

158 FERC ¶ 61,107
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Cheryl A. LaFleur, Acting Chairman;
Norman C. Bay, and Colette D. Honorable.

Indianapolis Power & Light Company

Docket No. EL17-8-000

v.

Midcontinent Independent System Operator, Inc.

ORDER GRANTING COMPLAINT IN PART AND DENYING COMPLAINT IN
PART

(Issued February 1, 2017)

1. On October 21, 2016, Indianapolis Power & Light Company (Indianapolis Power) filed a complaint, pursuant to sections 206 and 306 of the Federal Power Act (FPA),¹ alleging that Midcontinent Independent System Operator, Inc.’s (MISO) Open Access Transmission, Energy and Operating Reserve Markets Tariff (Tariff) is unjust, unreasonable, and unduly discriminatory or preferential because it fails to properly account for currently available grid-scale battery storage devices, in particular Indianapolis Power’s grid-scale lithium ion Harding Street Station Battery Energy Storage System (Battery Facility).² Specifically, Indianapolis Power asks the Commission to find that MISO’s Tariff is unjust, unreasonable, and unduly discriminatory or preferential because: (1) Schedule 3, Regulating Reserve fails to compensate suppliers of primary frequency response; (2) the dispatch protocol for Schedule 3, Regulating Reserve service does not accommodate the Battery Facility or other fast-responding resources; and (3) the MISO Tariff “Stored Energy Resource” (SER) resource type does not allow electric storage resources to provide all products that they are technically capable of providing.

¹ 16 U.S.C. §§ 824e, 825e (2012).

² Complaint of the Indianapolis Power & Light Company, Docket No. EL17-8-000 (filed Oct. 21, 2016) (Complaint). Unless indicated otherwise, all capitalized terms shall have the same meaning given them in the MISO Tariff.

2. In this order, we: (1) deny Indianapolis Power's request that the Commission find MISO's Tariff to be unjust, unreasonable, and unduly discriminatory or preferential because it does not compensate suppliers of primary frequency response; (2) deny Indianapolis Power's request that the Commission find that MISO's Tariff is unjust and unreasonable with respect to the current dispatch protocols for regulation service; and (3) grant Indianapolis Power's request that the Commission find MISO's Tariff to be unjust, unreasonable, and unduly discriminatory because it unnecessarily restricts competition by preventing electric storage resources from providing all the services that they are technically capable of providing, which could lead to unjust and unreasonable rates. We direct MISO to submit a compliance filing within 60 days of the date of this order proposing Tariff revisions that accommodate the participation of all electric storage resources, regardless of the technology, in all MISO markets that they are technically capable of participating in, taking into account their unique physical and operational characteristics, as requested in the Complaint.

I. Background

A. Frequency Response

3. Reliable operation of an Interconnection³ depends on maintaining frequency within predetermined boundaries above and below a scheduled value, which is 60 Hertz (Hz) in North America. Mitigation of frequency deviations after the sudden loss of generation or load is driven by three primary factors: inertial response, primary frequency response, and secondary frequency response. Primary frequency response involves the autonomous, automatic action of a generator or other resource to change its output to rapidly dampen large frequency deviations.⁴ Regulation service provides secondary frequency response, which is produced from either manual or automated dispatch through automatic generation control from a centralized control system.⁵ Transmission providers may sell primary frequency response service in combination with regulation service under the bundled *pro forma* Open Access Transmission Tariff Schedule 3 product, Regulation and Frequency Response Service.

³ An Interconnection is a geographic area in which the operation of the electric system is synchronized. In the continental United States, there are three Interconnections, namely the Eastern, Texas, and Western Interconnections.

⁴ *Frequency Response and Frequency Bias Setting Reliability Standard*, Order No. 794, 146 FERC ¶ 61,024, at PP 6, 8 (2014) (Order No. 794).

⁵ *Id.* P 9. Automatic generation control is equipment that automatically adjusts generation in a Balancing Authority Area from a central location to maintain the Balancing Authority's interchange schedule, plus frequency bias.

4. In 2014, the Commission approved North American Electric Reliability Corporation (NERC) Reliability Standard BAL-003-1.1, which defines the amount of frequency response needed from Balancing Authorities to maintain interconnection frequency within predefined bounds, and includes requirements for the measurement and provision of frequency response.⁶ It does not include any requirements for individual generator owners and operators. In 2015, in order to foster competition in the sale of primary frequency response service, the Commission issued Order No. 819 to amend its regulations to permit the sale of primary frequency response service at market-based rates by sellers with market-based rate authority for sales of energy and capacity.⁷ The Commission noted that, while most Balancing Authorities should be able to meet the new reliability standard using their own resources, some may nevertheless be interested in purchasing primary frequency response service from others if doing so would be economically beneficial.⁸

5. In November 2016, after the Complaint was filed, the Commission issued a Notice of Proposed Rulemaking (NOPR) in Docket No. RM16-6-000 that proposes to require all new synchronous and non-synchronous large and small generating facilities⁹ to install, maintain, and operate equipment capable of providing primary frequency response as a condition of interconnection, including a requirement that governor or equivalent controls be operated at settings that facilitate the provision of primary frequency response (Primary Frequency Response NOPR).¹⁰ Specifically, the Commission proposed a

⁶ Order No. 794, 146 FERC ¶ 61,024 at 1.

⁷ *Third-Party Provision of Primary Frequency Response Service*, Order No. 819, FERC Stats. & Regs. ¶ 31,375, at P 13 (2015) (Cross-Referenced) 153 FERC ¶ 61,220 (2015) (Order No. 819).

⁸ *Id.* P 10.

⁹ A small generating facility is a device used for the production of electricity having a capacity of no more than 20 MW, while a large generating facility is such a device larger than 20 MW.

¹⁰ *Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response*, 157 FERC ¶ 61,122 (2016). A governor is an electronic or mechanical device that implements primary frequency response on a generator via a droop parameter. *Id.* P 8 n.11. A governor also has a deadband which establishes a

minimum frequency deviation (e.g., ± 0.036 Hz) from nominal that must be exceeded in order for the governor to act.

maximum five percent droop and ± 0.036 Hz deadband settings.¹¹ In the Primary Frequency Response NOPR, the Commission did not propose a headroom requirement for new generating facilities,¹² and did not propose to mandate compensation for primary frequency response service.

B. Market Participation of Electric Storage Resources

6. Also in November 2016, the Commission issued a NOPR in Docket No. RM16-23-000¹³ proposing to amend the Commission's regulations to remove barriers to the participation of electric storage resources¹⁴ in the organized capacity, energy, and ancillary service markets (Storage NOPR). The Commission proposed to require each regional transmission organization (RTO) and independent system operator (ISO) to establish a participation model consisting of market rules that must: (1) ensure that electric storage resources are eligible to provide all capacity, energy, and ancillary services that they are technically capable of providing in the organized wholesale electric markets; (2) incorporate bidding parameters that reflect and account for the physical and operational characteristics of electric storage resources; (3) ensure that electric storage resources 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; (4) establish a minimum size requirement for participation in the organized wholesale electric markets that does not exceed 100 kW; and (5) specify that the sale of energy from the organized wholesale electric

¹¹ Droop refers to the variation in MW output due to variations in system frequency. *Id.*

¹² Headroom refers to the difference between the current operating point of a generator and its maximum operating capability, and represents the potential amount of additional energy that can be provided by the generating facility in response to drops in system frequency. *Id.* P 13 n.27.

¹³ *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 157 FERC ¶ 61,121 (2016).

¹⁴ An electric storage resource is defined as a resource capable of receiving electric energy from the grid and storing it for later injection of electricity back to the grid. These resources include all types of electric storage technologies, regardless of their size, storage medium (e.g., batteries, flywheels, pumped-hydro), or whether located on the interstate grid or on a distribution system. *Id.* P 1 n.1.

markets to an electric storage resource that the resource then resells back to those markets must be at the wholesale locational marginal price (LMP).¹⁵

II. Complaint

7. Indianapolis Power states that its Battery Facility is a grid-scale lithium ion battery-based energy storage system that contains a 20 MW array of lithium ion cells, and is comprised of eight 2.5 MW cores, each with 30 or more nodes.¹⁶ Indianapolis Power asserts that the Battery Facility can provide nearly instantaneous primary frequency response and could become a Load Modifying Resource¹⁷ satisfying five MW of Planning Reserve Margin Requirement under Module E of the MISO Tariff. Indianapolis Power states that, to qualify as a Load Modifying Resource, the Battery Facility must provide, on 12-hour notice, continuous energy for a four-hour period.

8. Indianapolis Power states that the Battery Facility achieved commercial operation on May 20, 2016, but that there is no means for MISO to dispatch the Battery Facility without causing harm to the battery, and so Indianapolis Power has placed the device behind the meter.¹⁸ Indianapolis Power states that the Battery Facility is currently providing primary frequency response and contributing to MISO's compliance with NERC Reliability Standard BAL-003-1.1, but that there is no provision in the MISO Tariff to compensate Indianapolis Power for this reliability service. Indianapolis Power asks the Commission to find that MISO's Tariff is unjust, unreasonable, and unduly discriminatory or preferential, as discussed below. In addition, Indianapolis Power provides recommended remedies.

III. Notice and Responsive Pleadings

9. Notice of the Complaint was published in the *Federal Register*, 81 Fed. Reg. 75,393 (2016), with answers, protests, and interventions due on or before November 10,

¹⁵ *Id.* P 4. The Commission defined a participation model as “a set of tariff provisions that accommodate the participation of resources with particular physical and operational characteristics in the organized wholesale electric markets of the RTOs and ISOs.” *Id.* P 2 n.5.

¹⁶ Complaint at 8.

¹⁷ Under the MISO Tariff, a Load Modifying Resource is “A Demand Resource or Behind the Meter Generation Resource.” MISO, FERC Electric Tariff, Modula A, § 1.L (37.0.0).

¹⁸ Complaint at 2.

2016. MISO filed a motion to dismiss and answer to the Complaint on November 10, 2016.

10. Timely motions to intervene were filed by: Coalition of MISO Transmission Customers; Alliant Energy Corporate Services, Inc.; Electric Power Supply Association; Dayton Power and Light Company; Calpine Corporation; American Municipal Power, Inc.; Ameren Services Company (Ameren);¹⁹ EDF Renewable Energy, Inc.; Duke Energy Corporation;²⁰ E.ON Climate & Renewables North America, LLC; International Transmission Company d/b/a ITC Transmission (ITC Transmission), Michigan Electric Transmission Company, LLC, and ITC Midwest LLC; Wabash Valley Power Association, Inc. (Wabash); Edison Electric Institute; Consumers Energy Company; MidAmerican Energy Company (MidAmerican); Enel Green Power North America, Inc.; the Sustainable FERC Project and Natural Resources Defense Council; the Entergy Operating Companies;²¹ the MISO Transmission Owners;²² Trans Bay Cable LLC; the

¹⁹ Ameren is agent for Union Electric Company d/b/a Ameren Missouri, Ameren Illinois Company d/b/a Ameren Illinois, and Ameren Transmission Company of Illinois.

²⁰ Duke Energy Corporation filed the motion to intervene on behalf its franchised utility affiliates Duke Energy Indiana, LLC (Duke Energy), Duke Energy Carolinas, LLC, Duke Energy Progress, LLC, and Duke Energy Business Services, LLC.

²¹ The Entergy Operating Companies are: Entergy Services, Inc., Entergy Arkansas, Inc., Entergy Louisiana, LLC, Entergy Mississippi, Inc., Entergy New Orleans, Inc., and Entergy Texas, Inc.

²² The MISO Transmission Owners for this filing consist of: Ameren; American Transmission Company LLC; Big Rivers Electric Corporation; Central Minnesota Municipal Power Agency; City Water, Light & Power (Springfield, IL); Cleco Power LLC; Cooperative Energy; Dairyland Power Cooperative; Duke Energy Business Services, LLC for Duke Energy; East Texas Electric Cooperative; the Entergy Operating Companies; Great River Energy; Hoosier Energy Rural Electric Cooperative, Inc.; Indiana Municipal Power Agency; ITC Transmission; MidAmerican; Minnesota Power (and its subsidiary Superior Water, L&P); Missouri River Energy Services; Montana-Dakota Utilities Co.; Northern Indiana Public Service Company; Northern States Power Company, a Minnesota corporation, and Northern States Power Company, a Wisconsin corporation, subsidiaries of Xcel Energy Inc.; Northwestern Wisconsin Electric Company; Otter Tail Power Company; Prairie Power Inc.; Southern Illinois Power Cooperative; Southern Indiana Gas & Electric Company (d/b/a Vectren Energy Delivery of Indiana); Southern Minnesota Municipal Power Agency; Wabash; and Wolverine Power Supply Cooperative, Inc.

(continued ...)

Environmental Law and Policy Center; Wisconsin Electric Power Company and Wisconsin Public Service Corporation; and the PSEG Companies.²³

11. Timely motions to intervene and comments were filed by: NextEra Energy Resources, LLC (NextEra); Alevo USA Inc. (Alevo); Energy Storage Association; and Advanced Energy Economy. Duke Energy and the Public Interest Organizations filed timely comments.²⁴

12. The Indiana Utility Regulatory Commission and the Organization of MISO States filed notices of intervention.

13. On November 23, 2016, Indianapolis Power filed an answer to MISO's answer. On December 14, 2016, MISO filed an answer to Indianapolis Power's answer.

IV. Discussion

A. Procedural Issues

14. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2016), the notices of intervention and timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.

15. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2016), prohibits an answer to a protest or answer unless otherwise ordered by the decisional authority. We will accept the answers filed by Indianapolis Power and MISO because they have provided information that assisted us in our decision-making process.

²³ The PSEG Companies are: Public Service Electric and Gas Company, PSEG Power LLC, and PSEG Energy Resources & Trade LLC.

²⁴ Public Interest Organizations are: Great Plains Institute, Wind on the Wires, Sierra Club, Sustainable FERC Project, Natural Resources Defense Council, Union of Concerned Scientists, and Environmental Law & Policy Center.

B. Substantive Issues**1. Primary Frequency Response****a. Complaint**

16. Indianapolis Power argues that primary frequency response is a critical requirement for interconnected grid operations, noting that NERC has recognized that frequency response is the most important of the required responses.²⁵ Indianapolis Power argues that primary frequency response is distinct from other ancillary services in the frequency control continuum because it is an immediate and automatic response, as compared with regulation (manual or automated dispatch from a centralized control system), tertiary frequency control (actions provided by a Balancing Authority), or time control (setting system frequency levels in order to elicit a response from resources capable of automatically responding).²⁶ Indianapolis Power states that primary frequency response is the only ancillary service needed to support operation of the interstate transmission system that is not unbundled and not compensated. Indianapolis Power states that, while a regulating reserve market exists in MISO, it is not a tool for primary frequency response; rather, it is a means of managing Area Control Error, which is a measure of the system-wide frequency and the instantaneous difference between a Balancing Authority's net actual and scheduled interchange.²⁷

17. Indianapolis Power asks that the Commission find MISO's Tariff unjust, unreasonable, and unduly discriminatory or preferential because it has not unbundled regulation and primary frequency response under Schedule 3, "Regulating Reserve," and does not compensate suppliers of primary frequency response.²⁸ Indianapolis Power requests fast track processing, and asks for Commission action on this request by the end of the year.²⁹ Indianapolis Power states that the Commission bundled regulation and primary frequency response in Order No. 888 because, at that time, they would be provided by the same generator equipment.³⁰ Indianapolis Power states that new

²⁵ Complaint at 20 (citing NERC Reliability Guideline Operating Reserve Management at 10-11).

²⁶ *Id.* at 21-23.

²⁷ *Id.* at 24.

²⁸ *Id.* at 18.

²⁹ *Id.* at 56.

³⁰ *Id.* at 25-26 (citing *Promoting Wholesale Competition Through Open Access (continued ...)*)

technology such as the Battery Facility can provide primary frequency response as a stand-alone service, and so the Commission's rationale no longer holds. Indianapolis Power argues that bundling unduly discriminates against the most efficient resources and provides an undue preference to less efficient resources.

18. Indianapolis Power further argues that unbundling is consistent with Commission actions to improve market opportunities and compensation methodologies for fast-responding resources.³¹ First, Indianapolis Power asserts that compensation for primary frequency response is in the spirit of Order No. 755, where the Commission recognized that regulation resources capable of faster responses to signals should be compensated more than slower-responding resources.³² Indianapolis Power recognizes that Order No. 755 required such compensation for dispatched regulation service only, but argues that, nevertheless, Order No. 755 recognized that faster-responding resources were more valuable and should be compensated to a greater degree as compared to traditional resources, and that this reasoning should be applied to resources providing primary frequency response. Indianapolis Power notes that its Battery Facility can respond in one second, unlike traditional resources such as generators or other types of storage such as flywheels or pumped storage, whose response begins in 10-60 seconds, and that its battery is at least 96 percent efficient, while generators are typically 60 percent efficient.³³

Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, FERC Stats. & Regs. ¶ 31,036, at 31,707 (1996), *order on reh'g*, Order No. 888-A, FERC Stats. & Regs. ¶ 31,048, *order on reh'g*, Order No. 888-B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in relevant part sub nom. Transmission Access Policy Study Group v. FERC*, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom. New York v. FERC*, 535 U.S. 1 (2002) ("While the services provided by Regulation Service and Frequency Response Service are different, they are complementary services that are made available using the same equipment. For this reason, we believe that Frequency Response Service and Regulation Service should not be offered separately, but should be offered as part of one service.")).

³¹ *Id.* at 27.

³² *Id.* at 27-28 (citing *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, Order No. 755, 137 FERC ¶ 61,064 (2011), *reh'g denied*, 138 FERC ¶ 61,123 (2012)).

³³ *Id.* at 38-39, Attachment A (Franks Testimony at 11).

19. Indianapolis Power argues that requiring a separate charge for primary frequency response, rather than keeping the cost bundled within Schedule 3, would send the appropriate price signal and is consistent with the Commission's goals of price formation.³⁴ Indianapolis Power states that, consistent with Order No. 825, the Commission should provide greater transparency so that market participants "understand how compensation and prices reflect the actual marginal cost of serving load and the operational constraints of reliably operating the system."³⁵ Indianapolis Power further contends that unbundling primary frequency response would provide the correct incentives for market participants to follow commitment and dispatch instructions, make efficient investments in facilities and equipment, maintain reliability, and increase transparency. Indianapolis Power contends that generators that provide primary frequency response may include the costs of providing the service through market offers for other products; however, the Battery Facility does not have the same options for cost recovery because, as further discussed below, Indianapolis Power asserts that the Battery Facility cannot currently participate in MISO's markets without degrading its useful life.³⁶

20. Indianapolis Power contends that primary frequency response is declining in the Eastern Interconnection and in MISO's footprint due to a number of factors, including an increase in the deployment of renewable resources (which causes spinning mass to decline) and the retirement of generators that can provide primary frequency response, and that the reliability of the bulk power system is at risk if an expedient remedy is not applied.³⁷ Indianapolis Power states that the Commission itself has expressed concern over the decline in primary frequency response capabilities in a Notice of Inquiry issued

³⁴ *Id.* at 31-32.

³⁵ *Id.* at 32 (citing *Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 155 FERC ¶ 61,276, at P 7 (2016) (Order No. 825)).

³⁶ *Id.* at 50.

³⁷ *Id.* at 33-37 (citing DOE/National Energy Technology Report "Frequency Instability Problems in North American Interconnections" (May 1, 2011), https://www.netl.doe.gov/energy-analyses/temp/FY11_FrequencyInstabilityProblemsinNorthAmericanInterconnections_060111.pdf ; MISO Stakeholder Presentation to the IPTF, "Frequency Response", at 6 (Mar. 10, 2016), <https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/IPTF/2016/20160310/20160310%20IPTF%20Item%2002%20Frequency%20Response.pdf>).

in Docket No. RM16-6-000 (Primary Frequency Response NOI).³⁸ Indianapolis Power states that MISO has no requirement or incentive for resources to provide primary frequency response, and the lack of compensation enables inappropriate leaning on less efficient generation resources.³⁹ Indianapolis Power argues that this is unduly discriminatory towards innovative technologies because it gives generators the ability to squelch new competition from those technologies, and that the elimination of a market for primary frequency response precludes the ability to determine the most reliable and cost efficient solution.⁴⁰ Indianapolis Power argues that the Commission should immediately require MISO to add a new Tariff schedule that compensates resources providing primary frequency response.⁴¹ Indianapolis Power argues that this would encourage additional batteries to be installed in the footprint to support the reliability of the grid as more renewable resources are interconnected and more traditional generators are retired.

21. Indianapolis Power recognizes that, in Order No. 794, the Commission directed NERC to submit a report by July 2018 analyzing the availability of resources for each Balancing Authority to meet its frequency response obligation, but asserts that the Commission should not wait to act on the Complaint, as the Battery Facility is in operation and providing an essential reliability service without compensation.⁴² Indianapolis Power also acknowledges that Order No. 819 allows providers of primary frequency response to provide the service at market-based rates, but argues that “the ability to sell at market-based rates is rendered moot by MISO’s failure to offer any compensation for [primary frequency response]” and that “[g]ranting market-based rates ... is irrelevant in MISO as MISO does not pay sellers for the service.”⁴³ Indianapolis Power further acknowledges that the Commission is currently examining issues related to primary frequency response in the Primary Frequency Response NOI, but argues that the rulemaking proceeding does not directly relate to the specific MISO Tariff provisions that

³⁸ *Id.* at 35 (citing *Essential Reliability Servs. & the Evolving Bulk-Power Systems-Primary Frequency Response*, Notice of Inquiry, 154 FERC ¶ 61,117, at PP 13-14 (2016)). The Complaint was filed before the Commission issued the Primary Frequency Response NOPR on November 22, 2016.

³⁹ *Id.* at 38.

⁴⁰ *Id.* at 40.

⁴¹ *Id.* at 33.

⁴² *Id.* at 37-38.

⁴³ *Id.* at 20, 29.

prevent the battery from effectively participating in the MISO markets; it only raises related issues in a generic manner.⁴⁴

22. Indianapolis Power additionally acknowledges that MISO announced a new stakeholder process in January 2016 to seek feedback from stakeholders regarding the future treatment of storage generally and what Tariff changes should be considered.⁴⁵ However, Indianapolis Power states that this stakeholder process was only commenced after it sought to engage with MISO about integrating batteries into MISO's system for over one and a half years, and, given that the battery has been in commercial operation since May 20, 2016, it is unjust and unreasonable to expect Indianapolis Power to wait for a multi-year stakeholder process while its device does not receive compensation for the service it provides (and, Indianapolis Power contends, while it is effectively prohibited from providing other services, as discussed below).⁴⁶

23. Indianapolis Power states that, once it has met its burden under section 206 to show that MISO's Tariff is not just and reasonable, it does not have a burden to demonstrate a just and reasonable alternative Tariff provision.⁴⁷ However, Indianapolis Power has developed an alternative approach to compensate providers of primary frequency response. Indianapolis Power asks that the Commission require MISO to: (1) pay the real-time LMP multiplied by the amount of MWhs of primary frequency response injected and absorbed in order to respond to frequency deviations; (2) multiply the amount in (1) by a performance factor of 2.9 for fast-responding resources, to account for the benefits of faster performance; and (3) "adopt the entire structure MISO uses in day-ahead and real-time for the dispatched regulation market."⁴⁸ Indianapolis Power emphasizes the importance of being paid for movement in either direction, as the Battery Facility can withdraw energy from the grid as a mitigating action in response to a frequency deviation, and not merely to charge; however, Indianapolis Power concedes that batteries should pay the LMP when they are strictly charging.⁴⁹ Indianapolis Power also states that there should be a penalty for non-performance.⁵⁰ Indianapolis Power

⁴⁴ *Id.* at 57-58.

⁴⁵ *Id.* at 12.

⁴⁶ *Id.* at 58-59.

⁴⁷ *Id.* at 41.

⁴⁸ *Id.* at 41-42.

⁴⁹ *Id.* at 43-44, 47.

⁵⁰ *Id.* at 46.

notes that, for other ancillary services, MISO pays a capacity or opportunity cost for keeping the resource available if needed, but that Indianapolis Power is not including any such availability payment in its proposal. Indianapolis Power states that this is a conservative initial approach that should be implemented immediately for a period of six months, at which time MISO can file a refined compensation mechanism given the benefit of experience.⁵¹

24. Indianapolis Power explains that its proposed 2.9 performance factor reflects a higher payment for resources with a faster response time, and that this factor is borrowed from PJM Interconnection, L.L.C.'s (PJM) frequency regulation market.⁵² Indianapolis Power explains that PJM has developed a "REG D" category of regulation for fast-responding resources, and applies the 2.9 performance factor along with a separate dispatch signal and performance criterion for fast-responding resources. With respect to its proposal that MISO pay the real-time LMP multiplied by the amount of MWhs of primary frequency response, Indianapolis Power states that MISO currently pays the LMP to Demand Response Resources Type II (DRR-Type II) that reduce load on the grid, and that battery storage resources should be treated comparably, especially considering their level of efficiency.⁵³

b. Comments and MISO Answer to the Complaint

25. Energy Storage Association, Advanced Energy Economy, and Public Interest Organizations support the Complaint and agree with Indianapolis Power that the MISO Tariff is unjust and unreasonable because it fails to compensate suppliers of primary frequency response.⁵⁴ Energy Storage Association and Public Interest Organizations suggest that a pay-for-performance concept, similar to the structure in Order No. 755, should be used to compensate primary frequency response.⁵⁵ Advanced Energy Economy and Public Interest Organizations urge the Commission not to require all generators to supply primary frequency response, arguing that this would continue the practice of relying on traditional generator equipment to provide primary frequency

⁵¹ *Id.* at 42-43.

⁵² *Id.* at 45.

⁵³ *Id.* at 47.

⁵⁴ Energy Storage Association Comments at 2; Advanced Energy Economy Comments at 3-4; Public Interest Organizations Comments at 2-3.

⁵⁵ Energy Storage Association Comments at 3; Public Interest Organizations Comments at 4.

response and stymie the participation of innovative technologies, as well as be discriminatory to generators that incur higher lost opportunity cost.⁵⁶

26. NextEra requests that any compensation structure approved for primary frequency response include a capacity payment (for the opportunity cost of maintaining headroom) and reflect the speed and accuracy of performance.⁵⁷ NextEra also asserts that any payment structure must compensate resources when they curtail output to address over-frequency conditions, and asserts that LMP-based compensation, as proposed by Indianapolis Power, may not reflect the actual opportunity cost of such curtailment.⁵⁸

27. Duke Energy opposes unbundling Schedule 3 and providing a new product without further vetting, arguing that the provision of regulation service can be directly impacted by the addition of primary frequency responsive resources within a Balancing Authority Area.⁵⁹ Specifically, it argues that incorporating resources only capable of providing primary frequency response could cause a gap in service when primary frequency response resources are exhausted and before regulating resources can replace them.

28. MISO and NextEra state that the Commission is currently investigating issues related to the provision of primary frequency response as part of the Primary Frequency Response NOI, and that this process should not be rushed by a section 206 complaint.⁶⁰ MISO further states that, as part of its “Market Roadmap” through which MISO identifies, prioritizes, and schedules the development of Tariff enhancements, MISO is currently holding stakeholder discussions regarding compensation for primary frequency response.⁶¹ MISO argues that, while the Commission is still considering the development or change of policies on certain matters, any current policy or tariff provisions that do not reflect any particular outcome of such policy-making should not be deemed unjust and unreasonable.⁶² Particularly, MISO argues that Order No. 888 and its

⁵⁶ Advanced Energy Economy Comments at 8; Public Interest Organizations Comments at 3.

⁵⁷ NextEra Comments at 3-4.

⁵⁸ *Id.* at 4.

⁵⁹ Duke Energy Comments at 2.

⁶⁰ MISO Answer to the Complaint at 14-15; NextEra Comments at 2-3.

⁶¹ MISO Answer to the Complaint at 21.

⁶² *Id.* at 15.

implementation in MISO's Schedule 3 should not be considered unjust and unreasonable while the Commission is still studying whether primary frequency response should be separately compensated.⁶³ MISO asks the Commission to dismiss the Complaint and let the issues raised therein be addressed in the Commission's ongoing proceedings and the MISO stakeholder process, especially as Indianapolis Power has not shown the present need for a change to the current situation where there is no regulatory or Tariff requirement to compensate primary frequency response, nor has Indianapolis Power shown any need for the Battery Facility to provide primary frequency response.⁶⁴ MISO asserts that, if there were a market, it would likely result in a zero clearing price.⁶⁵ MISO argues that Indianapolis Power has not met the requirement of Rule 206(b)(4) of the Commission's Rules of Practice and Procedure requiring a complainant to make a good faith effort to quantify the financial impact or burden created for the complainant.⁶⁶

29. MISO acknowledges that NERC has noted a decline in primary frequency response, but asserts that this decline will likely be addressed by requiring generators to have governors that manage primary frequency response, and not by relying on third-party performance of that function.⁶⁷ MISO states that granting the Complaint would be contrary to the Commission's recent decision to accept the California Independent System Operator Corporation's (CAISO) near-term proposal that reinforced requirements for the deadband and droop settings of governors without compensation for generators that provide primary frequency response within CAISO, even though CAISO has an urgent need for primary frequency response.⁶⁸ MISO asserts that primary frequency response is not compensated historically or currently within the industry, and argues that Indianapolis Power's request for interim compensation arrangements could raise issues of undue preference for the Battery Facility as compared to other non-storage resources that also provide primary frequency response without compensation.⁶⁹

⁶³ *Id.* at 15-16.

⁶⁴ *Id.* at 13, 16-17.

⁶⁵ *Id.* at 17.

⁶⁶ *Id.* at 19 (citing 18 C.F.R. § 385.206(b)(4) (2016)).

⁶⁷ *Id.* at 18.

⁶⁸ *Id.* (citing *California Indep. Sys. Operator Corp.*, 156 FERC ¶ 61,182, *reh'g pending* (2016) (CAISO)).

⁶⁹ *Id.* at 19.

c. **Indianapolis Power's Answer**

30. Indianapolis Power notes that most intervenors either support the Complaint or do not express opposition.⁷⁰ Indianapolis Power argues that MISO is mistaken in asserting that there is no immediate harm from the failure to compensate providers of primary frequency response, as the Battery Facility is currently providing this service without compensation and that, unlike generators, the Battery Facility cannot include the costs of this service through market offers for other products because it cannot safely participate in other MISO markets for regulating service or energy.⁷¹ Indianapolis Power argues that pending stakeholder processes do not prevent Commission action under the FPA, and reiterates that it has spent over two years attempting to work within MISO's stakeholder process, to no avail.⁷²

31. In response to Duke Energy's comments, Indianapolis Power states that it has not proposed a new product; rather, it has proposed to unbundle an existing product from Schedule 3.⁷³ Indianapolis Power also disagrees with Duke Energy's request for further vetting, given that MISO has been considering the issue for several years, and that there is no need to duplicate the vetting done for the implementation of NERC Standard BAL-003-1.1.⁷⁴ Indianapolis Power notes that it is sensitive to Duke Energy's reliability concern, but argues that it is NERC's responsibility to address any BAL-003-1.1 compliance issues that NERC determines could have a material impact on system reliability, and that it is critical for the Commission to separate primary frequency response from regulation service.⁷⁵

32. In response to NextEra, Indianapolis Power states that it does not disagree that a capacity payment would be appropriate, but believes that its requested remedies represent a conservative, middle-ground initial approach to the unbundled pricing of primary frequency response.⁷⁶

⁷⁰ Indianapolis Power Answer at 3.

⁷¹ *Id.* at 10, 19.

⁷² *Id.* at 11-14.

⁷³ *Id.* at 27-28.

⁷⁴ *Id.* at 28.

⁷⁵ *Id.* at 29.

⁷⁶ *Id.* at 31.

d. Commission Determination

33. We find that Indianapolis Power has not shown that MISO's Tariff is unjust, unreasonable, and unduly discriminatory or preferential for failing to compensate providers of primary frequency response, and we will deny the Complaint on this issue. We agree with Indianapolis Power that primary frequency response is a critical requirement for interconnected grid operations, and that the Eastern Interconnection has experienced a decline of primary frequency response as compared to historic values. Indeed, the Commission recognized this decline in the Primary Frequency Response NOPR, and noted that the nation's changing generation resource mix has the potential to reduce available primary frequency response.⁷⁷ However, as noted by MISO in its answer, MISO currently has adequate primary frequency response to meet its requirements under BAL-003-1.1.⁷⁸

34. In addition, in the Primary Frequency Response NOPR, which was issued after the Complaint was filed, the Commission proposed to require all new large and small generating facilities to install, maintain and operate equipment capable of providing primary frequency response as a condition of interconnection.⁷⁹ If adopted, the NOPR would result in additional resources providing primary frequency response in MISO as well as throughout the Eastern Interconnection. In light of these factors, Indianapolis Power has not persuaded us that MISO's Tariff is unjust and unreasonable because it would not provide for reliable operation of the transmission system.

35. We reject Indianapolis Power's claims that the Commission's reasoning in Order No. 888 for bundling primary frequency response and regulation together in Schedule 3 is no longer valid and, therefore, the Commission should require the two services to be unbundled. Indianapolis Power's argument rests on a misinterpretation of the Commission's reasoning in Order No. 888. In that order, the Commission concluded that, "while the services provided by Regulation Service and Frequency Response Service are different, they are complementary services that are made available using the same equipment."⁸⁰ While Indianapolis Power agrees that this reasoning was appropriate

⁷⁷ Primary Frequency Response NOPR, 157 FERC ¶ 61,122 at P 36.

⁷⁸ MISO Answer to the Complaint at 17. As Indianapolis Power acknowledged in the Complaint, only CAISO is experiencing a material shortage of the ancillary services that support grid reliability. *See* Complaint at 37.

⁷⁹ Primary Frequency Response NOPR, 157 FERC ¶ 61,122 at PP 36, 44. Notably, the Commission did not propose in the Primary Frequency Response NOPR to mandate compensation related to the proposed requirements. *Id.* PP 44, 55.

⁸⁰ Order No. 888, FERC Stats. & Regs. ¶ 31,036 at 31,707.

in 1996, it claims that, following the introduction of batteries that can provide primary frequency response, “the Commission’s statement that only generators provided the service is no longer correct and the undue preference afforded generators in this regard is no longer justified.”⁸¹ We disagree. Indianapolis Power’s attempt to equate the phrase “same equipment” with “generators” is misplaced. When read in the context of Order No. 888, there is nothing to suggest that the Commission’s statement that Regulation Service and Frequency Response Service are made available using the “same equipment” is equivalent to the Commission finding that only generators can provide the two services. Rather, the reference to the “same equipment” references control equipment that automatically adjusts a resource’s real power output. Indianapolis Power has not demonstrated that this fundamental proposition has changed for either traditional synchronous or newer non-synchronous resources. Moreover, Indianapolis Power has not explained any other changed circumstances that would necessitate unbundling of the two services within Schedule 3. Therefore, we reject Indianapolis Power’s request and decline to make any changes to our current policy with respect to Schedule 3.

36. Indianapolis Power has also not shown that MISO’s failure to compensate providers of primary frequency response is unjust and unreasonable or treats the Battery Facility in an unduly discriminatory manner. As an initial matter, we note that nothing in MISO’s Tariff requires the Battery Facility to provide primary frequency response. The Battery Facility is currently a behind-the-meter resource and is voluntarily providing primary frequency response. Indianapolis Power has not demonstrated why it is unjust and unreasonable to not be compensated for a service that it is not obligated to provide. Moreover, even if the MISO Tariff did require Indianapolis Power to provide primary frequency response, the Commission has previously accepted as just and reasonable tariffs that require certain resources that have headroom to provide primary frequency response without compensation.⁸² Accordingly, Indianapolis Power has not met its

⁸¹ Complaint at 26.

⁸² For instance, the Commission recently approved a CAISO Filing that, among other things, requires all synchronous generators to operate with governor controls in-service and set to a minimum standard. *See CAISO*, 156 FERC ¶ 61,182 at PP 44-51. The Commission found that CAISO’s proposal to procure transferred frequency response was a just and reasonable means to comply with BAL-003-1.1 and would help ensure that CAISO meets its frequency response obligations under this standard. The Commission did not require CAISO to pay resources for complying with its tariff amendments, but noted that CAISO committed to consider a market-based payment mechanism for frequency response, and directed CAISO to submit an informational report on the status of that initiative in six months. *Id.* P 50. *See also* ISO-NE, Transmission, Markets and Services Tariff, Schedule 22 Large Generator Interconnection Procedures (9.0.0), Appendix 6, § 9.6.2.2; NYISO, NYISO Tariffs, NYISO OATT, 30.14 OATT Att. X (*continued ...*)

burden to show that the lack of compensation for primary frequency response in MISO is unjust and unreasonable.

37. We disagree with Indianapolis Power's claim that compensation for primary frequency response is in the spirit of Order No. 755.⁸³ We find that Order No. 755 is inapposite, as that order involved an existing market, where the Commission found that the frequency regulation compensation practices of RTOs and ISOs resulted in rates that are unjust, unreasonable, and unduly discriminatory or preferential.⁸⁴ Here, Indianapolis Power has failed to show that MISO's Tariff is unjust, unreasonable, and unduly discriminatory or preferential for failing to provide a new market for primary frequency response.

38. We also reject Indianapolis Power's argument that a lack of compensation enables "inappropriate leaning" on less efficient resources.⁸⁵ As discussed above, MISO currently has adequate primary frequency response without providing compensation. Indianapolis Power has not shown that MISO is relying on less efficient resources for this primary frequency response. In addition, we disagree with Indianapolis Power's assertion that Order No. 819 does not provide a remedy because MISO does not pay any resource for primary frequency response. Order No. 819 is not limited to a Balancing Authority purchasing the service from any generator; it permits the sale of primary frequency response at market-based rates to any willing buyer. We note that Order No. 819 does not require the purchase of primary frequency response; it simply provides a means for the transaction to occur at market-based rates, should there be willing buyers and sellers.

39. We reject Indianapolis Power's contention that failing to establish a market for primary frequency response is unduly discriminatory in favor of generators because generators that provide primary frequency response may include the costs of providing the service through market offers for other products.⁸⁶ Indianapolis Power argues that the Battery Facility does not have the same options for cost recovery because MISO's dispatch protocol for regulation service would degrade the Battery Facility's useful life. We disagree. As discussed below, we: (1) find that Indianapolis Power has not shown

Appendices (8.0.0), Appendix 6, § 9.5.4.

⁸³ Complaint at 27-28.

⁸⁴ See Order No. 755, 137 FERC ¶ 61,064 at P 2.

⁸⁵ Complaint at 38, 40.

⁸⁶ *Id.* at 32.

that participation in MISO's regulation market will degrade the useful life of the Battery Facility; and (2) require MISO to submit Tariff revisions that will allow the Battery Facility to participate in any market in which it is technically capable of participating. Given these findings, Indianapolis Power's Battery Facility will be able to provide products other than primary frequency response in the MISO markets.

40. Because we deny Indianapolis Power's request to require MISO to compensate providers of primary frequency response, we do not address Indianapolis Power's recommendation for the structure of that compensation.

41. While we deny this aspect of Indianapolis Power's complaint, we note that this should not be construed as prohibiting public utilities from filing proposals for primary frequency response compensation under section 205 of the FPA.⁸⁷ Accordingly, we encourage MISO and its stakeholders to continue evaluating MISO's primary frequency response performance and considering, through the stakeholder process, any necessary changes to ensure that MISO continues to meet its requirements under BAL-003-1.1.

2. Stored Energy Resource Dispatch Protocol and Market Participation

a. Complaint

42. Indianapolis Power asks the Commission to find MISO's Tariff unjust, unreasonable, and unduly discriminatory or preferential with respect to the current dispatch protocols and compensation methodologies for regulation service as applied to its Battery Facility and all fast-responding resources.⁸⁸ Indianapolis Power states that its Battery Facility could technically qualify to provide regulation service under MISO's Schedule 3 SER resource type,⁸⁹ but argues that, as further explained below, the current market would degrade the useful life of the Battery Facility.⁹⁰

⁸⁷ 16 U.S.C. § 824d (2012).

⁸⁸ Complaint at 3, 48.

⁸⁹ An SER is defined as a "Resource capable of supplying Regulating Reserve, but not Energy Contingency Reserve, Up Ramp Capability, and Down Ramp Capability through the short-term storage and discharge of electrical Energy in response to Setpoint Instructions." See MISO FERC Electric Tariff, Module A, § 1.S, Definitions, "Stored Energy Resource" (46.0.0).

⁹⁰ Complaint at 49. Indianapolis Power states that the Battery Facility, which achieved commercial operation on May 20, 2016, was registered as a SER to be effective (*continued ...*)

43. Indianapolis Power states that the SER category would dispatch the Battery Facility at half-capacity continuously for one hour, and then send a negative signal for the following hour to charge.⁹¹ Indianapolis Power cites to section 39.2.1B.A of MISO's Tariff to support this conclusion, which states, "All Regulation Qualified Resources in the Day-Ahead Energy and Operating Reserve Market must be capable of supplying Regulating Reserve for a minimum continuous duration of sixty (60) minutes." Indianapolis Power asserts that, while the generic term SER encompasses many technologies including batteries, the MISO Tariff SER resource type was designed solely for the operating characteristics of flywheels, which are well-suited to provide regulation over one-hour time frames.⁹² Indianapolis Power contends that the SER dispatch design includes a requirement that the resource, through the Inter-Control Center Communications Protocol, provide MISO with factors to determine its state of charge, so that the flywheel is never dispatched at a setpoint that is beyond its capability.⁹³ However, Indianapolis Power explains that its Battery Facility manages its own state of charge so that it is continuously available, and that state of charge management for the 244 nodes occurs simultaneously with the provision of service.⁹⁴ Indianapolis Power asserts that the Battery Facility does not require a rest period to charge.

44. Indianapolis Power explains that, for lithium ion technology, life expectancy is measured in the number of expected cycles in the life of the battery, where a "cycle" is the charge up to full capacity and then total (or nearly total) discharge of that capacity.⁹⁵

June 1, 2016. However, according to Indianapolis Power, as the Battery Facility cannot participate in the current market without harm to the battery, Indianapolis Power submitted paperwork to remove it from the model on June 8, 2016. *Id.* at 8 n.14.

⁹¹ *Id.* at 50.

⁹² *Id.* at 4, 48, 50 (citing *Electric Storage Participation in Regions With Organized Wholesale Electric Markets*, Docket No. AD16-20-000, Response of the Midcontinent Independent System Operator, Inc., at 2-3, 9 (May 16, 2016); *Midwest Indep. Transmission Sys. Operator, Inc.*, 129 FERC ¶ 61,303, at P 40 (2009)). The Commission issued a series of data requests in Docket No. AD16-20-000 that sought information on rules affecting the participation of electric storage resources in the various RTOs and ISOs, and this process led to the issuance of the Storage NOPR in Docket No. RM16-23-000.

⁹³ *Id.*, Attachment A (Franks Testimony at 27-28).

⁹⁴ *Id.* at 28.

⁹⁵ *Id.* at 50.

Indianapolis Power states that, to maximize the life of the Battery Facility, such cycling must be limited, and that the dispatch scenario for SERs essentially causes the anticipated number of life cycles of the cells to be consumed in a much shorter time period than under normal operation. To maximize battery life, Indianapolis Power asserts that the Battery Facility should continuously maintain a charge level of 50-60 percent rather than fully depleting before recharging. Indianapolis Power argues that, if dispatched under the SER procedures, the battery cell life would decrease from 10 years to three years. Indianapolis Power asserts that resources providing regulation should not be confined to providing energy for an hour and then be forced to be unavailable in the next hour, nor should they be dispatched without the ability to manage the state of charge for optimal performance.⁹⁶ Therefore, Indianapolis Power asks the Commission to direct that MISO reform section 39.2.1B.A of its Tariff to accommodate newer and more efficient technologies, such that resources employing such technologies could submit Regulation Capacity Offers and Regulation Mileage Offers for less than one hour.⁹⁷

45. Indianapolis Power asserts that, consistent with its discussion of primary frequency response, compensation for regulation service should also be adjusted. First, Indianapolis Power argues that batteries should not be charged LMP when withdrawing energy to mitigate over-frequency conditions.⁹⁸ Second, Indianapolis Power argues that MISO should be directed to adopt a 2.9 mileage factor for regulating service that addresses greater grid benefits of fast-responding resources in a manner similar to the REG D performance factor used by PJM.⁹⁹ Indianapolis Power states that Order No. 755 required more efficient regulation resources to be compensated at a higher level, and that, on compliance, the Commission accepted MISO's proposed 1:1 ratio between regulating reserve mileage and regulating reserve.¹⁰⁰ However, since that time, Indianapolis Power notes that MISO has established a monthly regulation deployment factor that is based on the ratio between the Regulating Mileage Target and the Regulating Reserve Dispatch Target, using actual regulation deployment data, and that, since February, 2013, the ratio has been between 0.55 and 0.62.¹⁰¹ Indianapolis Power submits that changed circumstances require a change in findings by the Commission concerning the continued

⁹⁶ *Id.*, Attachment A (Franks Testimony at 29).

⁹⁷ *Id.* at 49.

⁹⁸ *Id.* at 51.

⁹⁹ *Id.* at 52-53.

¹⁰⁰ *Id.* at 52 (citing *Midwest Indep. Transmission Sys. Operator, Inc.*, 140 FERC ¶ 61, 224, at P 39 (2012)).

¹⁰¹ *Id.* at 53.

justness and reasonableness of the 1:1 mileage factor; specifically, with the growth of grid-scale batteries, Indianapolis Power argues that the technology options available to MISO to meet its Schedule 3 needs have changed and that a reexamination of the compensation available is necessary.

46. Indianapolis Power further asks the Commission to find that MISO's Tariff is unjust, unreasonable, and unduly discriminatory or preferential with respect to the limitations on resources providing other products that they are technically capable of providing.¹⁰² While Indianapolis Power notes that the SER category encompasses batteries, it states that the MISO Tariff limits SERs to providing regulating service, and does not permit them to participate in other energy or ancillary services markets, nor to receive capacity accreditation.¹⁰³ Indianapolis Power asserts that its Battery Facility is capable of providing other types of service for which it could be compensated – for instance, the Battery Facility meets the definition of “Load Modifying Resource” under the MISO Tariff and is capable of delivering five MW of energy for four continuous hours.¹⁰⁴ Thus, Indianapolis Power explains that the Battery Facility could qualify under Module E of MISO's Tariff to provide five MW of capacity or Planning Reserve Margin Requirement. Additionally, Indianapolis Power states that the Battery Facility can provide energy and regulating reserve service if needed.

47. Indianapolis Power asserts that MISO may argue that batteries could simply be registered under another resource type (for example Generation, Demand Response Type-1, Demand Response Type-II, Behind-the-Meter Generation, or Use-Limited Resource), but argues that the non-SER resource categories do not accommodate the unique features of various storage technologies.¹⁰⁵ Accordingly, Indianapolis Power asks that a new resource type for lithium ion batteries be added to the Tariff.

48. Indianapolis Power states that, when the Commission accepted MISO's revisions to its ancillary services market Tariff provisions, the Commission recognized the limitations that the Tariff placed on energy storage.¹⁰⁶ Indianapolis Power asserts that the Commission recognized that MISO's regulating reserve service was developed for flywheel technology, and expressed concern that the specificity of the Tariff may be

¹⁰² *Id.* at 4, 54.

¹⁰³ *Id.* at 54, Attachment A (Franks Testimony at 14).

¹⁰⁴ *Id.* at 55.

¹⁰⁵ *Id.* at 4.

¹⁰⁶ *Id.* at 12.

insufficient to address barriers to the participation of other new technologies and storage devices, including those providing longer-term storage.¹⁰⁷ Indianapolis Power notes that the Commission required MISO to submit an informational report on its efforts to incorporate long-term storage resources into its markets and its evaluation of barriers to the integration of these technologies into its markets. Indianapolis Power also notes that MISO submitted this informational report on March 1, 2010, indicating that it was investigating the potential need for Tariff modifications to enhance the ability of long-term storage resources to participate in its markets.¹⁰⁸ Indianapolis Power states that MISO has since made no progress on accommodating energy storage capabilities in a resource-neutral way, despite its efforts to engage with MISO on this topic for approximately two and a half years. Indianapolis Power asks that the Commission direct appropriate Tariff language to be developed within six months and implemented by one year from the date of a Commission order on the merits.¹⁰⁹

b. Comments and MISO Answer to the Complaint

49. Advanced Energy Economy and Public Interest Organizations argue that the operating and dispatch protocols for SERs prevent batteries from providing regulation service without causing harm to the batteries, and Advanced Energy Economy argues that this presents an undue preference for generators and flywheels.¹¹⁰ Public Interest Organizations support amending dispatch protocols as needed, for each resource class energy storage assets may register as, to be compatible with all energy storage technologies, recognizing the unique attributes of each energy storage technology.¹¹¹ They also state that the Commission should direct MISO to examine how energy storage could be dispatched to serve transmission needs.

50. Energy Storage Association and Advanced Energy Economy agree with Indianapolis Power that the current MISO Tariff is discriminatory because it does not

¹⁰⁷ *Id.* at 13 (citing *Midwest Indep. Transmission Sys. Operator, Inc.*, 129 FERC ¶ 61,303, at PP 40-41, 64 (2009)).

¹⁰⁸ *Id.* at 14 (citing *Midwest Indep. Transmission Sys. Operator, Inc.*, Docket Nos. ER07-1372-014 and ER09-1126-000, Informational Report of the Midwest Independent Transmission System Operator, Inc., at 4-5 (Mar. 1, 2010)).

¹⁰⁹ *Id.* at 56.

¹¹⁰ Advanced Energy Economy Comments at 10; Public Interest Organizations Comments at 4-7.

¹¹¹ Public Interest Organizations Comments at 5.

take advantage of the capabilities of advanced storage resources, and state that the Commission should address the barriers to participation facing advanced energy technologies across the RTO/ISO organized markets.¹¹² Energy Storage Association and Public Interest Organizations note that this issue is to be considered as part of MISO's stakeholder process but that it has yet to be acted upon, despite it being a high priority item for two years.¹¹³ NextEra agrees with Indianapolis Power that MISO's current energy and ancillary services products are discriminatory toward storage resources, but notes that such deficiencies are not unique to MISO or their regulation product, and requests that the Commission take action on this aspect of the complaint through a broader proceeding, such as Docket No. AD16-20-000.¹¹⁴

51. Alevo supports implementation of a pay-for-performance tariff that takes advantage of the speed and accuracy of fast-responding resources, but opposes Indianapolis Power's blanket statements about the limitations of lithium-ion batteries.¹¹⁵ Alevo states that it has developed a battery capable of lasting for up to 20 years while being dispatched as an SER in MISO. Alevo and Public Interest Organizations encourage the Commission to support a technology-neutral MISO market design instead of creating a lithium ion specific resource classification.¹¹⁶

52. Public Interest Organizations agree with Indianapolis Power that energy storage resources should not be charged the LMP for electricity withdrawn from MISO's system because this withdrawal of energy is a function of providing the service.¹¹⁷

53. MISO argues that the issues raised by Indianapolis Power have been, or are being, addressed by the Commission in other proceedings, and requests that the Commission

¹¹² Energy Storage Association Comments at 3; Advanced Energy Economy Comments at 12-13.

¹¹³ Energy Storage Association Comments at 3-4; Public Interest Organizations Comments at 6.

¹¹⁴ NextEra Comments at 5-6.

¹¹⁵ Alevo Comments at 2-6.

¹¹⁶ *Id.* at 6; Public Interest Organizations Comments at 7.

¹¹⁷ Public Interest Organizations Comments at 6.

dismiss the Complaint.¹¹⁸ MISO states that there are also stakeholder discussions and related studies underway to improve the accommodation of storage and battery resources as part of MISO's "Market Roadmap" process, and that Indianapolis Power has not demonstrated any imminent harm facing Indianapolis Power if it were to wait for the outcome of the ongoing MISO stakeholder process.¹¹⁹ Specifically, MISO states that it is considering a faster automatic generation control signal that will enable fast-responding regulation resources to be compensated commensurate with their faster responding capabilities, and ways to allow storage resources to provide other services besides regulation.¹²⁰

54. MISO recognizes the potential need to expand the Tariff's SER definition or create a new resource classification, but disagrees with Indianapolis Power's assertion that SER dispatch protocols would harm the Battery Facility.¹²¹ MISO states that it has advised Indianapolis Power that it could bypass MISO's use of real-time scheduling to manage the state of charge; specifically, Indianapolis Power can send through the Inter-Control Center Protocol a state of charge at the middle of the range, enabling Indianapolis Power to manage its Battery Facility's state of charge on its own, subject to the need to ensure that the cleared regulation will have enough storage to support the deployment.¹²² MISO recognizes that, to the extent the automatic generation control signal following real-time scheduling may also impact the effectiveness of storage utilization, it is advisable to improve the automatic generation control signal, which on average tends to be in the up direction with a relatively wide dead-band targeted primarily for traditional resources.¹²³ MISO acknowledges that a fast automatic generation control signal may help attract new regulating resources and reduce total production cost, but insists that any such improvement should be pursued through the

¹¹⁸ MISO Answer to Indianapolis Power's Answer at 13-14 (citing Order No. 755; Order No. 819; Request for Response, *Electric Storage Participation in Regions with Organized Wholesale Electric Markets*, Docket No. AD16-20-000 (Apr. 11, 2016)).

¹¹⁹ *Id.* at 20. MISO states that it is willing to periodically submit reports to the Commission to provide updates on these ongoing initiatives. *Id.* at 22.

¹²⁰ *Id.* at 21.

¹²¹ *Id.* at 23.

¹²² *Id.* at 24.

¹²³ MISO states that, even though the automatic generation control signal may deviate more to upward deployment, the signal moves regulating resources up and down within minutes or seconds. *Id.* at 25.

stakeholder process, and that MISO has plans to discuss with stakeholders a project for a fast automatic generation control signal (Market Roadmap Item No. 27: “[Automatic Generation Control] Enhancement for Fast-Ramping Resources”).

55. MISO states that it has also previously advised Indianapolis Power that, although the Tariff requires a regulation resource to be available for 60 minutes to provide regulation service, the actual market clearing and deployment will not cause the resource to be charged for one hour and then be discharged for one hour.¹²⁴ MISO states that the Battery Facility may respond under different automatic generation control signals and be able to clear for regulating reserve under all states of charge.¹²⁵

56. Regarding payment for regulation service, MISO states that its current performance factor (between 0.55 and 0.62) is appropriate for its current system, as it is based on the average ratio of system-wide regulation mileage to regulation capacity.¹²⁶ MISO notes that, under current market design, regulation mileage payments are adjusted after the fact based on the actual deployment; thus, MISO argues that Regulation Qualified Resources, whether SER or otherwise, are compensated for the actual mileage the automatic generator control deploys regardless of what factor is used in the clearing process.

57. MISO argues that Indianapolis Power’s Complaint is unnecessary because MISO has offered to file, and remains open to considering, potential Tariff waivers and/or revisions as transitional solutions to reduce or remove limitations on the services or products that the Battery Facility can provide, subject to the development of more permanent Tariff revisions through a stakeholder process.¹²⁷ MISO states that it initially explored modeling the Battery Facility as a DRR-Type II, with a Tariff waiver to allow it to operate in front of the meter. MISO states that it subsequently discussed with Indianapolis Power the option of modeling the Battery Facility as an SER, and requesting a Tariff waiver to allow it to provide other services/products. MISO states that it also proposed the idea of creating a new resource category, a SER-Type II category, which would not be limited to regulating service. MISO states that these solutions were not pursued due to three main reasons: (1) Indianapolis Power preferred that the Battery Facility be treated as a transmission asset; (2) Indianapolis Power viewed the provision of both regulating service and energy or capacity as uneconomic; and (3) Indianapolis

¹²⁴ *Id.*

¹²⁵ *Id.*, Attachment B (Bladen Testimony at 18-20).

¹²⁶ *Id.* at 26.

¹²⁷ *Id.* at 27.

Power believed the SER dispatch protocol might significantly shorten the life of its battery facility.

58. MISO states that transmission asset treatment of the battery poses Tariff and regulatory hurdles.¹²⁸ MISO states that it offered to allow Indianapolis Power to submit and support the Battery Facility as a transmission project through mid-cycle or expedited review and approval procedures, but Indianapolis Power believed it may not be able to demonstrate an appropriate level of need for the Battery Facility to warrant expedited review and approval. MISO argues that, to the extent Indianapolis Power is concerned that it could be uneconomic for its Battery Facility to provide both regulating service and capacity or energy in the near-term because current market clearing prices are relatively low and the actual regulation mileages from the automatic generator control signal are also low, the potential solutions involve substantive Tariff and system changes that should be explored as part of the stakeholder process, rather than an interim solution.¹²⁹ MISO states that Indianapolis Power should have proceeded with one of the transitional solutions discussed with MISO instead of filing the Complaint.¹³⁰

c. Answers

59. Indianapolis Power argues that the fact that the Commission is addressing barriers to storage through a rulemaking proceeding is irrelevant to the justness and reasonableness of the current MISO Tariff and that the Commission's ability to act is not hindered by rulemaking proceedings, nor is it hindered by MISO's on-going stakeholder processes.¹³¹ Indianapolis Power states that the Commission has often directed tariff revisions during the pendency of related rulemaking or administrative dockets.¹³² Indianapolis Power also argues that MISO should acknowledge how the past focus on developing the SER category for flywheel technology has resulted in a Tariff that fails to accommodate other storage resources and other technologies in a just and reasonable manner.¹³³

¹²⁸ *Id.* at 28 (citing *Western Grid Development, LLC*, 130 FERC ¶ 61,056, *reh'g denied*, 133 FERC ¶ 61,029 (2010)).

¹²⁹ *Id.* at 28-29.

¹³⁰ *Id.* at 29.

¹³¹ Indianapolis Power Answer at 5-6, 12.

¹³² *Id.* at 7-9.

¹³³ *Id.* at 15-16.

60. Indianapolis Power asserts that it has demonstrated that its Battery Facility will be harmed by MISO's dispatch protocols because the battery cells require appropriate operation and state of charge management to maintain cell lifetime, and the SER protocol causes the number of life cycles of the cells to be consumed in a much shorter time period.¹³⁴ Indianapolis Power further argues that MISO's suggested solution of using the Inter-Control Center Protocol to define state of charge in the middle of the range is inappropriate, because the state of charge is dynamic and can be managed separately for each of the 244 nodes in the battery.¹³⁵ Indianapolis Power states that provision of an aggregated value for the array, while possible, is not the appropriate measure to inform MISO regarding the appropriate dispatch level. Indianapolis Power argues that appropriate state of charge management by the Battery Facility's software makes the resource continuously available and able to provide service, and the flywheel-specific determination of what can be dispatched based on the Inter-Control Center Protocol transmitted state of charge is not appropriate for the Battery Facility. MISO answers that Indianapolis Power did not explain how managing the Battery Facility's state of charge on its own by sending a middle-of-the-range state of charge through the Inter-Control Center Protocol could harm the Battery Facility.¹³⁶ MISO states that Indianapolis Power could participate in MISO as an SER ahead of any final rule in the Storage NOPR adjusting bidding parameters for electric storage resources. In addition, MISO states that Indianapolis Power does not explain how an aggregated value for the battery's array of 244 nodes does not properly inform MISO of the appropriate dispatch level, and fails to explain how, without any aggregated value for the arrays, it can ensure that the Battery Facility has enough state of charge to provide regulation service that requires following setpoint instructions every four seconds.¹³⁷

61. Indianapolis Power argues that the Inter-Control Center Protocol does not fit the Battery Facility for additional reasons.¹³⁸ Indianapolis Power asserts that the market for regulation depends upon the automatic generation control signal for dispatch every five minutes, and the state of charge is managed continuously with data collected every two seconds, which causes a complication; performance to the directed setpoint via the Inter-Control Center Protocol may be read before or after actual performance. Indianapolis Power argues that, depending upon the interval where the response to dispatch is read,

¹³⁴ *Id.* 22-23.

¹³⁵ *Id.* at 23.

¹³⁶ MISO Answer to Indianapolis Power's Answer at 10.

¹³⁷ *Id.* at 11.

¹³⁸ Indianapolis Power Answer at 24.

the signal could look like it is non-performing. Indianapolis Power explains that, as performance against the Area Control Error standards is assessed on the hour, the meter reading for the hour can show perfect performance while the measurement through the Inter-Control Center Protocol gathered at a different time interval may not be the same, which could cause erroneous non-performance readings. Indianapolis Power states that the Commission recently recognized in the Storage NOPR that bidding parameters designed for slower storage technologies may limit the opportunity for faster electric storage resources to participate in the organized wholesale electric markets.¹³⁹ MISO answers that Indianapolis Power alludes to possible performance measurement differences, but does not provide any specific examples of performance measurement inaccuracies, and fails to show that a middle-of-the-range state of charge would not avoid such problems.¹⁴⁰

62. Indianapolis Power dismisses MISO's argument that the Battery Facility may be able to respond under different automatic generation control signals and be able to clear for regulating reserve under all states of charge.¹⁴¹ Rather, Indianapolis Power argues that, under MISO's examples, the Battery Facility would clear in the Day-Ahead market but not be dispatched in real-time, and therefore only earn a capacity payment. Indianapolis Power argues that MISO's regulation service must provide appropriate dispatch and compensation for the energy deployed from the storage device, and that MISO should not set up a compensation methodology wherein the most efficient resources are not dispatched.¹⁴² MISO responds that compensation for regulation service consists of two components, one for the capacity to be reserved to be able to provide the service, and one for the mileage, i.e., the amount of movement a resource makes in response to regulation deployment initiatives.¹⁴³ MISO states that the compensation for the Battery Facility would not be limited to a capacity payment in the regulation market.

63. Indianapolis Power states that it chose not to pursue MISO's offer of a Tariff waiver to remove limitations on the Battery Facility because: (1) waivers are to address issues of limited scope and duration, not indefinite duration; and (2) none of the offered waivers would have provided payment for services rendered by the Battery Facility,

¹³⁹ *Id.* (citing Storage NOPR, 157 FERC ¶ 61,121 at P 66).

¹⁴⁰ MISO Answer to Indianapolis Power's Answer at 11.

¹⁴¹ Indianapolis Power Answer at 25.

¹⁴² *Id.* at 25-26.

¹⁴³ MISO Answer to Indianapolis Power's Answer at 13.

nor would they have made it possible for the Battery Facility to participate in the regulation market.¹⁴⁴

64. In response to Alevo, Indianapolis Power also notes that the remedies it has proposed are not intended to be technology specific.¹⁴⁵

d. Commission Determination

i. SER Dispatch Protocol

65. We find that Indianapolis Power has not met its burden to show that MISO's Tariff is unjust, unreasonable, and unduly discriminatory or preferential because, as Indianapolis Power argues, MISO's SER dispatch protocol harms the Battery Facility, and we will deny the Complaint on this issue. Indianapolis Power claims that dispatching the Battery Facility under the SER resource offer parameters would result in dispatch of its battery at half-capacity continuously for one hour, and then send a negative signal for the following hour to charge, which would significantly shorten the Battery Facility's useful life.¹⁴⁶ However, Indianapolis Power failed to cite to any Tariff provisions or business practice manuals that support this claim. Indianapolis Power cites only to section 39.2.1B.A of MISO's Tariff, which states: "All Regulation Qualified Resources in the Day-Ahead Energy and Operating Reserve Market must be capable of supplying Regulating Reserve for a minimum continuous duration of sixty (60) minutes." MISO explains that, although this Tariff provision requires a regulation resource to be available for 60 minutes to provide regulating service, this does not mean that the actual market clearing and deployment will cause the resource to be charged for one hour and then discharged for one hour.¹⁴⁷ MISO explains that it uses the economic and operational offer data for SERs to dispatch energy from SERs during each five-minute real-time interval in a way that maximizes regulation capacity.

66. MISO further explains that Indianapolis Power can bypass MISO's use of real-time scheduling to manage the Battery Facility's state of charge by sending, through the Inter-Control Center Protocol, a state of charge at the middle of the range.¹⁴⁸ We note

¹⁴⁴ Indianapolis Power Answer at 17-18.

¹⁴⁵ *Id.* at 29-30.

¹⁴⁶ Complaint at 50-51.

¹⁴⁷ MISO Answer to the Complaint at 25.

¹⁴⁸ *Id.*

that Indianapolis Power argues that state of charge information transmitted to MISO through the Inter-Control Center Protocol is not the appropriate measure for its Battery Facility because its Battery Facility's state of charge is dynamic and can be managed differently for each of the 244 nodes within the array of its battery. However, this argument does not rebut MISO's explanation that its SER dispatch protocol does not operate in a way that harms the useful life of the Battery Facility. Although we recognize that the state of charge information submitted through the Inter-Control Center Protocol may not be perfectly suited to the Battery Facility, Indianapolis Power has not shown that it cannot manage its state of charge to participate in the regulation market without harm to the Battery Facility's useful life. Therefore, it has not met its burden under section 206 of the FPA. We note that, as Indianapolis Power pointed out, the Commission has recognized that existing RTO/ISO rules may require electric storage resources to use bidding parameters developed for traditional generators or other supply resources, which may fail to effectively utilize these resources.¹⁴⁹ Accordingly, in the Storage NOPR, the Commission proposed to require each RTO/ISO to revise its tariff to include a participation model for electric storage resources that incorporates bidding parameters that reflect and account for the physical and operational characteristics of electric storage resources.¹⁵⁰ We encourage Indianapolis Power to work with MISO through its stakeholder process to help improve upon existing bidding parameters for electric storage resources in compliance with any final rule in the Storage NOPR proceeding.

67. We also reject Indianapolis Power's requests to change the compensation mechanism for regulation service because we find that Indianapolis Power has not shown that MISO's existing compensation for regulation service is unjust and unreasonable. First, we reject Indianapolis Power's proposal to require MISO to pay the Battery Facility (rather than charge) the LMP for each MW of energy it withdraws to mitigate over-frequency conditions. Indianapolis Power has not shown that it would be appropriate to pay resources providing energy and resources providing primary frequency response at the same price, and has not explained why the lack of such a compensation scheme is unjust and unreasonable. Furthermore, Indianapolis Power fails to acknowledge that, in the frequency regulation market, the resource is already compensated for providing regulation down. MISO's compensation structure accounts for both capacity and mileage, as required by Order No. 755; when a resource provides regulation down, the capacity set aside for that service has already been compensated, and the movement down (in MWs) is also compensated. Indianapolis Power has failed to justify why any resource should receive an additional payment (i.e., LMP) when withdrawing energy to provide frequency regulation. In addition, Indianapolis Power has not shown that the

¹⁴⁹ Storage NOPR, 157 FERC ¶ 61,121 at P 53.

¹⁵⁰ *Id.* P 66.

fundamental design of MISO's frequency regulation market is insufficient to compensate the Battery Facility for providing regulation service.

68. We find that Indianapolis Power has not shown that MISO's Regulating Mileage Deployment Ratio for regulation service is no longer just and reasonable, and that MISO should be required to employ PJM's 2.9 benefits factor. Indianapolis Power appears to conflate the concepts of MISO's Regulating Mileage Deployment Ratio and PJM's benefits factor. As MISO states, the mileage factor is the average ratio of the system-wide average regulation mileage to regulation capacity.¹⁵¹ It is a historical measure of the average amount of mileage any one MW of regulation capacity is dispatched for each MW of cleared regulation reserve capacity. In contrast, PJM defines its benefits factor as the rate of substitution between traditional REG A resources and dynamic REG D resources.¹⁵² Indianapolis Power has not clearly linked these two disparate concepts and has not met its burden to show that MISO's current Regulating Mileage Deployment Ratio is unjust and unreasonable.

ii. Market Participation

69. We find that MISO's Tariff is unjust, unreasonable, and unduly discriminatory or preferential because it unnecessarily restricts competition by preventing electric storage resources from providing all the services that they are technically capable of providing, which could lead to unjust and unreasonable rates, and we will grant the Complaint on this issue. Although an electric storage resource, such as the Battery Facility, can participate in MISO as an SER, this resource category limits the resource to participation in MISO's regulation market and does not allow the resource to qualify for capacity, energy, ramp capability, and contingency reserves.¹⁵³ Additionally, while an electric

¹⁵¹ MISO Answer to the Complaint at 26. *See also*, MISO, FERC Electric Tariff, Module A, § 1.R (46.0.0) (defining the Market-Wide Regulating Mileage Deployment Ratio as the ratio of the Regulating Mileage Target (i.e., mileage performed by Regulation Reserve resources) and the Regulating Reserve Dispatch Target (i.e., cleared Regulation Reserve capacity)).

¹⁵² *PJM Interconnection, L.L.C.*, 139 FERC ¶ 61,130, at P 12 (2012) (“The benefits factor is intended to capture the value that each resource brings to the market, following PJM's regulation signals. Specifically, the benefits factor is intended to recognize that resources capable of following the dynamic [automatic generation control] signal more quickly, will help PJM meet its system reliability needs, as established by [NERC]. PJM explains that the benefits factor acts to reduce the capability and performance offers in order to make dynamic-signal resources more attractive to the market solution algorithm.”).

¹⁵³ *See* MISO, FERC Electric Tariff, Modula A, § 1.S “Stored Energy Resource” (continued ...)

storage resource may be able to participate in MISO's organized markets using market rules that were designed for generation, demand response, or other types of resources, these participation models were designed for those other types of resources and therefore may fail to accommodate the unique physical and operational characteristics of electric storage resources.

70. Indianapolis Power asserts that its Battery Facility is capable of providing other types of service for which it could be compensated. For instance, Indianapolis Power states that the Battery Facility meets the definition of "Load Modifying Resource" under the MISO Tariff and is capable of delivering five MW of energy for four continuous hours; thus, Indianapolis Power explains that the Battery Facility could qualify under Module E of MISO's Tariff to provide five MW of capacity or Planning Reserve Margin Requirement.¹⁵⁴ However, the Tariff provisions for SER participation are the only provisions that account for the unique attributes of electric storage resources, and they limit the participation of electric storage resources to the regulation market. We agree with Indianapolis Power that electric storage resources, such as the Battery Facility, should not be required to participate in MISO's markets by using rules that were designed for other types of resources, such as demand response resources, generation resources, or use-limited resources, because those participation models do not accommodate the unique features of electric storage technologies.¹⁵⁵ Requiring electric storage resources to use participation models designed for a different type of resource may fail to recognize electric storage resources' physical and operational characteristics and their capability to provide energy, capacity and ancillary services in MISO. We find that the failure to recognize the unique physical and operational characteristics of electric storage resources could unnecessarily restrict competition by preventing electric storage resources from providing all the services that they are technically capable of providing, which could lead to unjust and unreasonable rates.

71. We recognize that this issue is currently being addressed generically in the Storage NOPR proceeding, which proposes to require the RTOs/ISOs to revise their tariffs to establish a participation model consisting of market rules that, recognizing the physical and operational characteristics of electric storage resources, accommodate their participation in all capacity, energy, and ancillary services markets in which they are technically capable of participating.¹⁵⁶ Thus, any final rule in the Storage NOPR

and "Stored Energy Resource Offer" (46.0.0).

¹⁵⁴ Complaint at 55.

¹⁵⁵ *Id.* at 4.

¹⁵⁶ Storage NOPR, 157 FERC ¶ 61,121 at P 16.

proceeding may address Indianapolis Power's concerns regarding the market participation limitations placed on its Battery Facility in MISO. However, the Commission has not made any final determinations in the Storage NOPR proceeding, whereas Indianapolis Power has met its burden under section 206 to show that the MISO Tariff is unjust, unreasonable, and unduly discriminatory or preferential. Therefore, we find that it is appropriate for MISO to remedy its unjust and unreasonable Tariff to provide Indianapolis Power with relief. In the event that MISO's Tariff revisions conflict with the required Tariff revisions in any final rule resulting from the Storage NOPR, MISO may be required to adjust its Tariff to align with the Commission's determinations in that final rule.

72. We will direct MISO to submit a compliance filing, within 60 days from the date of this order, proposing Tariff revisions that accommodate the participation of all electric storage resources, regardless of the technology, in all MISO capacity, energy and ancillary service markets that they are technically capable of participating in, in a way that acknowledges their unique physical and operational characteristics, as requested in the Complaint.¹⁵⁷

The Commission orders:

(A) The Complaint is hereby denied in part and granted in part, as discussed in the body of this order.

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

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

¹⁵⁷ See Complaint at 4-5, 54-55.