

A Look At FERC's Plan To End Reactive Power Compensation

By **Norman Bay, Vivian Chum and Matthew Goldberg** (May 10, 2024, 5:47 PM EDT)

On March 21, the Federal Energy Regulatory Commission proposed a rulemaking that could put an end to compensation for the supply of reactive power within the standard power factor range.[1]

First, in the notice of proposed rulemaking, FERC preliminarily found that "where transmission providers require transmission customers to pay for the provision of reactive power within the standard power factor range, transmission rates may be unjust and unreasonable, as they include costs without a sufficient economic basis or justification." [2]

Second, the commission proposed "that a just and reasonable replacement rate is to prohibit 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." [3]

Finally, FERC proposed to eliminate reactive power payments as of the effective date of the final rulemaking — i.e., without a transition period to phase out reactive power compensation. [4]

The proposed rulemaking adds the following language to the end of Schedule 2 of the pro forma open access transmission tariff: "However, such rates shall not include compensation for generating facilities for the supply of reactive power within the power factor range specified in its interconnection agreement." [5]

In addition, the proposed rulemaking removes clauses from the pro forma large generator interconnection agreement and pro forma small generator interconnection agreement, requiring transmission providers that pay their own or affiliated generators for reactive power service to also pay their interconnection customers. [6]

Judging by the questions set forth in the NOPR, the commission is likely to move forward with eliminating compensation for the provision of reactive power within the standard power factor range. This change will have significant impacts on the electric power industry, given its reliance on income from reactive power compensation.

Background: Reactive Power Compensation

The proposed rulemaking eliminates compensation for reactive power that is produced within the standard power factor range — also known as the "deadband" of 0.95 leading to 0.95 lagging, unless otherwise denoted in a generation facility's interconnection agreement — within which a facility must be able to operate when operating at full real power capacity. [7]

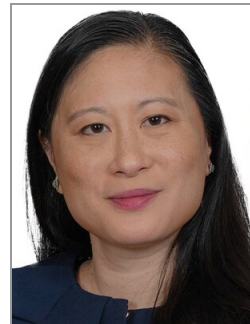
In addition to real power, measured in megawatts, generation facilities also produce two other types of power — reactive power, measured in megavolt-amperes reactive; and apparent power, measured in megavolt-amperes. Reactive power is an ancillary service that is necessary to control system voltage within ranges that ensure that the transmission system operates efficiently and reliably.

Reactive power can be produced or absorbed to maintain voltage levels. Apparent power is the total power output of the system.

The relationship among real, reactive and apparent power is often described in terms of the sides of a right triangle. [8] Apparent power forms the hypotenuse of the triangle, with real power as the base and reactive



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power as the height.

Power factor is the ratio of a facility's real power to its apparent power, and is a measure of a generating unit's efficiency. Power factor can range from 1.0 to 0.0, with a power factor of 1.0 representing only real power, or maximum energy transfer and efficiency, and a power factor of 0.0 representing only reactive power.

While the math behind reactive power is straightforward, approaches to reactive power compensation have varied by region. The California Independent System Operator, Southeast Power Pool, and some other transmission operators that are not regional transmission organizations or independent system operators do not compensate resources for the provision of reactive power.

The New York Independent System Operator and ISO New England rely on a flat rate that represents dollars per MVAR-year. This rate is then multiplied by a resource's tested reactive power capability.[9]

PJM Interconnect and some non-RTO and non-ISO transmission operators rely on the American Electric Power methodology. This is a cost-based methodology that compensates resources on a case-by-case basis based on reactive power capability.[10]

Until last year, MISO had also compensated facilities based on the AEP methodology. But in 2023, FERC accepted the Midcontinent Independent System Operator's application to end compensation for the provision of reactive power within the standard power factor range.[11]

Takeaways

Specifically, it is compensation for the provision of reactive power within the standard power factor range that FERC has proposed "to prohibit transmission providers from including in their transmission rates any charges associated with the supply of reactive power." [12]

In fact, the notice of proposed rulemaking explicitly distinguishes compensation for reactive power provided outside the standard power factor range, which was required by Order No. 2003:

Where reactive power is provided outside of the standard power factor range, it is considered "an ancillary service for transmitting power across the grid to serve load." By contrast, where the generating facility is operating within the standard power factor range, "it is meeting the obligation as a generator to maintain the appropriate power factor in order to maintain voltage levels for energy entering the grid during normal operations." "Put differently, reactive support by generating facilities operating within the standard power factor range ensures that when these facilities inject real power — the product that their facilities exist to create and sell — onto the grid under normal conditions, they can do their part to maintain adequate voltages and to not threaten reliability." [13]

The NOPR was not the commission's first announcement of potential changes to reactive power compensation. A notice of inquiry was issued in November 2021.

In response, a broad spectrum of stakeholders — e.g., generators, developers, cooperatives, trade associations, RTOs and ISOs, state commissions, and other federal and state agencies — filed dozens of comments.

Based at least in part on those comments, FERC subsequently took a no-holds-barred approach to enumerating the reasons why compensation for the provision of reactive power within the standard power factor range may no longer be just and reasonable. The commission characterized compensation for the provision of reactive power within the standard power factor range as:

- Paying for something that costs nothing, or next to nothing; [14]
- Paying for resources to meet basic obligations and follow the rules; [15]
- Paying separately for something that is already rolled into the cost of energy or capacity; [16]
- Paying some resources for a product that other resources have been providing just as well without separate compensation; [17] and
- Paying for a product that is overly burdensome and time-consuming to consistently price. [18]

Special ire was reserved for the application of the AEP methodology. Under the AEP methodology, a generating facility's compensation for reactive power is typically many orders of magnitude smaller than its annual

compensation for the provision of real power.

Nonetheless, the AEP methodology has generated reams of case precedent and litigation — particularly as nonsynchronous resources have attempted to apply the methodology, which was developed with traditional resources in mind.[19]

The notice of inquiry noted that "challenges in evaluating proposed reactive power rate schedules [under the AEP methodology result] in the majority of the filings being set for hearing and settlement procedures." [20]

The vast majority of, if not all, settlements of reactive power cases in recent history have been "black box" settlements. The 2023 State of the Market Report for PJM noted that "[i]n 2023, customers in PJM ... paid \$388.0 million for reactive capability based on archaic, nonmarket and unsupported assertions about cost allocation and a regulatory review process of filings by individual units that results in unsupported black box settlements." [21]

On the occasion of the issuance of the underlying notice of inquiry in November 2021, FERC staff summarized the state of affairs:

The AEP Methodology was designed based on the physical attributes of synchronous resources owned by a public utility that utilized the Commission's Uniform System of Accounts. ... However, now the majority of the reactive power filings submitted to the Commission are made by owners of non-synchronous resources. ... In the last six years, the Commission has processed more than 260 reactive power proceedings in PJM, setting at least 95 for hearing and settlement procedures. Over that same period, the Commission has processed more than 125 reactive power proceedings in MISO, setting at least 40 for hearing and settlement procedures. These factors have contributed to customers and the Commission facing challenges in evaluating proposed reactive power rate schedules submitted pursuant to section 205 of the Federal Power Act. [22]

According to the notice of inquiry and the NOPR, there is ample evidence that the AEP methodology is no longer workable. But rather than revise or eliminate the AEP methodology, the recent NOPR proposes to eliminate all reactive power compensation within the standard power factor range.

This change will undoubtedly roil the industry, which has relied on income streams from reactive power compensation. Even if the dollars at stake have generally been relatively small on a facility-by-facility basis, they do add up.

Entities eligible for such compensation pursuant to the AEP methodology have repeatedly shown that the juice is worth the squeeze, by virtue of investing the time and resources into filing for reactive power compensation, and engaging in the hearing and settlement procedures that ensue.

If the specific questions set forth in the recently issued NOPR are any indication, FERC is not likely to walk back its proposal to eliminate reactive power compensation for the provision of reactive power within the standard power factor range.

While the commission invited general comments on the NOPR, the questions explicitly set forth by the commission are focused exclusively on the appropriate timeline for implementation of the proposed rules. [23]

For example, the NOPR asks whether "removal of all reactive compensation under the standard power factor range without a transition period or other similar mechanism has the potential to disrupt business and investment decisions for generating entities in certain markets in the near term," [24] and "[i]f so, what transition mechanisms other than delaying the implementation date of the final rule would minimize such disruptions and be just and reasonable." [25]

The NOPR also asks whether existing generation resources that have previously received compensation for the provision of reactive power should continue to receive such compensation for a limited period.

If the commission adopts the rules as is, compensation for the provision of reactive power within the standard power factor range will end within five months of the effective date of the final rule. [26] That said, the NOPR does not preclude compensation for generation facilities that provide reactive power outside the standard power factor range.

The commission reasoned that if a transmission provider requires a facility to produce reactive power outside of its standard power factor range, there could be increased costs for the generating facility, including opportunity costs associated with the facility reducing its megawatt output to comply with the instruction. [27]

However, the NOPR also explicitly states, perplexingly, that compensation for reactive power outside of a generating facility's standard power factor range is "outside the scope of this rulemaking." [28]

Whether, and under what circumstances, facilities may be compensated for reactive power under the forthcoming final rulemaking remains to be seen. In the meantime, entities with an interest in the proceeding should file comments with FERC. Comments on the proposed rule are due by May 28, and reply comments are due by June 26.

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[1] Compensation for Reactive Power Within the Standard Power Factor Range, 186 FERC ¶ 61,203, at P 41 (2024) (NOPR).

[2] Id. P 25.

[3] Id. P 41.

[4] Id.

[5] Id. P 9.

[6] Id.

[7] Id. P 11.

[8] In popular culture, engineers prefer to describe the relationship in terms of a glass of beer, with reactive power as the foam on top. See, e.g., Mark Ng, Texas Instruments, What Do a Beer and Power Factor Have in Common? (2023) <https://www.ti.com/document-viewer/lit/html/SSZTBR1>; Md Jahid Shah, Medium, Power Factor Explained (Aug. 2022), <https://medium.com/@mdjahidshah/power-factor-explained-power-factor-609a350a0f28>; Fluke, What is power factor and why is it important?, <https://www.fluke.com/en-us/learn/blog/power-quality/power-factor-formula>.

[9] Reactive Power Capability Compensation, 177 FERC ¶ 61,118, at P 14 (2021) ("Notice of Inquiry").

[10] Id.

[11] Id.

[12] NOPR, 186 FERC ¶ 61,203 at P 41.

[13] Id. P 13 (citation omitted).

[14] Id. P 24 ("providing reactive power within the standard power factor range is a 'no cost' or de minimis cost service").

[15] Id. (providing reactive power within the standard power factor range is "a resource's obligation under its interconnection agreement and good utility practice").

[16] Id. ("these costs can be recovered through energy or capacity sales and do not require separate compensation").

[17] Id. P 7 ("Within these regions [that have elected not to compensate generating facilities for the provision of reactive power within the standard power factor range], there is no evidence that this lack of compensation has led to an insufficient supply of reactive power or that generating facilities in these regions have been unable to recover any costs associated with the production of reactive power."); id. P 43.

[18] Id. P 27 ("Implementing the Commission-approved AEP Methodology has become increasingly administratively burdensome ... due to the resource- and time-intensity involved in determining individualized, cost-of-service reactive power rates for generation facilities through hearing and settlement judge procedures").

[19] See, e.g., Fern Solar LLC, 183 FERC ¶ 63,004 (2023); Panda Stonewall LLC, 174 FERC ¶ 61,266 (2021); Lawrenceburg Power LLC, 173 FERC ¶ 61,166 (2020).

[20] Notice of Inquiry, 177 FERC ¶ 61,118 at P 17.

[21] Monitoring Analytics LLC, 2023 State of the Market Report for PJM at 68 (March 14, 2024), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2023/2023-som-pjm-vol2.pdf.

[22] Staff Presentation: Notice of Inquiry (NOI) Regarding Reactive Power Capability Compensation, Docket No. RM22-2-000, Nov. 18, 2021, <https://www.ferc.gov/news-events/news/staff-presentation-notice-inquiry-noi-regarding-reactive-power-capability>.

[23] NOPR, 186 FERC ¶ 61,203 at P 56.

[24] Id. 49.

[25] Id. P 56.

[26] Id. P 54.