UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

FERC NOI ON REACTIVE POWER COMPENSATION	**)** **)** **)**	**Docket No. RM22-2-000**

COMMENTS OF THE NATIONAL HYDROPOWER ASSOCIATION IN RESPONSE TO FERC'S NOTICE OF INQUIRY ON REACTIVE POWER COMPENSATION

Pursuant to Rule 211 of the rules of practice and procedure of the Federal Energy Regulatory Commission ("FERC" or "Commission"), the National Hydropower Association ("NHA") submits these comments in response to FERC's Notice of Inquiry (NOI) on reactive power compensation and market design, dated November 18, 2021. NHA is a national non-profit trade association dedicated exclusively to advancing the interests of the U.S. hydropower industry, including conventional, pumped storage and new marine and hydrokinetic technologies. NHA represents more than 250 companies, from Fortune 500 corporations to family-owned small businesses. Our diverse membership includes public and investor-owned utilities, independent power producers, developers, equipment manufacturers and other service providers.

I. Comments

Reactive power is an essential element to maintaining bulk electric reliability. As the nation's power systems transition to more variable generation mixes, ensuring the grid has adequate reactive power capabilities will become more vital. Effective market designs and compensation mechanisms will be critical for grid operators to incent the reliable and cost-effective provision of this essential grid service. This is especially important in areas of the country where reactive power is procured by Regional Transmission Organizations (RTOs) or Independent System Operators

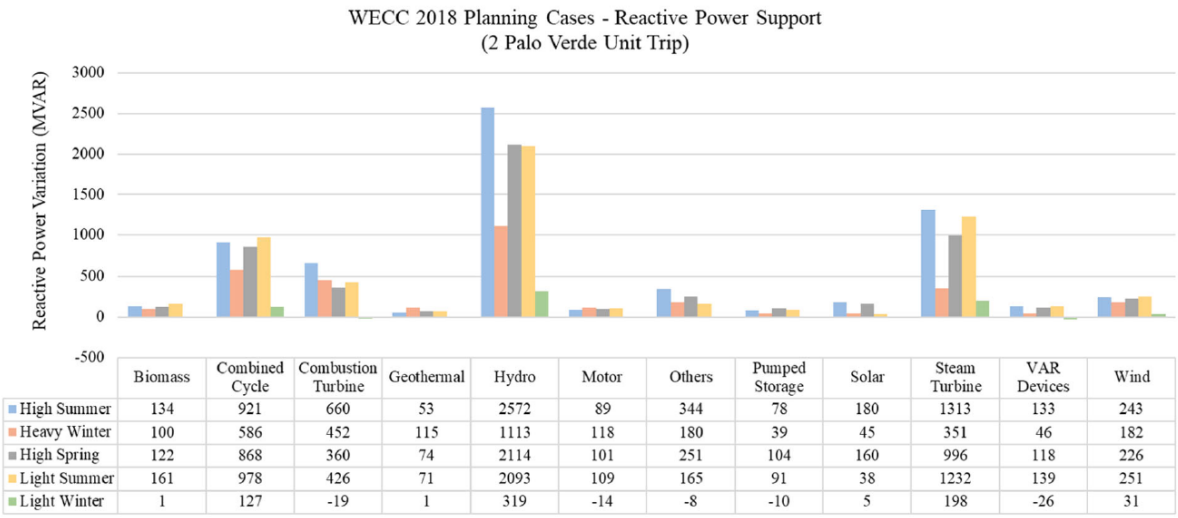
(ISOs). Although much of the NOI is focused on issues associated with the provision of reactive power from non-synchronous generators, NHA's comments hope to shed light on issues faced by hydropower resources who provide stable, reliable reactive power through synchronous generators.

a. Hydropower's provision of reactive power

All forms of hydropower (conventional, pumped storage and run-of-river) are capable of providing reactive power service. Hydropower resources typically operate below the +/-0.95 power factor allowing them to provide significant amounts of MVARs to maintain voltage. Indeed, a recent PNNL report found that hydropower's reactive power capabilities are critical to the western interconnect[1]. One illustrative example of hydropower's value is its contribution to reactive power after significant grid disruptions like the tripping of a large nuclear unit. Specifically, PNNL found that "reactive power supplied by hydropower, post-contingency, was observed to be consistently greater than other resources for all combinations of seasonal and system loading conditions"[2]. The figure below demonstrates hydropower's essential contribution to grid stability during a large generator trip in the western interconnect. Despite hydropower representing only 25% of capacity in the western interconnect, hydro resources can provide the bulk of reactive power support during large contingencies.

[1] PNNL, *Hydropower's Contribution to Grid Resilience*, October 2021 https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-30554.pdf

[2] Ibid at 3.16



	Biomass	Combined Cycle	Combustion Turbine	Geothermal	Hydro	Motor	Others	Pumped Storage	Solar	Steam Turbine	VAR Devices	Wind
High Summer	134	921	660	53	2572	89	344	78	180	1313	133	243
Heavy Winter	100	586	452	115	1113	118	180	39	45	351	46	182
High Spring	122	868	360	74	2114	101	251	104	160	996	118	226
Light Summer	161	978	426	71	2093	109	165	91	38	1232	139	251
Light Winter	1	127	-19	1	319	-14	-8	-10	5	198	-26	31

Figure 13. Additional reactive power supplied from various generation types following two Palo Verde Unit Trip contingency for 2018 WECC planning cases.

b. Reactive Power Compensation through Cost of Service

NHA members provide reliable reactive power service under several compensation mechanisms including cost of service. Hydropower owners and operators have some suggestions to potentially make PJM and MISO's cost of service method established under the AEP methodology a better process.

- **Time consuming and costly –** Most reactive power filings at the Commission are set for hearing and settlement procedures. While the vast majority of cases are settled, the settlement process can cost thousands of dollars and last six months or more to resolve. While this may be appropriate for some filers, the Commission's consistent practice of setting reactive power cases for hearing and settlement procedures has created a financial bar for smaller hydro owners who may not have the resources to fully litigate a rate filing. In addition, some smaller hydro generators are multi-purpose projects where the generation of power is the second or third highest objective of the facility. The Commission's practice of setting

reactive filings for hearing and settlement may have the effect of discouraging smaller projects from seeking adequate compensation for reactive power service which they are required to provide under their interconnection agreement. Even for projects with necessary resources, the "black box" hearing and settlement process can be time consuming and unpredictable. This could create uncertainty for owners of hydro facilities who must choose when and where to deploy capital.

- **Accounting –** Many of NHA's members are independent power producers (IPPs) and market based-sellers who are not subject to FERC Form No. 1 accounting standards. Indeed, most hydropower IPPs do not track their costs consistent with the Uniform System of Accounts. As such, it is difficult for NHA members applying for reactive power compensation in a cost-based setting to prove to Commission staff and other stakeholders their true cost of providing the service. Compounding this issue is the fact that many hydropower assets are long-life capital assets. The average age of a hydropower plant in the United States is 64 years[3]. When viewed solely from a book accounting perspective, these assets may appear to be fully depreciated. However, hydropower and pumped storage assets require constant re-investment to ensure their reliable operation over such a long-time horizon. These capital investments extend the useful life of the asset, including investments related to the provision of reactive power. NHA urges the Commission to allow for accounting standards that are flexible enough to allow for longer life assets to prove their reasonable and prudent costs.

[3] EIA, Hydroelectric generators are among the United States' oldest power plants, March 13, 2017 https://www.eia.gov/todayinenergy/detail.php?id=30312

- **Testing –** Any effective testing regime should fairly assess the full potential of a facility's technical capability of providing reactive power. NHA members have experienced challenges with the testing process in PJM. Reactive power capability test results and routine operations can understate a resource's full reactive support potential. This is because reactive capability tests are designed to verify if individual resources can satisfy their minimum operational reactive power requirements as specified through their interconnection service agreements – not their full design capability. Furthermore, reactive capability tests are usually conducted during periods in which system voltage conditions will not allow a resource to demonstrate its full design power factor rating. The real time operations of the grid rarely can accommodate such a testing request and therefore the true potential of a facility may not be accurately judged due to no fault of the owner.
- **Existing reactive power rates under cost of service** – Several NHA members have recently filed and settled reactive rates and are receiving compensation under Schedule 2 of PJM's tariff. NHA members strongly believe that any reform to reactive power compensation in PJM should hold these existing rates harmless for the life of the asset and only apply changes prospectively. NHA's members with reactive rates spent considerable time, resources, and effort, overcoming the administrative barriers mentioned above, to receive a just and reasonable rate from the Commission. As such these reactive power suppliers should be grandfathered from subsequent changes to the compensation mechanisms. Concerns with administrative burden of reactive rates are not sufficient to undo just and reasonable rates as determined by the Commission.

- **IMM's claim of overcompensation –** NHA members oppose the PJM Independent Market Monitor's (IMM) contention that reactive power in PJM is double recovered by virtue of its inclusion in the E&AS offset for the reference unit in the capacity market. The PJM IMM argues that the energy and ancillary service offset for the reference unit is designed to compensate all resources who receive capacity payments for reactive power. The IMM further argues that any payment above the $2,199/MW-year threshold is double recovered. First, the capacity market is not the ideal mechanism to compensate for reactive power. The reliability pricing model is a complex administrative construct designed to ensure PJM has enough "capacity" to meet peak demand. There are a multitude of factors that influence capacity market results. Evolving market rules, entry and exit of resources, demand forecasting, transmission constraints and many other factors influence capacity market revenues for generators. It is not an appropriate mechanism to ensure the just and reasonable compensation of *other* grid services completely unrelated to capacity. Second, reactive power demand is very specific to location. While PJM's capacity market has location-based prices, these prices are not granular enough to compensate for a specific generator's provision of reactive power. Third, even if the PJM capacity market were to clear at or above Net CONE, the resulting revenue for hydropower may still be insufficient as hydropower resources typically provide more reactive power than the hypothetical reference unit. Finally, energy-only resources (those resources that provide energy and or ancillary services but have not cleared the capacity market) can provide reactive power and thus would not receive compensation through the IMM's construct. Reactive power is an essential

grid service that should be compensated based on reasonable costs and performance. Tying compensation to the capacity market will ensure that reactive power revenue will not be based an individual generator's cost or performance.

c. Reactive Power through Stated Rates

Some NHA members are compensated through stated rates in wholesale markets such as ISO-NE and NYISO. Stated rates could provide a more stable and predictable revenue source and avoid cases where the cost of litigation exceeds the approved rates (for several years in the case of a smaller resource). In addition, the administrative burden associated with RTO-wide stated rates is much less than compared to cost-of-service ratemaking. Despite this, there is a significant compensation differential under PJM's model versus ISO-NE or NYISO. While the process and certainty of stated rates are preferred, an RTO-wide rate may not provide the most adequate mechanism for compensation for individual plants who may have much different reactive power capabilities and capital costs. We urge the commission to consider technology-specific stated rates that can distinguish between resource capabilities at the lowest possible cost to the system. Those resources who have greater reactive power capabilities should not be compensated the same as resources with reduced design capabilities.

II. NHA Recommendations

While there are concerns with the current process in PJM and MISO, NHA recommends that the cost of service process be improved rather than eliminated altogether. In addition, NHA recommends that the Commission consider a stated rate option for generators that do not wish to pursue a cost-based reactive rate. Retaining the cost of service option could help discipline the derivation of stated rates. NHA members are actively engaged in trying to find consensus for reforming reactive power compensation through the stakeholder process in PJM. We recommend

the Commission allow for the PJM stakeholder process to play out before further action is taken. In addition, NHA urges the Commission not to undertake a time-intensive rulemaking process. The NOI pointed to specific areas of concern in specific regions of the country. We hope FERC focuses on those areas in need of reform rather than instituting a one size fits all approach or a broad rulemaking that will needlessly tie up stakeholder time and resources.

In addition, NHA members strongly believe that reactive power suppliers who have successfully navigated the PJM process should be allowed to keep those rates in effect should the Commission eliminate cost of service compensation. These asset owners proactively invested significant money, time and resources to provide the Commission with enough information to establish a just and reasonable rate. Any changes to reactive power compensation should grandfather those companies who have approved rates on file for the life of the asset.

Finally, NHA members strongly oppose the IMM's contention that reactive power should be compensated through PJM's capacity market. The RPM is not well-equipped to account for the various differences between reactive power cost and performance among various technologies.

III. Communications

All correspondence, communications, pleadings and other documents related to this proceeding should be addressed to the following individuals:

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