841-A does not specify how the minimum size requirement may affect the quantities submitted for some of the physical and operational characteristics of electric storage resources, and stated that the Commission would not prejudge how the RTOs/ISOs may propose any such relationships between the minimum size requirement and the physical and operational characteristics of resources using the participation model for electric storage resources.⁴²²

a. Filing

173. To comply with Order No. 841, ISO-NE states that it will lower the minimum size requirement for Generator Assets, DARDs, and ATRRs associated with Electric Storage Facilities from 1 MW to 100 kW.⁴²³ ISO-NE explains that these changes permit Generator Assets and DARDs as small as 100 kW that are associated with

⁴¹⁸ *Id.* P 276.

⁴¹⁹ *Id.* P 273.

⁴²⁰ Order No. 841-A, 167 FERC ¶ 61,154 at PP 102-104.

⁴²¹ *Id.* P 105.

⁴²² *Id.* P 106.

⁴²³ ISO-NE Compliance Filing, Transmittal at 27-28.

Electric Storage Facilities to submit bids and offers into the day-ahead and real-time energy markets.⁴²⁴

174. In addition, Electric Storage Facilities will also be permitted to offer 100 kW of capacity into the regulation market as either a Generator Asset (in the case of a Binary Storage Facility) or as an ATRR (in the case of a Continuous Storage Facility).⁴²⁵ ISO-NE further states that the minimum bid size for the Forward Reserve Market will be decreased from 1 MW to 100 kW to allow participants (including those with Electric Storage Facilities) to acquire a 100 kW Forward Reserve Obligation.⁴²⁶

b. Data Request Response

175. ISO-NE states that Generator Assets, including those of Electric Storage Facilities, are not permitted to aggregate across multiple points of interconnection.⁴²⁷ As such, ISO-NE explains, at each point of interconnection an Electric Storage Facility must be 100 kW or greater; however, an Electric Storage Facility interconnecting at a single point may include multiple storage devices and/or inverters smaller than 100 kW provided that, together, they meet the 100 kW minimum size at the point of interconnection.⁴²⁸

176. ISO-NE explains that, under the current Tariff, an electric storage resource that participates as a Demand Response Asset or as a component of a Seasonal-Peak or On-Peak Demand Resource (rather than an Electric Storage Facility), may participate as part

⁴²⁴ ISO-NE Compliance Filing, Transmittal at 27. ISO-NE states that the Compliance Filing implements these revisions in Tariff Section III.1.10.6(a)(i), which states that an Electric Storage Facility shall “have the ability to inject at 0.1 MW and consume at least 0.1 MW” and an addition to the definition of Asset Related Demand in section I.2.2 that allows an Asset Related Demand to be composed of “a Storage DARD with a consumption capability of at least 0.1 MW.” *Id.* at n.157.

⁴²⁵ *Id.* at 27-28. ISO-NE states that the Compliance Filing implements this revision via an addition to section III.14.2(a)(ii), which states that “[t]he minimum Regulation Capacity of a Continuous Storage ATRR and a Generator Asset associated with a Binary Storage Facility is 0.1 MW.” *Id.* at n.158.

⁴²⁶ *Id.* at 28.

⁴²⁷ ISO-NE Data Request Response at 16.

⁴²⁸ *Id.* (citing Operating Procedure No. 18, section IV.B.7). ISO-NE thus proposes to modify proposed Tariff Section III.1.10.6(a) to clarify that an Electric Storage Facility shall “comprise one or more storage facilities at the same point of interconnection.”

of an aggregation across multiple points of interconnection or behind a single point of interconnection.⁴²⁹

c. Comments on Data Request Response

177. Advanced Energy Economy contends that ISO-NE does not explain why limiting aggregations of electric storage resources to a single point of interconnection is just and reasonable or consistent with the requirements of Order No. 841.⁴³⁰ Advanced Energy Economy argues that limiting aggregations to a single point of interconnection presents a barrier to meeting the 100 kW minimum size requirement, does not account for electric storage resources' unique physical and operational characteristics as required by Order No. 841, and restricts ISO-NE operators' ability to deploy these resources economically or for reliability needs, thereby resulting in unjust and unreasonable rates.⁴³¹ Advanced Energy Economy suggests that electric storage resource aggregations across the broadest possible areas, such as across multiple points of interconnection, would provide greater benefits to consumers and the grid and can be accomplished without raising reliability concerns.⁴³² Advanced Energy Economy asks the Commission to direct ISO-NE to revise this limitation to permit electric storage resource aggregations across a broader area.⁴³³

d. Commission Determination

178. We find that ISO-NE complies with the requirement of Order No. 841 that the participation model for electric storage resources establish a minimum size requirement for participation in the RTO/ISO markets that does not exceed 100 kW.⁴³⁴ ISO-NE's Compliance Filing establishes a minimum size requirement that does not exceed 100 kW, as required by Order No. 841. Additionally, we find Advanced Energy Economy's request that the Commission require ISO-NE to allow electric storage resource aggregation across a broader area to be outside the scope of this proceeding

⁴²⁹ *Id.* (citing ISO-NE Tariff, §§ III.8.1.1(a), III.8.1.1(f), III.8.1.2(a), III.13.1.4).

⁴³⁰ Advanced Energy Economy Comments on ISO-NE Data Request Response at 4.

⁴³¹ *Id.*

⁴³² *Id.* at 4-5.

⁴³³ *Id.* at 5.

⁴³⁴ Order No. 841, 162 FERC ¶ 61,127 at P 270.

because Order No. 841 does not address the aggregation of electric storage resources or other resources.⁴³⁵

6. Energy Used to Charge Electric Storage Resources

a. Price for Charging Energy

179. Order No. 841 adds section 35.28(g)(9)(ii) to the Commission’s regulations to require that the sale of electric energy from the RTO/ISO markets to an electric storage resource that the resource then resells back to those markets be at the wholesale LMP.⁴³⁶ This provision applies regardless of whether the electric storage resource is using the electric storage resource participation model or participates in RTO/ISO markets through other means, as long as the resource meets the definition of an electric storage resource set forth in Order No. 841.⁴³⁷ An electric storage resource’s wholesale energy purchases should take place at the applicable nodal LMP, and not the zonal price.⁴³⁸

180. Order No. 841 finds that, when an electric storage resource is charging to resell energy at a later time, then its behavior is similar to other load-serving entities and applicable transmission charges should apply.⁴³⁹ However, Order No. 841 finds that electric storage resources should not be charged transmission charges when they are dispatched by an RTO/ISO to provide a service (such as frequency regulation or a downward ramping service).⁴⁴⁰ Order No. 841-A clarifies that the Commission’s use of the phrase “applicable transmission charges” was intended to convey that an RTO/ISO may propose to apply its existing rate structure for transmission charges to an electric storage resource that is charging at wholesale but is not being dispatched by the RTO/ISO to provide a service in the RTO/ISO markets. Order No. 841-A further clarifies that, on

⁴³⁵ See Order No. 841-A, 167 FERC ¶ 61,154 at PP 30, 143, 155.

⁴³⁶ Order No. 841, 162 FERC ¶ 61,127 at P 294.

⁴³⁷ *Id.*

⁴³⁸ *Id.* P 296.

⁴³⁹ *Id.* P 297. To the extent that load resources located at a single node pay different transmission charges than load resources located across multiple nodes, each RTO/ISO must apply those transmission charges for single-node resources to electric storage resources that are located at a single pricing node, as long as they are not being dispatched to provide an ancillary service by an RTO/ISO. *Id.*

⁴⁴⁰ *Id.* P 298.

compliance, each RTO/ISO may propose that any electric storage resource that is charging for the purpose of participating in an RTO/ISO market but is not being dispatched by the RTO/ISO to provide a service should be assessed charges consistent with how the RTO/ISO assesses transmission charges to wholesale load under its existing rate structure. Order No. 841-A also states that if an RTO/ISO proposes not to apply transmission charges to an electric storage resource that is charging at wholesale but is not being dispatched by the RTO/ISO to provide a service, then the RTO/ISO must demonstrate that exempting such a resource from these charges is reasonable given its existing rate structure for transmission charges.⁴⁴¹

181. With respect to the meaning of a “service,” Order No. 841-A acknowledges that the participation of electric storage resources in RTO/ISO markets may convey a range of benefits, particularly under certain system conditions, but declines to grant clarification that charging pursuant to economic dispatch always qualifies as a service.⁴⁴² However, Order No. 841-A does clarify that services do not need to be limited to ancillary services and that they can include any service defined in an RTO/ISO tariff. Order No. 841-A explains that to the extent that an RTO/ISO seeks to create a new service that would involve charging pursuant to economic dispatch under certain system conditions, the RTO/ISO may propose such revisions to its tariff through a separate FPA section 205 filing.⁴⁴³

182. Order No. 841 does not require that electric storage resources purchase all electric energy for future use from RTO/ISO markets, and did not address whether they can pay some other rate, such as a retail rate, for charging of co-located generation.⁴⁴⁴ Regarding electric storage resources’ use of the distribution system, the Commission found that it may be appropriate, on a case-by-case basis, for distribution utilities to assess a wholesale distribution charge to an electric utility participating in the RTO/ISO markets.⁴⁴⁵ Order No. 841-A clarifies that the Commission will consider any proposal to establish a rate for providing wholesale distribution service to an electric storage resource for its charging on a case-by-case basis (e.g., a facility-specific rate, a wholesale distribution service rate that

⁴⁴¹ Order No. 841-A, 167 FERC ¶ 61,154 at P 121.

⁴⁴² *Id.* P 120.

⁴⁴³ *Id.*

⁴⁴⁴ Order No. 841, 162 FERC ¶ 61,127 at P 299.

⁴⁴⁵ *Id.* P 301.

applies to all or some subset of electric storage resources, a generally applicable wholesale distribution service tariff, or any other rate mechanism).⁴⁴⁶

183. Additionally, Order No. 841 finds that efficiency losses are charging energy and therefore not a component of station power load. Thus, charging energy lost to conversion inefficiencies should be settled at the LMP as long as those efficiency losses are an unavoidable component of the conversion, storage, and discharge process that is used to resell energy back to RTO/ISO markets and are not a component of what an RTO/ISO considers onsite load.⁴⁴⁷ With respect to directly integrated and other ancillary loads, Order No. 841 provides RTOs/ISOs flexibility to determine whether they are a component of charging energy or a component of station power.⁴⁴⁸

184. Order No. 841-A denies Pacific Gas and Electric's request to clarify that states have jurisdiction to determine how power flowing from the distribution grid into the electric storage resource located behind the customer meter is split between retail consumption and wholesale charging for later discharge into the wholesale markets. Order No. 841-A further reiterates that the Commission's finding regarding charging energy did not address payment of the retail rate for energy and therefore Order No. 841 does not authorize electric storage resources to bypass retail rates for its on-site electricity consumption, as Pacific Gas & Electric suggested.⁴⁴⁹

i. Filing

185. ISO-NE states that all sales of electric energy from ISO-NE to a resource in its control area are made at the wholesale LMP and, as required by Order No. 841, electric storage resources using the Electric Storage Facilities rules will also pay the wholesale LMP for MWhs that they purchase from ISO-NE.⁴⁵⁰ Specifically, electric storage resources will pay the nodal LMP since they are registered at a single node.⁴⁵¹ ISO-NE

⁴⁴⁶ Order No. 841-A, 167 FERC ¶ 61,154 at P 123.

⁴⁴⁷ Order No. 841, 162 FERC ¶ 61,127 at P 302.

⁴⁴⁸ *Id.*

⁴⁴⁹ Order No. 841-A, 167 FERC ¶ 61,154 at P 119 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 323-324).

⁴⁵⁰ ISO-NE Compliance Filing, Transmittal at 28-29 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 294, 296).

⁴⁵¹ *Id.* at 29.

notes that electric storage resources that do not participate as Electric Storage Facilities can still participate in the market in other manners and those that purchase energy from a single node will do so at the nodal LMP.⁴⁵²

186. In addition, ISO-NE states that the load of a DARD associated with an Electric Storage Facility is generally counted for 10-minute spinning reserve and can be dispatched by ISO-NE to address a reliability concern.⁴⁵³ Therefore, in accordance with Order No. 841,⁴⁵⁴ ISO-NE asserts that Electric Storage Facilities are exempt from transmission charges for Regional Network Service and Local Service when they are dispatched to charge.⁴⁵⁵

ii. Data Request Response

187. ISO-NE asserts that the load of an Electric Storage Facility will be represented in the market through a DARD, and that all energy that is consumed from the electric storage resource is reported to ISO-NE and settled at the wholesale nodal LMP.⁴⁵⁶ ISO-NE states that sales to and purchases from ISO-NE by DARDs and Generator Assets in the day-ahead and real-time markets are at the wholesale nodal LMP.⁴⁵⁷ ISO-NE explains that it determines day-ahead and real-time monetary positions for each market participant for each settlement interval pursuant to Tariff Sections III.3.2.1(f) and (g).

188. Regarding day-ahead settlement, Tariff Section III.3.2.1(f) sets a market participant's day-ahead charge or credit for net purchases from or sales to the day-ahead energy market during a particular interval at a particular location as the sum of the market

⁴⁵² *Id.*

⁴⁵³ *See id.*; McDonough-Parent Test. at 38.

⁴⁵⁴ ISO-NE Compliance Filing, Transmittal at 29 (citing Order No. 841, 162 FERC ¶ 61,127 at P 298).

⁴⁵⁵ *See id.* at 29-30; *see also* ISO-NE Tariff, §§ II.21.1, II.21.3; OATT Schedule 9; OATT Schedule 21, §§ I.13, II.9.

⁴⁵⁶ ISO-NE Data Request Response at 22. ISO-NE states that a wholesale customer must register a Storage DARD to be charged the wholesale nodal LMP when participating as an Electric Storage Facility. *Id.* at 23.

⁴⁵⁷ *Id.* at 18 (citing ISO-NE Tariff, § III.3.2.1(b)(ii)-(iii)).

participant's location-specific day-ahead location adjusted net interchanges,⁴⁵⁸ multiplied by the applicable day-ahead LMP.⁴⁵⁹ ISO-NE states that the Tariff definition of "Location," is a "Node, External Node, Load Zone, DRR Aggregation Zone, or Hub."⁴⁶⁰ ISO-NE explains that Asset Related Demands (including DARDs) and Generator Assets settle at nodes. Because Tariff Section I.2.2 provides that the LMP for a node is the nodal price at that node, sales to and purchases from ISO-NE by DARDs and Generator Assets in the day-ahead market are at the wholesale nodal day-ahead LMP.⁴⁶¹

189. Regarding real-time energy settlement, ISO-NE states that similar Tariff language applies to real-time charges and credits. Tariff Section III.3.2.1(g) sets a market participant's real-time charge or credit for its net purchases from or sales to the real-time market during a particular interval at a particular location as the sum of the market participant's location specific real-time locational adjusted net interchange deviations,⁴⁶² multiplied by the applicable real-time LMP.⁴⁶³ Therefore, ISO-NE states that, because in real-time, sales of electric energy from ISO-NE to a resource are part of the market participant's real-time adjusted load obligation and sales of electric energy from the

⁴⁵⁸ *Id.* at 17. ISO-NE explains that Tariff Section III.3.2.1(a)(v) makes the day-ahead locational adjusted net interchange in an interval equal to the sum of a market participant's day-ahead adjusted load obligation, day-ahead generation obligation, and day-ahead demand reduction obligation at that location. In the day-ahead market, ISO-NE states, sales of electric energy from ISO-NE to a resource are part of the market participant's day-ahead adjusted load obligation, while sales of electric energy from the resource to ISO-NE are part of the market participant's day-ahead generation obligation.

⁴⁵⁹ *Id.* (citing ISO-NE Tariff, § III.3.2.1(f)).

⁴⁶⁰ *Id.* (citing ISO-NE Tariff, § I.2.2).

⁴⁶¹ *Id.*

⁴⁶² *Id.* at 17-18. ISO-NE explains that Tariff Section III.3.2.1(d)(iv) defines the real-time locational adjusted net interchange deviation in an interval as: "the difference in MWhs between (1) the Real-Time Locational Adjusted Net Interchange and (2) the Day-Ahead Locational Adjusted Net Interchange minus the Day-Ahead Demand Reduction Obligation for that Location." Per Tariff Section III.3.2.1(b)(iv), the real-time locational adjusted net interchange in an interval equals a market participant's real-time adjusted load obligation plus the real-time generation obligation at that location.

⁴⁶³ *Id.* (citing ISO-NE Tariff, § III.3.2.1(g)).

resource to ISO-NE are part of the market participant's real-time generation obligation, sales to and purchases from ISO-NE by DARDs and Generator Assets in the real-time market are at the wholesale nodal real-time LMP.⁴⁶⁴

190. In addition, ISO-NE reiterates that electric storage resources will be directly metered.⁴⁶⁵ As such, the charging load reported to ISO-NE from the meter (a DARD's charging load), will include charging energy that is lost to conversion inefficiencies. ISO-NE states that it will not distinguish between charging load that is lost to inefficiency and charging load that is stored for later resale. ISO-NE repeats that all DARD load is settled at the wholesale nodal LMP.⁴⁶⁶

191. Regarding transmission charges, ISO-NE asserts that electric storage resources would never partake of, nor be charged for the use of, Through or Out Service, Other Transmission Facility Service, or Merchant Transmission Facility Service, which are types of transmission service for external transactions and not physical resources located in the New England control area, like electric storage resources.⁴⁶⁷ Therefore, ISO-NE states that electric storage resources would only use Regional Network Service and Local Service.⁴⁶⁸

192. While electric storage resources are exempt from charges for Regional Network Service, which are allocated based on Regional Network Load, ISO-NE states that electric storage resources are not exempt from the ancillary service and administrative charges that are also allocated based on Regional Network Load.⁴⁶⁹ Similarly, ISO-NE

⁴⁶⁴ *Id.* at 18 (citing ISO-NE Tariff, § III.3.2.1(b)(ii)-(iii)).

⁴⁶⁵ *Id.* (citing ISO-NE Tariff, § III.1.10.6(a)(iv)).

⁴⁶⁶ *Id.* (citing ISO-NE Tariff, §§ I.2.2; III.3.2.1(a), (b), (f), (g)).

⁴⁶⁷ *Id.* at 19-20.

⁴⁶⁸ *Id.* at 20.

⁴⁶⁹ ISO-NE Data Request Response at 20-21. Such charges include those pursuant to: section III.3.2.6A (New Brunswick Security Energy); section III.11.1(c) (Request For Proposals for Load Response and Supplemental Generation Resources for Reliability Purposes); section III.13.2.5.2.5.1(c) (Compensation for Bids Rejected for Reliability Reasons); section III.13.2.5.2.5.2(c) (Incremental Cost of Reliability Service From Permanent De-List Bid or Retirement De-List Bid Resources); section III.F.3.3(c) (Local Second Contingency Protection Resource [Net Commitment Period Compensation] Charges); Tariff Schedule 1 (Scheduling, System Control and Dispatch Service); Tariff Schedule 2 (Reactive Supply and Voltage Control Service); Tariff Schedule 16

states that electric storage resources are not exempt from ancillary service charges charged by the Participating Transmission Owners.⁴⁷⁰ ISO-NE contends that these charges are not related to the provision of transmission service but rather to the provision of energy or ancillary services, capacity, or administration.⁴⁷¹ ISO-NE states that it interprets “transmission charge” as referenced in Order No. 841 to mean charges for the provision of transmission service (i.e., charges for Regional Network Service and Local Service), and thus ISO-NE proposes exempting electric storage resources from those types of charges.⁴⁷²

193. In addition, ISO-NE asserts that the rate charged for Regional Network Service is a “postage-stamp” rate applied uniformly across load resources whether they are located at a single node or multiple nodes.⁴⁷³ ISO-NE asserts that regardless, electric storage resources participating as Electric Storage Facilities cannot be located across multiple nodes.⁴⁷⁴

iii. Commission Determination

194. We find that ISO-NE partially complies with the requirements of Order No. 841 with respect to energy used to charge electric storage resources. In particular, ISO-NE complies with Order No. 841 regarding the price electric storage resources pay for withdrawing energy from the grid, i.e., charging, because ISO-NE proposes that sales of electric energy from the ISO-NE markets to an electric storage resource that the resource

(Blackstart Service); ISO-NE Self-Funding Tariff Schedule 1 (Scheduling, System Control and Dispatch Service); and ISO-NE Self-Funding Tariff Schedule 5 (Collection of NESCOE Budget). *Id.* at 20, n.72.

⁴⁷⁰ *Id.* at 21.

⁴⁷¹ *Id.*

⁴⁷² *Id.* ISO-NE highlights proposed revisions to Tariff Section II.21, Tariff Schedule 9, and Tariff Schedule 21. ISO-NE argues that the Commission’s contrasting use of the terms “transmission charge” and “ancillary service” in Order No. 841 supports this interpretation. *Id.* at 21, n.73 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 294-299).

⁴⁷³ *Id.* at 21.

⁴⁷⁴ *Id.*

then resells back to those markets will be at the wholesale LMP.⁴⁷⁵ Also, ISO-NE's proposal that electric storage resources' wholesale energy purchases be priced at the applicable nodal LMP, and not the zonal price, complies with Order No. 841.⁴⁷⁶ Additionally, ISO-NE's proposal that efficiency losses constitute charging energy and are settled at the LMP complies with Order No. 841.⁴⁷⁷

195. However, we find that ISO-NE does not comply with the requirements of Order No. 841 and the clarifications set forth in Order No. 841-A with respect to the application of transmission charges to electric storage resources. ISO-NE proposes to exempt electric storage resources from all applicable transmission service charges, (i.e., charges for Regional Network Service and Local Service) when they are dispatched to charge.⁴⁷⁸

196. In Order No. 841-A, the Commission clarified that its use of the phrase "applicable transmission charges" was intended to convey that: (1) an RTO/ISO may propose to apply its existing rate structure for transmission charges to an electric storage resource that is charging at wholesale but is not being dispatched by the RTO/ISO to provide a service in the RTO/ISO markets; (2) any electric storage resource that is charging for the purpose of participating in an RTO/ISO market but is not being dispatched by the RTO/ISO to provide a service should be assessed charges consistent with how the RTO/ISO assesses transmission charges to wholesale load under its existing rate structure; and (3) if an RTO/ISO proposes not to apply transmission charges to an electric storage resource that is charging at wholesale but is not being dispatched by the RTO/ISO to provide a tariff-defined service, then the RTO/ISO must demonstrate that exempting such a resource from these charges is reasonable given its existing rate structure for transmission charges.⁴⁷⁹

197. ISO-NE does not meet these requirements because its proposal exempts all electric storage resources that are charging for later resale from transmission charges that are applicable to other load. Therefore, we direct ISO-NE to submit on compliance within 60 days of the date of this filing, Tariff revisions that comply with this aspect of Order Nos. 841 and 841-A by applying transmission charges to an electric storage resource

⁴⁷⁵ ISO-NE Tariff, § III.3.2.1(a), (b), (f), (g).

⁴⁷⁶ ISO-NE Tariff, §§ I.2.2; III.3.2.1 (b), (f), (g).

⁴⁷⁷ ISO-NE Tariff, §§ I.2.2; III.3.2.1(a), (b), (f), (g).

⁴⁷⁸ ISO-NE Compliance Filing, Transmittal at 29-30; ISO-NE Data Request Response at 20-21.

⁴⁷⁹ Order No. 841-A, 167 FERC ¶ 61,154 at P 121.

when that resource is charging for later resale in wholesale markets and is not providing a service. Consistent with the Commission's clarification in Order No. 841-A,⁴⁸⁰ we reiterate that to the extent that ISO-NE seeks to create a new service that constitutes charging pursuant to economic dispatch under certain system conditions, ISO-NE may propose such revisions to its Tariff through a separate FPA section 205 filing.

b. Metering and Accounting Practices for Charging Energy

198. To help implement the new requirement in section 35.28(g)(9)(ii) of the Commission's regulations,⁴⁸¹ Order No. 841 requires each RTO/ISO to implement metering and accounting practices as needed to address the complexities of implementing the requirement that the sale of electric energy from RTO/ISO markets to an electric storage resource that the resource then resells back to those markets be at the wholesale LMP.⁴⁸² Order No. 841 requires each RTO/ISO to directly meter electric storage resources, but offers flexibility for each RTO/ISO to propose alternative approaches that may not entail direct metering but nonetheless address the complexities of implementing the requirement that the sale of electric energy from RTO/ISO markets to an electric storage resource that the resource then resells back to those markets be at the wholesale LMP.⁴⁸³ Metering and accounting rules may need to differ based on whether the resource is located on the transmission system, the distribution system, or behind the meter.⁴⁸⁴

199. The Commission was not persuaded by the suggestion that electric storage resources must choose to participate in either wholesale or retail markets due to the complexity of the metering and accounting practices.⁴⁸⁵ The Commission found that it is possible for electric storage resources that are selling retail services also to be technically capable of providing wholesale services, and it would adversely affect competition in the RTO/ISO markets if these technically capable resources were excluded from participation. In response to concerns that not requiring electric storage resources to

⁴⁸⁰ *Id.* P 120.

⁴⁸¹ *See supra* P 21.

⁴⁸² Order No. 841, 162 FERC ¶ 61,127 at P 322.

⁴⁸³ *Id.* P 322. Order No. 841-A clarifies that the RTO/ISO itself does not need to be the entity that directly meters electric storage resources. Order No. 841-A, 167 FERC ¶ 61,154 at P 138.

⁴⁸⁴ Order No. 841, 162 FERC ¶ 61,127 at P 324.

⁴⁸⁵ *Id.* P 325.

choose to participate exclusively in either wholesale or retail markets will allow resources using the participation model for electric storage resources to evade the distribution utility's retail service or to simultaneously buy electricity at the retail rate and sell it at the wholesale LMP, Order No. 841-A states that each RTO/ISO can address these issues by developing its metering and accounting requirements in cooperation with the distribution utilities and relevant electric retail regulatory authorities in its footprint, as the Commission recognized in Order No. 841.⁴⁸⁶ Order No. 841-A also notes that, when the Commission found that the sale of electric energy from the RTO/ISO markets to an electric storage resource that the resource then resells back to those markets must be at the wholesale LMP, it was referring to the sale of energy from the grid that is used to charge electric storage resources for later resale into the energy or ancillary service markets.⁴⁸⁷

200. Order No. 841 also requires RTOs/ISOs to prevent electric storage resources from paying twice for the same charging energy (i.e., they should not have to pay both the wholesale and retail price for the same charging energy).⁴⁸⁸ To the extent that the host distribution utility is unable—due to a lack of the necessary metering infrastructure and accounting practices—or unwilling to net out any energy purchases associated with an electric storage resource's wholesale charging activities from the host customer's retail bill, the Commission found that RTOs/ISOs would be prevented from charging that resource wholesale rates for the charging energy for which it is already paying retail rates.⁴⁸⁹ Order No. 841-A clarifies that an RTO/ISO could require verification from the host distribution utility that it is unable or unwilling to net wholesale demand from retail settlement before the RTO/ISO ceases to settle an electric storage resource's wholesale

⁴⁸⁶ Order No. 841-A, 167 FERC ¶ 61,154 at P 142 (citing Order No. 841, 162 FERC ¶ 61,127 at P 324).

⁴⁸⁷ *Id.* (citing Order No. 841, 162 FERC ¶ 61,127 at P 294).

⁴⁸⁸ Order No. 841, 162 FERC ¶ 61,127 at P 326.

⁴⁸⁹ *Id.* Paragraph 326 of the preamble of Order No. 841 uses the term “resources using the participation model for electric storage resources” with respect to the requirements set forth therein (e.g., “we require each RTO/ISO to prevent resources using the participation model for electric storage resources from paying twice for the same charging energy”). However, section 35.28(g)(9)(ii) of the Commission's regulations (as modified by Order No. 841), which these requirements are intended to implement, specifies that it applies to electric storage resources. Thus, the Commission used the incorrect term in paragraph 326 of Order No. 841. In this order, we use the correct term throughout.

demand at the wholesale LMP.⁴⁹⁰ Order No. 841-A clarifies further that the Commission would consider on compliance each RTO's/ISO's proposal to identify whether a distribution utility is unable or unwilling to net out from a host customer's retail bill the wholesale energy purchases associated with charging an electric storage resource that is participating in the RTO/ISO market.⁴⁹¹ However, Order No. 841-A denies CAISO's request for clarification that when an RTO/ISO cannot verify the host distribution utility's inability or unwillingness to net out wholesale charging energy, the RTO/ISO can require the electric storage resource to use a participation model designed for retail customer participation. Order No. 841-A states that, while Order No. 841 provides flexibility with respect to how each RTO/ISO implements the requirement to prevent electric storage resources from paying twice for the same charging energy, it would be inappropriate for an RTO/ISO to meet that requirement by requiring an electric storage resource to use a participation model designed for retail customer participation.⁴⁹²

i. Filing

201. ISO-NE states that Order No. 841 requires each RTO/ISO to directly meter electric storage resources, and such resources should not be required to pay both the wholesale and retail price for the same charging energy.⁴⁹³ To meet this obligation, ISO-NE contends that it will require Electric Storage Facilities to be directly metered.⁴⁹⁴ In addition, ISO-NE states that the Electric Storage Facility rules use ISO-NE's existing wholesale load asset structure, which should prevent double billing.⁴⁹⁵ Under that structure, the host utility will report the electric storage resource's load to ISO-NE for

⁴⁹⁰ Order No. 841-A, 167 FERC ¶ 61,154 at P 138.

⁴⁹¹ *Id.*

⁴⁹² *Id.* P 139 (citing Order No. 841, 162 FERC ¶ 61,127 at P 326).

⁴⁹³ ISO-NE Compliance Filing, Transmittal at 30 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 322, 326).

⁴⁹⁴ *See id.*; *see also* ISO-NE Tariff, § III.1.10.6(a)(ii)-(iii). ISO-NE notes that electric storage resources that do not participate in ISO-NE as Electric Storage Facilities have the same participation and metering requirements as any other load or generation in New England.

⁴⁹⁵ ISO-NE Compliance Filing, Transmittal at 30.

settlement just as it reports the load of any other directly metered load asset, and in the event of an error, ISO-NE would work with the host utility to correct it.⁴⁹⁶

ii. **Protests/Comments**

202. Advanced Energy Economy states that ISO-NE must guarantee that electric storage resources located on the distribution grid or behind the meter can inject or withdraw energy from the grid at wholesale LMP and without duplicative charges for charging, in order to comply with Order No. 841.⁴⁹⁷ To do so, Advanced Energy Economy contends that an RTO/ISO must implement metering and accounting practices and methodologies that enable electric storage resources to provide wholesale services without regard to their location on the transmission system, distribution grid, or behind the meter.⁴⁹⁸ Advanced Energy Economy states that reliable metering and accounting practices are crucial to clearing a path for electric storage resource injection of energy onto the wholesale grid and delivery of wholesale services, while insufficient metering and accounting practices will limit electric storage resource participation and adversely impact Order No. 841's aim to enhance competition and ensure just and reasonable rates.⁴⁹⁹

203. Advanced Energy Economy contends that ISO-NE's limited discussion of metering and accounting practices is insufficient with respect to ISO-NE's statements that (1) electric storage resources will be directly metered; (2) electric storage resources declining to participate as Electric Storage Facilities will retain the same metering and participation options as other resources; (3) electric storage resources located behind the meter may participate under demand response participation models; and (4) the existing wholesale load asset structure will prevent double billing.⁵⁰⁰ Advanced Energy Economy believes that ISO-NE must provide more detail to comply with Order No. 841, particularly with respect to the wholesale market participation of electric storage resources located on the distribution grid or behind the meter, charging at LMP, and duplicative charges.⁵⁰¹ Advanced Energy Economy requests that ISO-NE include more

⁴⁹⁶ See *id.*; McDonough-Parent Test. at 39.

⁴⁹⁷ Advanced Energy Economy Protest at 6.

⁴⁹⁸ *Id.*

⁴⁹⁹ *Id.*

⁵⁰⁰ *Id.* at 7 (citing ISO-NE Compliance Filing, Transmittal at 9-10, 30).

⁵⁰¹ *Id.*

details in its Tariff regarding metering and accounting practices because many of these types of electric storage resources will have unique configurations that necessitate flexibility in the implementation of such practices.⁵⁰² Advanced Energy Economy states that inclusion of such provisions in the Tariff will provide guidance, accountability, and a means of resolving disputes as these practices are developed.⁵⁰³ Advanced Energy Economy concedes that increased participation of electric storage resources located on the distribution grid or behind the meter will require adaptation and experiential learning, but states that the Commission should require unfettered participation by these resources for an RTO/ISO to comply with Order No. 841.⁵⁰⁴

204. Tesla urges the Commission to require that the RTOs/ISOs describe how behind-the-meter electric storage resources are able to provide all services of which they are technically capable by injecting energy onto the grid and seamlessly transitioning between serving onsite load and injecting energy onto the grid. Tesla states that, if the RTOs'/ISOs' current or proposed rules do not provide this ability, the Commission should require them to achieve those objectives in order to comply with Order No. 841.⁵⁰⁵ Tesla asserts that ISO-NE's common dispatch model allows behind-the-meter resources, including electric storage resources, to provide wholesale electric service and be dispatchable as a single resource that can both reduce onsite load and inject energy onto the grid.⁵⁰⁶ Tesla states that it considers ISO-NE's market a current best practice because behind-the-meter resources can receive payment for reducing load, based on rules for demand response, and receive payment for injecting energy onto the grid as a generator.⁵⁰⁷

⁵⁰² *Id.*

⁵⁰³ *Id.*

⁵⁰⁴ *Id.* at 8. Advanced Energy Economy makes clear that it does not advocate delay in certifying the remainder of ISO-NE's Compliance Filing to resolve the issues Advanced Energy Economy raises in its comments. Advanced Energy Economy suggests that the Commission provide direction to ISO-NE to address these issues while implementing the rest of its proposals. *Id.* at n.19.

⁵⁰⁵ Tesla Comments at 18.

⁵⁰⁶ *Id.* at 19 (citing *ISO New England Inc.*, 150 FERC ¶ 61,007 (2015)). Under the common dispatch model, a demand response asset can both reduce its load and inject energy into the electric grid.

⁵⁰⁷ *Id.*

205. In addition, some commenters ask the Commission to require ISO-NE to expand upon the Compliance Filing's treatment of electric storage resources located behind the meter or on the distribution grid.⁵⁰⁸ EDF Renewables and Advanced Energy Economy argue that ISO-NE does not fully explain (1) how its participation model will allow electric storage resources located behind the meter or interconnected to a distribution system to participate on an equal footing with transmission-level electric storage resources; or (2) how it will permit electric storage resources to participate simultaneously in wholesale and retail-level programs.⁵⁰⁹ EDF Renewables requests that the Commission require ISO-NE to clarify these points.⁵¹⁰ Advanced Energy Economy adds that the Compliance Filing fails to fully describe how ISO-NE's electric storage resource participation models would provide a "clear path" for electric storage resources located on the distribution grid or behind the meter to participate in wholesale markets.⁵¹¹ Advanced Energy Economy contends that failure to integrate electric storage resources into the wholesale markets would deny customers the cost advantages that electric storage resources can bring to both wholesale and retail markets.⁵¹²

iii. Answers

206. In response to Advanced Energy Economy, ISO-NE requests that the Commission not direct ISO-NE to put additional metering and accounting details into its Tariff because, according to ISO-NE, these topics are already thoroughly detailed in ISO-NE's Tariff, manuals, and operating procedures.⁵¹³

207. ISO-NE explains that any entity wishing to purchase energy from the wholesale market will register one or more wholesale Load Assets with ISO-NE.⁵¹⁴ The prospective customer will jointly register the Load Assets with ISO-NE and the utility in

⁵⁰⁸ Advanced Energy Economy Protest at 4-8; EDF Renewables Protest at 3.

⁵⁰⁹ Advanced Energy Economy Protest at 4; EDF Renewables Protest at 3.

⁵¹⁰ EDF Renewables Protest at 3.

⁵¹¹ Advanced Energy Economy Protest at 3-8.

⁵¹² *Id.* at 5.

⁵¹³ ISO-NE Answer at 28-29.

⁵¹⁴ *Id.* at 29.

whose territory the load will interconnect.⁵¹⁵ The utility is responsible for reporting to ISO-NE the meter readings for the Load Asset, and based on this data and the LMP in the corresponding interval, ISO-NE bills the Load Asset owner for its purchased energy.⁵¹⁶ Separately, the utility bills its customer (e.g., the owner of the electric storage resource) for charges for which the utility is responsible (e.g., transmission or distribution charges).⁵¹⁷ ISO-NE states that, since ISO-NE bills the Load Asset owner for energy consumption, and the utility bills its customer for non-energy charges, retail-wholesale double billing cannot occur outside of ministerial error.⁵¹⁸ Thus, ISO-NE states that its market design renders the risk of double wholesale and retail billing negligible.⁵¹⁹ ISO-NE states that there is no more danger that an Electric Storage Facility located on the distribution system will be subject to double-billing than would one located on the transmission system.⁵²⁰

208. In response to commenters seeking further explanation about electric storage resources located on the distribution system, ISO-NE states that its rules do not distinguish between resources located on the transmission system and those located on the distribution system.⁵²¹ ISO-NE asserts that this is true of all Generator Assets, DARDs, and ATRRs, not just those associated with Electric Storage Facilities; neither the registration rules, nor the offer rules, nor the dispatch rules, nor the settlement rules depend on the point of interconnection.⁵²² However, ISO-NE states that, from the participant's perspective, operational needs may differ depending on the point of interconnection because, while constraints on the transmission system are visible to ISO-NE, constraints on the distribution system may not be.⁵²³ But, Electric Storage Facilities

⁵¹⁵ *Id.*

⁵¹⁶ *Id.* at 29-30.

⁵¹⁷ *Id.* at 30.

⁵¹⁸ *Id.*

⁵¹⁹ *Id.* at 28-31, 35.

⁵²⁰ *Id.* at 33.

⁵²¹ *Id.*

⁵²² *Id.*

⁵²³ *Id.* at 33-34.

can provide telemetry and/or offers to ISO-NE that allow them to take on distribution-level obligations while still following ISO-NE dispatch.⁵²⁴

209. In response to commenters seeking further explanation concerning electric storage resources located behind the meter, ISO-NE states that its rules fully comply with Order No. 841's behind-the-meter and direct metering requirements.⁵²⁵ ISO-NE explains that an electric storage resource located behind the meter (e.g., at a hospital or factory) may participate in the ISO-NE markets as an Electric Storage Facility, and, pursuant to those rules, must be directly metered.⁵²⁶ As a directly-metered resource, the electric storage resource will participate in ISO-NE's market in precisely the same way as resources located on the distribution or transmission system.⁵²⁷ ISO-NE notes that a behind-the-meter battery also has the option of participating as "price responsive demand," and in that case, the battery would not be directly metered.⁵²⁸ In such a case, the Demand Response Resource is paid the LMP for its demand reduction and generation, and the end-use customer is either charged wholesale LMP or the retail rate, depending on whether it is an ISO-NE wholesale customer or a retail customer.⁵²⁹ ISO-NE asserts that this practice is fully in keeping with Order No. 841, which concerns the sale of electric energy from the RTO/ISO markets to an electric storage resource.⁵³⁰

210. In its answer, NRECA disputes Advanced Energy Economy's contention that Order No. 841 "requires a clear path" for electric storage resources located on distribution systems or behind the meter to inject energy onto the wholesale grid and

⁵²⁴ *Id.* at 34. For example, ISO-NE states that, if there is a local distribution issue that constrains the maximum generation (or consumption) of the electric storage resource, the Continuous Storage Facility may communicate this information in real-time via its Available Energy or Available Storage telemetry. In contrast, ISO-NE states that, if there is a local distribution issue that requires a minimum generation (or consumption) at the facility, the Continuous Storage Facility can communicate this information either via its offer or a self-dispatch.

⁵²⁵ *Id.* at 34-35.

⁵²⁶ *Id.* at 35.

⁵²⁷ *Id.*

⁵²⁸ *Id.* at 35-36.

⁵²⁹ *Id.* at 36.

⁵³⁰ *Id.*

provide additional services.⁵³¹ NRECA states that Order No. 841 does not contain the phrase “clear path” and limits its directives to the RTOs/ISOs.⁵³² NRECA maintains that Order No. 841 does not require RTOs/ISOs to develop market rules that create a new path through local distribution facilities, retail meters, or retail electric regulation in general.⁵³³ Rather, NRECA claims, Order No. 841 recognizes the role of the states in retail and distribution-level services.⁵³⁴ NRECA states that an RTO/ISO complies with Order No. 841 by facilitating electric storage resource participation on the RTO/ISO-controlled transmission grid, not by preempting state or local regulation of local distribution facilities, retail electric services, or distribution-level electric storage resources.⁵³⁵

211. Similarly, in response to Tesla’s comments, NRECA states that Order No. 841 never uses the term “seamlessly transitioning,” nor does it authorize electric storage resources located behind the meter to operate in violation of state or local law.⁵³⁶ NRECA asserts that this proceeding should be limited to RTO/ISO market rules and should not impermissibly unbundle retail services, assert jurisdiction over retail net metering, or limit state and local regulation of distribution and retail storage uses.⁵³⁷ NRECA claims that these matters are beyond the scope of this compliance proceeding.⁵³⁸ Further, NRECA disputes Tesla’s assertion that ISO-NE’s program is a “best practice” for all resources located behind the meter—including non-electric storage resources—that should be adopted by all RTOs/ISOs, and that “no gaming will occur where changes to a behind-the-meter electric storage resource’s output level [are] offset by adjustments to separately metered loads on the customer site.”⁵³⁹ NRECA deems these arguments unsupported and beyond the scope of this proceeding and states that mechanisms to

⁵³¹ NRECA Answer at 4 (citing Advanced Energy Economy Protest at 7).

⁵³² *Id.*

⁵³³ *Id.*

⁵³⁴ *Id.* at 4-5 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 36, 301).

⁵³⁵ *Id.* at 5.

⁵³⁶ *Id.* at 6 (citing Tesla Comments at 18).

⁵³⁷ *Id.*

⁵³⁸ *Id.*

⁵³⁹ *Id.* (quoting Tesla Comments at 19).

prevent double-compensation of distributed energy resources must be addressed in the distributed energy resource aggregations rulemaking proceeding in Docket No. RM18-9-000.⁵⁴⁰

212. In response to EDF Renewables, ISO-NE notes that it is not entirely clear what is meant by “retail-level programs” or “retail services” because EDF Renewables does not describe these terms in its pleading.⁵⁴¹ However, ISO-NE states that, at a high level, it believes that some business cases that could be described as “retail services” are entirely compatible with participation as an Electric Storage Facility, while others would render an electric storage resource technically incapable of providing wholesale services.⁵⁴² ISO-NE further explains that it would not consider an electric storage resource that is subject to the dispatch authority of another entity, and whose dispatch the electric storage resource would follow over ISO-NE’s dispatch, to be technically capable of providing wholesale services as an Electric Storage Facility, because its ability to respond to dispatch is a first-order requirement of participating in the wholesale markets.⁵⁴³ However, ISO-NE states that if it maintained ultimate dispatch authority, the resource’s technical ability to provide wholesale services would not be hindered.⁵⁴⁴

iv. Data Request Response

213. ISO-NE states that Tariff Section I.2.2 requires Generator Assets—and therefore the associated Electric Storage Facility—to be directly metered assets measured by Operating Procedure No. 18 (OP-18) compliant metering.⁵⁴⁵ Specifically, OP-18 states that Generator Assets, and therefore Electric Storage Facilities, must have revenue quality metering for settlement and OP-18 compliant metering for telemetry.⁵⁴⁶ The accuracy standards and requirements for metering that Generator Assets and DARDs

⁵⁴⁰ *Id.* at 6-7.

⁵⁴¹ ISO-NE Answer at 31.

⁵⁴² *Id.*

⁵⁴³ *Id.* at 32.

⁵⁴⁴ *Id.*

⁵⁴⁵ ISO-NE Data Request Response at 21-22. ISO-NE states that OP-18 specifies that Generator Assets must have revenue quality metering for settlement and telemetry.

⁵⁴⁶ *Id.* (citing ISO-NE Operating Procedure No. 18, Metering and Telemetering Criteria (OP-18), sections IV, V, and VIII).

must meet can be found in Operating Procedure No. 14 (OP-14) and OP-18.⁵⁴⁷ The processes to register Asset Related Demands are documented in Manual M-RPA, and ultimately, ISO-NE explains, Participating Transmission Owners have the responsibility of ensuring that meter reading information is provided to ISO-NE.⁵⁴⁸

214. ISO-NE states that electric storage resources must be registered by and represented in the markets as a wholesale customer (i.e., Load Asset) in order to be a Binary Storage Facility or Continuous Storage Facility.⁵⁴⁹

215. ISO-NE contends that its protocols do not require changes to prevent electric storage resources from paying twice for the same charging energy.⁵⁵⁰ Similarly, ISO-NE states that no new accounting practices were needed or introduced for Electric Storage Facilities; ISO-NE instead relies on its long-established accounting practices.⁵⁵¹ Regarding retail load, ISO-NE states that the retail services described in its answer are provided pursuant to ISO-NE dispatch and settled at the wholesale nodal LMP.⁵⁵²

v. **Comments on Data Request Response**

216. Advanced Energy Economy states that ISO-NE fails to demonstrate that its metering and accounting practices will comply with Order No. 841 and ensure that all electric storage resources can participate in the ISO-NE markets without being subject

⁵⁴⁷ *Id.* at 23 (citing ISO-NE Operating Procedure No. 14, Technical Requirements for Generators, Demand Response Resources, Asset Related Demands and Alternative Technology Regulation Resources (OP-14), section IV.B.2; OP-18, section IV).

⁵⁴⁸ *Id.* at 22 (citing Manual M-RPA, ISO-NE Manual for Registration and Performance Auditing, section 1.3; Transaction Operating Agreement section 3.06(a)(x)). Further, ISO-NE states that Manual M-28, ISO-NE Manual for Market Rule 1 Accounting, section 7.2.4, explains that consumption associated with Load Assets in the settlement power system model must properly account for energy utilization on the system. *Id.* at 23.

⁵⁴⁹ *Id.*

⁵⁵⁰ *Id.* at 22.

⁵⁵¹ *Id.* at 23.

⁵⁵² *Id.* at 24 (citing ISO-NE Answer at 31-32, 34).

to multiple or inaccurate charges.⁵⁵³ Advanced Energy Economy argues that, in order to comply with Order No. 841, ISO-NE must have sufficient metering and accounting practices in place to ensure that electric storage resources located on the distribution grid or behind the meter have the right to inject and withdraw from the ISO-NE grid at the wholesale LMP and are not subject to multiple charges (e.g. at both wholesale and retail) for charging energy.⁵⁵⁴ Advanced Energy Economy contends that ISO-NE's metering and accounting practices do not provide all electric storage resources, including those located on the distribution grid or behind the meter, with an opportunity to provide all of the wholesale services they are technically capable of providing.⁵⁵⁵

217. Specifically, Advanced Energy Economy argues that ISO-NE's statements regarding OP-18 compliant metering for Generator Assets only addresses electric storage resources that are directly connected to the ISO-NE grid, rather than the distribution grid.⁵⁵⁶ Advanced Energy Economy states that the lack of clarity and specificity in how ISO-NE will account for charging does not ensure that charging energy provided to electric storage resources on the distribution grid or behind the meter is properly metered.⁵⁵⁷

vi. Commission Determination

218. We find that ISO-NE's proposal partially complies with the requirements of Order No. 841 pertaining to metering and accounting practices for electric storage resources and require ISO-NE to file, within 60 days of the date of issuance of this order, a further compliance filing as more fully described below.

219. Regarding metering, we find that ISO-NE complies with the Order No. 841 requirement that each RTO/ISO directly meter electric storage resources so that all the energy entering and exiting the resources is measured by that meter.⁵⁵⁸ Specifically, ISO-NE Tariff Section I.2.2—which defines a “Directly Metered Asset”—requires that

⁵⁵³ Advanced Energy Economy Comments in Response to ISO-NE Data Request Response at 1-3.

⁵⁵⁴ *Id.* at 2.

⁵⁵⁵ *Id.*

⁵⁵⁶ *Id.* at 2-3 (citing ISO-NE Data Request Response at 23).

⁵⁵⁷ *Id.* at 3.

⁵⁵⁸ Order No. 841, 162 FERC ¶ 61,127 at P 322.

Generator Assets, and therefore the associated Electric Storage Facilities, be directly metered assets measured by OP-18 compliant metering.⁵⁵⁹ Further, the DARDs of Electric Storage Facilities must be directly metered because an Electric Storage Facility must “be registered as, and subject to all rules applicable to, a DARD that represents the same equipment as the Generator Asset.”⁵⁶⁰ As ISO-NE explains, its existing metering requirements will apply to electric storage resources declining to participate as Electric Storage Facilities (i.e., participating instead as Generator Assets or DARDs) and therefore will retain the same metering and participation options as other resources. As ISO-NE contends, the accuracy standards and requirements for metering can be found in OP-14 and OP-18 (i.e., within the operating procedures and not the Tariff).⁵⁶¹ This direct metering requirement is applicable to all Electric Storage Facilities regardless of their location on the transmission system, distribution system, or behind the meter.⁵⁶²

220. Nevertheless, we find that the ISO-NE Tariff should include a basic description of ISO-NE’s proposed metering methodology and accounting practices for electric storage resources as well as references to specific documents containing further details. Decisions regarding whether an item should be placed in a tariff or in a business practice manual are guided by the Commission’s rule of reason policy, under which provisions that “significantly affect rates, terms, and conditions” of service, are readily susceptible of specification, and are not generally understood in a contractual agreement must be included in a tariff, while items better classified as implementation details may be included only in the business practice manual.⁵⁶³ The unique physical and operational characteristics of electric storage resources require unique metering and accounting

⁵⁵⁹ ISO-NE Data Request Response at 21 (citing ISO-NE Tariff, § I.2.2). ISO-NE states that OP-18 specifies that Generator Assets must have revenue quality metering for settlement and telemetry.

⁵⁶⁰ ISO-NE Compliance Filing, Transmittal at 30 (citing ISO-NE Tariff, § III.1.10.6(a)(iii)).

⁵⁶¹ ISO-NE Data Request Response at 21-23 (citing OP-14, section IV.B.2; OP-18, sections IV, V, VIII).

⁵⁶² ISO-NE Answer at 34-35.

⁵⁶³ *Energy Storage Assoc. v. PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,296 at P 103 (2018); *see also City of Cleveland v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985) (finding that utilities must file “only those practices that affect rates and service significantly, that are reasonably susceptible of specification, and that are not so generally understood in any contractual arrangement as to render recitation superfluous”).

practices to ensure that these resources are charged the LMP for charging energy and are not double charged, as required by Order No. 841. We find that these practices significantly affect rates, terms, and conditions and should be included in the Tariff.⁵⁶⁴ Further, we find that the Tariff should reference the specific documents that contain the implementation details for ISO-NE's metering methodology and accounting practices, so that market participants may plan and manage their participation accordingly. For example, while ISO-NE's Tariff includes a reference to OP-18, which contains metering details for electric storage resources, the Tariff does not clearly reference all the relevant documents that contain metering details (e.g., relevant sections of OP-14). Therefore, we direct ISO-NE to file, within 60 days of the date of issuance of this order, revisions to its Tariff to include a basic description of ISO-NE's metering methodology and accounting practices for electric storage resources, as well as references to the specific documents in ISO-NE's business practice manuals or other documents that contain the implementation details. Further, we direct ISO-NE to file, within 60 days of the date of issuance of this order, a further compliance filing to revise Tariff section III.1.10.6(a)(iv), consistent with its Data Request Response,⁵⁶⁵ and submit revised Tariff sheets to explicitly state that an Electric Storage Facility shall "be directly metered."

221. Further, we find that ISO-NE's Compliance Filing and Tariff provide insufficient detail to demonstrate that electric storage resources will not pay both the wholesale and retail price for the same charging energy.⁵⁶⁶ Regarding accounting, ISO-NE states that no new accounting practices were needed or introduced for Electric Storage Facilities, but rather that ISO-NE would rely on its long-established accounting practices, including registration practices found in Manuals M-28 and M-RPA.⁵⁶⁷ According to these practices, ISO-NE asserts that all energy that is consumed by an Electric Storage Facility is reported to ISO-NE by either the transmission or distribution utility (based on the resource's point of interconnection) within 1.5 business days following the operating day and settled at the wholesale LMP.⁵⁶⁸ Under that structure, the utility will report the electric storage resource's load to ISO-NE for settlement just as it reports the load of any other directly metered load asset, and in the event of an error, ISO-NE would work with

⁵⁶⁴ See *Energy Storage Ass'n v. PJM Interconnection, L.L.C.*, 162 FERC ¶ 61,296 at P 103; see also *City of Cleveland v. FERC*, 773 F.2d at 1376.

⁵⁶⁵ See ISO-NE Data Request Response at 18, n.65.

⁵⁶⁶ See Order No. 841, 162 FERC ¶ 61,127 at P 326.

⁵⁶⁷ ISO-NE Answer at 29; ISO-NE Data Request Response at 25.

⁵⁶⁸ ISO-NE Answer at 29-30.

the utility to correct it.⁵⁶⁹ However, we agree with Advanced Energy Economy that ISO-NE has not adequately demonstrated that its existing wholesale load asset structure will be sufficient to prevent double payment for charging energy at the retail and wholesale levels.⁵⁷⁰ For instance, while ISO-NE states that it bills the Load Asset owner for energy consumption and the utility only bills its host customer for non-energy charges, ISO-NE does not propose a process to identify whether a distribution utility is unable or unwilling to net out from a host customer's retail bill the wholesale energy purchases associated with charging an electric storage resource that is participating in ISO-NE's market.⁵⁷¹ While ISO-NE states in its Compliance Filing that it will work with the host utility to correct any errors in settlement, the ISO-NE Tariff also does not contain this requirement. We therefore direct ISO-NE to file, within 60 days of the date of issuance of this order, a further compliance filing revising its Tariff to explicitly state that ISO-NE will not charge distribution-connected electric storage resources for charging energy if the distribution utility is unwilling or unable to net out any energy purchases associated with an electric storage resource's wholesale charging activities from the host customer's retail bill.

222. As to concerns regarding the ability of electric storage resources located on the distribution system or behind the meter to participate in ISO-NE's markets, we reiterate that ISO-NE's definition of an Electric Storage Facility is inclusive of those resources located on a distribution system or behind the meter.⁵⁷² As ISO-NE indicates, neither the registration rules, offer rules, dispatch rules, nor the settlement rules depend on an electric storage resource's point of interconnection.⁵⁷³ Therefore, we find that ISO-NE has demonstrated that its proposed market rules provide a means for all electric storage resources, including those located on the distribution system or behind the meter, to provide services under the Tariff.

223. However, we agree with commenters that Order No. 841 requires each RTO/ISO to allow electric storage resources to participate in RTO/ISO markets even if they also provide retail services. In Order No. 841, the Commission stated that it was not

⁵⁶⁹ See ISO-NE Compliance Filing, Transmittal at 30; McDonough-Parent Test. at 39.

⁵⁷⁰ See Advanced Energy Economy Protest at 6-7.

⁵⁷¹ See Order No. 841, 162 FERC ¶ 61,127 at P 326; Order No. 841-A, 167 FERC ¶ 61,154 at P 138.

⁵⁷² See *supra* P 18.

⁵⁷³ See ISO-NE Answer at 33.

persuaded by commenters' suggestion that electric storage resources must choose to participate in either wholesale or retail markets due to the complexity of the metering and accounting practices that would be necessary to distinguish between retail and wholesale activity.⁵⁷⁴ The Commission found that electric storage resources that provide retail services may also be technically capable of providing wholesale services, and that excluding these resources from wholesale market participation would adversely affect competition in RTO/ISO markets.⁵⁷⁵ On rehearing, the Commission stated that, while it agreed with petitioners that appropriate metering and accounting practices will be necessary to distinguish between wholesale and retail activity, it disagreed that these practices would be prohibitively complex or costly to develop and implement given the flexibility provided to the RTOs/ISOs to propose reasonable approaches.⁵⁷⁶

224. While ISO-NE states that Electric Storage Facilities can provide telemetry and/or offers to ISO-NE that allow them to take on distribution level obligations while still following ISO-NE dispatch, ISO-NE also states that some business cases that could be described as "retail services" would render an electric storage resource technically incapable of providing wholesale services.⁵⁷⁷ Moreover, it is unclear whether an electric storage resource could register only a portion of its capacity with ISO-NE and reserve the remaining capacity for retail services. Accordingly, we direct ISO-NE to file, within 60 days of the date of issuance of this order, a further compliance filing to explain how its Tariff allows for electric storage resources to participate in both wholesale and retail markets, or alternatively, revise its Tariff to allow electric storage resources that provide retail services to also participate in ISO-NE's markets, as required by Order No. 841. For instance, ISO-NE can propose Tariff changes to ensure that, or further specify how, an electric storage resource can engage in dual participation in retail and wholesale markets, including details that clearly define the separation and proper accounting of wholesale and retail uses for electric storage resources. Alternatively, ISO-NE could identify Tariff language that clarifies that, by registering as an asset in ISO-NE, an electric storage

⁵⁷⁴ Order No. 841, 162 FERC ¶ 61,127 at P 325; *see also* Order No. 841-A, 167 FERC ¶ 61,154 at P 140 (denying rehearing of the decision to decline to require electric storage resources to choose to participate exclusively in either wholesale or retail markets).

⁵⁷⁵ Order No. 841, 162 FERC ¶ 61,127 at P 325.

⁵⁷⁶ Order No. 841-A, 167 FERC ¶ 61,154 at P 140.

⁵⁷⁷ *See* ISO-NE Answer at 31.

resource is not precluded from providing retail services, so long as the resource meets its wholesale market obligations (e.g., Forward Capacity Market obligations), as applicable.

7. Effective Date

225. Order No. 841 requires each RTO/ISO to file tariff changes needed to implement the requirements of Order No. 841 within 270 days of its publication in the *Federal Register*, and allows a further 365 days from that date to implement the tariff provisions.⁵⁷⁸ The Commission declined to allow the RTOs/ISOs to develop their own implementation schedules, finding that the compliance and implementation schedule set forth in the Final Rule is appropriate.⁵⁷⁹ The Commission stated that the regional flexibility allowed in the Final Rule will assist the RTOs/ISOs in meeting the compliance and implementation deadlines.⁵⁸⁰ Order No. 841-A reiterates that Order No. 841's compliance and implementation schedule is reasonable, and declines to permit the individual RTOs/ISOs to propose their own timeframes.⁵⁸¹

a. Filing

226. ISO-NE requests a January 1, 2024, effective date for the Tariff revisions that provide for the provision of regulation by Binary Storage Facility DARDs, based on its assessment of the work required and other project priorities.⁵⁸² ISO-NE requests this date because no Binary Storage Facility DARD has requested the ability to provide regulation, and ISO-NE has not yet developed the software infrastructure necessary to accommodate it.⁵⁸³ ISO-NE states that the Compliance Filing therefore includes versions of the Regulation Resource definition (in section I.2.2) and the regulation market rules (in section III.14) with two different effective dates. The earlier effective versions (effective December 3, 2019) exclude DARDs from the definition of Regulation Resource and do not contemplate their provision of regulation, and the later effective versions (effective

⁵⁷⁸ Order No. 841, 162 FERC ¶ 61,127 at P 348.

⁵⁷⁹ *Id.* P 349.

⁵⁸⁰ *Id.* P 350.

⁵⁸¹ Order No. 841-A, 167 FERC ¶ 61,154 at P 154.

⁵⁸² ISO-NE Compliance Filing, Transmittal at 7, n.23; *see* McDonough-Parent Test. at 15.

⁵⁸³ *Id.*

January 1, 2024) include DARDs in the definition of Regulation Resource and allow them to provide regulation.⁵⁸⁴

227. In its Effective Date Filing, ISO-NE proposes to advance the effective date of certain previously filed OATT revisions implementing the transmission charge exemption for Electric Storage Facilities from December 3, 2019, to December 1, 2019.⁵⁸⁵ ISO-NE states that this change will ease implementation of these OATT revisions and avoid difficult issues that arise with implementing system changes after the first day of the month.⁵⁸⁶

b. Protests/Comments

228. Advanced Energy Economy contends that ISO-NE falls short of Order No. 841's directive that electric storage resources participating under existing constructs be able to provide all of the wholesale services they are technically capable of providing by postponing the ability of electric storage resources participating as DARDs to provide regulation service until January 1, 2024.⁵⁸⁷ Advanced Energy Economy states that the delay will prevent some electric storage resources from providing an important service in ISO-NE markets solely because no DARD has to date requested the ability to provide regulation, causing ISO-NE to prioritize other projects and refrain from developing the required software expeditiously.⁵⁸⁸ In light of the importance to electric storage resources of providing regulation service, Advanced Energy Economy asks the Commission to require ISO-NE to describe how it weighed its project priorities and came to such a prolonged implementation date.⁵⁸⁹ Advanced Energy Economy notes that software changes may necessitate an extended timeframe but contends that ISO-NE should implement Order No. 841's requirements as quickly as is feasible.⁵⁹⁰

⁵⁸⁴ ISO-NE Compliance Filing, Transmittal at 7, n.23.

⁵⁸⁵ Effective Date Filing at 1 (citing OATT revisions in section II.21, Schedules 9 (Regional Network Service) and 21 (Local Service)).

⁵⁸⁶ *Id.* at 1-2.

⁵⁸⁷ Advanced Energy Economy Protest at 11.

⁵⁸⁸ *Id.*

⁵⁸⁹ *Id.* at 12.

⁵⁹⁰ *Id.*

c. Answers

229. In response to Advanced Energy Economy, ISO-NE states that all 1,100 MW of electric storage resources in its interconnection queue are batteries that are expected to participate as Continuous Storage Facilities and will be eligible to provide regulation service on the effective date of the compliance filing.⁵⁹¹ Only DARDs of Binary Storage Facilities will be unable to provide regulation service under the proposed model; however, because no DARD has ever requested the ability to regulate, ISO-NE has not developed the software infrastructure necessary to accommodate the provision of regulation by DARDs.⁵⁹² ISO-NE explains that it proposes the January 1, 2024, effective date to implement software to allow DARDs to provide regulation because updating the software would be a major undertaking, and it is focused on other high priority projects, including storage participation rules, offer caps, and energy security improvements.⁵⁹³ ISO-NE states that, if a stakeholder or developer would like to participate as a Binary Storage Facility and regulate as a DARD, it would work to accelerate the development of this capability.⁵⁹⁴

d. Commission Determination

230. We find that ISO-NE's proposed January 1, 2024, effective date for permitting DARDs of Binary Storage Facilities to provide regulation service is reasonable due to the scope of the undertaking required to modify its software infrastructure, other competing project priorities, and, most importantly, the absence of perceived need for this software at this time, as no stakeholder or developer has indicated an intention to provide regulation service using the DARD of a Binary Storage Facility. While the Commission in Order Nos. 841 and 841-A declined to provide the RTOs/ISOs with additional time for implementation, we find here that ISO-NE's proposal to implement this limited aspect of Order No. 841 after the deadline established in Order No. 841 is reasonable based on the specific circumstances outlined in its Compliance Filing. As ISO-NE has explained, by the December 3, 2019 deadline, Continuous Storage Facilities will be able to provide regulation service, as will Binary Storage Facilities' Generator Assets; only DARDs of Binary Storage Facilities will not. Since no DARDs of Binary Storage Facilities have requested the ability to regulate, and since most, if not all, of the

⁵⁹¹ ISO-NE Answer at 24.

⁵⁹² *Id.* at 25.

⁵⁹³ *Id.*

⁵⁹⁴ *Id.* at 25-26.

batteries in the interconnection queue are expected to participate as Continuous Storage Facilities, we find it unreasonable to order ISO-NE to reassess its priorities and direct a reallocation of its resources to develop new software that will likely not be utilized by DARDs of Binary Storage Facilities in the near term.⁵⁹⁵

231. However, we agree with Advanced Energy Economy that it is important that electric storage resources, including the DARDs of Binary Storage Facilities, be able to provide regulation service, as required by Order No. 841.⁵⁹⁶ While we accept ISO-NE's proposal to extend the effective date of this Tariff revision to January 1, 2024, we expect ISO-NE to carry out its commitment to accelerate the development of this capability if a stakeholder or developer requests to participate as a Binary Storage Facility and regulate as a DARD.⁵⁹⁷ Furthermore, we accept ISO-NE's proposal to advance the requested effective date of the OATT revisions associated with transmission charges to December 1, 2019, pending acceptance of ISO-NE's submission of a further compliance filing, as described above.⁵⁹⁸

The Commission orders:

(A) ISO-NE's Compliance Filing is hereby accepted, subject to a further compliance filing, as discussed in the body of this order.

(B) ISO-NE is hereby directed to submit a further compliance filing, within 60 days of the date of this order, as discussed in the body of this order.

By the Commission. Commissioner McNamee is concurring with a separate statement attached.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

⁵⁹⁵ See *id.* at 24-25.

⁵⁹⁶ See Advanced Energy Economy Protest at 11-12.

⁵⁹⁷ See ISO-NE Answer at 25-26.

⁵⁹⁸ See *supra* P 197.

Appendix: Tariff Records Filed

ISO New England Inc.

FERC FPA Electric Tariff

ISO New England Inc. Transmission, Markets and Services Tariff

ER19-470-000

Effective 12/3/2019

[I.2, I.2 Rules of Construction; Definitions, 116.0.0](#)

[II.21, II.21 Rates and Charges, 4.0.0](#)

[Schedule 9, Schedule 9 Regional Network Service, 3.0.0](#)

[Schedule 21 Common, Schedule 21 Common, 8.0.0](#)

[III.1, III.1 Market Operations, 46.0.0](#)

[III.9, III.9 Forward Reserve Market, 19.0.0](#)

[III.14 Regulation Market, III.14 Regulation Market, 15.0.0](#)

Effective 1/1/2024

[I.2, I.2 Rules of Construction; Definitions, 117.0.0](#)

[III.14 Regulation Market, III.14 Regulation Market, 16.0.0](#)

ER19-470-001

Effective 12/3/2019

[III.1, III.1 Market Operations, 49.0.0](#)

ER19-470-002

Effective 12/1/2019

[II.21, II.21 Rates and Charges, 5.0.0](#)

[Schedule 9, Schedule 9 Regional Network Service, 4.0.0](#)

[Schedule 21 Common, Schedule 21 Common, 9.0.0](#)

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

ISO New England Inc.

Docket Nos. ER19-470-000
ER19-470-001
ER19-470-002

(Issued November 22, 2019)

McNAMEE, Commissioner, *concurring*:

1. I concur with today's order insofar as it finds that ISO New England Inc. (ISO-NE) complies in part with Order Nos. 841¹ and 841-A² (together, the Storage Orders) as issued and the Commission's regulations.³ I write separately, however, to express my continuing concern that the Commission exceeded its statutory authority under the Federal Power Act,⁴ and should have, at the very least, provided states the opportunity to opt-out of the participation model created by the Storage Orders.⁵

2. On February 15, 2018,⁶ the Commission issued Order No. 841 to remove barriers to the participation of electric energy storage resources (ESRs) in the capacity, energy, and ancillary service markets operated by Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs).⁷ In Order No. 841, the Commission denied

¹ *Elec. Storage Participation in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 841, 162 FERC ¶ 61,127 (2018) (Order No. 841).

² *Elec. Storage Participation in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 841-A, 167 FERC ¶ 61,154 (2019) (Order No. 841-A).

³ 18 C.F.R. §§ 35.28(b)(9), 35.28(g)(9) (2019).

⁴ 16 U.S.C. §§ 791a-825r (2018).

⁵ *See generally* Order No. 841-A, 167 FERC ¶ 61,154 (McNamee, Comm'r concurring in part and dissenting in part) (McNamee Separate Statement).

⁶ This order was later amended by an errata issued on February 28, 2018. *Elec. Storage Participation in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Docket Nos. RM16-23-000 and AD16-20-000, Errata Notice (Feb. 28, 2018).

⁷ *See generally* Order No. 841, 162 FERC ¶ 61,127.

requests to allow states to decide whether distribution-level ESRs or those resources located behind a retail meter could participate in RTO or ISO markets.⁸ On rehearing, in Order No. 841-A, a majority of the Commission affirmed these findings and declined to provide the states with an opt-out.⁹

3. I was not a member of the Commission at the time Order No. 841 was issued, but I concurred in part and dissented in part when Order 841-A was issued. Specifically, I stated my support for ESRs and my belief that they have the potential to transform the electricity industry. But to the extent the Commission's Storage Orders exercised authority over the distribution system and behind-the-meter, I concluded:

[T]he majority has exceeded the Commission's jurisdictional authority by depriving the states of the ability to determine whether distribution-level ESRs may use distribution facilities so as to access the wholesale markets. By doing so, in my view, the Commission claimed jurisdiction over functions and assets reserved by statute to the states. Further, even if the majority thought they could rightly exercise jurisdiction in this matter, I think they should have furthered the path of "cooperative federalism" by permitting the states to choose whether or not behind-the-meter and distribution-connected ESRs may participate in the wholesale markets through an opt-out provision.¹⁰

4. Therefore, I concluded that the Commission exceeded its statutory authority in the Storage Orders and stated that I would have granted rehearing to reconsider the Commission's assertion of jurisdiction and its failure to provide states the opportunity to opt-out of the participation model created by the Storage Orders.¹¹

5. While I approve ISO-NE's compliance filing today to the extent it complies with the Commission's Storage Orders, I note that the Storage Orders are presently pending judicial review,¹² and I reiterate my concern with the Commission's assertion of

⁸ *Id.* P 35.

⁹ Order No. 841-A, 167 FERC ¶ 61,154 at PP 30-56.

¹⁰ McNamee Separate Statement, 167 FERC ¶ 61,154 at P 3 (footnotes & citations omitted).

¹¹ *Id.* PP 2-24.

¹² *See Nat'l Ass'n of Regulatory Comm'rs v. FERC*, Nos. 19-1142 and 19-1147

jurisdiction over ESRs interconnecting either to a distribution system or behind-the-meter. Further, I continue to believe the Commission should have included in the Storage Orders an opt-out provision for states.

For these reasons, I respectfully concur.

Bernard L. McNamee
Commissioner

(D.C. Cir. filed July 11, 2019).