

December 16, 2021

Holly R. Anderson, Clerk
Vermont Public Utility Commission
112 State Street
Montpelier, VT 05620

Re: 21-3883-RULE Proposed Creation of PUC Rule Concerning Energy Storage

Dear Ms. Anderson:

The Public Utility Commission (Commission) issued an order on September 17, 2021 seeking input regarding the creation of a rule concerning energy storage facilities. Vermont Electric Cooperative (VEC) appreciates the opportunity to discuss the appropriate level of regulatory oversight when permitting storage facilities. Storage resources are, and will continue to be, an integral part of the electric system as the State of Vermont and the region promotes electrification and our grid moves towards a renewable, more distributed, and intermittent model of electricity generation. Investigating the permitting scheme while the industry is still nascent will help ensure storage can be developed at an appropriate rate. VEC looks forward to a robust discussion of not only the questions posed by the Commission, but also more general policy considerations surrounding storage resources.

To help set the stage for this conversation, it is important to understand the value streams available to storage projects and the reasons behind storage project development, as they presently exist. Currently, storage projects have been primarily focused on peak shaving as this has been the highest value stream available to storage projects. It is important to note that a merchant battery project may be able to participate in the Forward Capacity Market in order to gain some of the peak shaving value, but that Vermont's distribution utilities (DUs) are the only market participants that can take advantage of potential Regional Network Services savings.



Other value streams that are currently available to a merchant battery project include energy arbitrage and frequency regulation; however, VEC does not believe that these value streams by themselves would make a project economically viable today. It is possible (more likely than not) that future rule changes from Independent System Operator-New England (ISO NE) may make additional value streams available to merchant generators. This could cause additional interest and development in the storage industry. Additionally, the very nature of the energy transformation currently underway will likely increase some value streams. For example, energy arbitrage could become more valuable if the proliferation of intermittent generation resources on the system causes more volatility in Locational Marginal Pricings (LMPs).

As the storage market, ISO NE rules, and our grid evolve, so too should our permitting processes. To that end, VEC recommends that the Commission consider including a periodic review of the storage rules, akin to the biennial review of Rule 5.100. Below are some of the use cases and values that may not be ripe for cost-effective implementation presently, but that may warrant attention in future proceedings:

- Using batteries for reliability purposes.
- Enabling or promoting use cases that reduce the carbon footprint of the electric grid.
- Transmission and distribution upgrade deferrals.
- Vehicle to grid capabilities combining multiple and mobile uses
- Location and timing of output

Additionally, VEC has offered responses below to the questions posed by the Commission.

Sincerely,

Dan Potter

Dan Potter



C. Questions for initial comments

To facilitate a productive process, the Commission requests that participants include responses to the following questions in their comments filed on October 22, 2021.

Stakeholders are encouraged to submit substantive comments on these and any other issues pertinent to energy storage as well as comments on the process proposed in this order.

Topic 1. Simplified siting

- a. **Threshold.** The amended provision of § 248(u) states that “the Commission shall establish a simplified application process for energy storage facilities subject to this section with a capacity of up to 1 MW, unless it establishes a larger threshold by rule.” Should the Commission establish a threshold larger than 1 MW for projects to be eligible for simplified siting? If not, why not? If so, what should that threshold be and why?

VEC does not believe that the Commission should establish a threshold larger than 1 MW for a simplified application process. Storage projects act as both generators and load and can cause impacts to the system such as voltage rise and/or capacity upgrades. Given these considerations, any projects above 1 MW should be subject to the full Section 248 permitting process; however, for projects above 150 kW and up to 1 MW nameplate capacity, a simplified application process may make sense.

VEC believes that there should be a registration and notification process for residential and small commercial scale storage projects, for projects up to 150 kW in nameplate capacity. This process could be similar to the registration process that currently exists for residential scale net metering projects where a form is filed with the Commission and a permit deemed issued within 10-days if there are no objections. Without a process, the utility has no way of knowing what storage exists on the system. The host DU could use the registration list to conduct outreach to storage owners with the goal of enrolling them in flexible load management programs or rates. Also, depending on how the battery is wired, it can affect billing and metering processes.

Finally, VEC would like to raise for the Commission’s consideration that while a threshold based on the kW rating of a battery makes sense from a grid impact perspective, the kWh rating

of a battery will determine its footprint and may make better sense as a threshold for permitting from a land use perspective.

- b. **Conditional waivers.** Which, if any, Section 248 criteria and requirements for a CPG should be conditionally waived?

All projects above 1MW should be subject to the full Section 248 permitting process; however, for projects above 150 kW and up to 1 MW nameplate capacity, some criteria could be waived. Some smaller scale storage projects could be located entirely within an existing structure or disturbed footprint on a building site. These type of projects could have b(1), portions of b(5), and b(8) conditionally waived. However, for projects above 150 kW and up to 1 MW nameplate capacity that are sited on a greenfield these criteria should not be conditionally waived.

Finally, it may make sense to impose different application requirements or permit conditions based on ownership of the battery. One concrete example of the difference is related to decommissioning requirements on merchant facilities. As the Commission has done with merchant solar facilities, the Commission should ensure adequate plans, processes, and financial resources will be in place to ensure decommissioning at the end of a project's life.

- c. **Codes and standards.** Are there any codes and standards relevant to energy storage that the Commission should incorporate by reference into the rule? If so, which ones and why?

The National Electrical Safety Code (NESC) and National Electric Code (NEC) or NFPA 70 should be included. Both of these standards are used for all electric facilities on VEC's system both member and VEC owned. The latest version of the NESC has specific guidelines related to storage. In addition, all inverters should meet the latest version of IEEE 1547 and any regional requirements such as the ISO NE SRD (Source Requirement Document). Any ISO NE or Federal Energy Regulatory Commission (FERC) notification requirements should also be referenced.

- d. **Application materials.** What application materials should stand-alone storage facilities be required to file to be considered administratively complete?

The same materials as 5.500 generator applications should be included.

- e. **Retrofitting.** Would the list of applicable § 248 criteria or the list of materials to be filed be different for storage facilities that are being added to existing facilities (e.g., an existing solar facility with a CPG adding storage)? How should the Commission consider cumulative impacts of adding storage to existing facilities?

Information on the existing facilities that storage is being added to should be included in the list of materials. When storage systems are added to a generating resource, it is very likely that it will change the generation curve for that resource. The development of the Sheffield Highgate Export Interface (SHEI) has demonstrated that both time and location of generation matter and can have significant, unintended, economic impacts to other utility customers. When permitting these type of systems, the following 248 criteria should not be conditionally waived: (b)2 Need, (b)3 System Stability and Reliability, (b)4 Economic Benefit, (b)6 Consistency with IRP, and (b)7 Consistency with CEP.

- f. **Comment deadline.** Noting that Act 54 requires the Commission to issue a CPG within 46 days if no major issues are raised, what is an appropriate deadline for stakeholder comments on CPG applications for energy storage facilities (e.g., 15 or 30 days after the application is filed)?

As VEC has articulated above, for residential and small commercial scale projects a registration type process with a 10-day comment period would be sufficient. However, for systems that are above 150kW a 30-calendar day notice period should be maintained, which is consistent with Rule 5.500.

- g. **Notice.** Should the Commission modify the notice requirements of Title 30 for energy storage projects in the simplified process?

VEC believes that the Commission should consider simpler notice requirements than those in place for traditional 248 projects, considering the limited land use and aesthetic impacts of battery projects. VEC does not have a specific proposal at this time and looks forward to engaging in further discussion with the Commission and the parties.

- h. **Interconnection.** What is the optimal process to manage interconnection for facilities in the simplified siting review? Should the Commission require that applicants file a copy of an executed interconnection agreement with the application? Are there size thresholds that should trigger a requirement for an interconnection agreement? If so, what are the appropriate size thresholds?

Storage resources should follow the same processes for interconnection as are used in Rules 5.100 and 5.500. Additionally, interconnection agreements should be required for projects that are above 150kW.

- i. **Other issues.** What other issues should the Commission consider in establishing a simplified siting process for storage systems?

Battery storage systems have varying chemical makeups with the potential for environmental impacts. These should be considered during a simplified siting process for systems above 150kW.

Topic 2. Aggregations and interplay between owners, operators, and utilities

- a. **Visibility to utilities.** Are there specific requirements related to two-way communications with distribution utilities that the Commission should impose on aggregators as a condition of receiving a § 231 CPG?

Storage should be treated by each DU the same way generation is treated (for example, monitoring for projects above 150 kW and monitoring and control for projects 500kW and

above). Also, considerations should be made for smaller units that may/will participate in an aggregate DER program. Visibility into the status of the aggregated resource needs to be provided to VEC.

- b. **Override.** Are there circumstances under which local distribution utilities may need to override operator control to charge or discharge aggregated systems to maintain system stability and reliability? If so, is that currently technically feasible?

There may be maintenance needs on VEC's facilities that require the battery to be off-line. In addition, there are times when utilities are audited/tested to demonstrate compliance with regional reliability requirements, such as voltage reduction and load shedding. Currently VEC has the ability to take a facility offline only by opening the interconnection switch or breaker (if equipped with control, typically at 500 kW or above). During these tests/audits storage facilities could interfere with the utility's ability to demonstrate compliance.

- c. **Notice of changes to an aggregation.** Aggregations are likely to change over time. For example, small resources may leave or join aggregations rather frequently. What requirements for notice should be included in § 231 CPGs when changes occur to aggregations?

It is important for VEC to understand not only the size of an aggregator's virtual battery, but also how to they plan to use the resource. Aggregators should be required to file with their 231 application the use cases they intend to pursue with their aggregations. The DUs should be notified of any 231 application that affects their service territory. Additionally, DUs should be notified if the use case for the resource changes and to changes in capacity enrolled in the program. In order to limit the administrative burden, such enrolled capacity filings could be made quarterly or semi-annually.

- d. **Dispute resolution.** Should the Commission create a special or unique dispute resolution process for parties involved in energy storage? If so, what is an appropriate process for dispute resolution when disputes arise between storage facility owners, operators, and the

interconnecting providers? Are disputes likely on matters other than system stability and reliability? Are there limits on the Commission's jurisdiction to resolve disputes among these entities?

Given that we are in the early phase of implementing battery storage, it is difficult at this time to anticipate the types of disputes that may arise. Developing a dispute resolution process in a vacuum may not be the most efficient use of time at this point and may be more appropriate for a later iteration of the rule.

- e. **Other issues.** What issues outside system stability and reliability should the Commission consider when issuing a CPG for energy storage aggregators?

VEC recommends that before a 30 V.S.A. §231 CPG is issued to an energy storage aggregator, the Commission should consider and mitigate any potential cross subsidization between participants and non-participants. For example, a storage resource should not be allowed to participate in both a third-party and DU sponsored aggregation program.

Topic 3. Role of energy storage.

- a. **System optimization.** How can the Commission encourage or require energy storage systems paired with existing resources to allow for system optimization, including: injecting power during times tied to regional power supply expense drivers, alleviating local grid congestion, and shifting renewable production to cover peak times? What tools, inverter settings, and control protocols are needed to ensure that storage paired with systems in State programs is benefitting the grid as much as possible?

Notification and near real-time utility visibility are necessary to ensuring that grid reliability is maintained while additional services/system optimization are added.

- b. **Carbon impact.** Storage systems programmed to optimize deployment for revenue only can have a significant carbon impact because they can charge on carbon-intensive, overnight energy. If storage systems are paired with resources in State renewable

programs, should the Commission impose charge and discharge requirements related to carbon intensity? If so, how might this be done?

With respect to resources in State renewable programs in which the output of the battery would be paid a rate that assumes the energy is renewable, it is imperative that charge requirements be imposed such that the energy discharged can be shown to be renewable. Similar requirements already exist for renewable tax credits associated with batteries. To the extent that the rate received for the discharged energy assumes system benefits, such as peak reduction, both charge and discharge requirements may be necessary to ensure that the benefits are realized to the extent possible, and the charging of the battery does not increase the host distribution utility's load at a time that increases utility costs. All scenarios and how to address this deserve further discussion.

- c. **Equity and access.** Historically disadvantaged and low-income communities have comparatively little access to clean energy technologies, including storage. How can the benefits of energy storage be shared in an equitable fashion? How can the Commission improve equity and access for energy storage?

When storage projects are designed such that the economic benefits flow through to the distribution utility, all ratepayers benefit equally. However, DUs will not be the only developers and owners of battery projects. The Commission should pay particular attention to ensuring that cross subsidization between storage participants and non-storage participants is mitigated. This becomes especially important when storage resources are sited with generating resources already benefiting from subsidization, such as net metering.