UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Compensation for Reactive Power Within the Standard Power Factor Range	**)**	**Docket No. RM22-2-000**

COMMENTS OF ISO NEW ENGLAND INC.

ISO New England Inc. ("ISO-NE")[1] respectfully submits these comments in response to the Notice of Proposed Rulemaking ("NOPR") that the Federal Energy Regulatory Commission ("FERC" or "Commission") issued on March 21, 2024, in Docket No. RM22-2-000. In the NOPR, the Commission proposes to revise Schedule 2 of its *pro* forma open-access transmission tariff (*"pro forma* OATT"), section 9.6.3 of its *pro forma* large generator Interconnection Agreement ("LGIA") and section 1.8.2 of its *pro forma* small generator Interconnection Agreement ("SGIA") to prohibit the inclusion in transmission rates of charges related to the provision of reactive power within the power factor range specified in a generator's interconnection agreement. Referencing reactive power compensation on a cost of service basis through application of the AEP methodology,[2] the Commission held that continuing compensation for the full power factor range is unjust and unreasonable due to a lack of economic justification (as to incurrence of additional costs), unnecessary because cost recovery of generator costs can be obtained through energy and capacity markets and that current cost-of-

[1] Capitalized terms used but not defined in this filing are intended to have the meaning given to such terms in the ISO New England Inc. Transmission, Markets, Services Tariff ("Tariff"). Section II of the ISO Tariff contains the Open Access Transmission Tariff ("ISO-NE OATT").

[2] Generating facilities in PJM Interconnection, L.L.C. generally use the cost-based AEP Methodology to calculate cost-of-service rates for the production of reactive power. Because the same generation equipment contributes to the production of both real power and reactive power, the AEP Methodology attempts to functionalize each piece of equipment as between its contribution to real power and reactive power. Then, using allocators calculated based on the facility's output, the AEP Methodology allocates the cost of each piece of equipment based on its relative contribution to each function. NOPR at P 17.

service basis rate structure imposes undue administrative burdens through generator-specific proceedings before the Commission.

As fully explained in these comments, the treatment of reactive power within the ISO-NE market structure is wholly separate and distinct from the scenarios upon which the Commission's findings have been made. ISO-NE respectfully submits that: (1) the overall cost of reactive supply and voltage support ("VAR") Service in New England is relatively low, and VAR Service provides significant reliability benefits to the New England Transmission System; (2) the compensation mechanism currently in place in New England compensates for valuable VAR Service, not cost of service, and is just and reasonable; (3) VAR Service should be compensated separately from energy or capacity; and (4) ISO-NE's compensation mechanism is transparent and does not create administrative burdens. For these reasons, ISO-NE respectfully requests that the Final Rule in this proceeding allow ISO-NE to retain its Schedule 2 VAR compensation program without changes.

I. IDENTIFICATION OF ISO NEW ENGLAND; COMMUNICATIONS

ISO-NE is a private, non-profit entity that serves as the regional transmission organization ("RTO") for New England. ISO-NE operates the New England bulk power system and administers New England's organized wholesale electricity market pursuant to the ISO-NE Tariff and the Transmission Operating Agreement. In its capacity as an RTO, ISO-NE also has the objective to assure that the bulk power system within the New England Control Area conforms to the proper standards of reliability as established by the Northeast Power Coordinating Council ("NPCC") and the North American Electric Reliability Corporation ("NERC").

All correspondence and communications concerning these comments should be sent to the following person, who should be added to the official service list, at the address shown:

Margoth Caley, Esq.
Chief Regulatory Compliance Counsel
ISO New England Inc.
One Sullivan Road
Holyoke, MA 01040-2841
Tel: (413) 535-4045
Fax: (413) 535-4379
mcaley@iso-ne.com

II. BACKGROUND

The ISO-NE Tariff sets forth a methodology for reactive power compensation that differs from the AEP Methodology and is not resource specific. In New England, compensation for the capability to provide reactive supply and voltage support ("VAR Service") to the New England Transmission System is set forth in Schedule 2 of the ISO-NE OATT, with implementation details specified in the ISO New England Ancillary Services Schedule 2 Business Procedure and Operating Procedures.[3] The Schedule 2 rate design, which was first implemented in 1999 through a Commission-approved settlement agreement,[4] compensates both Qualified Generator Reactive Resources and Qualified Non-Generator Reactive Resources (collectively, "Qualified Reactive Resources").

The Schedule 2 rate design consists of four components: (1) the fixed Capacity Cost ("CC") rate, under which Qualified Reactive Resources are eligible to receive VAR Payments

[3] The ISO New England Ancillary Service Schedule 2 Business Procedure is available on the ISO-NE website at: https://www.iso-ne.com/static-assets/documents/rules_proceds/operating/gen_var_cap/schedule_2_var_business_procedure.pdf. Operating Procedures include primarily: ISO New England Operating Procedure No. 12 – Voltage and Reactive Control, available at https://www.iso-ne.com/static-assets/documents/rules_proceds/operating/isone/op12/op12_rto_final.pdf ("OP 12"); and ISO New England Operating Procedures No. 23 – Generating Resource Auditing, available at http://www.iso-ne.com/static-assets/documents/rules_proceds/operating/isone/op23/op23_rto_final.pdf ("OP 23").

[4] *See New England Power Pool*, 88 FERC ¶ 61,140 (1999) (approving settlement agreement implementing the Schedule 2 rate design elements that are currently in place).

for their measurable capability to provide VAR Service to the New England Transmission System; (2) the variable Lost Opportunity Cost, which compensates for the value of a resource's lost opportunity in the wholesale energy market in situations where a resource that would otherwise be economically dispatched is directed by the ISO to reduce real power output to provide more reactive power; (3) the variable Cost of Energy Consumed, which compensates for the cost of energy consumed by the resource solely to provide reactive power; and (4) the Cost of Energy Produced, which compensates for the difference between the locational marginal price and a resource's offer price, if the locational marginal price is lower than the offer price, for each hour the resource provides reactive power. As discussed throughout these comments, the CC rate component (component (1) above) is the primary mechanism by which VAR capability is demonstrated and compensated under Schedule 2. The other three components compensate for the direct cost or opportunity costs associated with producing, or consuming, real power when a resource is operating specifically to provide VAR capability in response to ISO-NE dispatch instructions.[5]

Schedule 2 VAR Payments are available to Qualified Reactive Resources that voluntarily enroll in the Schedule 2 program. Schedule 2 allows for compensation under the CC rate component over the full range of a Qualified Reactive Resource's VAR capability (*i.e.*, "Qualified VARs"), which is physically determined by measuring the demonstrated lagging and leading VAR capability of each resource at the point of delivery on the New England

[5] These three components are not the focus of ISO-NE's comments because the total amounts compensated under them are, generally, far less than the CC rate component and may occur only infrequently. However, that is not to suggest that these three components are irrelevant. Rather, these three components support an important principle that a market participant should be no worse off financially for following the ISO's dispatch instructions, and serve to fully remunerate market participants' resources for the provision of reactive power capability.

Transmission System.[6] All enrolled Qualified Reactive Resources are subject to reactive capability tests with compensation adjusted based on the test results.[7] The lagging reactive capability test measures the Qualified Reactive Resource's ability to provide reactive power to the system at a specified real power output, and the leading capability measures the ability to absorb the reactive power from the system at a specified real power output. The reactive capability testing requirement results in payment for what the dynamic reactive resource can actually produce or absorb under typical operating conditions, rather than calculations of expected capability based upon manufacturer's data.[8]

III. COMMENTS

A. The Overall Cost for VAR Service in New England is Relatively Low and VAR Service Provides Significant Reliability Benefits to the New England Transmission System

In the NOPR, the Commission states that, where transmission providers provide compensation for reactive power, the costs to transmission customers have increased substantially without any commensurate increase in benefits.[9] The Commission also states that "it appears that under the current framework, generating facilities are eligible to receive *cost-based* reactive power payments that do not reflect the reliability benefits of the reactive power at each facility's location (*i.e.*, the extent to which the generating facility supports the voltage of the transmission system), and that the reliability benefit may be zero for certain generating

[6] *See* OATT, Schedule 2 at § IV.A.12. *See also* OP 23 at §IV.

[7] *See* note 3 supra.

[8] When a dynamic reactive power resource first enrolls in the Schedule 2 VAR compensation program as a Qualified Reactive Resource, however, it may be untested. In that case, Schedule 2 provides for the resource's Qualified VARs to be determined in accordance with Section IV.A.12(b)-(c), using calculated values of expected capability, but only until actual testing is performed.

[9] NOPR at P 26.

facilities."[10] (Emphasis added.) The Commission seeks comment on the reliability impact of prohibiting transmission providers from including in their transmission rates any charges associated with the supply of reactive power within the standard power factor range from a generating facility in regions where generating facilities currently receive such compensation.[11]

As described in Section II of these comments, in New England, VAR Payments are not cost-based. Rather, VAR Payments are based on a Qualified Reactive Resource's demonstrated capability to provide full tested VARs when required, and all Qualified Reactive Resources are compensated for this capability at a uniform payment rate. In New England, between 2018 and 2023, annual VAR Payments have been approximately between $18 million and $20 million. On average, annual VAR Payments amounted to 0.25% (*i.e.*, one quarter of one percent) of the total value of all energy, ancillary service, and capacity market costs over that same period. Thus, VAR Payments are relatively low and have not substantially increased in the last six years. Moreover, the commitment from Qualified Reactive Resources to provide VAR capability is vital to the reliability of the New England Transmission System.

From ISO-NE's perspective, the entire VAR capability provided by many generation resources in New England is valuable. Eliminating application of the CC rate to the full power factor range will de-emphasize the need for dynamic VAR capability necessary to reliably operate the New England Transmission System. In turn, this could place the New England Transmission System at risk of exposure to a number of reliability risks and increased market inefficiencies. As a transmission provider, ISO-NE has concluded that the level of investment,

[10] NOPR at 35.

[11] *Id.*

via payment for all provided VAR capability, is a direct and appropriate means of mitigating such risks and inefficiencies.

The New England Transmission System is reliably planned and operated to comply with all applicable NERC, NPCC, and ISO-NE reliability criteria. These criteria all share requirements to maintain equipment voltages in acceptable ranges for a set of predetermined conditions, and in response to a set of predetermined contingencies. Reactive power capability directly contributes to the ability to maintain equipment voltages per these criteria. Should generators choose to no longer provide the full demonstrated VAR capability they have been providing, then, absent other mitigating actions, the New England Transmission System may be exposed to voltage-related reliability violations of these criteria, which may lead to a number of undesirable outcomes.

First, a subset of those reliability violations may require ISO-NE to identify the need to install additional transmission devices to provide dynamic reactive capability to resolve these issues. Second, absent mitigating steps, some potential reliability violations would require a reduction of transfer capability across certain interfaces in order to maintain reliability. This could result in increased congestion and costs to consumers. Third, the reactive capability that ISO-NE currently procures through Schedule 2 is valuable to improving the transient voltage response of the New England Transmission System, especially in weak areas. This helps assure proper operation of controls for both synchronous and inverter-based ("IBR") generation. Improper operation of these controls may result in unexpected behavior of those generators, including disconnection, which may lead to reliability problems. This is especially important for the evolving New England Transmission System as more IBR generation is interconnected to it, often in weak areas. Fourth, and directly related to the Commission's statements on locational

reliability benefits, the New England Transmission System is always susceptible to less probable beyond-criteria conditions and contingencies. Due to recent events, most notably extreme weather accompanied with concurrent failures of bulk power system generation and transmission equipment, there has been an increased awareness and movement in the industry to improve the transmission system's resilience.[12] The full dynamic range of reactive capability has significant value for both normal and beyond-criteria conditions and contingencies to which the New England Transmission System may be exposed. This capability may mitigate damage to equipment and prevent loss of customers during beyond-criteria events.

B. ISO-NE's Schedule 2 Rate Design Compensates for Valuable VAR Service, not Cost of Service, and is Just and Reasonable

In the NOPR, the Commission preliminarily found that providing compensation for the provision of reactive power within the power factor range included in a generator's interconnection agreement is unjust and unreasonable because the generating facility already is under an interconnection-based obligation to have leading and lagging capabilities within the standard power factor range, such that the provision of reactive power support occurs at no cost or *de minimis* cost.[13] The Commission further stated that such compensation may result in undue compensation or other market distortions.[14] In addition, the Commission preliminarily found that separate compensation for providing reactive power within the standard power factor range is not necessary for resources to be able *to recover their costs*.[15]

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[12] *See* 2023 ERO Reliability Risk Priorities Report, available at https://www.nerc.com/comm/RISC/Related%20Files%20DL/RISC_ERO_Priorities_Report_2023_Board_Approved_Aug_17_2023.pdf

[13] NOPR at P 33.

[14] *Id.* at P 28.

[15] *Id.* at P 45.

ISO-NE respectfully submits that these findings are not applicable to New England's Schedule 2 rate design. First, in New England, not all generators are obligated to provide reactive power service within the standard power factor range. Specifically, several older resources in New England have Interconnection Agreements that pre-date the obligation to provide reactive power service within the standard power factor range. These resources choose to participate in the Schedule 2 VAR compensation program, incurring an obligation to maintain and provide valuable VAR Service in New England. Likewise, Qualified Non-Generator Reactive Resources (*e.g.*, synchronous condensers and Flexible AC Transmission Systems) do not have a specific power factor requirement, but are compensated under Schedule 2 for the actual tested capability to provide or absorb reactive power thereby also providing valuable VAR Service to the New England Transmission System.

Second, ISO-NE's reactive power compensation mechanism in Schedule 2 of the ISO-NE OATT is not based on cost recovery. Rather, the compensation is for valuable VAR capability and is based on regular testing of VAR capability. As mentioned in Section II above, the reactive capability testing requirement in Schedule 2 results in payment for what the dynamic reactive resource can actually produce or absorb under typical operating conditions, rather than calculations of expected capability based upon manufacturer's data. Importantly, this compensation does not distinguish between VAR capability required under Interconnection Agreements and VAR capability that is above that requirement, because the entire capability has the same value to the New England Transmission System and, accordingly, it should be similarly compensated.

As the Commission acknowledged in *Maine Public Utilities Commission v. ISO New England Inc.*, 126 FERC ¶ 61,090 (2009) ("Maine PUC"), the CC rate component is a negotiated

New England-wide rate for all VAR-capable resources that is designed to compensate qualified resources for *their VAR capability* to provide reactive service *but not for the costs associated with the equipment of a particular generator.*[16] In Maine PUC, the Maine Public Utilities Commission filed a complaint to request that FERC order ISO-NE to use a CC Rate Deadband proposal (*i.e.*, that the Schedule 2 CC rate provide compensation only for capability to provide reactive service outside the 0.95 leading to 0.95 lagging power factor range).[17] In denying the complaint, the Commission agreed with ISO-NE that the complaint was "based on a faulty notion that the VAR CC Rate cannot be just and reasonable because of cost overlap judged on a phantom cost-of-service basis."[18] In addition, the Commission recognized that the CC Rate component is a "negotiated value and is not equal to, nor is it intended to recover, the cost of service of any particular generating Resource."[19] Furthermore, the Commission held that the CC rate component provides an appropriate financial inducement for qualified resources to invest in providing and maintaining additional dynamic VAR capability, which ISO-NE relies on to reliably operate the system.[20] Accordingly, the Commission concluded that the CC rate component of Schedule 2 is just and reasonable. ISO-NE respectfully submits that the CC rate component of Schedule 2 remains a just and reasonable mechanism to procure valuable VAR Service in New England.

[16] Maine PUC at P 42.

[17] *Id*. at P 9.

[18] *Id.* at P 42.

[19] *Id.*

[20] *Id.*

C. VAR Service is a Separate Service and, as such, it Should be Compensated Separately from Energy or Capacity

In the NOPR, the Commission preliminarily found that, in the context of RTO/ISO markets, it is more efficient for generating facilities to recover any identified reactive power costs, to the extent they exist, through energy and capacity sales, since competition between generating facilities may incentivize efficiency.[21]

Notwithstanding the foregoing, the Commission has previously concluded that reactive service under Schedule 2 and capacity service are two distinct services, designed to achieve a different purpose.[22] ISO-NE agrees with that previous conclusion and, accordingly, respectfully submits that it is not appropriate to include VAR compensation in the energy or capacity markets.

The purpose of the energy market is to compensate resources for the marginal cost of producing energy. The purpose of the capacity market is to compensate resources for the value of the reliability provided to the system by additional generating capacity that cannot be recovered in the energy market. Since VAR capability is a different product than energy or capacity, compensating for VAR capability within the energy or capacity markets will not simultaneously reflect the value provided by VAR capability and the value provided by energy/capacity. Additionally, combining offers to sell multiple products under a single market construct would not achieve an efficient market outcome, and may muddle the underlying incentives and compensation rather than providing transparency.

Under New England's current Forward Capacity Market ("FCM") rules, to avoid double counting concerns, new resources are prohibited from including any anticipated revenues they

[21] NOPR at 46.

[22] Maine PUC at P 39.

expect to receive as Qualified Reactive Resources pursuant to Schedule 2.[23] However, even if resources were allowed to reflect VAR capability in capacity market offers, the capacity market would still not efficiently compensate for VAR capability. This is because capacity demand is derived based on how incremental capacity reduces expected unserved energy ("EUE"), and does not consider reliability attributes such as VAR capability. The capacity market will select a resource if the value of the additional EUE reduction associated with the resource, as measured by the capacity demand curve, is more than the cost of the resource's capacity market offer. Capacity demand curves do not place value on VAR capability, so even if a resource is allowed to increase its capacity market offer to reflect VAR capability, the resource may not clear the capacity market because the VAR capability is not valued in the capacity market construct.

To illustrate this, consider two resources that each offer 1 MW of capacity into the capacity market. The first resource offers at a price of $4 and has limited VAR capability, while the second resource offers at $4.01 and has significant VAR capability. All else equal, the first, cheaper, resource will clear the market ahead of the second resource no matter how much more VAR capability is associated with the second resource, because the value of VAR capability is not reflected in capacity demand. The second resource may or may not incur additional fixed cost associated with its VAR capability, but allowing these costs to be reflected in capacity market offers will not necessarily lead to sufficient VAR capability on the grid. Because the capacity market is not designed to assess the relative value of capacity and VAR capability, moving VAR compensation into the capacity market would not lead to more efficient or transparent market outcomes.

[23] Section III.13.1.1.2.2.3 of the Tariff. Similarly, while existing resources are allowed to reflect their going forward costs for generating capacity in their capacity market offers, they are required to net out all of their anticipated infra-marginal revenues, including compensation for VAR capability, to avoid double-counting concerns.

Including VAR compensation in the energy market would present the same problem. Resources are allowed to reflect their marginal costs for producing energy in supply bids, but energy market demand bids are based on buyers' willingness to pay for energy, not willingness to pay for VAR capability. Even if resources were allowed to reflect their VAR capability in supply bids, the market would still clear the cheapest bids without regard to how much VAR capability clears the market, because VAR capability is not valued by energy demand bids. For example, consider two resources that each offer 1 MW into the energy market for a given hour. The first resource offers at $20/MW and has limited VAR capability, while the second resource offers at $20.01/MW and has significant VAR capability. All else equal, the first, cheaper resource will clear the market ahead of the second resource, regardless of the difference in VAR capability between the two resources, because it can provide the same amount of energy at a lower price. Like in the capacity market, the energy market is not designed to assess the relative value of energy and VAR capability, so moving VAR compensation to the energy market would not lead to more efficient or transparent market outcomes.

ISO-NE respectfully submits that the Schedule 2 rate design appropriately compensates VAR Service separately from energy or capacity to incent the voluntary provision of VAR Service. Because ISO-NE relies on dynamic reactive capability above and beyond what is minimally required in the design of generators for interconnection, and this service can be obtained from either generator or non-generator resources, VAR Payments under Schedule 2 ensure the most effective procurement, which results in the significant reliability benefits to the New England region described in Section III.A of these comments.

D. ISO-NE's Schedule 2 Rate Design is Transparent and Does Not Create Administrative Burdens

In the NOPR, the Commission stated that a benefit of market-based compensation in RTOs/ISOs is that any costs of providing reactive power within the standard power factor range would be more transparent to market participants because they would be included in RTO/ISO energy and/or capacity prices as opposed to generating facility-specific out-of-market cost-of-service agreements.[24] The Commission also found that, in the context of RTO/ISO markets, it is less administratively burdensome for generating facilities to recover any identified reactive power costs, to the extent they exist, through energy and capacity sales.[25]

Under ISO-NE's Schedule 2 rate design, ISO-NE is required to publish reports identifying all Qualified Reactive Resources, their reactive capabilities, and compensation – providing transparency to the market on this revenue stream.[26] Thus, unlike the AEP methodology, ISO-NE's VAR program is transparent. Likewise, unlike the AEP methodology used in other regions, ISO-NE'S VAR program does not create administrative burdens because it does not require resource-specific revenue filings. As such, ISO-NE's Schedule 2 rate design avoids onerous, expensive, and protracted litigation before the Commission.

[24] *Id.*

[25] NOPR at 46.

[26] Monthly VAR status reports are available on the ISO-NE website at: https://www.iso-ne.com/isoexpress/web/reports/billing/-/tree/oatt.

IV. CONCLUSION

For the foregoing reasons, ISO-NE respectfully requests that the Final Rule in this proceeding allow ISO-NE to retain its Schedule 2 VAR compensation program without changes.

Respectfully submitted,

/s/ *Margoth Caley*
Margoth Caley
Chief Regulatory Compliance Counsel
ISO New England Inc.
One Sullivan Road
Holyoke, MA 01040

Counsel for ISO New England Inc.

Dated: May 28, 2024

CERTIFICATE OF SERVICE

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

Dated at Holyoke, Massachusetts this 28th of May 2024.

/s/ Julie Horgan
Julie Horgan
eTariff Coordinator
ISO New England Inc.
One Sullivan Road
Holyoke, MA 01040-2841
(413) 540-4683