

171 FERC ¶ 61,043
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

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

ISO New England Inc.

Docket No. ER19-470-003

ORDER ON REHEARING

(Issued April 16, 2020)

1. On November 22, 2019, the Commission accepted ISO New England Inc.'s (ISO-NE) filing in compliance with the requirements of Order No. 841,¹ subject to a further compliance filing, to become effective December 3, 2019, with a limited number of revisions to become effective December 1, 2019, and January 1, 2024.² ISO-NE seeks rehearing of the Commission's requirement that ISO-NE submit a compliance filing revising its market rules to account for electric storage resources' State of Charge in the day-ahead market. In this order, we deny the requested rehearing.

I. Background

2. In Order No. 841, the Commission adopted reforms to remove barriers to the participation of electric storage resources in regional transmission organization and independent system operator (RTO/ISO) markets. The Commission modified section 35.28 of its regulations³ 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

¹ *Elec. Storage Participation in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 841, 162 FERC ¶ 61,127 (2018), *order on reh'g*, Order No. 841-A, 167 FERC ¶ 61,154 (2019). Order No. 841 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).

² *ISO New England Inc.*, 169 FERC ¶ 61,140 (2019) (Compliance Order).

³ 18 C.F.R. § 35.28 (2019).

RTO/ISO markets produce just and reasonable rates, pursuant to the Commission's legal authority under Federal Power Act (FPA) section 206.⁴

3. On December 3, 2018, ISO-NE, joined by the New England Power Pool Participants Committee, submitted proposed revisions to the Open Access Transmission Tariff 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 (Compliance Filing). 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, ISO-NE submitted a response to the Data Request with additional explanation (Data Request Response).

4. On November 22, 2019, the Commission accepted ISO-NE's Compliance Filing, subject to a further compliance filing.⁵ As relevant on rehearing, in the Compliance Order, the Commission found that ISO-NE failed to demonstrate how it will account for Maximum Run Time, Maximum Charge Time, State of Charge,⁶ Maximum State of Charge, and Minimum State of Charge (collectively, State of Charge and Duration Characteristics) in the day-ahead market, as required by Order No. 841.⁷ The Commission further found that neither the Maximum Daily Energy Limit nor Maximum Daily Consumption Limit parameters⁸ included in ISO-NE's proposal account for an electric storage resource's State of Charge in the day-ahead market, despite ISO-NE's contentions.⁹ The Commission found that these parameters cannot ensure that an electric storage resource's charging or discharging megawatt hours (MWhs) will be scheduled at

⁴ 16 U.S.C. § 824e (2018).

⁵ Compliance Order, 169 FERC ¶ 61,140 at P 1.

⁶ 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.

⁷ Compliance Order, 169 FERC ¶ 61,140 at P 150.

⁸ ISO-NE defines the Maximum Daily Energy Limit parameter as "the maximum amount of megawatt-hours that a Limited Energy Resource expects to be able to generate in the next [o]perating [d]ay," and the Maximum Daily Consumption Limit parameter as "the maximum amount of megawatt-hours that a Storage [Dispatchable Asset Related Demand] expects to be able to consume in the next [o]perating [d]ay." ISO-NE Transmittal at 25 (citing Tariff §I.2.2).

⁹ Compliance Order, 169 FERC ¶ 61,140 at PP 110-15.

times when the electric storage resource can withdraw or inject because ISO-NE's day-ahead software does not account for the resource's State of Charge at the start of each day-ahead market interval.¹⁰ The Commission stated that because ISO-NE would have to make assumptions about the State of Charge of an electric storage resource, ISO-NE's proposal does not fully comply with Order No. 841.¹¹ Moreover, the Commission explained that ISO-NE's failure to account for State of Charge in the day-ahead market could result in infeasible schedules.¹²

5. On December 23, 2019, ISO-NE filed a request for rehearing of the Commission's finding. ISO-NE argues that the Commission erred in finding that ISO-NE's proposal fails to account for State of Charge in the day-ahead market, and that the Commission's requirement that ISO-NE "account for the resource's State of Charge at the start of each day-ahead market interval" would not prevent an electric storage resource from receiving an infeasible schedule.

6. On February 10, 2020, ISO-NE filed a second compliance filing in response to the Commission's directives in the Compliance Order.

II. Procedural Matters

7. FPA section 313(a) allows an aggrieved party to file a request for rehearing within 30 days after the issuance of a final Commission order.¹³ The Commission's business hours are "from 8:30 a.m. to 5:00 p.m.,"¹⁴ and filings must be made before 5:00 p.m. in order to be considered filed on that day.¹⁵ ISO-NE submitted its rehearing request at 5:25 p.m. on the date that requests for rehearing were due in this proceeding. The

¹⁰ *Id.* P 150.

¹¹ *Id.* P 149 (citing Order No. 841, 162 FERC ¶ 61,127 at P 213; *see also id.* P 211).

¹² *Id.* P 150.

¹³ 16 U.S.C. § 825l(a) (2018) ("Any person, State, municipality, or State commission aggrieved by an order issued by the Commission in a proceeding under this chapter to which such person, State, municipality, or State commission is a party may apply for a rehearing within thirty days after the issuance of such order."). *See* 18 C.F.R. § 385.713(b) (2019) ("A request for rehearing by a party must be filed not later than 30 days after issuance of any final decision or other final order in a proceeding.").

¹⁴ 18 C.F.R. § 375.101(c) (2019).

¹⁵ *See, e.g., Cameron LNG, LLC*, 148 FERC ¶ 61,237, at P 6 (2014).

Commission's eFiling system could not accept filings starting at 4:40 p.m. and was not restored until after 5:00 p.m. On December 26, 2019, ISO-NE filed a motion requesting that the Commission accept its rehearing request as timely filed. The Commission's Office of the Secretary accepted the rehearing request as timely filed on December 23, 2019. Accordingly, the motion to accept a late-filed rehearing request is dismissed as moot.

III. Discussion

A. Accounting for State of Charge in Day-Ahead Market

1. Rehearing Request

8. On rehearing, ISO-NE argues that the Commission erred by finding that ISO-NE's proposal does not account for an electric storage resource's State of Charge in the day-ahead market, in contrast to the requirements of Order No. 841.¹⁶ Specifically, ISO-NE argues that the Compliance Order incorrectly found that "neither the Maximum Daily Energy Limit nor 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."¹⁷ ISO-NE contends that electric storage resources can account for their day-ahead State of Charge by incorporating that State of Charge into their Maximum Daily Energy Limit and Maximum Daily Consumption Limit parameters.¹⁸ ISO-NE contends that the Commission is incorrect that the use of Maximum Daily Energy Limit and Maximum Daily Consumption Limit could result in infeasible schedules because these bidding parameters can ensure a feasible day-ahead schedule if the market participant accurately takes into account the electric storage resource's expected State of Charge at the start of the operating day.¹⁹

9. According to ISO-NE, requiring an electric storage resource to submit its State of Charge at the start of each day-ahead market interval as proposed by the Commission could result in an entirely infeasible day-ahead schedule.²⁰ Once the operating day has

¹⁶ ISO-NE Rehearing Request at 9.

¹⁷ *Id.* (citing Compliance Order, 169 FERC ¶ 61,140 at P 149).

¹⁸ *Id.*

¹⁹ *Id.* at 10. Operating day means the calendar day period beginning at midnight for which transactions on the New England Markets are scheduled. ISO-NE Tariff, GT&C I.2.2. Definitions.

²⁰ *Id.* at 11.

begun, ISO-NE asserts that there is no way to ensure a day-ahead schedule will be achievable because, in New England, the day-ahead megawatt (MW) schedules of resources are not carried over into real time, and resources are dispatched in real time based on real-time system conditions and offer data.²¹

10. ISO-NE also argues that the Compliance Order incorrectly characterizes ISO-NE's position as limiting electric storage resources to one full charge and discharge cycle in the day-ahead market.²² ISO-NE claims that electric storage resources are not limited to a single charge-discharge cycle in the day-ahead market, but can offer as many charge-discharge cycles as they wish.²³ ISO-NE claims that, because of this error, the Commission incorrectly concluded that ISO-NE's proposal 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.²⁴

11. On rehearing, ISO-NE argues that feasibility for the day-ahead market can be determined by considering: (1) the day-ahead schedule in isolation; (2) State of Charge at the beginning of the operating day; or (3) real-time conditions.²⁵

12. Moreover, ISO-NE claims that the Commission-directed approach does not consider optimality when ISO-NE is required by its Tariff to consider optimality.²⁶ ISO-NE asserts that consideration of optimization in day-ahead State of Charge accounting makes ISO-NE's approach more effective than the Commission-directed approach in "improving the ability of electric storage resources to provide all of the services that they are technically capable of providing" and in "allowing ISO-NE to

²¹ *Id.* at 10-12.

²² *Id.* at 13-14 (citing Compliance Order, 169 FERC ¶ 61,140 at P 150 ("ISO-NE's suggestion that electric storage resources should limit themselves to one full charge and discharge cycle in the day-ahead market.")).

²³ *Id.* at 14 (citing its Data Request Response at 12 n.44).

²⁴ *Id.* (citing Compliance Order, 169 FERC ¶ 61,140 at P 150).

²⁵ *Id.* at 10-14.

²⁶ *Id.* at 14-15 (citing ISO-NE Tariff § III.1.7.6 ("The ISO shall schedule Day-Ahead and schedule and dispatch in Real-Time Resources economically on the basis of least-cost, security-constrained dispatch and the prices and operating characteristics offered by Market Participants.")).

procure such services more efficiently.”²⁷ ISO-NE contends that the Commission-directed solution will not be compatible with ISO-NE’s optimization of day-ahead market clearing, and thus could not be offered to resources using the Maximum Daily Energy Limit and Maximum Daily Consumption Limit parameters.²⁸ ISO-NE claims that requiring ISO-NE to move from a daily-cycle optimization to an approach that includes no optimization would produce an inferior day-ahead solution, could financially harm ISO-NE’s electric storage resources, and would not constitute well-reasoned decision-making.²⁹

13. ISO-NE asserts that the Commission directed ISO-NE to institute Maximum Run Time and Maximum Charge Time parameters in the day-ahead market, but ignored ISO-NE’s arguments that ISO-NE’s day-ahead market solution accounts for the duration characteristics of electric storage resources at least as effectively as a Maximum Run Time parameter.³⁰ ISO-NE claims that a Maximum Run Time parameter would provide no useful information given the structure of the ISO-NE markets because a limited energy resource’s maximum run or charge time is entirely dependent on the rate at which the resource discharges or charges, respectively.³¹ In contrast, ISO-NE maintains that its software, which relies on energy-based limitations to determine how long a resource will be able to generate or charge, is superior to the Maximum Run Time parameter.³² ISO-NE claims that the Commission did not respond to this argument.³³

14. Chiefly, ISO-NE states that its approach: (1) allows an electric storage resource to reflect that it is physically impossible to charge or discharge for longer than its State of Charge would allow; (2) prevents ISO-NE from dispatching the resource to charge for a duration that would exceed the resource’s Maximum State of Charge; and (3) provides

²⁷ *Id.* at 16 (citing Compliance Order, 169 FERC ¶ 61,140 at P 150 (quoting Order No. 841, 162 FERC ¶ 61,127 at P 191)).

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.* at 16-17 (citing Compliance Order, 169 FERC ¶ 61,140 at P 149).

³¹ *Id.* at 17.

³² *Id.* at 16-17 (citing ISO-NE Answer at 18, Docket No. ER19-470-000 (filed Feb. 22, 2018)).

³³ *Id.* at 18 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 221, 223).

useful information about how long the resource can be relied upon to receive energy from the grid if ISO-NE needs to dispatch it to do so.³⁴

15. Finally, ISO-NE states that not including a Maximum Run Time parameter for electric storage resources is consistent with its treatment of other resource types.³⁵ ISO-NE states that the Commission found this argument persuasive when discussing the real-time markets but rejected this argument for its day-ahead market analysis.³⁶

2. Commission Determination

a. Consistency with Order No. 841

16. At the outset, we affirm the Commission's finding that ISO-NE's proposal as to its day-ahead market does not comply with the requirements of Order No. 841.³⁷ Order No. 841 requires 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.³⁸ State of Charge as a bidding parameter is defined in Order No. 841 as the level of energy that an electric storage resource is anticipated to have available at the *start* of the market interval rather than at the end.³⁹ ISO-NE contends that its proposal accounts for State of Charge in accordance with the directives of Order No. 841 through its Maximum Daily Energy Limit and Maximum Daily Consumption Limit parameters. But ISO-NE fails to recognize that these parameters only account for the cumulative amount of energy an electric storage resource can charge or discharge over the entire operating day, as opposed to an electric storage resource's State of Charge at the start of each market interval.⁴⁰ Similarly, other physical and operational characteristics of electric storage resources such as Maximum State of

³⁴ *Id.* at 18 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 221, 223).

³⁵ *Id.*

³⁶ *Id.* (citing Compliance Order, 169 FERC ¶ 61,140 at P 148 (“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.”)).

³⁷ Compliance Order, 169 FERC ¶ 61,140 at P 149.

³⁸ *Id.* P 151 (citing Order No. 841, 162 FERC ¶ 61,127 at P 189).

³⁹ Order No. 841, 162 FERC ¶ 61,127 at P 213.

⁴⁰ ISO-NE Rehearing Request at 9-10.

Charge, Minimum State of Charge, Maximum Charge Time, and Maximum Run Time are related to the State of Charge of an electric storage resource; therefore, accounting for these characteristics requires proper consideration of State of Charge at the start of each market interval.⁴¹ As the Commission stated in the Compliance Order, ISO-NE's proposal failed to account for these State of Charge and Duration Characteristics in the day-ahead market and therefore would have to "make assumptions about the state of charge of an electric storage resource."⁴² Because ISO-NE's Maximum Daily Energy Limit and Maximum Daily Consumption Limit bidding parameters do not account for State of Charge at the start of each day-ahead market interval, they similarly do not account for these other physical and operational characteristics. Thus, we reaffirm the Commission's finding that ISO-NE's participation model fails to account for State of Charge, Maximum State of Charge, Minimum State of Charge, Maximum Charge Time, and Maximum Run Time in the day-ahead market as required by Order No. 841.

17. Although we find that ISO-NE's proposal fails to meet the standards as set forth in Order No. 841, ISO-NE's rehearing request misconstrues several aspects of the Compliance Order, which we address below.

b. Clarification on State of Charge Bidding Parameters

18. First, we clarify that the Compliance Order merely directs ISO-NE to ensure that its participation model accounts for the physical and operational characteristics of electric storage resources in the day-ahead market. Contrary to ISO-NE's contentions, the Compliance Order does not prescribe a particular method by which ISO-NE must account for State of Charge and Duration Characteristics of electric storage resources in its day-ahead market. While the Commission found that ISO-NE failed to account for several characteristics of electric storage resources including State of Charge, Minimum State of Charge, Maximum State of Charge, Maximum Run Time, and Maximum Charge Time, ISO-NE is not required to utilize those specific bidding parameters, so long as these

⁴¹ Maximum State of Charge and Minimum State of Charge are defined as "State of Charge values." Order No. 841, 162 FERC ¶ 61,127 at P 236. Maximum Charge Time prevents an electric storage resource from being dispatched to charge for a duration that would exceed the resource's Maximum State of Charge. 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. *Id.* PP 223-24. Therefore, these characteristics should be represented similarly to State of Charge, that is, for each market interval.

⁴² Compliance Order, 169 FERC ¶ 61,140 at P 149 (citing Order No. 841, 162 FERC ¶ 61,127 at P 213).

characteristics are accounted for in the day-ahead market. For example, ISO-NE's proposal to account for these State of Charge and Duration Characteristics in the real-time market was found to be compliant with Order No. 841 because ISO-NE's proposal accounts for these characteristics at the start of each real-time market interval using the telemetered values Available Energy and Available Storage.⁴³ We clarify that ISO-NE could similarly account for all of the State of Charge and Duration Characteristics in its day-ahead market at the start of each market interval through parameters similar to Available Energy and Available Storage.

19. Furthermore, we clarify that the Commission does not disagree with ISO-NE's argument that Maximum Run Time and Maximum Charge Time parameters are unnecessary if the duration of an electric storage resource's commitment is otherwise constrained based on its energy schedule and its State of Charge.⁴⁴ We acknowledge that Maximum Run Time and Maximum Charge Time are not meaningful characteristics for Continuous Storage Facilities⁴⁵ because Continuous Storage Facilities are neither committed nor de-committed by the ISO-NE unit commitment software.⁴⁶ However, Maximum Run Time and Maximum Charge Time are meaningful physical and operational characteristics of Binary Storage Facilities,⁴⁷ and ISO-NE's proposal fails to adequately account for them in the day-ahead market because it does not constrain Binary

⁴³ *Id.* P 148. 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. 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.

⁴⁴ *See* ISO-NE Rehearing Request at 16-17.

⁴⁵ ISO-NE's market rules divide electric storage resources into two categories: Continuous Storage Facilities and Binary Storage Facilities. Continuous Storage Facilities 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. Compliance Order, 169 FERC ¶ 61,140 at P 23. *See* ISO-NE Tariff, § III.1.10.6.

⁴⁶ *See* Transmittal at 8.

⁴⁷ 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-storage hydroelectric units. Compliance Order, 169 FERC ¶ 61,140 at P 23. *See* ISO-NE Tariff, § III.1.10.6.

Storage Facilities' commitment duration based on their State of Charge. As discussed above, if ISO-NE were to revise its day-ahead market to constrain Binary Storage Facilities' commitment durations based on their approximated Available Energy and Available Storage at the start of each market interval, ISO-NE would sufficiently account for both Maximum Charge Time and Maximum Run Time.

20. State of Charge represents the amount of energy stored in proportion to the limit on the amount of energy that can be stored (i.e., an electric storage resource's capability to charge or discharge energy at a specific point in time).⁴⁸ The ability for a resource to charge or discharge energy at a specific point in time is contingent on its State of Charge at the beginning of the operating day and its energy schedule prior to the current market interval. Electric storage resources can charge and discharge throughout the day. Therefore, to sufficiently account for State of Charge, ISO-NE's day-ahead market must represent an electric storage resource's ability to charge or discharge in a given market interval based on the resource's State of Charge at the start of that market interval. ISO-NE's proposed Maximum Daily Energy Limit and Maximum Daily Consumption Limit bidding parameters fail to account for State of Charge in the day-ahead market because they only account for the *cumulative* energy charged/discharged over the entire operating day.

c. Optimization

21. Just as ISO-NE misconstrues the Commission's direction in the Compliance Order as necessitating certain bidding parameters, it similarly misconstrues the Commission's direction as it pertains to optimization.⁴⁹ We clarify that the Compliance Order does not preclude or prohibit consideration of optimization in day-ahead accounting, nor is accounting for State of Charge and Duration Characteristics of electric storage resources mutually exclusive with optimization. As stated above, the Commission simply directed ISO-NE to account for State of Charge and Duration Characteristics in its day-ahead market, but doing so does not bar nor inhibit prioritization of optimization.⁵⁰ For example, ISO-NE could optimize resources' charge-discharge schedules subject to their State of Charge at the beginning of each day-ahead market interval, while also allowing

⁴⁸ Order No. 841, 162 FERC ¶ 61,127 at P 236 ("State of Charge represents the amount of energy stored in proportion to the limit on the amount of energy that can be stored, typically expressed as a percentage. It represents the forecasted starting State of Charge for the market interval being offered into.").

⁴⁹ ISO-NE Rehearing Request at 4-6, 15-16.

⁵⁰ Compliance Order, 169 FERC ¶ 61,140 at P 149.

resources to elect to self-manage their State of Charge as required by Order No. 841.⁵¹ ISO-NE should continue to prioritize optimization, consistent with its Tariff, but should also ensure that its day-ahead market accounts for State of Charge and Duration Characteristics as required by Order No. 841.

d. Feasibility

22. Next, ISO-NE misinterprets the Commission's rejection of ISO-NE's proposal on the basis that it could result in infeasible schedules.⁵² As the Compliance Order stated, ISO-NE's proposal to use Maximum Daily Energy Limit and Maximum Daily Consumption Limit parameters may not result in feasible day-ahead schedules.⁵³ As described above, on rehearing, ISO-NE challenges this finding, and argues that feasibility for the day-ahead market can be assessed by considering: (1) the day-ahead schedule in isolation; (2) State of Charge at the beginning of the operating day; or (3) real-time conditions. We clarify that the Commission meant that ISO-NE's proposal could result in day-ahead market schedules that, *at the time of the day-ahead market run*, are not achievable given the physical and operational characteristics of the electric storage resource.

23. As explained in the Compliance Order, because ISO-NE's proposal only accounts for State of Charge at the start of the operating day, as opposed to at the beginning of each market interval, ISO-NE's proposed Maximum Daily Energy Limit and Maximum Daily Consumption Limit bidding parameters can result in infeasible schedules (e.g., the scheduling of those charging or discharging MWhs at times when the electric storage resource cannot withdraw or inject because doing so would violate its operational limits).⁵⁴ While ISO-NE claims that its proposal can guarantee a feasible day-ahead schedule, ISO-NE fails to demonstrate that its proposal accounts for State of Charge in the day-ahead market. Furthermore, even if ISO-NE's proposal can guarantee a feasible day-ahead schedule, doing so requires that an electric storage resource offer less energy than it is technically capable of providing, as discussed in the following section.

⁵¹ See, e.g., *New York Independent System Operator, Inc.*, 169 FERC ¶ 61,225, at PP 148-151 (2019) (accepting NYISO's proposal to have a Self-Managed option as well as an ISO-Managed option that optimizes a resource's day-ahead schedule over 24 hours subject to its bids and energy level constraints).

⁵² ISO-NE Rehearing Request at 9.

⁵³ Compliance Order, 169 FERC ¶ 61,140 at P 150.

⁵⁴ *Id.* See also *supra* P 20.

e. **Charge-Discharge Cycles Per Day**

24. Additionally, ISO-NE also misinterprets the Commission's position regarding the ability for electric storage resources to be scheduled for multiple charge and discharge cycles in the day-ahead market. In the Data Request, the Commission sought information as to how ISO-NE's proposal, which relied on Available Energy and Available Storage telemetered values, could ensure that an electric storage resource is not subject to infeasible schedules in the day-ahead market, given that the values for Available Energy and Available Storage would only be collected in real-time.⁵⁵ ISO-NE responded that electric storage resources can use ISO-NE's Maximum Daily Energy Limit and Maximum Daily Consumption Limit bidding parameters to prevent infeasible day-ahead schedules, explaining 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," and that "[d]oing so would limit the resource's day-ahead schedule to one full charge-discharge cycle," which is the same approach taken by other Limited Energy Resources . . . in the day-ahead market to ensure a feasible schedule.⁵⁶

25. The Commission found in the Compliance Order that ISO-NE's suggestion that electric storage resources should limit themselves to one full charge and discharge cycle in the day-ahead market to improve the likelihood of a feasible schedule is at odds with the requirement in Order No. 841 that each RTO/ISO 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.⁵⁷

26. On rehearing, ISO-NE states that the Commission's findings in the Compliance Order incorrectly characterize its position and proposal as limiting electric storage resources to one full charge and discharge cycle per day.⁵⁸ We clarify that the Commission did not interpret ISO-NE's position to limit electric storage resources to one full charge and discharge per day, but that ISO-NE's failure to account for State of Charge in the day-ahead market leaves electric storage resources in the position of either

⁵⁵ Data Request at 5.

⁵⁶ Data Request Response at 11-13.

⁵⁷ Compliance Order, 169 FERC ¶ 61,140 at P 150 (citing Order No. 841, 162 FERC ¶ 61,127 at P 191).

⁵⁸ ISO-NE Rehearing Request at 13-14.

risking an infeasible day-ahead schedule or offering less energy to the market than they are technically capable of providing, in contravention of Order No. 841's requirements.⁵⁹

B. Regional Flexibility

1. Rehearing Request

27. ISO-NE argues that the Commission erred by imposing a requirement on ISO-NE beyond what is required in Order No. 841.⁶⁰ ISO-NE asserts that the Commission did not explain why it claimed to offer regional flexibility for RTOs/ISOs to “more effectively account for the physical and operational characteristics of electric storage resources through different mechanisms given their unique market designs,” but at the same time, rejected ISO-NE's proposal.⁶¹ ISO-NE argues that in the Order No. 841 proceeding, the Commission stated “that there may be other means of accounting for the physical and operational characteristics of electric storage resources than bidding parameters.”⁶² ISO-NE contends that its proposal is consistent with the requirement of Order No. 841 to account for the physical and operational characteristics of electric storage resources through bidding parameters *or other means*.⁶³ In particular, ISO-NE contends that its compliance proposal accounts for State of Charge and Duration Characteristics of electric storage resources in the day-ahead market at least as effectively as if it were to adopt bidding parameters for State of Charge, Maximum State of Charge, Minimum State of Charge, Maximum Run Time, and Maximum State of Charge Time.⁶⁴

⁵⁹ For example, a resource that is forecasted to begin the Operating Day at zero percent State of Charge, intending to charge in the low-priced early-morning hours, would have to specify a Maximum Daily Energy Limit of *zero* MWh to ISO-NE to ensure a feasible schedule — despite the fact that a proper accounting of its State of Charge at the start of each market interval would show that the resource is capable of providing its full capacity to the ISO-NE market after it has recharged.

⁶⁰ ISO-NE Rehearing Request at 7.

⁶¹ *Id.* at 7-8 (quoting Order No. 841, 162 FERC ¶ 61,127 at P 190).

⁶² *Id.*

⁶³ *Id.* at 8 (quoting Order No. 841, 162 FERC ¶ 61,127 at P 4 (emphasis added)).

⁶⁴ *Id.*

2. Commission Determination

28. We deny rehearing. We are not persuaded by the argument that the Commission should find ISO-NE's proposal consistent with Order No. 841 on the basis of regional flexibility. We acknowledge that, in Order No. 841, the Commission provided RTOs/ISOs with flexibility to more effectively account for the physical and operational characteristics of electric storage resources through different mechanisms given their unique market designs.⁶⁵ However, the regional flexibility provided in Order No. 841 is not boundless. Because ISO-NE's proposed Maximum Daily Energy Limit and Maximum Daily Consumption Limit bidding parameters fail to adequately account for electric storage resources' State of Charge in the day-ahead market, the Commission appropriately rejected that aspect of ISO-NE's proposal as inconsistent with Order No. 841.

29. We reiterate that ISO-NE misinterprets the Commission's determination in the Compliance Order. We do not require ISO-NE to utilize the specific parameters provided in Order No. 841 in its day-ahead market. Rather, ISO-NE is merely required to account for these characteristics through some means.⁶⁶ For example, as stated above, the Commission accepted ISO-NE's proposal to account for these State of Charge and Duration Characteristics in the real-time market because ISO-NE constrains real-time dispatch based on the telemetered values Available Energy and Available Storage.⁶⁷ ISO-NE could similarly account for State of Charge in the day-ahead market by collecting the estimated Available Energy and Available Storage levels from electric storage resources for the beginning of the operating day, approximating resources' Available Energy and Available Storage levels at the start of each market interval within the day-ahead market optimization engine, and constraining resources' day-ahead schedules within the optimization engine based on their approximated Available Energy and Available Storage levels at the start of each market interval.

C. Facility Constraints

1. Rehearing Request

30. ISO-NE next claims the Commission's determination regarding State of Charge accounting is inferior to ISO-NE's proposal because it does not consider facility constraints associated with electric storage resources that are co-located with

⁶⁵ Order No. 841, 162 FERC ¶ 61,127 at P 190.

⁶⁶ See Compliance Order, 169 FERC ¶ 61,140 at P 150.

⁶⁷ See *supra* PP 18-20.

generation.⁶⁸ For example, ISO-NE states that the majority of batteries expressing interest in participating in New England markets are paired with solar photovoltaic (PV) facilities. These facilities may have constraints unrelated to the battery's charge/discharge cycle, such as a shared inverter between the battery and PV facility that places a limit on the combined output of the battery and PV facility, or a design such that the battery can only charge from the PV facility.⁶⁹ ISO-NE states that the Commission does not address ISO-NE's concerns about how co-located facility constraints might impact State of Charge accounting and how various day-ahead approaches might impact co-located storage-PV resources.⁷⁰

2. Commission Determination

31. We deny rehearing and affirm the finding that issues regarding the participation of electric storage resources co-located with other resources in ISO-NE markets are beyond the scope of this proceeding because Order No. 841 did not address co-location of electric storage resources with other resources.⁷¹ Accordingly, the fact that ISO-NE's failure to account for State of Charge and Duration Characteristics in the day-ahead market might better accommodate co-located facilities has no bearing on whether ISO-NE's electric storage resource participation model complies with Order No. 841. We note, however, that nothing in the Commission's directives precludes ISO-NE from developing market rules tailored to electric storage resources that are co-located with generation.

D. Software and Other Regional Efforts

1. Rehearing Request

32. ISO-NE contends that the Commission did not consider ISO-NE's explanation that expending significant resources to change the day-ahead market on the current software platform is not an optimal course of action because ISO-NE is in the process of re-architecting its software.⁷² ISO-NE also claims that the Commission disregarded its concern that such a change should not proceed before the re-architecture of ISO-NE's

⁶⁸ ISO-NE Rehearing Request at 19.

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ Compliance Order, 169 FERC ¶ 61,140 at P 35.

⁷² ISO-NE Rehearing Request at 19.

day-ahead market software.⁷³ Additionally, ISO-NE states that the Commission did not acknowledge its arguments that further efforts to improve storage rules should wait until after implementation when ISO-NE and participants have gained more insight into the operational requirements of electric storage resources.⁷⁴

33. Finally, ISO-NE argues that accounting for electric storage resources' State of Charge and Duration Characteristics in the day-ahead market could jeopardize the timing of critical efforts that directly impact the day-ahead market, such as addressing issues pertaining to electric storage resources co-located with intermittent resources, re-architecture of the day-ahead software, and addressing New England energy security issues.⁷⁵

2. Commission Determination

34. The Commission recognizes that revising the day-ahead market software to account for the State of Charge and Duration Characteristics of electric storage resources will require time and resource-intensive software upgrades. We note that in its February 10, 2020 compliance filing, ISO-NE requests that, if the Commission denies rehearing, the Commission allow for an effective date of January 1, 2026 for these software upgrades to take place.⁷⁶ The issue of the effective date for compliance is pending before the Commission in Docket No. ER19-470-004, and we will address ISO-NE's request in that docket.

⁷³ *Id.* at 19-20.

⁷⁴ *Id.* at 20 (citing ISO-NE Answer at 3).

⁷⁵ *Id.*

⁷⁶ *See* Transmittal at 7 n.23.

The Commission orders:

(A) ISO-NE's request for rehearing is hereby denied, as discussed in the body of this order.

(B) ISO-NE's motion to accept a late-filed rehearing request is hereby dismissed, as discussed in the body of this order.

By the Commission.

(S E A L)

Kimberly D. Bose,
Secretary.