169 FERC ¶ 61,225
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

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

New York Independent System Operator, Inc. Docket Nos. ER19-467-000
ER19-467-001
ER19-467-002

ORDER ON COMPLIANCE FILING

(Issued December 20, 2019)

1. On December 3, 2018, as amended on May 1, 2019 and May 31, 2019, New York Independent System Operator, Inc. (NYISO) submitted proposed revisions to its Market Administration and Control Area Services Tariff (Services Tariff) and Open Access Transmission Tariff (OATT)[1] in compliance with the requirements of Order No. 841,[2] 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). In this order, we accept in part, and reject in part, NYISO's compliance filing, subject to a further compliance filing to be submitted within 60 days of the date of issuance of this order, as discussed below. As part of its further compliance filing, we direct NYISO to propose an effective date for its compliance filing that is no later than May 1, 2020, as discussed below.[3]

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.[4] The Commission

[1] Appendix A lists the Services Tariff and OATT sections filed by NYISO. Capitalized terms that are not defined in this order have the meaning specified in Section 2 of the Services Tariff or section 1 of the OATT.

[2] *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).

[3] *See infra* P 223.

[4] Order No. 841, 162 FERC ¶ 61,127 at P 1.

modified section 35.28 of its regulations[5] 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.[6]

3. Order No. 841 required 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.[7] 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).[8]

II. Compliance Filing

4. In its December 3, 2018 filing, NYISO proposes tariff revisions to establish a new participation model (i.e., a dispatch-only model) for electric storage resources' participation in the NYISO-administered energy, ancillary services, and Installed Capacity markets.[9] NYISO explains that the proposed tariff revisions build upon NYISO's existing Commission-approved market, planning, and market power mitigation

[5] 18 C.F.R. § 35.28 (2019).

[6] 16 U.S.C. § 824e (2018).

[7] 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.*

[8] *Id.* P 4.

[9] Compliance Filing, Transmittal at 1.

provisions and are designed to be compatible with existing rules and processes.[10] NYISO asserts that its proposed tariff revisions are just and reasonable and fully comply with the directives of Order No. 841.

5. NYISO requests an effective date of no earlier than May 1, 2020 for the proposed tariff revisions because the software platform upon which the proposed tariff revisions will be implemented is currently undergoing a significant upgrade.[11] NYISO proposes to submit a filing at least two weeks in advance of its intended effective date, specifying the date on which the tariff revisions submitted in this compliance filing will take effect. NYISO also requests that the proposed tariff revisions concerning the reinstatement of the Category III Examined Facilities under the Buyer Side Market Power (BSM) Rules become effective one day after the Commission issues an order accepting them, unless the timing of the order is such that immediate effectiveness would disrupt NYISO's administration of its Class Year process or the BSM Rules.[12]

6. On April 1, 2019, Commission staff issued a data request advising NYISO that additional information was necessary to process its December 3, 2018 filing (Data Request).[13] On May 1, 2019, in Docket No. ER19-467-001, NYISO filed a response to the Data Request, which amended its compliance filing (Data Request Response).

7. On May 31, 2019, in Docket No. ER19-467-002, NYISO filed limited tariff revisions amending its compliance filing, and requested that these revisions become effective on the dates originally proposed in its December 3, 2018 compliance filing (Amended Compliance Filing).

III. Notice of Filing and Responsive Pleadings

8. Notice of NYISO's December 3, 2018 filing was published in the *Federal Register*, 83 Fed. Reg. 63,852 (2018), with interventions and protests due on or before

[10] *Id.* at 2.

[11] *Id.* at 2.

[12] *Id.* at 65.

[13] *N.Y. Indep. Sys. Operator, Inc.*, Docket No. ER19-467-000, at 1 (Apr. 1, 2019).

December 24, 2018. On December 14, 2018, the Commission extended the comment period until and including February 7, 2019.[14]

9. Notice of NYISO'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.

10. Notice of NYISO's May 31, 2019 Amended Compliance Filing was published in the *Federal Register*, 84 Fed. Reg. 26,412 (2019), with interventions and protests due on or before June 21, 2019.

11. Advanced Energy Economy; American Public Power Association; City of New York; Earthjustice; Electric Power Supply Association; EDF Renewables, Inc. (EDF Renewables); Energy Storage Association; Exelon Corporation; GlidePath Development LLC; Helix Ravenswood, LLC; Independent Power Producers of New York, Inc. (IPPNY); Institute for Policy Integrity, New York University School of Law (Institute for Public Integrity); Lincoln Clean Energy, LLC; Natural Resources Defense Council (NRDC) and the Sustainable FERC Project; National Rural Electric Cooperative Association (NRECA); New York Association of Public Power; NextEra Energy Resources, LLC (NextEra); NRG Power Marketing LLC; Penn Oak Services, LLC; NYISO Market Monitoring Unit (NYISO MMU); New York Transmission Owners (NYTOs);[15] and Voith Hydro, Inc. (Voith Hydro) filed timely motions to intervene.

12. Advanced Energy Economy; the Institute for Policy Integrity; IPPNY; NYISO MMU;[16] NYTOs; and Voith Hydro filed timely comments. Tesla, Inc. (Tesla) also filed timely comments but did not file a motion to intervene.

---

[14] 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 (December 14, 2018).

[15] NYTOs include Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., Niagara Mohawk Power Corporation d/b/a National Grid, New York Power Authority, New York State Electric & Gas Corporation, Orange and Rockland Utilities, Inc., Power Supply Long Island, and Rochester Gas and Electric Corporation.

[16] NYISO MMU filed comments on February 25, 2019 and May 22, 2019. We note that NYISO MMU characterized its February 25, 2019 pleading as an answer. We treat NYISO MMU's February 25, 2019 pleading as comments because, in substance, NYISO MMU provided comments on NYISO's December 3, 2019 filing.

13. City of New York; NextEra; EDF Renewables; Energy Storage Association; IPPNY; NRDC;[17] NYTOs; and Public Interest Organizations filed timely protests.[18]

14. New York State Public Service Commission and New York State Energy Research and Development Authority (together, New York State Entities) collectively filed a notice of intervention, timely motion to intervene, and protests.

15. On February 22, 2019, New York State Entities, NRECA, and NYISO each filed answers. On February 27, 2019, IPPNY filed an answer. On March 22, 2019, Energy Storage Association filed an answer.

IV. Discussion

A. Procedural Matters

16. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2019), the notices of intervention and timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding. The entities that filed protests or comments but did not file motions to intervene are not parties to the proceeding.[19]

17. 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.

[17] NRDC filed a protest on May 15, 2019. We note that NRDC characterized its May 15, 2019 pleading as an answer. We treat NRDC's May 15, 2019 pleading as a protest because, in substance, NRDC protested NYISO's May 1, 2019 Data Request Response.

[18] Public Interest Organizations include NRDC, Earthjustice, Sustainable FERC Project, Acadia Center, Sierra Club, and Association of Affordability, Inc.

[19] 18 C.F.R. § 385.211(a)(2) (2019). Tesla filed comments but did not file a motion to intervene. As part of Public Interest Organizations' protest, Acadia Center, Sierra Club, and Association of Affordability, Inc. filed protests but did not file motions to intervene. Although we do not grant party status to these entities, we address Tesla's comments and Public Interest Organizations' protest in this order.

B. Substantive Matters

18. As discussed below, we accept in part, and reject in part, NYISO's compliance filing, subject to a further compliance filing to be submitted within 60 days of the date of issuance of this order. As part of its further compliance filing, we direct NYISO to propose an effective date for its compliance filing that is no later than May 1, 2020, as discussed below.

19. As a preliminary matter, we find that NYISO's proposal complies with the requirement that each RTO/ISO establish a minimum size requirement that does not exceed 100 kW for participation of electric storage resources in the RTO/ISO markets.[20] NYISO proposes a minimum size requirement of 100 kW.[21] NYISO's compliance with this requirement is not contested. All remaining compliance requirements and all comments and protests are addressed below.

1. Definition of Electric Storage Resource

20. To identify the set of resources that are eligible to use the required participation model for electric storage resources, Order No. 841 revised section 35.28(b) of the Commission's regulations[22] to define an electric storage resource as "a resource capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid."[23] Order No. 841 explained that this definition is intended to cover electric storage 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 (e.g., batteries, flywheels, compressed air, and pumped-hydro). Additionally, Order No. 841 provided that electric storage resources located on the interstate transmission system, on a distribution system, or behind the meter fall under this definition. Further, because electric storage resources that inject electric energy back to the grid for purposes of participating in an RTO/ISO market are engaging in a sale of electric energy at wholesale in interstate commerce, the Commission found that they must fulfill certain responsibilities set forth in the FPA and the Commission's rules and regulations.[24] However, the Commission declined for purposes of Order No. 841 to

[20] Order No. 841, 162 FERC ¶ 61,127 at P 270.

[21] Compliance Filing, Transmittal at 23; proposed Services Tariff, § 4.1.4.

[22] 18 C.F.R § 35.28(b).

[23] Order No. 841, 162 FERC ¶ 61,127 at P 29.

[24] *Id.* P 30. Examples of such responsibilities include filing rates under FPA section 205 (potentially including obtaining market-based rate authority); submitting filings related to corporate mergers and other activities under FPA sections 203 and 204;

broaden the definition of "electric storage resources" to apply to behind-the-meter electric storage resources that do not inject electricity onto the grid.[25] Further, the definition of an electric storage resource excludes a resource that is either: (1) physically incapable of injecting electric energy back onto the grid due to its design or configuration; or (2) contractually barred from injecting electric energy back onto the grid.[26]

a. NYISO's Filing

21. Under NYISO's new dispatch-only participation model, NYISO proposes to define Energy Storage Resource to include:

> Generators that receive Energy from the grid at a specified location, and are capable of storing that Energy, for later injection back onto the grid at the same location. Resources that cannot inject Energy onto the grid cannot be Energy Storage Resources. In order to qualify for wholesale market participation, Energy Storage Resources must be able to inject at a rate of at least 0.1 MW for a period of at least one hour. Energy Storage Resources are Withdrawal-Eligible Generators.[27]

NYISO adds that its proposed qualification requirements do not limit the electric storage facilities eligible to use its participation model to a particular type of electric storage facility or technology.[28]

---

and fulfilling FPA section 301 accounting obligations and FPA section 305(b) interlocking directorate obligations. *Id.* n.50 (citing 16 U.S.C. §§ 824b, 824c, 824d, 825, 825d(b)).

[25] *Id.* P 32.

[26] *Id.* P 33.

[27] Compliance Filing, Transmittal at 12-13; proposed Services Tariff, § 2.5. A Withdrawal-Eligible Generator is "[a] Generator that is eligible to withdraw energy from the grid at a price for the purposes of recharging or refilling for later injection back into the grid." NYISO Services Tariff, § 2.23, Definitions - W.

[28] Compliance Filing, Transmittal at 13.

b. Protests/Comments

22. New York State Entities contend that NYISO fails to comply with the Order No. 841 directive to eliminate market barriers by proposing a participation model that prohibits resource aggregation, which in turn will prevent smaller resources from entering the market and should be rejected.[29] Tesla urges the Commission to require NYISO to apply existing rules regarding aggregation to electric storage resources until NYISO submits tariff revisions to change the existing rules to accommodate electric storage resources.[30]

c. Data Request Response

23. In its Data Request, Commission staff asked NYISO to provide the rationale for including the phrase "at a specified location" in the definition of Energy Storage Resource, and to explain whether this definition would prevent the aggregation of Energy Storage Resources. In its Data Request Response, NYISO states that it included the phrase "at a specified location" in its definition of Energy Storage Resource so that an electric storage facility must receive and inject energy at the same location on the grid to qualify as an Energy Storage Resource. NYISO states that, consistent with its definition, electric storage facilities that are aggregated behind the same meter at the same point of interconnection may qualify and participate as a single Energy Storage Resource in the NYISO-administered markets.[31] NYISO also explains that it included this location requirement because, at the time of the compliance filing, it did not have rules that would permit an aggregation of electric storage facilities at multiple, disparate locations to qualify and participate in the NYISO-administered markets as a single Energy Storage Resource. However, NYISO states that its stakeholders recently approved tariff changes to establish new market rules for aggregations, which apply to all Generators, including Distributed Energy Resources,[32] electric storage resources, and other resources located at different interconnection points behind the same transmission node.[33]

---

[29] New York State Entities at 10-11, 38-39.

[30] Tesla Comments at 23-24.

[31] NYISO Data Request Response at 2 n.8.

[32] *Id*. at 3.

[33] *Id*. at 2-3 n.9 (noting that it believes that requirements for aggregation of electric storage resources "should be addressed through each region's stakeholder process to accommodate each region's unique market framework, system characteristics, and operational requirements.").

d. Commission Determination

24. We find that NYISO's proposed definition of an Energy Storage Resource complies with the requirements of Order No. 841 because an electric storage resource participating in the NYISO-administered markets is capable of receiving electric energy from the grid and storing it for later injection back to the grid, regardless of their storage medium. We also find that, as required by Order No. 841, NYISO's proposed Energy Storage Resource definition covers electric storage resources capable of receiving electric energy from the grid and storing it for later injection back to the grid, regardless of whether the resources are located on the interstate transmission system, on a distribution system, or behind the meter.

25. In response to New York State Entities' and Tesla's comments, we also find that NYISO's compliance proposal to prohibit aggregation of electric storage facilities at multiple, disparate locations does not conflict with Order No. 841. Order No. 841 only requires RTOs/ISOs to address the participation of non-aggregated electric storage resources in RTO/ISO markets.[34] We note that, on June 27, 2019, in Docket No. ER19-2276-000, NYISO filed proposed tariff revisions to implement its new market rules for aggregations, including aggregation requirements for Distributed Energy Resources, electric storage resources, and other resources located at different interconnection points behind the same transmission node. Those tariff revisions are currently pending before the Commission.

2. Creation of a Participation Model

a. Participation Model

26. 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.[35] 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.[36] Order No. 841 requires

[34] Order No. 841-A, 167 FERC ¶ 61,154 at PP 30, 143, 155.

[35] Order No. 841, 162 FERC ¶ 61,127 at P 51.

[36] *Id.* P 52.

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.

27. 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 propose such revisions to its tariff through a separate FPA section 205 filing.[37] 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.[38] 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.

28. 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.[39] 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. 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. This issue is discussed further in the Energy Used to Charge Electric Storage Resources section below.

i. NYISO's Filing

29. NYISO proposes to establish a new participation model that facilitates the participation of Energy Storage Resources in the NYISO-administered energy, ancillary services, and Installed Capacity markets. Specifically, NYISO's proposed tariff revisions

[37] *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.

[38] Order No. 841, 162 FERC ¶ 61,127 at P 55.

[39] *Id.* P 56.

treat Energy Storage Resources as "dispatch-only," which means that Energy Storage Resources will offer energy using fully dispatchable, continuous bid curves across their operating ranges. That is, Energy Storage Resources will be treated as always available for dispatch, consistent with their bids.[40] According to NYISO, Energy Storage Resources will be required to be dispatchable when they are physically available.[41] NYISO explains that electric storage facilities using this participation model will be modeled as available and ready for dispatch whenever bids are submitted and will be permitted to submit an incremental bid-curve representing the entire range of the Energy Storage Resource's capability.[42] NYISO states that withdrawals of energy that are stored for later injection back to the grid will be treated as "negative generation," and therefore will be part of the supply stack. Since such withdrawals are supply, NYISO explains that energy withdrawals will be settled at the applicable Generator bus Locational Based Marginal Price (LBMP) and will be able to set the market clearing price.[43]

30. NYISO states that it considered an alternative proposal that would allow Energy Storage Resources to be evaluated for both commitment and dispatch.[44] However, NYISO determined that it is not technically feasible at this time to allow Energy Storage Resources with non-continuous operating ranges between injecting and withdrawing states (i.e., injecting, withdrawing, and off) to submit bids to inject and withdraw energy in the same market hour, because doing so significantly increases the time for its software to develop day-ahead market and real-time market solutions.[45] Thus, NYISO proposes a participation model that recognizes only one operating state (i.e., on) and treats Energy Storage Resources as fully dispatchable within their operating range.[46]

31. NYISO states that electric storage facilities with non-continuous dispatch ranges can elect to participate in NYISO's new dispatch-only participation model, but that such

[40] Compliance Filing, Transmittal at 9, 19.

[41] *Id*. at 9, 19.

[42] *Id*. at 9; proposed Services Tariff, §§ 4.2.3, 4.4.1.1.

[43] Compliance Filing, Transmittal at 9; proposed Services Tariff, § 17.1.

[44] Compliance Filing, Transmittal at 19.

[45] *Id*. at 19.

[46] *Id*. at 19-20 & n.46.

resources may have to buy out their position if they are dispatched to a level that falls within their infeasible operating range.[47]

32. NYISO explains that, under its new participation model, Energy Storage Resources are a subset of Generators[48] under the NYISO Services Tariff. NYISO states that, to qualify as an Energy Storage Resource, an electric storage facility must satisfy the qualification requirements to be a Generator, as well as other specified additional qualification requirements that take into account the physical and operational characteristics of electric storage facilities, the directives of Order No. 841, and the capabilities of NYISO's markets and settlements software.[49] NYISO further states that it has revised its registration requirements and market rules to integrate Energy Storage Resources into its existing market and settlements constructs to provide, to the extent possible, comparable treatment of Energy Storage Resources and other participants in the NYISO-administered markets.[50] NYISO explains that its proposed revisions also eliminate barriers to entry for the participation of Energy Storage Resources based on their physical and operational characteristics.[51]

33. NYISO states that, under its proposal, an electric storage facility participating in NYISO's participation model may submit bids to withdraw and inject energy, can self-schedule megawatts (MW) to withdraw and inject energy, and can set the wholesale market clearing prices.[52] NYISO states that "an electric storage facility using the Energy Storage Resource participation model is also eligible to provide cost-based Ancillary Services that the NYISO does not procure through an organized market, such as Voltage Support Service."[53]

34. Additionally, NYISO states that, if an Energy Storage Resource is unable to respond to a dispatch signal, it may be subject to settlement charges for not following its

[47] *Id*. at 21.

[48] *Id*. at 8; proposed Services Tariff, § 2.5.

[49] Compliance Filing, Transmittal at 8.

[50] *Id*. at 8.

[51] *Id*.

[52] *Id*. at 9; proposed Services Tariff, § 17.1.

[53] Compliance Filing, Transmittal at 8-9.

Base Point Signal.[54] NYISO explains that an Energy Storage Resource will be subject to a Persistent Undergeneration Charge[55] when it persistently operates below its energy schedule, subject to a *de minimis* tolerance band, and a Persistent Over-Withdrawal Charge[56] when it persistently withdraws energy at a level exceeding its scheduled withdrawal level, subject to the same *de minimis* tolerance band. Also, NYISO proposes revisions to its market monitoring requirements to evaluate Energy Storage Resources for economic and physical withholding.[57]

35. NYISO states that under its existing market rules, electric storage facilities can currently participate in the NYISO-administered markets under various existing participation models of Generators, Energy Limited Resources, Limited Energy Storage Resources,[58] or as a component of a Demand Side Resource in certain demand response programs. NYISO further explains that, although electric storage facilities are currently eligible to participate as Generators in the NYISO-administered energy and ancillary services markets, the existing market rules are not tailored to the operating characteristics of electric storage facilities.[59]

36. In its initial compliance filing, NYISO submitted tariff revisions to offer its Energy Limited Resources model[60] as an Order No. 841-compliant participation model

---

[54] *Id*. at 10; proposed Services Tariff, § 4.2.1.3.4.

[55] Compliance Filing, Transmittal at 33; proposed Services Tariff, § 15.3A.2.8, Rate Schedule 3-A. The existing Persistent Undergeneration Charge is a charge assessed to generators that persistently undergenerate energy in real-time as compared to their real-time schedules. Compliance Filing, Transmittal at 33.

[56] *Id*. at 33; proposed Services Tariff, § 15.3A.1.2, Rate Schedule 3-A.

[57] Compliance Filing, Transmittal at 10; proposed Services Tariff, §§ 23.2.4.1.1, 23.2.4.1.2, 23.3.1.2.1.1.1, 23.3.1.2.1.1.2, 23.3.1.2.2.6, 23.3.1.2.1.4, 23.3.1.2.1.5, 23.3.3.3.1.3.3, 23.3.1.3, 23.3.1.3.2, 23.3.1.3.2.1, 23.3.1.3.2.2, 23.3.1.3.2.1, and 23.3.1.4.1.

[58] Limited Energy Storage Resources are generators that are not able to sustain continuous operation at maximum energy withdrawal or maximum energy injection for a minimum period of one hour. Compliance Filing, Transmittal at 6.

[59] *Id*.

[60] Energy Limited Resources are Installed Capacity Suppliers that are unable to operate continuously on a daily basis due to certain restrictions (e.g., environmental restrictions or the need to re-charge), but that can provide energy for at least four contiguous hours each day. *Id*. NYISO's Energy Limited Resource construct is available to accommodate resources capable of withdrawing energy for later injection back onto

because it asserts that, under that model, Energy Limited Resources (e.g., pumped-hydro resources) are eligible to withdraw energy in order to charge or refill.[61] However in its Amended Compliance Filing, NYISO withdrew its tariff revisions for the Energy Limited Resources model because it determined that it will not be possible for the model to comply with Order No. 841 by NYISO's proposed effective date for the compliance filing.[62] NYISO explains that its software for the Energy Limited Resources model does not allow electric storage facilities, other than the Blenheim-Gilboa Pumped Storage Power (Gilboa Pumped Storage Power Project), to bid to withdraw energy from the grid.[63] NYISO asserts that it expects its new Energy Storage Resource participation model to be a superior model for electric storage resources because the model will allow a resource to offer to be dispatched from its maximum withdrawal level (its Lower Operating Limit) to its maximum injection level (its Upper Operating Limit).[64]

ii. Protests/Comments

37. Energy Storage Association argues that NYISO's conclusion that its software can only accommodate electric storage resources that are continuous and can operate in a dispatch-only mode (i.e., without any commitment parameters) results in unequal treatment under NYISO's new dispatch-only participation model.[65] Energy Storage Association disagrees with NYISO's position that it is equivalent treatment to allow non-continuous storage resources to use either the existing Energy Limited Resource participation model, which is designed for pumped-hydro resources, or the Energy Storage Resource participation model, under which these resources bear the risk of being

---

the grid (due to energy limitations, environmental restrictions or other non-economic reasons), but the minimum generation level and/or minimum withdrawal level will be reflected in the resources' bids. *Id*. at 21.

[61] *See* proposed revisions to the definition of Energy Limited Resource, NYISO Services Tariff, § 2.5, Definitions - E.

[62] Amended Compliance Filing, Transmittal at 1-2. NYISO states that its withdrawal of the tariff revisions will not affect tariff provisions that the Commission has previously accepted for the Energy Limited Resources model. *Id*. at 6.

[63] *Id*. at 1. NYISO notes that the Gilboa Pumped Storage Project is the only pumped storage resource in the New York Control Area that is able to withdraw energy from the grid as negative energy to fill its reservoirs. NYISO Data Request Response at 33.

[64] Amended Compliance Filing, Transmittal at 3.

[65] Energy Storage Association Protest at 15.

dispatched in their infeasible range.[66] Energy Storage Association argues that the Commission intended for Order No. 841 to apply to all types of electric storage resources and NYISO's lack of a proposal to ensure that non-continuous storage receives non-discriminatory treatment does not comply with the order.[67]

38. Advanced Energy Economy states that NYISO's compliance filing falls short of full compliance by treating electric storage resources differently from other resources with respect to recovering start-up and no-load costs.[68]

39. Voith Hydro generally urges the Commission and the RTOs/ISOs to take into account the technical capability of pumped-hydro in providing a number of services in the RTO/ISO markets. For example, pumped hydro has the ability to: (1) provide reliable, long duration generation capacity; (2) deliver energy from all sources (e.g., pumped hydro can store excess energy generated by nuclear plants during off-peak hours and then release the energy back to the grid during peak hours); (3) provide spinning and non-spinning reserves; (4) provide black start capabilities; and (5) set the wholesale market clearing price.[69]

40. Energy Storage Association states that it is unclear how NYISO's Order No. 841 compliance approach will be applied to electric storage resources co-located with generation. Energy Storage Association concludes that this is an issue that needs further evaluation and, accordingly, requests that the Commission open a generic docket focused on tariff provisions for co-location.[70] Energy Storage Association argues that NYISO's filing does not address the myriad ways in which Order No. 841 compliance affects the market participation of hybrid resources that include energy storage.[71] Energy Storage

---

[66] *Id*. (citing Compliance Filing, Transmittal at 21).

[67] *Id*. (citing Order No. 841, 162 FERC ¶ 61,127 at P 61 ("[qualification criteria] must not limit participation under the electric storage resource participation model to any particular type of electric storage resource or other technology and must 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.")).

[68] Advanced Energy Economy Comments at 2.

[69] Voith Hydro Comments at 2-7.

[70] Energy Storage Association Comments at 16.

[71] Energy Storage Association explains that questions regarding what category hybrid resources should register as; how they are parameterized in market software; what their capacity value is; how they interconnect; and other topics need to be addressed. *Id*.

Association concludes that lack of clarity in these matters may ultimately constrain the participation of hybrid resources that include electric storage, and therefore may represent an unreasonable barrier to market participation.[72]

41. Public Interest Organizations state that it may be economically efficient to co-locate generation and storage project components behind a single point of interconnection onto the NYISO system.[73] Public Interest Organizations therefore request that the Commission open a generic docket to develop market rules for electric storage resources that are co-located with generation.[74]

iii. Data Request Response

42. In its Data Request Response, NYISO states that the advanced technologies being considered for future deployment in New York as Energy Storage Resources, including the projects in the existing queue, will be continuously dispatchable whenever they are available.[75] NYISO also states that these advanced technologies, which are batterybased, will not have start-up costs.[76] NYISO therefore expects all these electric storage resources that participate through its new dispatch-only model will be able to recover their costs through incremental offers.[77]

iv. Commission Determination

43. We find that NYISO's proposed tariff revisions establishing a new dispatch-only participation model for Energy Storage Resources comply with the requirement of Order No. 841 to create a participation model for electric storage resources that ensures the eligibility of such resources to participate in NYISO's markets in a way that recognizes their physical and operational characteristics. We find that NYISO's proposal will facilitate the participation of all types of electric storage technologies and will allow these resources to be compensated for the wholesale services that they provide in the same manner as other resources that provide these services.

---

[72] *Id*.

[73] Public Interest Organizations Protest at 29.

[74] *Id*. at 28.

[75] NYISO Data Request Response at 8-9.

[76] *Id*. at 19.

[77] *Id*.

44. In particular, NYISO demonstrates that its proposed dispatch-only participation model is available to all electric storage technologies, including pumped-hydro resources, and thus NYISO's proposed model complies with Order No. 841 in that respect. Although electric storage facilities that do not have a continuous dispatch range, such as pumped-hydro resources, must buy out of their position should they be dispatched under the new dispatch-only participation model to a level that falls within their infeasible operating range, we find that this buy-out requirement is reasonable given the physical and operational characteristics of these non-continuous electric storage resources, and allows them to be able to participate in NYISO's markets under NYISO's dispatch-only participation model.

45. Further, as Order No. 841 explains, while the participation model for electric storage resources should be designed to facilitate the participation of all types of electric storage technologies, the Commission does not require all electric storage resources to use that participation model. For example, NYISO states that most pumped-hydro resources lack the flexibility to withdraw energy as negative generation and thus cannot use the proposed Energy Storage Resource participation model. We note that they may still choose to use the Energy Limited Resource model to participate in the NYISO-administered markets.[78]

46. NYISO expects the Energy Storage Resource participation model to be superior to its existing Energy Limited Resource model for electric storage resources because a resource can inject energy in one interval and withdraw energy in the next interval assuming that the LBMP at its location changes. We agree. In contrast, as NYISO points out, NYISO's Energy Limited Resources lack such flexibility because NYISO's software does not allow new resources to withdraw energy from the grid to charge or refill.

47. With respect to Advanced Energy Economy's argument regarding Energy Storage Resources' inability to recover start-up and no-load costs under NYISO's participation model, we agree with NYISO that currently available battery-based Energy Storage Resources do not have start-up or no-load costs because they are already synchronized with the grid and can be dispatched from an idle state, and all Energy Storage Resources will be able to recover all of their incremental operating costs through their incremental offers when they are scheduled to operate.[79] As discussed below under Section 2.c of this order (Relationship Between Electric Storage Participation Model and Existing Market Rules), we find that NYISO's dispatch-only model does allow resources to include relevant costs, including opportunity costs, in their energy market bids, similar to other market participants. Therefore, while NYISO's model does not specify start-up, no-load,

[78] Amended Compliance Filing, Transmittal at 3.

[79] NYISO Data Request Response at 9, 19.

or related commitment costs, we find that its proposed treatment of Energy Storage Resources is consistent with how it treats other generators with respect to allowable cost recovery.[80]

48. Regarding Voith Hydro's concerns regarding the technical capability of pumped-hydro resources in providing a number of services in the NYISO market, Order No. 841 states that an RTO/ISO may use a separate participation model for pumped-hydro resources to participate in an RTO's/ISO's markets. Voith Hydro's Gilboa Pumped Storage Project participates in the NYISO markets through NYISO's Energy Limited Resources model. In Order No. 841, the Commission did not require an RTO/ISO to consolidate existing participation models with the participation model for electric storage resources required by Order No. 841.[81] We note that Voith Hydro may choose to participate in NYISO's new participation model for Energy Storage Resources if it buys out of its position should it be dispatched to a level that falls within its infeasible operating range, and we believe that this buy-out requirement is reasonable given the physical and operational characteristics of these non-continuous electric storage resources.

49. Finally, 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 NYISO-administered markets to be beyond the scope of this compliance proceeding.

b. Qualification Criteria for the Participation Model

50. 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).[82] 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.

---

[80] *Id*. at 19.

[81] Order No. 841, 162 FERC ¶ 61,127 at P 55.

[82] *Id.* P 61.

51. Order No. 841 provides each RTO/ISO with flexibility to propose qualification criteria that best suit its participation model for electric storage resources.[83] However, the qualification criteria should not create barriers to the participation of any electric storage 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.[84]

i. NYISO's Filing

52. NYISO states that, under its proposed definition of an Energy Storage Resource, an electric storage facility must: (1) satisfy NYISO's qualification requirements to be a Generator; (2) be capable of receiving electric energy from the grid and storing it for later injection back to the grid, as required in the Order No. 841 definition of "electric storage resources;" (3) be able to inject electric energy onto the grid; (4) receive and inject energy at the same location on the grid; and (5) be able to inject at a rate of at least 0.1 MW of energy for a period of at least one hour.[85] NYISO explains that the proposed qualification requirements do not limit the electric storage facilities eligible to use the Energy Storage Resource participation model to a particular type of electric storage facility or technology.[86] NYISO explains that these specific qualification criteria reflect Energy Storage Resources' unique physical and operational characteristics and comply with the directives in Order No. 841.[87]

ii. Commission Determination

53. We find that the qualification criteria provided in NYISO's tariff comply with the requirements of Order No. 841 because NYISO's qualification criteria are based on the physical and operational characteristics of electric storage resources and ensure that NYISO is able to dispatch a resource in a way that recognizes its physical and operational characteristics and optimizes its benefits to NYISO. Under NYISO's proposal, an Energy Storage Resource will be able to inject electric energy onto the grid and receive energy at the same location on the grid. We also find that NYISO's qualification criteria do not create barriers to the participation of any electric storage resource in the NYISO-

---

[83] *Id.* P 63.

[84] *Id.* P 64.

[85] Compliance Filing, Transmittal at 13; proposed Services Tariff, § 2.5.

[86] Compliance Filing, Transmittal at 13.

[87] *Id*. at 8. Section 5 of this order discusses the physical and operational characteristics of NYISO's energy storage resources.

administered markets and are inclusive of those resources set forth under the Commission's definition of electric storage resources.

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

54. 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 required 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.[88] Order No. 841 allowed the use of one or more existing market participation agreements so long as the agreement complies with the terms of Order No. 841.[89]

i. NYISO's Filing

55. NYISO states that Energy Storage Resources will be required to register with NYISO pursuant to its existing customer registration process in order to participate in the markets.[90] NYISO explains that Energy Storage Resources will also have to execute service agreements under NYISO's OATT and Services Tariff, and satisfy the existing customer registration requirements, as modified for Energy Storage Resources.[91] NYISO also proposes to include as part of its registration process requirements that an Energy Storage Resource must: (i) purchase charging energy from NYISO at the wholesale LBMP; and (ii) provide an attestation that metering is sufficient to identify only that energy that is withdrawn for later injection back to the grid.[92] NYISO adds that it also

[88] Order No. 841, 162 FERC ¶ 61,127 at P 68.

[89] *Id.* P 69.

[90] Compliance Filing, Transmittal at 15.

[91] *Id*.

[92] *Id*.

proposes to amend its customer registration materials to require an Energy Storage Resource to submit information concerning the parameters specified in Order No. 841.[93]

56. As noted above, NYISO states that, under its existing market rules, electric storage facilities can currently participate in the NYISO-administered markets under various existing participation models of Generators, Energy Limited Resources, Limited Energy Storage Resources, or as a component of a Demand Side Resource in certain demand response programs.[94] However, in its Amended Compliance Filing, NYISO submits tariff corrections to reflect its inability to permit electric storage facilities (other than the Gilboa Pumped Storage Project) that participate in its markets as Energy Limited Resources to bid to withdraw energy at their electrical locations.[95]

57. NYISO proposes modifications to Sections 23.2.1 and 23.4.5.7 of its Services Tariff to apply its existing BSM Rules to all Energy Storage Resources.[96] NYISO states that, as a class of Generator, all Energy Storage Resources larger than 2 MW will be subject to the same BSM Rules as other types of Generators larger than 2 MW.

58. NYISO also proposes new changes to the BSM Rules that would govern new Generators that are 2 MW or less, including Energy Storage Resources. NYISO states that this would provide consistency across how all Generators are treated.[97] NYISO asserts that, by making the BSM Rule revisions part of its compliance filing, NYISO will ensure that market participants and investors have clear notice of the BSM Rules' applicability to an Energy Storage Resource in a Mitigated Capacity Zone.[98] NYISO explains that the reason Generators 2 MW or less are not currently subject to the BSM Rules is because NYISO eliminated them from its list of facilities subject to BSM Rules

[93] These parameters are discussed in this order in Section 5 of this order, which discusses the physical and operational characteristics of NYISO's energy storage resources.

[94] Compliance Filing, Transmittal at 6.

[95] Amended Compliance Filing, Transmittal at 1.

[96] Services Tariff, §§ 23.2.1, 23.4.5.7. These sections are part of NYISO's BSM Rules.

[97] Compliance Filing, Transmittal at 51.

[98] *Id*.

(Examined Facilities) in 2016.[99] NYISO states that, at the time, NYISO did not believe that it was possible for new projects 2 MW or less, which NYISO referred to as Category III Examined Facilities, to enter NYISO's markets.[100]

59. NYISO proposes to allow Energy Storage Resources to account for intertemporal energy level constraints and reflect relevant opportunity costs related to intertemporal constraints in real-time bids.[101] To effectuate this, NYISO proposes to implement new software that will permit claimed opportunity costs along with an energy bid.[102] NYISO states that opportunity cost submissions must pass NYISO's screening process to be incorporated into an Energy Storage Resource's reference level.[103] NYISO proposes tariff revisions that will explicitly add opportunity costs as a component of a cost-based reference level, and a definition of opportunity cost to indicate how NYISO intends to review offers that include an opportunity cost component.[104] In addition, NYISO proposes to establish a new process, which parallels the existing process for adjusting fuel cost components of energy offers, to adjust opportunity costs when setting reference levels.[105]

60. In addition, NYISO proposes additional language concerning the types of conduct that may warrant mitigation.[106] Specifically, NYISO notes that if an electric storage resource refuses to offer bids or schedules to withdraw energy for later injection, then such refusal may constitute physical withholding.[107] NYISO further states that economic

---

[99] Examined Facilities are those facilities that are subject to evaluation, and potential mitigation, under the BSM Rules. *Id*.

[100] *Id*. at 52. *See N.Y. Indep. Sys. Operator, Inc*., 155 FERC ¶ 61,166, at P 1 n.3 (2016).

[101] Compliance Filing, Transmittal at 40. [102]

Id. at 55.

[103] *Id*.

[104] *Id*. at 58; proposed Services Tariff, § 23.3.1.4.1.3.

[105] Compliance Filing, Transmittal at 58-59.

[106] *Id*. at 56; proposed Services Tariff, § 23.2.4.1.1.

[107] Compliance Filing, Transmittal at 56; proposed Services Tariff, § 23.2.4.1.1.

withholding includes unjustifiably high bids to withdraw energy for generators that set (either indirectly or directly) a high market clearing price.[108]

ii. Protests/Comments

61. Some commenters generally support the application of the existing BSM Rules to Energy Storage Resources in NYISO. NYISO MMU agrees with NYISO that a special exemption for electric storage resources is not warranted.[109] Similarly, IPPNY asserts that NYISO must evaluate Generators as Examined Facilities to determine whether they are eligible for one of the exemptions listed in the Services Tariff, and if not exempt, the offer floor will apply.[110]

62. Other commenters oppose applying the existing BSM Rules to Energy Storage Resources. City of New York argues that the Commission should reject the application of NYISO's BSM Rules to Energy Storage Resources as unjust and unreasonable because the qualification requirements for Electric Storage Resources are more rigorous than for traditional generators.[111] New York State Entities argue that subjecting Energy Storage Resources to potential mitigation creates a significant economic and logistical barrier to electric storage resource market entry and participation while interfering with legitimate state policy objectives.[112] New York State Entities argue that, because electric storage resources do not have the incentive or ability to exercise market power, an exemption similar to the one the Commission recently approved for Special Case Resources

---

[108] Compliance Filing, Transmittal at 56; proposed Services Tariff, § 23.2.4.1.2. [109]

NYISO MMU February 25, 2019 Comments at 3-4.

[110] IPPNY February 7, 2019 Comments at 3. [111]

City of New York Protest at 9

[112] New York State Entities Protest at 13. *See also* Public Interest Organizations Protest at 11-14.

(SCRs)[113] should be applied to Energy Storage Resources.[114] Commenters also expressed concern that subjecting Energy Storage Resources to BSM measures would mean that these resources would be subject to NYISO's Class Year process, a burden commenters argue would be onerous and cause unnecessary delays.[115]

63. Some protestors argue the Commission should reject NYISO's proposal to reinstate Category III Examined Facilities as beyond the scope of Order No. 841 compliance because it would effectively extend BSM rules to all Generators, not only energy storage resources, that are 2 MW or less.[116] City of New York argues that NYISO's proposal is overly broad because it would extend BSM rules to resources that lack the incentive and ability to exercise market power.[117] NYTOs assert that the only justification NYISO provides for the changes is "the need for consistent rules across all generation types," but NYISO does not cite to any supporting language in Order No. 841.[118] NYTOs request that the Commission reject NYISO's proposed revisions to the BSM Rules because they would unnecessarily delay market entry for smaller Energy Storage Resources located in mitigated capacity zones, and will preclude meaningful evaluation by stakeholders of potential impacts, which is inconsistent with Order No. 841.[119]

---

[113] New York State Entities Protest at 14-18. The Services Tariff defines SCRs as: "Demand Side Resources whose Load is capable of being interrupted upon demand at the direction of the ISO, and/or Demand Side Resources that have a Local Generator, which is not visible to the ISO's Market Information System and is rated 100 kW or higher, that can be operated to reduce Load from the NYS Transmission System or the distribution system at the direction of the ISO..... " Services Tariff, § 2.19 (16.0.0).

[114] New York State Entities Protest at 14-16 (citing *N.Y. State Pub. Serv. Comm. v. N.Y. Indep. Sys. Operator, Inc*., 158 FERC ¶ 61,137 (2017)).

[115] City of New York Protest at 10-11; New York State Entities Protest at 23.

[116] City of New York Protest at 13-15; NYTOs February 7, 2019 Protest at 7; NYTOs May 22, 2019 Comments at 3-5; New York State Entities Protest at 28-30; Energy Storage Association Protest at 10-11; NRDC Comments at 4; Public Interest Organizations at 7-9.

[117] City of New York Protest at 9-10.

[118] NYTOs February 7, 2019 Protest at 5. [119]

Id. at 10.

64. In contrast, some commenters support NYISO's proposal to apply BSM Rules to Generators 2 MW or less by reinstating Category III Examined Facilities to the BSM Rules. NYISO MMU supports NYISO's proposal, and argues that if these rules are not reinstated, then resources under 2 MW will be mitigated automatically without any way to receive a legitimate exemption.[120] NYISO MMU argues that the size of resources is irrelevant because of the aggregate amount of generating capacity that receives out-of-market subsidies.[121]

65. Advanced Energy Economy states that NYISO's evaluation of opportunity costs may not fully address the opportunity costs that an Energy Storage Resource may face, which could result in NYISO inappropriately mitigating the Energy Storage Resource to a reference level offer below its true short-run marginal cost.[122] For example, Advanced Energy Economy argues that customers could face significant costs in higher demand charges if they opt to participate in NYISO's markets.[123]

iii. Answers

66. NYISO states that the rules for developing opportunity costs filed in this proceeding are already sufficient to permit Energy Storage Resources to demonstrate, and for NYISO to consider and accept (where appropriate) as a valid opportunity cost, the incremental cost increase that the co-located and co-metered retail load will incur if its retail demand charge increases as a result of wholesale market dispatch.[124]

67. NYISO clarifies that the proposed BSM Rules to reinstate Category III Examined Facilities do not revise the Class Year Process. NYISO explains that resources 2 MW or less are not subject to the Class Year delivery requirements. NYISO affirms that its proposal "would result in these resources being subject to a Buyer Side Mitigation evaluation in tandem with a Class Year Study, but would not subject such resources to the deliverability analysis within the Class Year Study itself."[125]

---

[120] NYISO MMU February 25, 2019 Comments at 5. [121]

Id. at 4.

[122] Advanced Energy Economy Comments at 13.

[123] *Id*.

[124] NYISO Answer at 14-15. [125]

Id. at 19.

68. In response to IPPNY's claims that the BSM Rules should apply to Energy Storage Resources, New York State Entities argue that electric storage resources smaller than 20 MW are not net buyers of capacity, do not have buyer-side market power, and have no incentive to suppress capacity prices.[126] New York State Entities also assert that any capacity price impacts from electric storage resources would be *de minimis*.[127] IPPNY answers that subsidized, uneconomic electric storage resources, no matter their size, can effectively artificially suppress Installed Capacity market prices, especially when combined with many other small resources.[128]

iv. Data Request Response

69. In response to Commission staff's Data Request, NYISO states that, because Commission precedent requires all new entrants to be evaluated under NYISO's BSM rules, it proposes to restore the BSM rules to resources 2 MW or less.[129] NYISO explains that under its currently effective BSM Rules, a resource 2 MW or less is not subject to mitigation and such resource would therefore not be "subject to mitigation automatically" if the Commission rejects NYISO's proposal to reinstate Category III Examined Facilities to the BSM Rules in this proceeding.

70. In response to Commission staff's Data Request, NYISO states that it expects Energy Storage Resources to recover all incremental costs, including opportunity costs,[130] when they are scheduled to operate.[131] NYISO adds that any generator, including an Energy Storage Resource, will be allowed to submit an Opportunity Cost

---

[126] New York State Entities Answer at 5-6.

[127] *Id*. at 7.

[128] IPPNY Answer at 8.

[129] NYISO Data Request Response at 22 (citing *N.Y. Pub. Serv. Comm'n v. N.Y. Indep. Sys. Operator, Inc*., 153 FERC ¶ 61,022 (2015) (rejecting multiple proposed exemptions from the BSM Rules that had not been justified)).

[130] According to NYISO, "opportunity cost is intended to reflect the revenue that the Energy Storage Resource forgoes by deviating from the wholesale market schedule that would result in the highest profits ("optimal schedule") for a given day-ahead or real-time market interval. Opportunity costs are anticipated to be the primary component of an Energy Storage Resource's marginal costs, and thus their Reference Levels." *Id.* at 9.

[131] *Id*.

Adjustment[132] with its day-ahead or real-time market bid, and an energy bid that includes any claimed opportunity costs.[133] Additionally, NYISO states that an Energy Storage Resource can submit either an alternative calculation of its opportunity costs or an entirely different type/category of opportunity cost for consideration.[134] NYISO specifies that it will determine whether the proposed alternate opportunity cost calculation or a different cost type estimate is appropriate, and therefore whether the alternate estimate should be included in the Energy Storage Resource's reference level. NYISO argues that the proposed market rules for developing opportunity costs "would permit an Energy Storage Resource to demonstrate, and permit NYISO to consider and accept (where appropriate) as a valid opportunity cost, the incremental cost increase that [a] co-located and co-metered retail load will incur if its retail demand charge increases as a result of [an Energy Storage Resource's] wholesale market dispatch."[135]

v. Comments on Data Request Response

71. NYISO MMU reiterates its support for NYISO's proposed BSM Rules. The need for BSM Rules, according to NYISO MMU, is driven by the large number of new subsidized entrants that it expects to enter NYISO's market, rather than by the size of individual projects.[136] NYISO MMU believes that reinstating the provision regarding Category III Examined Facilities, as NYISO proposes, will provide a path for small resources to obtain an exemption in a way that is comparable to other resources, rather than automatically subjecting small resources in mitigated capacity zones to an offer floor.[137] NYISO MMU explains that it expects many new Energy Storage Resources to be exempted from BSM Rules under one of the existing BSM exemption tests.[138]

---

[132] NYISO maintains that incorporating an accurate Opportunity Cost Adjustment into the reference levels will prevent over-mitigation and enhance price formation. *Id.* at 10.

[133] *Id*. at 9.

[134] NYISO states that "Market Participants continue to have the option to consult with the NYISO, on a case-by-case basis, to demonstrate valid opportunity costs to be included in reference levels." *Id*. at 13 n.27.

[135] *Id*. at 13.

[136] NYISO MMU May 22, 2019 Comments at 3.

[137] *Id*.

[138] NYISO MMU February 25, 2019 Comments at 4.

72. IPPNY states that, while it reiterates its support for NYISO's proposed BSM Rules, it protests NYISO's assertion that the currently effective BSM Rules do not apply to resources 2 MW or less and that such resources should be subject to automatic offer floor mitigation.[139] IPPNY argues that NYISO's interpretation is a violation of Commission's long-established precedent that all new resources in NYISO's Mitigated Capacity Zones should be subject to offer floor mitigation.[140] Therefore, IPPNY urges the Commission to require NYISO to clarify the existing BSM Rules by incorporating resources 2 MW or less within the Category III Examined Facilities definition.[141]

vi. Commission Determination

73. We reject NYISO's proposal to reinstate Category III Examined Facilities in its BSM Rules because this proposal would apply to all new Generators that are 2 MW or less and therefore is beyond the scope of this compliance proceeding. We agree with NYTOs and other commenters that NYISO's proposal is not rooted in an Order No. 841 compliance directive and therefore can only be properly proposed through an FPA section 205 filing.[142] Therefore, we do not rule on the merits of NYISO's proposal to reinstate Category III Examined Facilities in its BSM Rules or the question of whether Generators 2 MW or less should be subject to the BSM Rules. We direct NYISO to file, within 60 days of the date of issuance of this order, a further compliance filing with revisions to remove all tariff language related to reinstating Category III Examined Facilities in proposed MST section 23.

74. We find that the remainder of NYISO's proposed tariff revisions comply with the requirements of Order No. 841 because NYISO made the necessary modifications to its tariff to specify: (1) whether resources that qualify to use the participation model will participate in the NYISO 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.

75. 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

[139] IPPNY May 22, 2019 Protest at 3-4.

[140] *Id*. at 13.

[141] *Id*. at 14-15.

[142] NYTOs February 7, 2019 Protest at 5. If NYISO wants to propose reinstating provisions concerning Category III Examined Facilities in its BSM Rules, NYISO may propose such revisions to its tariff through an FPA section 205 filing.

other market participants, when appropriate. We find that NYISO's existing rules allow Electric Storage Resources to do so, noting that determining whether a resource should be allowed to include opportunity costs in its energy market offers and bids and how such opportunity costs may be calculated can be complex and case specific.[143] NYISO's proposal appropriately allows Energy Storage Resources to include opportunity costs in their energy market bids and offers. In addition, NYISO proposes a new process by which market participants may seek revisions to reference levels to account for appropriate opportunity costs in consultation with NYISO.[144] Thus, we accept NYISO's proposal on opportunity costs because NYISO explains how Energy Storage Resources will be able to reflect relevant opportunity costs in their energy market offers and bids, similar to other market participants, when appropriate.

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

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

76. Order No. 841 added 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

[143] 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, 256-57. 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.

[144] Compliance Filing, Transmittal at 58; proposed Services Tariff, §23.3.1.4.1.3. *See also* NYISO Manual 34, Reference Level Manual, January 2019, p. 9-10, https://www.nyiso.com/documents/20142/2923301/rl_mnl.pdf/ae26885c-9f44-b0bb-11ab-e09ac2431c69.

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

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]

77. 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 to respond to automatic generation control to provide frequency regulation.[147] The Commission noted that it 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]

i. NYISO's Filing

78. NYISO states that electric storage resources currently are eligible to participate in NYISO-administered energy and ancillary services markets as Generators.[152] NYISO adds that electric storage resources currently may also participate in the NYISO's Day-Ahead Demand Response Program, Demand Side Ancillary Services Program, and Emergency Demand Response Program as a component of a Demand Side Resource,

---

[146] *Id.* P 77.

[147] *Id.* P 78.

[148] *Id.*

[149] *Id.* P 78 n.106.

[150] *Id.* P 79.

[151] *Id.* P 81.

[152] Compliance Filing, Transmittal at 6.

such that the electric storage resource helps reduce the Demand Side Resource's load at NYISO's direction.[153]

79. NYISO explains that, because an Energy Storage Resource is a type of Generator, the vast majority of NYISO's bidding and scheduling constructs in the energy and ancillary services markets will apply to Energy Storage Resources. However, NYISO proposes to modify its existing market rules to account for both the characteristics of Energy Storage Resources and the directives of Order No. 841,[154] and the particular services that an individual Energy Storage Resource may provide will depend on its ability to meet the revised market rules.[155]

80. NYISO states that an Energy Storage Resource may sell and purchase energy, provide regulation service and operating reserves (i.e., spinning reserves and 30 minute reserves) both when injecting energy (i.e., discharging) and withdrawing energy (i.e., charging), and may provide other ancillary services if it satisfies the applicable tariff requirements.[156] NYISO adds that the requirements for providing operating reserves are set forth in Rate Schedule 4 of its Services Tariff.[157] NYISO states that it procures several different operating reserves products, including: (1) spinning reserve (also known as 10-Minute synchronized reserve); (2) 10-Minute non-synchronized reserve; and (3) 30-minute reserve (which includes both synchronized and non-synchronized components).[158]

81. NYISO also states that, as with other generators, an Energy Storage Resource offering regulation service must register its qualified regulation capacity, provide applicable response rates, offer in the ISO-Committed Flexible or Self-Committed Flexible bid modes, specify that part of its capacity that is offered to provide regulation service, and ensure that the resource can respond to six-second base point signals at all times.[159] NYISO states that it will award a regulation service schedule for an Energy Storage Resource that is injecting in the same manner as other generators, based on the

---

[153] *Id*.

[154] *Id*. at 18.

[155] *Id*.

[156] *Id*. at 17.

[157] *Id*. at 34.

[158] *Id*.

[159] *Id*. at 32.

resource's offered regulation capacity, the bid price for that capacity, and the bid price for regulation movement.[160] NYISO adds that it will award a regulation service schedule for an Energy Storage Resource that is withdrawing energy based on the same bid parameters used for resources that are injecting energy. With respect to operation, NYISO indicates that it will cap regulation service schedules for all Energy Storage Resources in real-time to respect the actual, real-time energy level it receives from the resource via six-second telemetry.[161]

82. NYISO states that, in accordance with this existing practice, its proposal sets forth a set of qualification and performance requirements for Energy Storage Resources that is comparable to the existing requirements for other resource types participating in NYISO's Installed Capacity market.[162] NYISO states that Energy Storage Resources can set the capacity clearing price in the same manner as other Installed Capacity Suppliers.[163] Further, NYISO adds that, in order to participate as an Installed Capacity Supplier, an Energy Storage Resource must satisfy all applicable qualification requirements set forth in Section 5.12 of the Services Tariff and ISO Procedures, which include offer-size,[164] ISO-Managed Energy Level in its day-ahead market bids,[165] Capacity Resource Interconnection Service (CRIS),[166] minimum run-time,[167] and

---

[160] *Id*.

[161] *See* Services Tariff, § 15.3.2.1(e); Compliance Filing, Transmittal at 32. [162]

Compliance Filing, Transmittal at 42.

[163] Order No. 841, 162 FERC ¶ 61,127 at P 142; Compliance Filing, Transmittal at 42.

[164] The minimum size requirement is discussed in P 19 of this order.

[165] This requirement allows NYISO to control and optimize the scheduled energy injections as well as withdrawals associated with energy storage resource throughout the day. Compliance Filing, Transmittal at 43.

[166] According to NYISO, "CRIS is interconnection service that allows a Developer to interconnect its facility to the New York State Transmission System or Distribution System in accordance with the NYISO Deliverability Interconnection standard, which allows participation in the NYISO's Installed Capacity market to the extent of the facility's deliverable capacity." *Id*. at 44 n.125.

[167] Installed Capacity Supplier must be capable of running for a minimum of four consecutive hours each day. NYISO explains that this requirement is consistent with the existing qualification requirements for Energy Limited Resources and Special Case

Dependable Maximum Net Capability (DMNC) test.[168] NYISO also proposes to modify Section 5.12.5.1 to include Energy Storage Resources in the existing provision that requires other capacity resources to submit the necessary Generating Availability Data System data or Operating Data, which NYISO states will enable it to evaluate the availability of the resource.[169]

83. NYISO states that an Installed Capacity Supplier must obtain CRIS in accordance with NYISO's interconnection process.[170] NYISO explains that Attachments X and Z of its OATT contain the procedures for processing interconnections of Large Facilities and Small Generating Facilities, respectively. NYISO also explains that Attachment S of the OATT contains the procedures for the Class Year Interconnection Facilities Study (Class Year Study), in which a project must participate to obtain CRIS with limited exceptions.[171] NYISO states that it proposes revisions in these OATT attachments to address the CRIS and interconnection requirements applicable to Energy Storage Resources.[172]

ii. Commission Determination

84. We find that NYISO's proposed tariff revisions comply with the requirements of Order No. 841 because they ensure that electric storage resources are eligible to provide all capacity, energy, and ancillary services that they are technically capable of providing. NYISO's proposal sets forth qualification and performance requirements for Energy Storage Resources that are comparable to the existing requirements for other resource types participating in NYISO's installed capacity market. We find that resources that meet all technical, operational, and performance requirements (e.g., minimum run-time, CRIS, six-second telemetry, ability to register a resource's qualified regulation capacity,

---

Resources. *Id*. at 44; Services Tariff, §§ 5.12.11.3 and 5.12.11.1, respectively.

[168] NYISO states that an energy storage resource participating in its Installed Capacity market will be required to provide the results of a DMNC test or historical production data to establish the maximum Installed Capacity for each Capability Period. NYISO states that it will work with its stakeholder to supplement the ISO Procedures to establish the DMNC test requirements for energy storage resources. Compliance Filing, Transmittal at 43-44.

[169] *Id*. at 45.

[170] Services Tariff, § 5.12.1; Compliance Filing, Transmittal at 44. [171]

Compliance Filing, Transmittal at 46.

[172] *Id*.

and provide applicable response rates for frequency regulation) will be eligible to participate in NYISO-administered markets.

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

85. 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.[173] 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.[174]

86. 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.[175] 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.[176] 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.[177]

87. 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.[178] However, if an electric storage resource elects to de-rate its capacity, it must not de-rate its capacity

---

[173] Order No. 841, 162 FERC ¶ 61,127 at P 94.

[174] *Id.* P 95.

[175] *Id.* P 96.

[176] *Id.* P 97.

[177] *Id.* P 98.

[178] *Id.* P 99.

below any capacity obligations that it has assumed, such as any applicable must-offer requirement. 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.

88. Order No. 841 does not require RTOs/ISOs to make specific changes to minimum run-time or must-offer requirements associated with providing capacity.[179] 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.[180] 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.[181]

i. NYISO's Filing

89. NYISO states that it has revised its Installed Capacity market requirements to allow Energy Storage Resources to spread their full capability over four hours to meet the minimum four consecutive hour run time qualification requirement.[182] NYISO explains that it has incorporated this change by adding a new section, Section 5.12.1.13, to its Services Tariff to provide that an Energy Storage Resource seeking to qualify as an Installed Capacity Supplier must "be capable of running for a minimum of four (4) consecutive hours each day" except when the resource is incapable of doing so because of a reported outage.[183] NYISO states that the four-hour minimum run-time is consistent with NYISO's existing qualification requirements for Energy Limited Resources and Special Case Resources. NYISO also states that, consistent with Order No. 841, the requirement that an Energy Storage Resource may spread its output across four hours to meet the four-hour minimum run-time will be set forth in ISO Procedures.[184] NYISO states that it discussed potential de-rating concepts for Energy Storage Resources with its stakeholders and will continue to work with them to finalize the concepts in the ISO

---

[179] *Id.* P 100.

[180] *Id.* PP 100, 101.

[181] *Id.* P 100.

[182] Compliance Filing, Transmittal at 9.

[183] *See* Services Tariff, § 5.12.1.13; Compliance Filing, Transmittal at 44. [184]

Compliance Filing, Transmittal at 44-45.

Procedures.[185] NYISO states that it will calculate the derating factor based on a resource's "availability and historic performance over a 17 month period."[186]

90. As described above, NYISO explains that, under its proposed participation model, an Energy Storage Resource may qualify as an Installed Capacity Supplier if it satisfies the existing qualification requirements for a Generator as well as the Energy Storage Resource-specific requirements set forth in Services Tariff Section 5.12.[187]

ii. Protests/Comments

91. Tesla states that it supports NYISO's proposal to require that electric storage resources have a four-hour minimum duration to participate in the Installed Capacity market.[188] Further, Tesla supports NYISO's proposal to allow electric storage resources to de-rate their installed capacity to meet the four-hour duration, noting that NYISO's proposal is similar to the existing run-time requirements for Installed Capacity Resources and Special Case Resources in NYISO.[189] Tesla also notes that a four-hour duration is a reasonable duration requirement for electric storage resources providing capacity.[190]

92. Tesla recommends that RTOs/ISOs limit performance penalties to the physical energy capacity in MWh committed to the capacity market by the electric storage resource.[191] Tesla argues that granting this treatment would ensure just and reasonable

[185] *See, e.g.*, *Capacity Market Rules for Energy Storage Resources Presentation*, NYISO Installed Capacity Working Group (September 21, 2018), http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_icapwg/meeting_materials/2018-09-21/3%20ESR%20Capacity%20Model%20Tariff%20092118%20presentation.pdf.

[186] Compliance Filing, Transmittal at 45.

[187] *Id*. at 43-44.

[188] Tesla Comments at 12-13.

[189] *Id*.

[190] *Id*. at 13.

[191] *Id*. at 11-12.

results from capacity markets by preventing undue discrimination against electric storage resources.[192]

93. New York State Entities state that the Commission should require NYISO to file the methodology it uses to calculate the derating.[193] According to New York State Entities, if an electric storage resource elects not to bid in the real-time market because, for instance, it intends to participate in the retail market for a given interval, the resource would be deemed unavailable in the real-time market and its UCAP downgraded accordingly, even if it has fulfilled its day-ahead bidding requirements.[194] Further, New York State Entities argue that NYISO's proposed dispatchability requirement, which requires Energy Storage Resources to be fully dispatchable and available within their operating range, serves as a barrier to the ability of Energy Storage Resources to manage their participation in retail markets.[195] New York State Entities therefore request that the Commission reject NYISO's filing and direct NYISO to submit revised tariff amendments to eliminate, to the extent practicable, barriers to the participation of electric storage resources.[196]

iii. Commission Determination

94. We find that NYISO's filing partially complies with the requirement of Order No. 841 to allow electric storage resources to de-rate capacity to meet minimum run-time requirements. We find that NYISO has demonstrated that its existing market rules provide a means for Energy Storage Resources to provide capacity. As NYISO explains, Energy Storage Resources will be able to spread their full capability over four hours to meet the four-hour minimum run-time requirement. Additionally, NYISO demonstrates how its capacity market rules are applicable to resources using the participation model.

95. However, as described above, NYISO indicates that the requirement that an Energy Storage Resource may spread its output across four hours to meet the minimum run-time requirement will be set forth in ISO Procedures. 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

---

[192] *Id*. at 8-9.

[193] New York State Entities Protest at 40. [194]

Id. at 40-41.

[195] *Id*. at 41-43.

[196] *Id*. at 12.

requirements.[197] Given that NYISO has not provided tariff provisions allowing Energy Storage Resources to de-rate their capacity to meet minimum run-time requirements, we direct NYISO to submit, within 60 days of the date of issuance of this order, a further compliance filing revising its tariff to provide such a process for Energy Storage Resources.

96. In response to New York State Entities' argument that an Energy Storage Resource will be penalized for not adhering to its day-ahead schedule in the real-time energy market, we find that this practice of derating Energy Storage Resources is consistent with the derating practices that NYISO applies to other Generators in its market. While NYISO's dispatch-only model treats resources as always available, Energy Storage Resources can manage their actual dispatch through bidding. If an Energy Storage Resource wishes to manage its retail and wholesale obligations, as suggested by New York State Entities, we find that it may do so through its bids. Having found that NYISO's proposed dispatch-only participation model complies with the requirements of Order No. 841, we deny New York State Entities' request to reject NYISO's filing.

97. In response to Tesla's request that RTOs/ISOs limit performance penalties to the physical capability that an electric storage resource commits for capacity service, we reiterate that electric storage resources must still meet all of the technical, operational, and/or performance requirements that are necessary to reliably provide a service and Order No. 841 does not exempt an electric storage resource that is participating in RTO/ISO capacity markets from any applicable penalties for non-performance.[198]

4. Participation in the RTO/ISO Markets as Supply and Demand

a. Eligibility to Participate as a Wholesale Seller and Wholesale Buyer

98. Order No. 841 adds section 35.28(g)(9)(i)(B) to the Commission's regulations to require that each RTO/ISO have tariff provisions to ensure 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.[199] For a resource using the participation model for electric storage

[197] Order No. 841, 162 FERC ¶ 61,127 at P 94.

[198] *Id.* PP 78, 95.

[199] *Id.* P 142.

resources to be able to set prices in the RTO/ISO markets as either a wholesale seller or a wholesale buyer, it must be available to the RTO/ISO as a dispatchable resource.[200]

99. Order No. 841 requires that: (1) resources using the participation model for electric storage resources be able to set the price in the capacity markets, where applicable; (2) RTOs/ISOs accept wholesale bids from resources using the participation model for electric storage resources to buy energy, consistent with the rules related to wholesale purchasers of energy in each RTO/ISO; and (3) resources using the participation model for electric storage resources be allowed to participate in the RTO/ISO markets as price takers, consistent with the existing rules for self-scheduled resources.[201] To ensure that electric storage resources are treated consistently with self-scheduled load resources and traditional generation resources that participate in the RTO/ISO markets, electric storage resources must be allowed to self-schedule when they participate in the RTO/ISO markets as supply or demand, consistent with rules governing how other resources self-schedule.[202]

100. While Order No. 841 does not require RTOs/ISOs to change any participation models that they may already have that apply to pumped-hydro resources,[203] it did require each RTO/ISO to establish means by which all electric storage resources, including pumped-hydro resources, can participate as wholesale sellers and wholesale buyers in the RTO/ISO markets using a participation model.[204] Lastly, Order No. 841 explains that the Commission does not consider electric storage resources in charging mode to be negative demand response. Order No. 841 requires an electric storage resource to be eligible to participate in the RTO/ISO markets as a wholesale buyer and

---

[200] Order No. 841-A modifies section 35.28(g)(9)(i)(B) of the Commission's regulations to clarify that, to the extent electric storage resources are dispatchable, the RTO/ISO is required to allow them to participate as dispatchable resources and to set the clearing price in the RTO/ISO markets as part of the participation model. Order No. 841-A clarified that not all electric storage resources that seek to use the electric storage resource participation model need to be dispatchable to use that participation model. Order No. 841-A, 167 FERC ¶ 61,154 at PP 74-77.

[201] Order No. 841, 162 FERC ¶ 61,127 at P 142. [202]

Id. PP 144, 148.

[203] *See id.* P 55.

[204] *Id.* P 149.

required each RTO/ISO to be able to dispatch them as such; such a mechanism would entail participation in the energy markets, and not the provision of a new service.[205]

i. NYISO's Filing

101. NYISO states that the bid of a Withdrawal-Eligible Generator, including an Energy Storage Resource, to withdraw energy will be treated in the NYISO's Day-Ahead Security Constrained Unit Commitment (SCUC), Real-Time Commitment (RTC), and Real-Time Dispatch (RTD) software as "negative generation," rather than "Load."[206] NYISO adds that, consistent with the directives in Order No. 841, a withdrawing Energy Storage Resource can be the marginal "Supplier" and will be eligible to set the wholesale market clearing price.[207] NYISO also states that several conforming changes to Service Tariff Sections 4.1.6, 4.2.1.1, 4.2.1.4, 4.2.6, 4.4.1.2.1, and 4.4.1.4 clarify that Energy Storage Resources can both sell energy as generation and purchase energy as "negative generation," and to distinguish Energy Storage Resource withdrawals from Load.[208]

102. Under NYISO's proposal, four bidding modes are available to energy storage resources (i.e., ISO-Committed Fixed, ISO-Committed Flexible, Self-Committed Fixed, and Self-Committed Flexible) in order to bid in NYISO's day-ahead and real-time markets. ISO-Committed Fixed is a bidding mode in which a generator requests that NYISO commit and schedule its resource in the day-ahead market. In the real-time market, ISO-Committed Fixed mode allows a generator to request that NYISO schedule its resource no more frequently than every 15 minutes. ISO-Committed Flexible is a bidding mode in which a dispatchable generator or demand side resource is committed and follows Base Point Signals issued by NYISO. These bidding modes require NYISO to evaluate an Energy Storage Resource's economic bids prior to scheduling.[209] With Self-Committed Fixed and Self-Committed Flexible bidding modes, an Energy Storage Resource can self-schedule (or self-commit) its output regardless of the LBMP. These bidding modes do not require commitment decision from NYISO prior to scheduling, they follow NYISO's dispatch instruction.[210] NYISO also states that an Energy Storage

---

[205] *Id.* P 150.

[206] Compliance Filing, Transmittal at 21.

[207] *Id.*

[208] *Id.* at 22.

[209] *Id.* at 27 n.75.

[210] *Id.* at 27-28.

Resource that elects to use Self-Managed Energy Levels[211] will be able to choose from any of the four bidding modes in the day-ahead market. NYISO states that Energy Storage Resources that bid with Self-Managed Energy Levels in the real-time market may use the Self-Committed Fixed, Self-Committed Flexible, or ISO-Committed Flexible bid.[212]

ii. Commission Determination

103. We find that NYISO's proposed tariff revisions comply with the requirements of Order No. 841 because they treat electric storage resources as dispatchable resources that can bid and set wholesale prices. We also find that under NYISO's proposal, electric storage resources using the participation model are allowed to participate in NYISO's markets as a wholesale seller and wholesale buyer. Additionally, consistent with the existing rules for self-scheduled resources, an Energy Storage Resource that elects to bid with Self-Managed Energy Levels will be able to choose from either the Self-Committed Fixed or Self-Committed Flexible bid modes in the day-ahead market in order to participate in NYISO-administered markets as a price taker. Energy Storage Resources that choose to bid with Self-Managed Energy Levels in the real-time market have the option to use the Self-Committed Fixed, Self-Committed Flexible, or ISO-Committed Flexible Bid.

b. Mechanism to Prevent Conflicting Dispatch Signals

104. To implement the new requirement in section 35.28(g)(9)(i)(B) of the Commission's regulations, Order No. 841 requires each RTO/ISO to either: (1) demonstrate that its market design will not allow for conflicting supply offers and demand bids from the same resource for the same market interval; or (2) modify its market rules to prevent conflicting supply offers and demand bids from the same resource for the same market interval.[213] Order No. 841 does not require a specific approach to prevent conflicting dispatch, but provided that the RTO/ISO is responsible for preventing

[211] NYISO's proposed Services Tariff defines Self-Managed Energy Level as "[a] Bid parameter which when selected indicates that an Energy Storage Resource's Energy Level constraints will not be directly accounted for in the [NYISO] optimization." *See* proposed Services Tariff, §§ 2.19, 4.2.1.3.4, 4.4.2.1. ISO-Managed Energy Level is defined as "[a] Bid parameter which when selected indicates that an Energy Storage Resource's Energy Level constraints will be directly accounted for in the [NYISO] optimization." *See* proposed Services Tariff, §§ 2.9, 4.2.1.3.4.

[212] Compliance Filing, Transmittal at 28.

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

conflicting dispatch and therefore it would not be the responsibility of the market monitor to review bids to address conflicting dispatch.[214] Order No. 841 also states that "while each RTO/ISO should allow resources using the participation model for electric storage resources to participate as supply and demand simultaneously (i.e., submit bids to buy and offers to sell during the same market interval), the RTOs/ISOs should not require resources using the participation model for electric storage resources to participate as supply and demand simultaneously."[215]

i. NYISO's Filing

105. NYISO states that it will permit Energy Storage Resources to submit an incremental bid curve representing the entire range of the Energy Storage Resource's capability.[216] NYISO explains that its modeling of each Energy Storage Resource as a single resource in the wholesale market with a bid curve that represents the resource's entire operating range, from injection to withdrawal, will prevent the Energy Storage Resource from being dispatched to withdraw and inject in the same market interval.[217] NYISO states that new Section 4.2.1.3.1 of its Services Tariff establishes that the Energy Storage Resource must submit a single, continuous bid curve in the day-ahead market.[218]

ii. Commission Determination

106. We find that NYISO's proposed tariff revisions comply with the requirements of Order No. 841 because electric storage resources using its participation model have the flexibility to submit supply offers and demand bids in the same market interval, but NYISO's market design will not accept and dispatch conflicting supply offers and demand bids from the same Energy Storage Resource for the same market interval. To prevent its market design from dispatching conflicting supply offers and demand bids from the same Energy Storage Resource for the same market interval, NYISO proposes to treat an Energy Storage Resource as a single resource in the wholesale market with a bid curve that represents the resource's entire operating range from injection to withdrawal. In addition, NYISO modifies its Services Tariff to require Energy Storage Resources to submit a single, continuous bid curve in the day-ahead market.

---

[214] *Id.* P 163.

[215] *Id*. P 165.

[216] Compliance Filing, Transmittal at 9.

[217] *Id.*

[218] *Id.* at 23.

c. Make-Whole Payments

107. Given the unique capability of electric storage resources to serve as both a supply of, and demand for, energy and to implement the new requirement in section 35.28(g)(9)(i)(B) of the Commission's regulations, Order No. 841 requires that each RTO/ISO have tariff provisions to ensure 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 eligible for make-whole payments.[219] Specifically, Order No. 841 requires that the participation model for electric storage resources allows make-whole payments when a resource is dispatched as load and the wholesale price is higher than the resource's bid price and when it is dispatched as supply and the wholesale price is lower than the resource's offer price. Any such make-whole payments must be consistent with the rules for make-whole payments for other dispatchable resources, and such payments should only be provided to resources using the participation model for electric storage resources to the extent that such payments are already provided to other market participants.[220] Order No. 841 does not require a specific method for make-whole payments and provided the RTOs/ISOs with flexibility to establish a methodology under which resources using the participation model can receive make-whole payments.[221]

108. Order No. 841 also states that make-whole payments should only be available to resources using the electric storage resource participation model if the system operator dispatches that resource in a way that is inconsistent with its bids to buy and offers to sell energy.[222] Because one of the requirements of Order No. 841 is that each RTO/ISO have the ability to dispatch electric storage resources as load, it is necessary for each RTO/ISO to establish a methodology under which resources using the participation model for electric storage resources that participate as load are able to receive make-whole payments.[223] Because electric storage resources must be able to be dispatched as load, their eligibility to receive make-whole payments when dispatched as load needs to be consistent with other dispatchable resources but does not need to be consistent with the eligibility of other load resources that are not dispatchable by the RTO/ISO.

---

[219] Order No. 841, 162 FERC ¶ 61,127 at P 174.

[220] *Id.* P 177.

[221] *Id.* P 174.

[222] *Id.* P 178.

[223] *Id.* P 179.

i. NYISO's Filing

109. NYISO's make-whole payments consist of both Bid Production Cost Guarantee (BPCG)[224] payments and Day-Ahead Margin Assurance Payments (DAMAP).[225] NYISO proposes that, consistent with the directives of Order No. 841, Energy Storage Resources will be eligible to receive real-time BPCG payments when they are manually committed for reliability reasons regardless of whether they select an ISO-managed or self-managed bid mode.[226] NYISO further adds that it has revised its BPCG and DAMAP requirements to establish when electric storage facilities using the Energy Storage Resource participation model will be eligible for make-whole payments.[227] NYISO also states that, consistent with the existing eligibility requirements, an Energy Storage Resource must be scheduled by NYISO, based on an ISO-Committed Fixed or ISO-Committed Flexible Bid, in order to be eligible for a Day-Ahead BPCG payment.[228] NYISO explains that because Self-Committed Resources' schedules are not the result of an economic evaluation, their costs are not protected through a Day-Ahead BPCG payment.[229] NYISO notes that Energy Storage Resources may be eligible for Day-Ahead BPCG payments regardless of whether scheduled to inject energy or withdraw energy.[230]

110. NYISO states that several revisions to its Services Tariff establish the circumstances in which Energy Storage Resources are eligible to receive Day-Ahead

---

[224] A BPCG payment is the mechanism by which the NYISO guarantees that a qualifying Supplier will recover its as-bid costs over the applicable period if it is committed by the NYISO. *See* Compliance Filing, Transmittal at 37.

[225] A DAMAP is "a supplemental payment to resources, as necessary, to recover the difference between their accepted day-ahead offer price and the day-ahead locational based marginal price when NYISO has directed that they reduce their real-time output and such reduction has exposed them to balancing obligations that erode their day-ahead margin." *See N.Y. Indep. Sys. Operator, Inc.*, 139 FERC ¶ 61,108, at P 2 (2012). NYISO states that DAMAPs protect Day-Ahead Margins that are lost when a Generator offers flexibly in real-time and follows its real-time dispatch. *See* Compliance Filing, Transmittal at 40.

[226] *Id.* at 38.

[227] *Id.* at 9.

[228] *Id.* at 37.

[229] *Id.*

[230] *Id.* at 38.

BPCG payments. NYISO explains that Section 18.2.1.1 of its Services Tariff provides that an Energy Storage Resource is eligible to receive a Day-Ahead BPCG payment.[231] NYISO also notes that it has revised the variables in the Day-Ahead BPCG formula in Section 18.2.2.1 to clarify that Energy Storage Resources may be eligible for Day-Ahead BPCG payments.[232] NYISO lastly states that it has revised Section 4.6.6.1 of the Services Tariff to clarify that BPCG payments are not limited to bids to inject energy.[233] NYISO further adds that its proposed approach provides the Energy Storage Resource with an incentive to self-manage its energy level in real-time if the resource operator believes it can do so better than the NYISO's Real-Time Market RTC and RTD software.[234]

111. NYISO proposes to insert new formulas that account for real-time schedules to inject energy and real-time schedules to withdraw energy into Sections 18.4.2 (for RTD Intervals) and 18.5.2 (for Supplemental Event Intervals)[235] of its Services Tariff.[236] NYISO also proposes to revise several definitions currently included in Section 18.4.2 of its Services Tariff.[237] NYISO states that it has also revised intervals in Sections 4.6.6.3 and 4.6.6.4 of its Services Tariff to clarify that BPCG payments are not limited to bids to inject energy.[238] NYISO also proposes to make energy storage resources eligible for DAMAP when they have been taken Out-of-Merit by NYISO or a transmission owner for reliability reasons, regardless of whether they bid an ISO-managed or self-managed energy level.[239]

---

[231] *Id.* at 37.

[232] *Id.* at 38.

[233] *Id.*

[234] *Id.* at 39.

[235] A Supplemental Event Interval is defined as "[a]ny RTD interval in which there is a maximum generation pickup or a large event reserve pickup or which is one of the three RTD intervals following the termination of the maximum generation pickup or the large event reserve pickup." NYISO Services Tariff, § 2.19, Definitions - S.

[236] Compliance Filing, Transmittal at 39.

[237] *Id.*

[238] *Id.*

[239] *Id.* at 41.

ii. Protests/Comments

112. NextEra and Energy Storage Association argue that NYISO's proposal to exclude electric storage resources from DAMAP is inconsistent with Order No. 841, which requires that make-whole payments should be available to electric storage resources so that they are held harmless for manual dispatch.[240] Energy Storage Association asserts that NYISO's restriction of the ability of electric storage resources to receive DAMAP and, in some cases, to receive BPCG payments is discriminatory and removes protection against uneconomic schedules and dispatches from electric storage resources participating in the NYISO-administered markets.[241] Energy Storage Association points to the Commission's finding in Order No. 841 that make-whole payments should be available to electric storage resources to protect against dispatch of supply when the wholesale price is below the resource's bid price or dispatch of load when the wholesale price is above the resource's bid price.[242] Energy Storage Association concludes that NYISO's proposal to remove the protection of DAMAP for electric storage resources is unjust and unreasonable because: (1) it raises the risk of unprotected uneconomic dispatch; and (2) it results in different treatment of electric storage resources than that of other generation resources.[243]

iii. Answers

113. NYISO states that suppliers bidding Energy Storage Resources into NYISO's energy markets will be eligible to receive make-whole payments, which consist of both real-time BPCG and DAMAP, whenever they are either manually dispatched via a Supplemental Resource Evaluation[244] commitment or manually dispatched by NYISO

---

[240] NextEra Protest at 5-6 (citing Order No. 841, 162 FERC ¶ 61,127 at P 174); Energy Storage Association Comments at 7.

[241] Energy Storage Association Comments at 7.

[242] *Id.* (citing Order No. 841, 162 FERC ¶ 61,127 at P 171 ("we find that the participation model for electric storage resources must allow make-whole payments when a resource is dispatched as load and the wholesale price is higher than the resource's bid price and when it is dispatched as supply and the wholesale price is lower than the resource's offer price.")).

[243] *Id.* at 8.

[244] NYISO's Services Tariff defines Supplemental Resource Evaluation as "[a] determination of the least cost selection of additional Generators, which are to be committed, to meet: (i) changed or local system conditions for the Dispatch Day that may cause the day-ahead schedules for the Dispatch Day to be inadequate to meet the

Out-of-Merit to ensure New York Control Area or local reliability.[245] NYISO states that, consistent with its treatment of other resources, it will make Energy Storage Resources whole to their bids through the Day-Ahead BPCG payments if they accrued a net loss over the 24-hour Day-Ahead Market day.[246] According to NYISO, Energy Storage Resources that self-manage their energy level will be eligible for real-time BPCG payments if they satisfy the eligibility requirements applicable to other resources.[247]

114. However, NYISO asserts that Energy Storage Resources will not be eligible to receive real-time BPCG payments if they rely on NYISO to optimize their energy level over the Real-Time Commitment and Dispatch optimization horizons (2.5 hour and 1 hour) because NYISO's software for the real-time market will optimize the ISO-Managed Energy Storage Resource's Energy Level over the optimization windows and dispatch the resource based on its available and expected energy level over that window.[248] NYISO also affirms that, given the shorter optimization windows (i.e., 2.5 hours and 1 hour) compared to the daily timeframe for real-time BPCG payments, it is not reasonable to expect New York Control Area Loads to assume the risks associated with an ISO-Managed Energy Storage Resource being dispatched above or below its Day-Ahead schedule.[249]

115. Energy Storage Association asserts that NYISO's answer has not supported NYISO's argument that BPCG or DAMAP are inappropriate to be placed on "[New York Control Area] Loads" as a result of inefficient dispatch by NYISO that does not cover the as-bid costs of Energy Storage Resources, and that this is a subversion of the concept of

---

reliability requirements of the Transmission Owner's local system or to meet Load or reliability requirements of the ISO; or (ii) forecast Load and reserve requirements over the six-day period that follows the Dispatch Day." NYISO Services Tariff, § 2.19, Definitions - S.

[245] NYISO Answer at 16.

[246] *Id.* (noting that its day-ahead market "selects the least cost mix of Ancillary Services and Energy from Suppliers, Demand Side Resources, and Customers submitting Virtual Transaction Bids over the same 24-hour period protected by Day-Ahead BPCG payments").

[247] *Id.* at 16-17.

[248] *Id.* at 17.

[249] *Id.*

make-whole payments.[250] Energy Storage Association explains that NYISO's answer hypothesizes that it would be possible under NYISO's proposal for an Energy Storage Resource operator to turn the operation of an Energy Storage Resource in the day-ahead and real-time markets entirely over to NYISO and its optimization algorithms, yet still end up not covering its as-bid costs with market revenues.[251] Energy Storage Association further states that NYISO's assertion is unpersuasive and ignores that the markets are to be structured such that a supplier will not be exposed to losses compared to its as-bid-costs. Energy Storage Association notes that this issue may be exposing a more fundamental problem with NYISO's real-time market optimization structure, and, if so, fixing the problem is beyond the scope of Order No. 841.[252] Energy Storage Association nonetheless reiterates that NYISO should not require operators of Energy Storage Resources to bear the risk and cost of this shortcoming in NYISO's market; instead, NYISO should make Energy Storage Resources whole to their as-bid costs if those resources submit to the NYISO management of State of Charge in the day-ahead and real-time markets.[253] Finally, Energy Storage Association contends that NYISO's proposal to require that Energy Storage Resources that are Installed Capacity Suppliers use the ISO-Managed Energy Level would restrict the ability of these Energy Storage Resources to receive DAMAP.[254]

iv. Commission Determination

116. We find that NYISO's proposal complies with Order No. 841's requirement that electric storage resources committed by NYISO be eligible to receive make-whole payments. As NYISO states, Energy Storage Resources dispatched manually out-of-merit for reliability needs are eligible for real-time BPCG payments regardless of whether they elect an ISO-Managed Energy Level or the Self-Managed Energy Level. We disagree with Energy Storage Association's argument that, in certain circumstances, Energy Storage Resources that opt for an ISO-Managed Energy Level may be dispatched in such a way that they could fail to recover their as bid costs and should therefore be eligible for real-time BPCG payments because, as NYISO explains, an Energy Storage Resource can successfully manage this risk by selecting to self-manage its Energy Level in the real-time market. Moreover, we agree with NYISO that its proposal provides an

[250] Energy Storage Association Answer at 7-8 (citing NYISO Answer at 17). [251] *Id.* at 8.

[252] *Id.*

[253] *Id.*

[254] *Id.* at 8-9.

incentive for resource operators to select a Self-Managed Energy Level in real-time if an Energy Storage Resource believes it can optimize its operations more efficiently than NYISO's real-time market software. We note that the compliance obligation described in our determination on State of Charge Management below[255] requires NYISO to make the Electric Storage Resource the default manager of the resource's State of Charge. This compliance obligation addresses Energy Storage Association's concern that NYISO's proposal to require that Energy Storage Resources that are Installed Capacity Suppliers use the ISO-Managed Energy Level would restrict the ability of these Energy Storage Resources to receive Day Ahead Margin Assurance Payments.

117. We also disagree with the argument that NYISO's treatment of Energy Storage Resources with respect to make-whole payments is unduly discriminatory. Under NYISO's dispatch-only model, Energy Storage Resources can submit bid curves that, if the bid curves accurately reflect a resource's costs, will allow the resource to avoid being dispatched in a manner that would cause the resource to incur losses in real-time operations during normal system conditions. We find that NYISO's treatment of electric storage resources, through the participation model, is consistent with its treatment of other Generators.

5. Physical and Operational Characteristics of Electric Storage Resources

118. 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.[256] Each RTO/ISO must demonstrate how its proposed or existing tariff provisions account for each of these 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

[255] *See infra* P 175.

[256] Order No. 841, 162 FERC ¶ 61,127 at P 191.

physical and operational characteristic.[257] 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.[258]

119. 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.[259] 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. 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.[260]

120. 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.[261] To the extent that an RTO/ISO includes such a proposal in its compliance filing, it must demonstrate that such bidding parameters or other mechanisms do not impose barriers to the participation of electric storage resources in its markets.

121. 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.[262]

---

[257] *Id.* PP 211, 220, 229.

[258] *Id.* PP 211, 220, 230. [259]

Id. P 192.

[260] *Id.* P 193.

[261] *Id.* P 235.

[262] Order No. 841-A, 167 FERC ¶ 61,154 at P 93.

i. State of Charge

122. 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.[263] 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. 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.[264]

ii. Maximum State of Charge and Minimum State of Charge

123. 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.[265] This value may either be 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).

124. 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.[266] 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).

iii. Maximum Charge Limit and Minimum Charge Limit

125. 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

---

[263] Order No. 841, 162 FERC ¶ 61,127 at P 213.

[264] *Id.* P 214.

[265] *Id.* P 215.

[266] *Id*.

from the grid.[267] The Minimum Charge Limit represents the minimum MW level that the resource can receive from the grid.[268]

iv. Maximum Discharge Limit and Minimum Discharge Limit

126. The Maximum Discharge Limit is the maximum MW quantity that the resource can inject onto the grid.[269] 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. The Minimum Discharge Limit represents the minimum MW output level that the resource can inject onto the grid.[270]

v. Maximum Charge Time and Minimum Charge Time

127. 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).[271] 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.

128. 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.[272] 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.

---

[267] *Id.* P 216.

[268] *Id.* P 231.

[269] *Id.* P 216.

[270] *Id.* P 231.

[271] *Id.* P 223.

[272] *Id.* P 222.

vi. Maximum Run Time and Minimum Run Time

129. 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.[273] 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.

vii. Discharge Ramp Rate and Charge Ramp Rate

130. The Discharge Ramp Rate represents the speed at which electric storage resources can move from zero output to full output, or Maximum Discharge Limit.[274] 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.

viii. Additional Physical and Operational Characteristics

131. 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.[275] 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.

a. NYISO's Filing

132. NYISO proposes to add to its Services Tariff the new parameters "Energy Level" and "Beginning Energy Level," which it states are equivalent to the term State of Charge used in Order No. 841.[276] NYISO proposes to define: (1) Energy Level as "[t]he amount of Energy stored in an Energy Storage Resource";[277] and (2) Beginning Energy Level as "the total amount of Energy stored by the [Energy Storage] Resource at the beginning of

---

[273] *Id.* P 224.

[274] *Id.* P 234.

[275] *Id.* P 235.

[276] Compliance Filing, Transmittal at 24.

[277] *Id.*; proposed definitions in Services Tariff, § 2.5

a market interval."[278] Under NYISO's proposal, electric storage resources will have the option to either self-manage their energy level (i.e., State of Charge)[279] or have it be managed by NYISO.[280] The mode of Energy Level Management is the method by which the Energy Storage Resource chooses to control the amount of energy stored.[281] An Energy Storage Resource must submit its Beginning Energy Level, as part of its Day-Ahead Market Bids, which is determined by six-second telemetry in real-time.[282]

133. NYISO states that the new parameter "Upper Storage Limit" will serve as the equivalent to the term Maximum State of Charge used in Order No. 841.[283] NYISO proposes to define Upper Storage Limit as "[t]he maximum amount of Energy an Energy Storage Resource is physically capable of storing."[284] NYISO notes that this is a parameter that would only apply to Energy Storage Resources.[285]

134. NYISO states that the new parameter "Lower Storage Limit" will serve as the equivalent to the term Minimum State of Charge used in Order No. 841.[286] NYISO proposes to define Lower Storage Limit as "[t]he minimum amount of Energy an Energy Storage Resource is physically capable of storing."[287] NYISO notes that this is a parameter that would only apply to Energy Storage Resources.[288]

---

[278] Compliance Filing, Transmittal at 30; proposed definitions in Services Tariff, § 2.2.

[279] *See supra* note 213.

[280] Compliance Filing, Transmittal at 24. *See supra* note 213. [281]

Compliance Filing, Transmittal at 24.

[282] *Id.* at 29-30.

[283] *Id.* at 17.

[284] *Id.*; proposed definitions in Services Tariff, § 2.21 [285]

Compliance Filing, Transmittal at 16-17.

[286] *Id.* at 17.

[287] *Id.*; proposed definitions in Services Tariff, § 2.12 [288]

Compliance Filing, Transmittal at 16-17.

135. NYISO states that the new parameter "Lower Operating Limit" will serve as the equivalent to the terms Maximum Charge Limit and Minimum Discharge Limit used in Order No. 841.[289] NYISO proposes to define Lower Operating Limit as "the maximum amount of megawatts the Resource can consume from the grid, if it is bidding to withdraw Energy, or the minimum amount of MW the Resource can supply the grid if it is not bidding to withdraw Energy. The Lower Operating Limit of an ISO-Managed Energy Storage Resource that is not bidding to withdraw energy shall not be set to less than 0 MW."[290]

136. NYISO describes the Lower Operating Limit as the minimum MW level at which the Energy Storage Resource is willing to operate. Upon registration, the Energy Storage Resource must provide the physical Lower Operating Limit of the resource. When bidding, the Energy Storage Resource must supply a Lower Operating Limit value that is no less than the physical Lower Operating Limit. The Lower Operating Limit may be used to represent either the Minimum Discharge Limit or the Maximum Charge Limit and can be a negative number.[291] NYISO also proposes to revise Section 4.2.1.3.3 of the Services Tariff to require that Withdrawal-Eligible Generators also specify the Generator's Lower Operating Limit for each hour.[292]

137. NYISO states that it will account for the Minimum Charge Limit and the Maximum Discharge Limit in its tariff as the "Upper Operating Limit," and that these parameters are comparable.[293] NYISO proposes to revise the definition of Normal Upper Operating Limit in Section 2.14 of its Services Tariff to state that "Bids for Energy Storage Resources may include a negative [Normal Upper Operating Limit] when the Resource bids to withdraw Energy from the grid. The [Normal Upper Operating Limit] for ISO-Managed Energy Storage Resources shall not be lower than 0 MW."[294]

138. NYISO states that Maximum Charge Time and Minimum Charge Time are commitment parameters that do not apply to NYISO's dispatch-only model for Energy Storage Resources because NYISO will not make commitment decisions for Energy

---

[289] *Id.*

[290] *See* proposed definitions in Services Tariff, § 2.12 [291]

Compliance Filing, Transmittal at 16-17.

[292] *Id.* at 29; proposed definitions in Services Tariff, § 4.2.1.3.3. [293]

Compliance Filing, Transmittal at 29.

[294] *Id. See* proposed definitions in Services Tariff, § 2.14.

Storage Resource.[295] NYISO states that, because its Energy Storage Resource participation model will only recognize when the resource is on or off, it will therefore treat all energy storage resource as fully dispatchable within the operating range that the market participant provides to the ISO.[296] NYISO explains that this approach significantly reduces the time required by its software to solve for unit commitment and dispatch.[297] As a result, NYISO states that it will not require the Energy Storage Resource to provide information regarding maximum or minimum charge time because it will not be making commitment decisions for the Energy Storage Resource.[298] NYISO proposes to use each Energy Storage Resource's Beginning Energy Level and a new parameter, Roundtrip Efficiency, to ensure that both day-ahead and real-time schedules are feasible.[299] NYISO also states that an Energy Storage Resource must submit its Roundtrip Efficiency, which will be used to schedule resources that opt to be ISO-Managed.[300] NYISO asserts that including this parameter will provide for more accurate accounting of an Energy Storage Resource's Energy Level throughout the scheduling horizon.[301]

139. NYISO states that Maximum Run Time and Minimum Run Time are commitment parameters that do not apply to NYISO's dispatch-only model for Energy Storage Resources.[302]

140. NYISO states that it will account for the Discharge Ramp Rate and the Charge Ramp Rate through its current tariff references to "response rates," which represent how quickly an Energy Storage Resource can respond to NYISO's dispatch instructions under various operating conditions.[303] NYISO's Services Tariff requires that bids supplying

---

[295] Compliance Filing, Transmittal at 16.

[296] *Id.* at 20.

[297] *Id.*

[298] *Id.*

[299] *Id.* at 10. Roundtrip Efficiency is the ratio of energy injections to energy withdrawals for an energy storage resource. *See* proposed Services Tariff, § 2.18.

[300] Compliance Filing, Transmittal at 30; Services Tariff, § 2.18. [301]

Compliance Filing, Transmittal at 30.

[302] *Id.* at 16.

[303] *Id.* at 17; Services Tariff, § 4.2.1.3.3.

energy and ancillary services must specify a normal response rate and may provide up to three normal response rates provided that the minimum normal response rate may be no less than 1 percent of the generator's operating capacity per minute.[304]

b. Protests/Comments

141. Energy Storage Association asserts that NYISO's proposal does not allow resource operators to sufficiently represent their state of charge as a bidding parameter, which Energy Storage Association believes is contrary to Order No. 841.[305] Energy Storage Association contends that Energy Storage Resource operators will be unable to submit a "Beginning Energy Level" parameter as part of their real-time bids.[306] Instead, Energy Storage Association argues that this parameter will solely be determined by NYISO through telemetry in real-time, conflicting with Order No. 841's requirement that electric storage resources be able to submit their state of charge for both day-ahead and real-time energy markets.[307] Energy Storage Association requests that the Commission direct NYISO to revise its filing to include Beginning Energy Level as a biddable parameter for electric storage resource operators in real-time because of the potential value in having the option for telemetry that aids in estimating future state of charge.[308] Lastly, Energy Storage Association requests that the Commission direct NYISO to ensure through its stakeholder processes and implementations that other bidding parameters, particularly those related to state of charge limits, are updateable in all bidding intervals by market participants.[309]

142. New York State Entities state that NYISO's proposal to require all Energy Storage Resources to provide real-time operating data via telemetry in six-second intervals may be overly broad for the services that Energy Storage Resources will provide, and overly-broad telemetry requirements can be prohibitively expensive. Therefore, New York State

[304] Services Tariff, § 4.2.1.3.3.

[305] Energy Storage Association Protest at 11. [306]

Id. at 11-12.

[307] Energy Storage Association argues that this is problematic because, "[Energy Storage Resource] operators may have knowledge of circumstances that could change the estimated Beginning Energy Level between the time bids are submitted and the RealTime operating hour, and therefore could provide more accurate estimates than the NYISO could ascertain through telemetry alone." *Id.* at 12.

[308] *Id.* at 11-12.

[309] *Id.* at 13.

Entities request that the Commission direct NYISO to include the necessary telemetry requirements for Energy Storage Resources in its administrated markets so that Energy Storage Resources are not confronted with cost-prohibitive telemetry requirements.[310]

143. 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 are sufficient for all uses, including planning processes and cost-based determination.[311]

144. Public Interest Organizations and Advanced Energy Economy argue that NYISO's failure to allow Energy Storage Resources to provide commitment parameters, while permitting that option for other resources, is inconsistent with Order No. 841.[312] Public Interest Organizations specifically contend that this exposes Energy Storage Resources to increased costs and risks, and the unequal treatment violates the FPA's prohibition on undue discrimination.[313] Advanced Energy Economy emphasizes that NYISO's proposal does not appear to afford Energy Storage Resources sufficient ability to provide information to NYISO on certain parameters, specifically Minimum Charge Time, Maximum Charge Time, Minimum Run Time, and Maximum Run Time.[314]

c. Answer

145. NYISO states that its operating parameter requirements are necessary to ensure the participation of Energy Storage Resources in its administered markets.[315] NYISO states that it examined Energy Storage Resources for both commitment and dispatch in NYISO's day-ahead and real-time Markets, but its software cannot ensure the development of both day-ahead and real-time market solutions within a reasonable time period when committing Energy Storage Resources. In response to Energy Storage Association's argument that Energy Storage Resources should be permitted to provide

---

[310] New York State Entities Protest at 43.

[311] Tesla Comments at 23.

[312] Public Interest Organizations Protest at 22; Advanced Energy Economy Comments at 12.

[313] Public Interest Organizations Protest at 22.

[314] Advanced Energy Economy Comments at 12. [315]

NYISO Answer at 9.

the real-time Beginning Energy Level manually, rather via telemetry, NYISO believes that real-time telemetered Energy Level data is the most accurate source of that data.[316]

146. With regard to New York State Entities' question about whether NYISO's sixsecond telemetry requirements are overbroad and reflect the actual data needed for the service provided, NYISO explains that its proposed telemetry requirements mirror the existing telemetry requirements applicable to all other generators participating in the NYISO's energy and ancillary services markets and ensure data consistency across all resources.[317] In response to Tesla, NYISO states that it does not prohibit resources from making seasonal changes to their registration parameters, subject to the resource providing NYISO with advance notice of the proposed changes.[318]

147. NYISO argues that its proposed dispatch-only model, which does not commit Energy Storage Resources, does not require that Energy Storage Resources provide commitment-related information such as Minimum Run Time, Maximum Run Time, Minimum Charge Time, and Maximum Charge Time.[319]

d. Commission Determination

148. We find that NYISO complies with the requirement of Order No. 841 to account for the State of Charge of electric storage resources using the participation model through its new Energy Level and Beginning Energy Level bidding parameters. NYISO proposes to define: (1) Energy Level as "[t]he amount of Energy stored in an Energy Storage Resource";[320] and (2) Beginning Energy Level as "the total amount of Energy stored by the [Energy Storage] Resource at the beginning of a market interval."[321] We find

---

[316] *Id.* at 11.

[317] *Id.*

[318] *Id.* at 12.

[319] *Id.* at 9 n.20 (citing Order No. 841, 162 FERC ¶ 61,127 at P 192 (stating that in Order No. 841, the Commission provided flexibility concerning the information that an energy storage resource was required to provide, noting that the flexibility "may help 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.")).

[320] Compliance Filing, Transmittal at 24. *See* proposed definitions in Services Tariff, § 2.5.

[321] Compliance Filing, Transmittal at 30; proposed definitions in Services Tariff,

NYISO's proposal to incorporate an estimated Beginning Energy Level into day-ahead market bids, as well as to evaluate Beginning Energy Levels in real-time through six-second telemetry, sufficiently complies with Order No. 841. We also find it reasonable that, if six-second telemetry is unavailable in real-time, NYISO will use the last valid Energy Level modified to reflect subsequent schedules.[322] We note that all bids will require a Beginning Energy Level Bid, even if that constraint is not binding due to the Energy Storage Resource electing to operate using the Self-Managed Energy Level mode.

149. We find that NYISO's proposed tariff revisions comply with the requirement in Order No. 841 to account for the Maximum State of Charge of resources using the participation model because Energy Storage Resources will use a new bidding parameter, "Upper Storage Limit" to account for the term "Maximum State of Charge" used in Order No. 841.[323] NYISO defines Upper Storage Limit as "[t]he maximum amount of Energy an Energy Storage Resource is physically capable of storing."[324] The Upper Storage Limit bidding parameter will be used by Energy Storage Resources as part of NYISO's software in both the day-ahead and real-time markets.[325]

150. We are not persuaded by Public Interest Organizations' and Advanced Energy Economy's arguments that NYISO must allow Energy Storage Resources to provide commitment parameters to comply with Order No. 841. Having found that NYISO's proposed Energy Storage Resource participation model accounts for the physical and operational characteristics of Energy Storage Resources in compliance with Order No. 841, we find, as set forth below, that NYISO proposes reasonable parameters necessary to implement its dispatch-only model.[326]

151. NYISO's proposed tariff revisions comply with the requirement in Order No. 841 to account for the Minimum State of Charge of Energy Storage Resources using the participation model because Energy Storage Resources will use the new bidding parameter "Lower Storage Limit" to account for the term Minimum State of Charge used

---

§ 2.2.

[322] *See* proposed definitions in Services Tariff, §§ 2.2, 4.2.1.3.4, 4.4.1.2.

[323] Compliance Filing, Transmittal at 17; proposed definitions in Services Tariff, § 2.21.

[324] *Id.*

[325] Compliance Filing, Transmittal at 23; proposed revisions in Services Tariff, §§ 4.4.1.2, 4.2.1.3.4.

[326] Compliance Filing, Transmittal at 19.

in Order No. 841.[327] NYISO proposes to define Lower Storage Limit as, "The minimum amount of Energy an Energy Storage Resource is physically capable of storing."[328] The Lower Storage Limit bidding parameter will be used by Energy Storage Resources as part of the NYISO's software in both the day-ahead and real-time markets.[329]

152. We also find that NYISO's proposed tariff revisions comply with the Order No. 841 requirement to account for the Maximum Charge Limit and Minimum Discharge Limit of Energy Storage Resources using the participation model because Energy Storage Resources will use a new bidding parameter, "Lower Operating Limit" to account for the terms, "Maximum Charge Limit" and "Minimum Discharge Limit" used in Order No. 841.[330] NYISO proposes to define Lower Operating Limit as "the maximum amount of megawatts the Resource can consume from the grid, if it is bidding to withdraw Energy, or the minimum amount of MW the Resource can supply the grid if it is not bidding to withdraw energy. The Lower Operating Limit of an ISO-Managed Energy Storage Resource that is not bidding to withdraw Energy shall not be set to less than 0 MW."[331] The Lower Operating Limit bidding parameter will be used by Energy Storage Resources as part of the NYISO's software in both the day-ahead and real-time markets.[332]

153. We find that NYISO's proposed tariff revisions comply with the requirement to account for the Minimum Charge Limit and Maximum Discharge Limit of Energy Storage Resources using the participation model because Energy Storage Resources will use the revised bidding parameter, "Upper Operating Limit" to account for the terms, "Minimum Charge Limit" and "Maximum Discharge Limit" used in Order No. 841.[333] NYISO proposes to revise the definition of Normal Upper Operating Limit in Section 2.14 of its Services Tariff to state that "Bids for Energy Storage Resources may include a negative [Normal Upper Operating Limit] when the Resource bids to withdraw Energy from the grid. The [Normal Upper Operating Limit] for ISO-Managed Energy

---

[327] *Id.* at 17.

[328] *Id.*; proposed definitions in Services Tariff, § 2.12.

[329] Compliance Filing, Transmittal at 23; proposed revisions in Services Tariff, §§ 4.4.1.2, 4.2.1.3.4.

[330] Compliance Filing, Transmittal at 16-17.

[331] *See* proposed definitions in Services Tariff, § 2.12. [332]

See id., §§ 4.2.1.3.3, 4.4.1.2.

[333] Compliance Filing, Transmittal at 16.

Storage Resources shall not be lower than 0 MW."[334] Currently, Normal Upper Operating Limit is a required bidding parameter for Generators in the day-ahead and realtime markets in NYISO, and this would be applicable to Energy Storage Resources as well because they are a subset of Generators.[335]

154. We find that NYISO's proposal not to account for Maximum Charge Time, Minimum Charge Time, Maximum Run Time, and Minimum Run Time through bidding parameters is acceptable because of the nature of NYISO's proposed dispatch-only participation model, which is incompatible with commitment parameters established by NYISO for Energy Storage Resources.[336] As noted above, we find NYISO's dispatchonly participation model complies with Order No. 841.

155. We find that NYISO's proposed tariff revisions comply with the requirement in Order No. 841 to account for the Discharge Ramp Rate and Charge Ramp Rate of resources using the participation model because energy storage resources will use a current bidding parameter—"response rates" —to account for these terms used in Order No. 841.[337] NYISO currently requires response rates to be submitted as a component of bids in both the day-ahead and real-time market.[338] NYISO proposes to require Energy Storage Resources, as a subset of Generators, to submit response rates as a component of their bids as well.[339]

156. We are not convinced by the New York State Entities' argument that requiring six-second interval telemetry is overly broad or prohibitively expensive. Order No. 841 notes that, "[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 resource participation model if it wants to provide that service."[340] In that context, we find reasonable NYISO's

---

[334] *Id.* at 29; proposed definitions in Services Tariff, § 2.14.

[335] Compliance Filing, Transmittal at 16; proposed definitions in Services Tariff, §§ 2.14, 2.23, 4.2.1.3.3, 4.4.1.2.

[336] Compliance Filing, Transmittal at 16, 20. [337]

Id. at 17.

[338] *Id.* at 18; proposed revisions to Services Tariff, §§ 4.2.1.3.3, 4.4.1.2.1.

[339] Compliance Filing, Transmittal at 17-18; proposed definitions in Services Tariff, § 2.23.

[340] Order No. 841, 162 FERC ¶ 61,127 at PP 77.

explanation that its proposed telemetry requirements mirror the existing telemetry requirements applicable to all other generators participating in the NYISO's energy and ancillary services markets.[341]

157. Further, we find NYISO's clarification regarding the ability of resources to make seasonal changes to their registration parameters, subject to the resource providing NYISO with advance notice of the proposed changes, sufficiently addresses Tesla's concerns.[342]

6. State of Charge Management

158. 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.[343] 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. 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.

159. 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.[344] 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.[345] 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

[341] NYISO Answer at 11.

[342] *Id.* at 12.

[343] Order No. 841, 162 FERC ¶ 61,127 at P 253. [344]

Id. P 254.

[345] *Id.* n.300.

Charge if it elects to do so.[346] 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.

160. 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.[347] 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. Self-managing electric storage resources, just like all market participants, are subject to any non-performance penalties in the RTO/ISO tariff.

161. The Commission recognized 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.[348] As with other resources, market monitors have the ability to review the bids from electric storage resources to detect economic or physical withholding.[349] 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.[350]

---

[346] *Id.* P 254.

[347] *Id.* P 255.

[348] *Id.* P 256.

[349] *Id.* P 257.

[350] *Id.* (citing 16 U.S.C. § 824d).

a. NYISO's Filing

162. NYISO states that its proposed tariff revisions provide an electric storage resource with the option to choose its mode of Energy Level Management,[351] which is equivalent to the term State of Charge used in Order No. 841.[352] NYISO explains that its proposed tariff language requires an electric storage resource to indicate, in both its day-ahead bids and real-time bids, whether the resource's Energy Level will be Self-Managed or ISO-Managed.[353] NYISO explains that an Energy Storage Resource may change its Energy Level Management election for different operating hours between the day-ahead and real-time markets and within the real-time market day.[354] However, NYISO will not allow the resource to change its Energy Level Management election within a day-ahead market day since a uniform election must be made for all hours of a day-ahead market evaluation period.[355]

163. With respect to ISO-Managed bid mode, NYISO states that its market software will evaluate an ISO-Managed Energy Storage Resource to inject or withdraw based on the economics of the resource's bids and its Energy Level constraints over the entire optimization window that is being evaluated.[356] NYISO also explains that its market software will assess the intertemporal bid spread (i.e., the difference between an Energy Storage Resource's bids to inject and its bids to withdraw energy)[357] over all intervals of

---

[351] NYISO defines Energy Level Management as "[t]he method by which an Energy Storage Resource controls the amount of Energy stored in the Resource. Energy Storage Resources may choose to be Self-Managed or ISO-Managed in their Bid." NYISO also proposes to define: (1) Energy Level as "[t]he amount of Energy stored in an Energy Storage Resource"; and (2) Beginning Energy Level as "the total amount of Energy stored by the Resource at the beginning of a market interval." *See* proposed definitions in Services Tariff, §§ 2.2, 2.5.

[352] Compliance Filing, Transmittal at 24 (citing Order No. 841, 162 FERC ¶ 61,127 at P 253).

[353] *See supra* note 213.

[354] *See* proposed Services Tariff, § 4.4.1.2. [355]

Id., § 4.2.1.3.1.

[356] NYISO notes that Energy Level constraints are intertemporal in nature; they link operations in one hour with operations in another hour. Compliance Filing, Transmittal at 25.

[357] An ISO-Managed energy storage resource may be scheduled to withdraw energy during a non-economic market hour (e.g., when the day-ahead LBMP for a market

the applicable optimization period. NYISO states that Energy Storage Resources will only be allowed to submit incremental energy bids, rather than spread bids, that include up to 11 distinct price steps.[358] NYISO states that Energy Storage Resources that wish to participate as an Installed Capacity Supplier must use the ISO-Managed Energy Level in its day-ahead market bids.[359]

164. With respect to Self-Managed bid mode, NYISO states that it will not optimize the Energy Level constraints for resources participating in this mode, since such resources will be responsible for managing their own constraints through their self-committed bids, which enable the resource to attain specific injection and withdrawal levels.[360] NYISO explains that, if a Self-Managed Energy Storage Resource fails to provide the quantity of energy scheduled over an interval, then NYISO's real-time dispatch software would adjust the resource's schedule to align with the resource's Energy Level.[361] According to NYISO, this adjustment is done to minimize: (1) the likelihood of NYISO issuing infeasible real-time schedules that the Energy Storage Resource cannot achieve; and (2) the need to manually de-rate the resource when its bids are inconsistent with its Energy Level.[362] NYISO further states that, when an Energy Storage Resource's real-time telemetered Energy Level is unavailable because of equipment failure or other reasons, it will use the last valid Energy Level value as modified to reflect subsequent schedules.[363]

165. NYISO states that Energy Storage Resources are responsible for submitting real-time operating data through telemetry in six-second increments.[364] NYISO notes that this

---

hour is greater than the bid price to withdraw energy). Conversely, an ISO-Managed energy storage resource may be scheduled to inject energy when the day-ahead LBMP for a market hour is less than the bid price to inject energy. *Id.* at 26.

[358] *Id.*

[359] Proposed Services Tariff, § 5.12.1.13.

[360] Compliance Filing, Transmittal at 27; proposed Services Tariff, §§ 4.2.1.3.4, 4.4.1.2. *See also* NYISO Data Request Response at 14.

[361] Compliance Filing, Transmittal at 26.

[362] *Id.* at 27.

[363] *Id.*

[364] *See* proposed Services Tariff, §4.4.2.1. Proposed Services Tariff, Section 3.5.2 provides that "Energy Storage Resources are required to provide a real-time Energy Level signal to the NYISO in accordance with ISO Procedures." Compliance Filing,

requirement will help maintain situational awareness and reliability of the grid.[365] NYISO further states that real-time Energy Level information is necessary to ensure that schedules for Energy Storage Resources are feasible.[366]

b. Protests/Comments

166. Several commenters assert that NYISO's proposed requirement that electric storage resources that serve as Installed Capacity Suppliers must use ISO-Managed Energy Levels in day-ahead market bids violates Order No. 841's requirement that Energy Storage Resources be able to self-manage their State of Charge.[367] NextEra and Energy Storage Association add that NYISO's requirements on Energy Storage Resources that are Installed Capacity Suppliers could have adverse implications for how the Energy Storage Resources are managed in the real-time market, and that the day-ahead schedule established by NYISO's software could be burdensome for electric storage resources that seek to self-manage their state of charge.[368] Specifically, NextEra argues that the day-ahead schedule established by NYISO's software will create binding market positions that will complicate real-time operations and optimization of electric storage resources.[369] Similarly, Energy Storage Association adds that, although it is conceivable that Energy Storage Resources that receive day-ahead schedules could adjust those schedules in real-time markets through buy-outs or other mechanisms, relying on this possibility would be overly burdensome, subject Energy Storage Resources to undue economic risk, and still hinder their ability to provide all services that they are technically capable of providing in the day-ahead market.[370] Energy Storage Association and Public Interest Organizations therefore request that the Commission reject NYISO's requirement

---

Transmittal at 55.

[365] *Id.* at 28.

[366] *Id.*

[367] *See*, *e.g.,* Energy Storage Association Comments at 5; NextEra Protest at 2; Public Interest Organizations Protest at 21.

[368] NextEra Protest at 4; Energy Storage Association Comments at 5-6. [369]

NextEra Protest at 4.

[370] Energy Storage Association Comments at 5-6.

to use ISO-Managed Energy Levels in the day-ahead market for electric storage resources participating in the installed capacity market.[371]

167. Public Interest Organizations further argue that NYISO's requirement that Energy Storage Resources that serve as Installed Capacity Suppliers allow NYISO to manage their energy level in day-ahead market bids forces Energy Storage Resources to choose between participating in the Installed Capacity market and engaging in State of Charge self-management.[372] Further, Public Interest Organizations state that while NYISO's provision for ISO-Managed Energy Level could help Energy Storage Resources if it were optional, the manner in which NYISO has implemented its proposed mechanism falls short.[373]

168. NextEra also argues that, under NYISO's proposal, an electric storage resource must be fully scheduled in the day-ahead market in order to provide Installed Capacity. This requirement, according to NextEra, will create inefficient outcomes and will prohibit the full potential of flexible deployment of electric storage resources.[374] NextEra asserts that this structure is unreasonable because it would discriminate against self-managed electric storage resources with respect to their real-time availability and their ratings for purposes of participation in the Installed Capacity market.[375] NextEra concludes that self-managed electric storage resources with valid offers for charging and discharging in the NYISO's real-time market should be considered just as 'available' as NYISO-managed Energy Storage Resources when they are fully discharged.[376]

169. 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.[377] 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

---

[371] *Id.*; Public Interest Organizations Protest at 24-25.

[372] Public Interest Organizations Protest at 21. [373]

Id. at 21-22.

[374] NextEra Protest at 4. [375]

Id. at 5.

[376] *Id.* at 6.

[377] Tesla Comments at 22.

regulation down.[378] 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.[379] Likewise, Tesla explains that fully discharged electric storage resources cannot provide frequency regulation based on an energy neutral signal, but could provide its full capacity for regulation down service.[380] Tesla states that it does not oppose the option to utilize energy neutral signals for frequency regulation, but requests that the Commission 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.[381]

c. Answer

170. NYISO argues that its management of day-ahead market Energy Levels is necessary to ensure efficient market outcomes and maintain system reliability.[382] NYISO requests that the Commission deny the protests because NYISO's proposal will, among other things, ensure comparable treatment of Energy Storage Resources with other Installed Capacity Suppliers.[383] NYISO states that Order No. 841 requires a resource using the participation model to meet the technical requirements for any of the services that it wants to provide and the Commission did not require NYISO to establish a new process by which an electric storage resource could demonstrate that it was technically capable.[384] NYISO states that the Commission only encouraged an RTO/ISO to consider whether modifications or additions are required to facilitate the participation of electric storage resources in its markets.[385] NYISO states that Energy Storage Resources, because of their unique characteristics (i.e., duration limitations), cannot participate in NYISO-administered markets in the same manner as conventional resources.

---

[378] *Id.*

[379] *Id.*

[380] *Id.*

[381] *Id.* at 23.

[382] NYISO Answer at 5.

[383] *Id.* at 5-6.

[384] *Id.* at 6 (citing Order No. 841, 162 FERC ¶ 61,127 at P 81).

[385] *Id.*

Accordingly, NYISO proposed the ISO-Managed Energy Level bidding requirement for the day-ahead market so that Energy Storage Resources can participate in the Installed Capacity market.[386] NYISO states that Energy Storage Resources participating in the Installed Capacity market may still self-manage their State of Charge in the real-time market.[387] NYISO explains that because Energy Storage Resources are duration limited, they may be awarded an infeasible day-ahead market schedule in the day-ahead market if NYISO does not manage the resource's state of charge.[388] Therefore, NYISO requires Energy Storage Resources participating in the Installed Capacity market to elect ISO-Managed Energy Levels so that they can be evaluated in NYISO's day-ahead market software to maintain consistency between schedule and capability.[389]

d. Data Request Response

171. In response to Commission staff's Data Request, NYISO further explains that it will require an Energy Storage Resource participating as an Installed Capacity Supplier in its administered Installed Capacity market to elect ISO-Managed Energy Levels in its day-ahead market bids.[390] NYISO asserts that Energy Storage Resources participating in the Installed Capacity market may still self-manage their state of charge in the real-time Market.[391] NYISO further states that because of Energy Storage Resources' unique characteristics (e.g., they are duration limited and cannot supply energy for all hours), they cannot be awarded a feasible day-ahead market schedule similar to conventional resources that participate in the Installed Capacity market without ISO management of their State of Charge.[392] NYISO further adds that if it does not account for the duration limitation in the day-ahead market economic evaluation, Energy Storage Resources may frequently be required to buy-out of infeasible day-ahead schedules.[393]

---

[386] *Id*. at 6.

[387] *Id.*

[388] *Id.*

[389] *Id.* at 7-8.

[390] NYISO Data Request Response at 29 (citing Proposed Services Tariff, § 5.12.1.13).

[391] *Id.* at 29.

[392] *Id*.

[393] *Id.* at 30. NYISO also states that if after the day-ahead market closes an energy storage resource becomes unavailable, NYISO may need, among other things, to commit

e. Commission Determination

172. We find that NYISO's proposed tariff revisions partially comply with the requirement of Order No. 841 to permit electric storage resources to self-manage their State of Charge in both the day-ahead and real-time markets. In particular, NYISO complies with Order No. 841 regarding self-management of State of Charge because NYISO's proposal provides Energy Storage Resources with the tools to self-manage State of Charge in the day-ahead and real-time markets. However, we find that NYISO's proposal to require Energy Storage Resources that are Installed Capacity Suppliers to use the ISO-Managed Energy Level in their day-ahead market bids does not comply with the requirement in Order No. 841 "to allow resources using the participation model for electric storage resources to self-manage their state of charge."[394] Order No. 841 explains that, where an electric storage resource has the option to allow the RTO/ISO to manage its State of Charge, the electric storage resource must be the default manager of the resource's State of Charge. Thus, NYISO's proposal to require an Installed Capacity Supplier to use the ISO-Managed Energy Level in its day-ahead market bids conflicts with the requirement in Order No. 841 to make the electric storage resource the default manager of the resource's State of Charge.

173. In the event that an Energy Storage Resource deviates from its day-ahead schedule in order to self-manage its State of Charge, NYISO's proposal would require an Installed Capacity Supplier that cannot meet its day-ahead schedule to buy out of that position at the real-time LBMP.[395] This is consistent with Order No. 841's statement 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."[396] However, we disagree with NYISO's argument that Energy Storage Resources that are Installed Capacity Suppliers must use the ISO-Managed Energy Level because it is not sufficient to rely on financial penalties and simply require Energy Storage Resources to buy out of infeasible day-ahead schedules if the duration limitation is not properly accounted for in the day-ahead market economic evaluation.[397]

---

and/or dispatch less efficient and more costly resources in real-time to maintain resource adequacy.

[394] Order No. 841, 162 FERC ¶ 61,127 at P 253. [395]

NYISO Answer at 8.

[396] Order No. 841, 162 FERC ¶ 61,127 at P 253. [397]

NYISO Answer at 8-9.

We see no reason to believe that the requirement—that an Installed Capacity Supplier that cannot meet its day-ahead schedule must buy out of its position at the real-time LBMP—would be insufficient to ensure that an Energy Storage Resource serving as an Installed Capacity Supplier will meet its day-ahead schedule or opt to use the ISOManaged Energy Level in its day-ahead market bids.

174. 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.[398] In addition, we disagree that the Commission must require NYISO to allow electric storage resources to submit asymmetrical offer curves for regulation up and regulation down service. This was not a requirement in Order No. 841, and thus is outside the scope of this compliance proceeding.

175. Accordingly, we direct NYISO to submit, within 60 days of the date of issuance of this order, a further compliance filing to remove the requirement that Energy Storage Resources that are Installed Capacity Suppliers must elect the ISO-Managed Energy Level bidding parameter for each day-ahead market bid, and designate the Energy Storage Resource as the default manager of the resource's State of Charge.

7. Energy Used to Charge Electric Storage Resources

a. Price for Charging Energy

176. 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.[399] 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. An electric storage resource's wholesale energy purchases should take place at the applicable nodal LMP, and not the zonal price.[400]

---

[398] *Id.*

[399] Order No. 841, 162 FERC ¶ 61,127 at P 294. [400]

Id. P 296.

177. The Commission found 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.[401] However, the Commission found 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).[402] 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.[403] Order No. 841-A further clarifies that, on 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.

178. 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 declined to grant clarification that charging pursuant to economic dispatch always qualifies as a service.[404] However, Order No. 841-A clarifies 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

---

[401] *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.

[402] *Id.* P 298.

[403] Order No. 841-A, 167 FERC ¶ 61,154 at P 121. [404]

Id. P 120.

RTO/ISO may propose such revisions to its tariff through a separate FPA section 205 filing.

179. 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.[405] 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.[406] 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 applies to all or some subset of electric storage resources, a generally applicable wholesale distribution service tariff, or any other rate mechanism).[407]

180. Additionally, the Commission found 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.[408] 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.

181. 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.[409]

---

[405] Order No. 841, 162 FERC ¶ 61,127 at P 299. [406]

Id. P 301.

[407] Order No. 841-A, 167 FERC ¶ 61,154 at P 123.

[408] Order No. 841, 162 FERC ¶ 61,127 at P 302.

[409] Order No. 841-A, 167 FERC ¶ 61,154 at P 119 (citing Order No. 841, 162

i. NYISO's Filing

182. NYISO proposes to revise the definition of station power to clarify that energy withdrawals by Energy Storage Resources when that energy is stored for later injection back onto the grid is not station power.[410] NYISO states that this proposed clarification is consistent with Order No. 841's directive that energy withdrawn for later injection back to the grid be settled at the applicable wholesale LBMP. NYISO states that Energy Storage Resources will need to have adequate metering in place to separately account for withdrawals for station power. Additionally, NYISO states that its day-ahead market optimization will account for expected Roundtrip Efficiency losses of withdrawing and storing energy from the grid at a later time.[411] For example, NYISO explains that an Energy Storage Resource with a Roundtrip Efficiency ratio of 0.85 will only inject 850 kW hours of energy for each MW of energy consumed. Therefore, this parameter will allow NYISO to account for an Energy Storage Resource's efficiency losses.

183. NYISO states that, as Energy Storage Resources are negative generation, Energy Storage Resources are not responsible for transmission service charges associated with energy withdrawals.[412] NYISO explains that this treatment is consistent with the treatment of other resources in the New York Control Area, and that the transmission charges assessed to load are calculated at the zonal level, not at the individual generator bus or nodal level. NYISO also argues that this is consistent with Order No. 841's directives.[413]

ii. Data Request Response

184. In response to Commission staff's Data Request, NYISO responds that it treats Energy Storage Resources' bids to withdraw energy for later injection onto the grid as negative generation rather than as withdrawals to serve load. Therefore, like other conventional generators, Energy Storage Resources will only be assessed charges in NYISO's Services Tariff based on its injections, rather than as load based on its withdrawals.[414] NYISO asserts that since it does not calculate and assess charges to

---

FERC ¶ 61,127 at PP 323-324).

[410] Compliance Filing, Transmittal at 62. *See* Services Tariff, § 2.19. [411]

Compliance Filing, Transmittal at 26.

[412] *Id.* at 22.

[413] *Id.* at 22 n.52 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 297-298).

[414] NYISO Data Request Response at 31 (stating it also proposed "conforming revisions to Service Tariff, §§ 4.1.6, 4.2.1.1, 4.2.1.4, 4.2.6, 4.4.1.2.1, and 4.4.1.4 to make

Generators based on their injections (or negative injections) at the individual Generator bus (or node), it will not assess transmission charges to Energy Storage Resources based on their injections or negative injections.[415]

185. In addition, NYISO states that its treatment of withdrawals by Energy Storage Resources as negative generation for the purpose of modeling Energy Storage Resources in its software does not complicate or prohibit accurate assessment of transmission charges for withdrawals.[416] NYISO further adds that by treating Energy Storage Resources as negative generation for later injection, it will be able to keep such transactions entirely separate in all of its settlement calculations from withdrawals to serve load.[417]

iii. Commission Determination

186. We find that NYISO's filing partially complies with the requirements of Order No. 841 with respect to energy used to charge electric storage resources. In particular, NYISO's filing complies with Order No. 841 regarding the price Energy Storage Resources pay for withdrawing energy from the grid, i.e., charging, because NYISO proposes that sales of electric energy from the NYISO markets to an Energy Storage Resource that the resource then resells back to those markets will be at the wholesale LBMP. Also, NYISO's proposal that Energy Storage Resources' wholesale energy purchases will be priced at the applicable nodal LBMP, and not the zonal price, complies with Order No. 841. Additionally, NYISO's proposal that efficiency losses constitute charging energy and are settled at the LBMP complies with Order No. 841.

187. However, we find that NYISO's proposal 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. NYISO argues that, because Energy Storage Resources are negative generation, they are not responsible for transmission service charges associated with energy withdrawals, and thus proposes to exempt from transmission service charges both energy withdrawals used to charge an Energy Storage Resource for later economic dispatch and energy withdrawals by an

---

clear that Energy Storage Resources can both sell Energy and purchase Energy as "negative generation," and to distinguish Energy Storage Resource withdrawals from Load.").

[415] *Id.* at 32.

[416] *Id.*

[417] *Id.*

Energy Storage Resource to provide an ancillary service.[418] We disagree with NYISO's assertion that, because transmission charges assessed to load are calculated at the zonal level while the price of electric storage resource withdrawals is calculated at the nodal level, it cannot assess transmission charges to electric storage resources when they charge. In Order No. 841, the Commission found that the applicable transmission charges that apply to load should apply to energy storage resources because when an energy storage resource is charging to resell energy at a later time, its behavior is similar to other load-serving entities. However, the Commission recognized that it may be possible for different transmission charges to apply to load resources located at a single node (such as pumped storage resources) that are paying a nodal price for energy and load resources that are located across multiple loads (such as load serving-entities) that are paying a zonal price for energy. To the extent that load resources located at a single node pay different transmission charges than load located across multiple nodes, Order No. 841 requires an RTO/ISO to apply the transmission charges of single-node load resources to electric storage resources that are located at a single pricing node, unless electric storage resources are being dispatched by an RTO/ISO to provide an ancillary service.[419]

188. 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.[420]

189. NYISO does not meet these requirements because its proposal exempts Energy Storage Resources that are charging for later resale from transmission charges that are applicable to other load. We find that NYISO has not shown, as required in Order No. 841-A, that its proposal is reasonable given how NYISO assesses transmission

[418] Compliance Filing, Transmittal at 22.

[419] Order No. 841, 162 FERC ¶ 61,127 at P 297.

[420] Order No. 841-A, 167 FERC ¶ 61,154 at P 121.

charges to wholesale load under NYISO's existing rate structure. We, therefore, direct NYISO to file, within 60 days of the date of issuance of this order, a further compliance filing with tariff revisions that comply with this aspect of Order Nos. 841 and 841-A by applying transmission charges to Energy Storage Resources when that resource is charging for later resale in wholesale markets but is not being dispatched by the RTO/ISO to provide a service and explaining how such charges would be calculated.

b. Metering and Accounting Practices for Charging Energy

190. To help implement the new requirement in section 35.28(g)(9)(ii) of the Commission's regulations,[421] 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.[422] Order No. 841 requires each RTO/ISO to directly meter electric storage resources,[423] but offered 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.[424] 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.[425]

191. The Commission rejected 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.[426] 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

[421] *See supra* P 176.

[422] Order No. 841, 162 FERC ¶ 61,127 at P 322.

[423] Order No. 841-A clarified 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.

[424] Order No. 841, 162 FERC ¶ 61,127 at P 322. [425]

Id. P 324.

[426] *Id.* P 325.

response to concerns that not requiring electric storage resources to 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 the Relevant Electric Retail Regulatory Authorities in its footprint.[427] 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.[428]

192. 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).[429] 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.[430] 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 demand at the wholesale LMP.[431] 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.

---

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

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

[429] Order No. 841, 162 FERC ¶ 61,127 at P 326.

[430] *Id.*; Order No. 841-A, 167 FERC ¶ 61,154 at P 127 & n.254. [431]

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

i. NYISO's Filing

193. NYISO proposes to require all Energy Storage Resources to be directly metered, including those Energy Storage Resources that are co-located with load.[432] Energy Storage Resources that are co-located with load behind a single end-use customer meter will be required to be separately metered from the load.[433] To account for the wholesale load for a corresponding Load Serving Entity (LSE), NYISO will require the Meter Authority for a load co-located with the directly metered Energy Storage Resource to submit the full load for the appropriate LSE, without netting out the resource's injections and withdrawals.[434] NYISO states that requiring direct metering will reduce the changes necessary to the NYISO's settlements software and ensure that all injections and withdrawals of energy are settled at wholesale market LBMPs.[435]

194. NYISO states that it will establish as part of its registration requirements that an Energy Storage Resource is required to provide an attestation that it has sufficient metering to identify only that energy that is withdrawn for later injection back onto the grid.[436] NYISO states that the metering specifications and standards necessary for Energy Storage Resources located in the ISO Procedures will be updated to include any specifications and standards necessary for Energy Storage Resources.[437]

195. NYISO states that it has discussed concerns regarding Energy Storage Resources being forced to pay twice for the same charging energy with its New York transmission owners and stakeholders, and understands that New York utilities do not intend to invoice Energy Storage Resources for energy withdrawals for wholesale market participation.[438]

ii. Protests/Comments

196. Energy Storage Association argues that the Commission should reject NYISO's metering requirement because it creates a de facto barrier to dual participation in

---

[432] Compliance Filing, Transmittal at 61.

[433] *Id.*

[434] *Id.* at 61-62.

[435] *Id.* at 61.

[436] *Id.* at 15.

[437] *Id.* at 61; Services Tariff, § 13.

[438] Compliance Filing, Transmittal at 62.

wholesale and retail markets and is a significant financial detriment to storage resources.[439] Energy Storage Association states that the Commission was clear in Order No. 841 that metering and accounting practices should distinguish between wholesale and retail activity, and not simply preclude retail activity, and therefore NYISO's proposal violates the mandates of Order No. 841.[440] Energy Storage Association requests that the Commission direct NYISO to develop plans to separate metering and accounting of wholesale transactions from retail transactions, which do not create a de facto prohibition on dual participation.[441]

197. Advanced Energy Economy states that NYISO's filing fails to fully detail metering and accounting practices that support the participation of Energy Storage Resources located on the distribution system or behind the meter.[442] Advanced Energy Economy specifically takes issue with NYISO's proposal that all Energy Storage Resources be separately metered and have all energy that they use for charging and discharging accounted for independently of the customer's retail load. Advanced Energy Economy asserts that these requirements will, in practice, prevent a resource that is behind the meter from being used to provide wholesale services and on-side reductions in retail load.[443] Advanced Energy Economy asserts that NYISO's proposal, which plans to rely on distribution utilities to net out charging activity to ensure that an Energy Storage Resource is not charged twice, does not comply with Order No. 841.[444]

198. Advanced Energy Economy also suggests that the Commission direct NYISO to remedy these problems by implementing additional metering and/or accounting practices that better account for energy injections and withdrawals used for wholesale and retail purposes. As an example, Advanced Energy Economy advocates that NYISO should be directed to develop more precise accounting procedures that ensure that, for directly-metered behind-the-meter electric storage resources, the distribution utility only nets out charging energy that is later injected onto the wholesale grid (and is thus a wholesale

[439] Energy Storage Association Protest at 4.

[440] *Id.* at 4 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 318, 322, 325). [441]

Id. at 5.

[442] Advanced Energy Economy Comments at 7.

[443] *Id.*

[444] *Id.* at 9.

sale), and that charging energy that is used to reduce on-site load is appropriately settled at retail.[445]

iii. Data Request Response

199. In response to Commission staff's Data Request, NYISO affirms that direct metering will enable it to separate the electric storage resource's wholesale market operations from any other obligations, and will settle Energy Storage Resources solely for their wholesale transactions.[446] Additionally, NYISO reiterates that it has worked closely with all New York transmission owners to ensure that any wholesale withdrawals by an electric storage resource for later injection will be excluded from retail withdrawals to serve load for the corresponding LSE.[447] NYISO also affirms that because it does not have access to the retail invoices of individual New York State electricity consumers, it cannot independently determine whether the energy withdrawn to charge an electric storage resource has also been included on a facility's retail invoice.[448]

iv. Commission Determination

200. We find that NYISO's proposed tariff revisions partially comply with the requirements of Order No. 841 pertaining to metering and accounting practices for electric storage resources. As noted in its Data Request Response, NYISO affirms that its proposed direct metering requirement will enable it to separate an Energy Storage Resource's wholesale market operations from any other obligations, and will ensure that all injections and withdrawals of energy are settled (solely for their wholesale transactions) at wholesale market LBMPs. NYISO also states that, because it does not have access to the retail invoices of its individual New York State electric customers, it would rely on New York transmission owners to ensure that wholesale withdrawals for later injection will be excluded from retail withdrawals to serve load for the appropriate LSE. However, we agree with commenters that NYISO has not adequately demonstrated that the proposed metering and accounting practices will be sufficient to prevent double payment for charging energy at the retail and wholesale levels. We, therefore, direct

[445] *Id.* at 8-9.

[446] NYISO Data Request Response at 20-21. NYISO states that Section 13 of the Services Tariff requires all of its customers to provide the meter data information necessary (i.e., energy storage resources will be required to submit a set of data for injections and another set of data for withdrawals) for NYISO to perform its functions and to fulfill its responsibilities under the Services Tariff.

[447] *Id.* at 21.

[448] *Id.*

NYISO to file, within 60 days of the date of issuance of this order, a further compliance filing revising its tariff to state that NYISO 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.

201. Additionally, we find that NYISO's tariff, rather than the ISO Procedures, must include a basic description of NYISO's metering methodology and accounting practices for Energy Storage Resources, as well as references to the specific documents in the ISO Procedures that contain the implementation details. Under the Commission's precedent, 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.[449] Although the majority of metering and accounting principles pertaining to other types of resources are not specified in the tariff, because of the unique physical and operational characteristics of electric storage resources, the particular metering and accounting practices for such resources will ensure that Energy Storage Resources are charged LBMP 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. Further, because Energy Storage Resource market participants should be aware of the procedures that apply to them in order to plan and manage their participation in the markets, we find that the tariff should reference the specific documents in the ISO Procedures that contain the implementation details for NYISO's metering methodology and accounting practices for Energy Storage Resources. Accordingly, we direct NYISO to file, within 60 days of the date of issuance of this order, tariff revisions to include a basic description of NYISO's metering methodology and accounting practices for Energy Storage Resources, as well as references to the specific documents in the ISO Procedures that contain the implementation details.

c. Participation in Wholesale and Retail Markets

202. In Order No. 841, the Commission stated that it was not requiring that electric storage resources purchase all electric energy for future use from the RTO/ISO markets, and was not addressing whether such resources can pay some other rate for their charging

[449] *Energy Storage Assoc. v. PJM Interconnection, L.L.C.,* 162 FERC ¶ 61,296, at P 103 (2018).

energy, such as a retail rate or charging off of co-located generation.[450] The Commission further stated that it was not 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.[451] 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.

203. In Order No. 841-A, the Commission denied rehearing of the decision to decline to require electric storage resources to choose to participate exclusively in either wholesale or retail markets due to the complexity of the metering and accounting practices.[452] 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. The Commission explained that it chose not to prescribe particular metering and accounting practices that each RTO/ISO must adopt, instead providing flexibility for each RTO/ISO to develop practices that reflect its unique market rules and its member utilities' requirements for metering, billing systems, and other supporting software and IT platforms.[453]

i. NYISO's Filing

204. NYISO contends that dual participation is outside the scope of Order No. 841, but explains that it is exploring a dual participation concept as part of its aggregation market design.[454]

ii. Protests/Comments

205. Commenters request that the Commission direct NYISO to submit a compliance filing that would allow Energy Storage Resources to simultaneously provide wholesale

---

[450] Order No. 841, 162 FERC ¶ 61,127 at P 299.

[451] *Id.* P 325.

[452] Order No. 841-A, 167 FERC ¶ 61,154 at P 140. [453]

Id. PP 140-41.

[454] Compliance Filing, Transmittal at 55.

and retail services.[455] Institute for Public Integrity contends that NYISO's prohibition of dual participation for Energy Storage Resources would lead to unjust and unreasonable rates in violation of the FPA, and conflicts with the requirements of Order No. 841. Institute for Public Integrity requests that the Commission require NYISO to facilitate dual participation in a separate FPA section 205 filing.[456] Advanced Energy Economy argues that the ability of electric storage resources to participate in both wholesale and retail markets is not beyond the scope of Order No. 841.[457] Advanced Energy Economy therefore requests that the Commission direct NYISO to address the ability of electric storage resources to provide both wholesale and retail services.

iii. Data Request Response

206. In response to Commission staff's Data Request, NYISO explains that NYISO stakeholders recently approved tariff changes to implement new market rules for aggregations that outline dual participation requirements for all Generators, including Energy Storage Resources, as well as for Distributed Energy Resources.[458] NYISO states that the new dual participation requirements will allow all Generators, including Energy Storage Resources, located in the New York Control Area (NYCA) to simultaneously participate in NYISO-administered markets and in programs or markets operated to meet the needs of distribution systems located in the NYCA.[459] NYISO states that it expects to file tariff revisions concerning the new market rules for aggregations, including NYISO's proposed dual participation requirements, in the second quarter of 2019, and intends for these dual participation requirements to be in place and available for Energy Storage Resources by the time its Order No. 841 compliance filing here is implemented.[460]

---

[455] *See, e.g.*, EDF Renewables Protest at 2; New York State Entities Protest at 33-38; Public Interest Organizations Protest at 15-21.

[456] Institute for Public Integrity Comments at 6.

[457] Advanced Energy Economy Comments at 9-10 (citing Order No. 841, 162 FERC ¶ 61,127 at P 325).

[458] NYISO Data Request Response at 14-15. [459]

Id. at 15.

[460] *Id.* We note that NYISO filed these tariff revisions on June 27, 2019 in Docket No. ER19-2276-000. The revisions are currently pending before the Commission.

iv. Commission Determination

207. We find that NYISO does not comply with Order No. 841 because its proposed tariff revisions do not allow electric storage resources to use the electric storage resource participation model if they also participate in retail markets. We disagree with NYISO that the ability of electric storage resources to participate in both wholesale and retail markets is beyond the scope of Order No. 841. In Order No. 841, the Commission stated that it was not 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.[461] 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.[462] Further, in Order No. 841-A, the Commission denied rehearing of the decision to decline to require electric storage resources to choose to participate exclusively in either wholesale or retail markets due to the associated metering and accounting complexity.[463] 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.[464]

208. However, we note that on June 27, 2019 in Docket No. ER19-2276-000, NYISO submitted a proposal under FPA section 205 to allow participation by all resources in its wholesale and retail markets. Those tariff revisions would establish new market rules for aggregations of all Generators, including Energy Storage Resources, as well as Distributed Energy Resources that allow participation by all resources in its wholesale and retail markets. NYISO also requests that that proposal become effective as of May 1, 2020, to ensure that Energy Storage Resources will be able to make use of the provisions once NYISO's tariff revisions in compliance with Order No. 841 become effective on NYISO's proposed effective date of May 1, 2020. Therefore, we defer further action on the Order No. 841 compliance directive to allow participation in wholesale and retail

[461] Order No. 841, 162 FERC ¶ 61,127 at P 325.

[462] *Id.*

[463] Order No. 841-A, 167 FERC ¶ 61,154 at P 140.

[464] *Id.*

markets until the Commission takes action on the merits of NYISO's proposal filed in Docket No. ER19-2276-000.

d. Participation of Behind the Meter Electric Storage Resources in Wholesale Markets

209. In Order No. 841, the Commission revised section 35.28(b) of the Commission's regulations to define an electric storage resource as "a resource capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid." The Commission stated that this definition is intended to cover electric storage 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 (e.g., batteries, flywheels, compressed air, and pumped-hydro). Additionally, the Commission stated that electric storage resources located on the interstate transmission system, on a distribution system, or behind the meter fall under this definition. The Commission stated that, by including all electric storage technologies, and by allowing resources that are interconnected to the transmission system, distribution system, or behind the meter to use the participation model for electric storage resources, the Commission was ensuring that the market rules will not be designed for any particular electric storage technology.[465]

i. NYISO's Filing

210. As described above, NYISO states that, consistent with its definition, electric storage facilities that are aggregated behind the same meter at the same point of interconnection may qualify and participate as a single Energy Storage Resource in the NYISO-administered markets.[466]

ii. Protests/Comments

211. Advanced Energy Economy asserts that NYISO has not fully shown how its tariff revisions will fully permit Energy Storage Resources on the distribution grid or behind the meter to inject and withdraw energy and otherwise fully provide all of the wholesale services that they are technically capable of providing.[467] Advanced Energy Economy states that Order No. 841 requires a clear path for electric storage resources located on the distribution grid or behind the meter to be able to inject energy onto the wholesale grid

[465] Order No. 841, 162 FERC ¶ 61,127 at P 29.

[466] NYISO Data Request Response at 2 n.8.

[467] Advanced Energy Economy Comments at 4.

(provided they are technically and contractually able to do so) and provide all wholesale services that they are technically capable of providing.[468]

212. Tesla urges the Commission to require that the RTOs and ISOs describe how behind-the-meter electric storage resources are able to provide all services 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.[469] Tesla argues that NYISO's proposal does not include a participation model that would allow behind-the-meter energy storage to transition between serving onsite load and injecting energy onto the grid, and that as a result of this restriction these behind-the-meter storage resources will likely be unable to offer their full capacity into NYISO's markets.[470] Tesla explains that the NYISO proposal would only allow behind-the-meter Energy Storage Resources to participate either as a demand response resource by adjusting onsite load, or, alternatively, as a generation resource that provides service only by injecting energy onto the grid.[471]

213. Energy Storage Association states that NYISO, in its compliance filing, creates a de-facto barrier to dual participation through its requirements that any Energy Storage Resource located behind a customer meter be separately metered and have all energy used for charging and discharging accounted for independent of the customer's retail load.[472] Energy Storage Association explains its view that these requirements fail to adhere to Order No. 841 because electric storage resources located behind a retail meter will be precluded from earning revenues incurred by modifying load, such as by reducing retail demand charges or shifting peak load based on retail time-of-use rates.[473]

---

[468] *Id.*

[469] Tesla Comments at 18. [470]

Id. at 19.

[471] *Id.* at 19-20.

[472] Energy Storage Association Comments at 4 (citing Compliance Filing, Transmittal at 61).

[473] *Id.* at 4.

iii. Answers

214. NRECA filed an answer to Advanced Energy Economy's and Tesla's comments arguing that the tariff provisions they seek are beyond the scope of the Order No. 841 compliance proceedings. According to NRECA, the compliance proceedings should not become vehicles to restructure, unbundle, or otherwise federally regulate local distribution facilities, local distribution services, or retail electric services, which NRECA claims would be beyond the requirements of Order No. 841 and the Commission's statutory authority.[474]

215. In response to Advanced Energy Economy's argument that Order No. 841 "requires a clear path" for electric storage resources on distribution systems or behind the retail meter "to be able to inject energy onto the wholesale grid (provided they are technically and contractually able to do so) and provide all wholesale services they are technically capable of providing,"[475] NRECA states that Order No. 841 never uses the term "clear path" and instead requires each RTO/ISO to revise its tariff to establish market rules that "facilitate . . . participation" by electric storage resources and "remove barriers" to such participation.[476] According to NRECA, Order No. 841 is exclusively addressed to RTOs/ISOs and does not require an RTO/ISO to adopt market rules that clear a new path through non-RTO/ISO local distribution facilities, retail meters, or retail electric regulation more generally.[477]

iv. Commission Determination

216. As to concerns regarding the ability of Energy Storage Resources located on the distribution system or behind the meter to participate in NYISO's markets, we reiterate that NYISO's definition of Energy Storage Resource is inclusive of those resources located on a distribution system or behind the meter.[478] As described above, we find that NYISO has demonstrated that all Energy Storage Resources, including those located on the distribution system or behind the meter, will be eligible to provide all capacity,

---

[474] NRECA Answer at 2 (citing 16 U.S.C. § 824).

[475] Advanced Energy Comments at 7.

[476] NRECA Answer at 4 (citing Order No. 841, 162 FERC ¶ 61,127 at PP 1, 3, 19, 20).

[477] *Id.* (citing Order No. 841, 162 FERC ¶ 61,127 at PP 19, 20; 18 C.F.R. § 35.28(g)(9)).

[478] *See supra* P 24.

energy, and ancillary services that they are technically capable of providing.[479] With respect to the concerns raised by Energy Storage Association, we do not believe that requiring Energy Storage Resources to be separately metered presents a de-facto barrier to participation in retail and wholesale electric markets. We note that NYISO's instant filing does not include details on NYISO's metering methodology and accounting practices for Energy Storage Resources located behind a customer meter, and as discussed above, we find that NYISO's tariff must include a basic description of NYISO's metering methodology and accounting practices.[480] Further, we note our earlier determination[481] that defers further action on the Order No. 841 compliance directive to allow participation in wholesale and retail markets until the Commission takes action on the merits of NYISO's proposal filed in Docket No. ER19-2276-000.

8. Effective Date

217. 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 allowed a further 365 days from that date to implement the tariff provisions.[482] The Commission declined to allow the RTOs/ISOs to develop their own implementation schedules, finding that the compliance and implementation schedule set forth in Order No. 841 is appropriate.[483] The Commission stated that the regional flexibility allowed in Order No. 841 will assist the RTOs/ISOs in meeting the compliance and implementation deadlines.[484] 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.[485]

a. NYISO's Filing

218. NYISO's proposed compliance tariff sheets do not include an effective date, but in its transmittal letter, NYISO requests an effective date of no earlier than May 1, 2020 for

---

[479] *See supra* P 43.

[480] *See supra* P 201.

[481] *See supra* P 208.

[482] Order No. 841, 162 FERC ¶ 61,127 at P 348. [483]

Id. P 349.

[484] *Id.* P 350.

[485] Order No. 841-A, 167 FERC ¶ 61,154 at P 154.

the proposed tariff revisions. In support of this proposed effective date, NYISO explains that the software and computer hardware necessary to implement the proposed tariff revisions are undergoing a significant upgrade.[486] NYISO explains that this upgrade is the culmination of a 3-year process, and that the software systems related to implementation of its proposed Energy Storage Resource participation model are being coded consistent with its new, upgraded software and computer hardware systems.

219. NYISO proposes to submit an informational filing at least two weeks in advance of its intended effective date, specifying the date on which the tariff revisions submitted in this compliance filing will take effect. NYISO cites Commission precedent in which the Commission has found that such an informational filing has provided adequate notice to the Commission and market participants.[487]

220. NYISO also requests that the proposed tariff revisions concerning the reinstatement of the Category III Examined Facilities under the BSM Rules become effective one day after the Commission issues an order accepting them, unless the timing of the order is such that immediate effectiveness would disrupt NYISO's administration of its Class Year process or the BSM Rules.[488]

b. Protests/Comments

221. Energy Storage Association argues that the Commission should reject NYISO's proposed effective date because it is six months later than the Commission's required implementation timeline.[489] In addition, Energy Storage Association claims that NYISO's proposal of "no earlier" than May 1, 2020 is open-ended[490] and would provide Energy Storage Resources with as little as two weeks of notice before implementation. Energy Storage Association claims that this is unreasonable and impractical.[491]

---

[486] Compliance Filing, Transmittal at 64.

[487] *Id.* at 65 (citing *N.Y. Indep. Sys. Operator, Inc.*, 106 FERC ¶ 61,111, at P 10 (2004); *N.Y. Indep. Sys. Operator, Inc.*, Docket No. ER11-2544-000, at 1 (Feb. 10, 2011) (delegated order); *N.Y. Indep. Sys. Operator, Inc.*, Docket No. ER15-485-000, at 2 (Jan. 15, 2015) (delegated order); *N.Y. Indep. Sys. Operator, Inc.*, 151 FERC ¶ 61,057, at P 20 (2015)).

[488] *Id.* at 65.

[489] Energy Storage Association Protest at 13.

[490] *See also* NextEra Protest at 7; Advanced Economy Energy Comments at 2. [491]

Energy Storage Association Protest at 14.

Furthermore, according to Energy Storage Association, delaying and predicating implementation of Order No. 841 on a software upgrade that has already undergone significant delays creates market uncertainty. NextEra argues that the Commission should direct NYISO to expedite its efforts so it at least meets the new May 1, 2020 date.[492] NYTOs state that they do not object to the short delay in implementation until May 1, 2020, but they are concerned about the potential for further delays.[493] NYTOs state that they discussed their concern with NYISO and NYISO agreed to make an informational filing no later than December 31, 2019, to advise stakeholders on the completion date of the software upgrades.[494] NYTOs state that if it becomes apparent that the software upgrades will not be deployed in the fourth quarter of 2019, then NYISO agreed to make an informational filing prior to December 31, 2019, in order to notify stakeholders of the delayed deployment.[495]

c. Commission Determination

222. While the Commission in Order Nos. 841 and 841-A declined to grant the RTOs/ISOs additional time for implementation, we find here that NYISO's request to implement the requirements of Order No. 841 after the deadline established in Order No. 841 is reasonable based on the specific circumstances outlined in its compliance filing. We recognize that NYISO's extensive software upgrade process has been underway for several years and predates Order No. 841. NYISO states that it chose to code the software necessary for implementation of its Energy Storage Resource participation model consistent with this new suite of computer systems, rather than with its existing systems. We find persuasive NYISO's explanation that the upgrades it was already undertaking prevent it from implementing its participation model before May 1, 2020. Therefore, we will not require NYISO to recode the software necessary to implement its participation model so that it could run on its existing systems before May 1, 2020.

223. However, we agree with Energy Storage Association that it is not reasonable to allow NYISO to adopt an open-ended effective date of no earlier than May 1, 2020, with an informational filing providing notice two weeks in advance. We believe NYISO's proposal inappropriately creates uncertainty for existing and prospective market participants expecting to participate in NYISO's markets under the Energy Storage

[492] NextEra Protest at 7.

[493] NYTOs February 7, 2019 Protest at 10. [494]

Id. at 10-11.

[495] *Id.* at 11.

Resource participation model. Nearly a full year has elapsed since NYISO proposed this effective date in its compliance filing. Consequently, we expect that NYISO has made sufficient progress to implement its software upgrade. Therefore, we direct NYISO to submit, within 60 days of the date of issuance of this order, a further compliance filing to propose an effective date for its compliance filing that is no later than May 1, 2020.

The Commission orders:

(A) NYISO's compliance filing is hereby accepted in part and rejected in part, subject to a further compliance filing, as discussed in the body of this order.

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

(C) As part of its further compliance filing, NYISO is hereby directed to propose an effective date for its compliance filing that is no later than May 1, 2020, 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.

Appendix A

Tariff Records Filed

New York Independent System Operator, Inc.

FERC FPA Electric Tariff

NYISO Tariffs

Docket No. ER19-467-000

NYISO OATT, 1.5 OATT Definitions - E, 13.0.0

NYISO OATT, 1.9 OATT Definitions - I, 14.0.0

NYISO OATT, 1.23 OATT Definitions - W, 3.0.0

NYISO OATT, 25.7 OATT Att S Cost Allocation Methodology for CRIS, 10.0.0

NYISO OATT, 25.8 OATT Att S Project Cost Allocation Decisions, 8.0.0

NYISO OATT, 30.3 OATT Att X Interconnection Requests, 11.0.0

NYISO OATT, 30.14 OATT Att X Appendices, 16.0.0

NYISO OATT, 32.5 OATT Att Z Appendices, 16.0.0

NYISO MST, 2.2 MST Definitions - B, 13.0.0

NYISO MST, 2.3 MST Definitions - C, 18.0.0

NYISO MST, 2.5 MST Definitions - E, 17.0.0

NYISO MST, 2.9 MST Definitions - I, 26.0.0

NYISO MST, 2.12 MST Definitions - L, 9.0.0

NYISO MST, 2.13 MST Definitions - M, 19.0.0

NYISO MST, 2.14 MST Definitions - N, 18.0.0

NYISO MST, 2.15 MST Definitions - O, 11.0.0

NYISO MST, 2.18 MST Definitions - R, 28.0.0

NYISO MST, 2.19 MST Definitions - S, 23.0.0

NYISO MST, 2.21 MST Definitions - U, 4.0.0

NYISO MST, 2.23 MST Definitions - W, 4.0.0

NYISO MST, 3.5 MST ISO Procedures, 5.0.0

NYISO MST, 4.1 MST Market Services - General Rules, 13.0.0

NYISO MST, 4.2 MST Day-Ahead Markets and Schedules, 17.0.0

NYISO MST, 4.4 MST Real-Time Markets and Schedules, 32.0.0

NYISO MST, 4.6 MST Payments, 5.0.0

NYISO MST, 5.12 MST Requirements Applicable to Installed Capacity Suppl, 22.0.0

NYISO MST, 15.3 MST Rate Schedule 3 - Payments for Regulation Service, 15.0.0

NYISO MST, 15.3A MST Rate Schedule 3A - Charges Applicable to Suppliers, 8.0.0

NYISO MST, 15.4 MST Rate Schedule 4 - Payments for Supplying Operating, 18.0.0

NYISO MST, 17.1 MST Att B LBMP Calculation, 23.0.0

NYISO MST, 18 MST Attachment C - Formulas For Determining Bid Production, 11.0.0

NYISO MST, 23.1 MST Att H Purpose and Objectives, 1.0.0

NYISO MST, 23.2 MST Att H Conduct Warranting Mitigation, 30.0.0

NYISO MST, 23.3 MST Att H Criteria for Imposing Mitigation Measures (2), 17.0.0

NYISO MST, 23.4-23.4.4 MST Att H Mitigation Measures, 46.0.0

NYISO MST, 23.4.5 MST Installed Capacity Market Mitigation Measures, 25.0.0

NYISO MST, 23.4.6-23.4.8 MST Virtual Bidding Measures, 2.0.0

NYISO MST, 25 MST Attachment J - Determination Of Day-Ahead Margin Assu, 11.0.0

Docket No. ER19-467-002

NYISO MST, 2.5 MST Definitions - E, 18.0.0

NYISO MST, 15.4 MST Rate Schedule 4 - Payments for Supplying Operating, 20.0.0

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

New York Independent System Operator, Inc. Docket Nos. ER19-467-000
ER19-467-001
ER19-467-002

(Issued December 20, 2019)

McNAMEE, Commissioner, *concurring*:

■ I concur with today's order insofar as it finds that New York Independent System Operator, Inc. (NYISO) complies in part with Order Nos. 841[1] and 841-A[2] (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]

■ 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)

[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).

and Independent System Operators (ISOs).[7] In Order No. 841, the Commission denied 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]

■ 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]

■ 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]

---

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

[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.

■ While I approve NYISO'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 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

[12] *See Nat'l Ass'n of Regulatory Comm'rs v. FERC*, Nos. 19-1142 and 19-1147 (D.C. Cir. filed July 11, 2019).