

STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 21-3883-RULE

Proposed creation of Vermont Public Utility Commission Rule Concerning Energy Storage	
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VERMONT DEPARTMENT OF PUBLIC SERVICE INITIAL COMMENTS

On September 17, 2021, the Vermont Public Utility Commission (“Commission”) issued an Order Opening Rulemaking to develop rules governing the installation and operation of energy storage facilities in Vermont. The Commission sought initial comments from stakeholders on several questions grouped under three central topics: (1) the creation of a simplified application process for storage facilities under 1 MW (or higher threshold) seeking a CPG, (2) Aggregations and the interplay between owners, operators, and utilities, and (3) the integration of storage with existing resources. The Vermont Department of Public Service (“Department”) offers the following comments in response to the questions posed in the Commission’s Order.

I. Simplified siting

Question 1.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?

In the Department’s view, the ideal threshold for a simplified siting process would be one that is tied to the potential impacts of storage projects under the 30 V.S.A. § 248 criteria. This presents a challenge: while the impacts of storage can be related to size, they may also relate to technology type or use case, or to duration rather than to capacity. For example, a 1 MW, 4-hour lithium-ion standalone storage project deployed by a utility or other entity to reduce peaks for Vermont ratepayers may have comparable impacts under the § 248 criteria to a 2 MW, 2-hour lithium-ion standalone storage project that is similarly sited and performs similar functions. Yet those projects may have very different impacts from a 1 MW, 4-hour compressed air storage project; a 5 MW, 4-hour lithium-ion project; a storage project co-located with a solar or wind project; or a project that primarily benefits a single customer.

Section 248(u) establishes 1 MW as the upper limit for a simplified application process, unless a larger threshold is set by rule. It seems that the statute does not contemplate parameters other than size (capacity) in considering a different threshold. However, Act 54 also created 30 V.S.A. § 8011, which provides similar authority to § 8010 governing net-metering. As in the net-metering context, § 8011 enables the Commission to (1) “waive the requirements of section 248 . . . that are not applicable to energy storage facilities”; (2) “modify notice and hearing requirements of this title as the Commission considers appropriate”; and (3) “seek to simplify the application and review process.”¹ The most precise way to refine the siting process and substantive review for different storage projects may be to follow the model of the net-metering program in some respects, that is, to take advantage of these statutory provisions and craft application processes tailored to specific sizes, types, and/or use cases to ensure adequate, but not overly burdensome, review.

This could be accomplished within the structure of a rule akin to Commission Rule 5.100, which governs the application process and requirements for various categories of net-metering projects. Energy storage projects located within existing structures, for instance, or used solely for on-site backup power with no ability to export to the grid (either on demand or inadvertently), are examples of use cases that are potentially suited to an expedited application process even if the system in question is larger than 1 MW. Because size is not always the predominant factor in assessing the impacts of a project, the Department suggests that expedience can be achieved through means other than simply raising the size threshold for access to a simplified application process for projects larger than 1 MW.

In recent years, storage projects from 1 MW to 5 MW in size (2- to 4-hour durations) have made use of the process established for facilities “of limited size and scope” pursuant to 30 V.S.A. § 248(j). Under § 248(j), there is inherent flexibility in both the process and the scope of review based on the potential impacts of the proposed project: review can be expeditious where appropriate, but the scope can be expanded if a party raises, and the Commission finds, a significant issue under the § 248 criteria.² The Department suggests that review under § 248(j), or a process adapted from it, could provide for adequate and efficient evaluation of storage projects in two broad categories. The first category encompasses all projects greater than 1 MW and up to

¹ Compare 30 V.S.A. § 8010 with 30 V.S.A. § 8011.

² See 30 V.S.A. §§ 248(j)(1), (2).

5 MW, where impacts can vary considerably in degree and type depending on project characteristics and proposed uses. The second category includes smaller projects, between 100 kW and 1 MW, and specifically those which are not located within existing structures. Though many of the potential impacts associated with these projects are likely to be lesser in degree than those of larger systems, a broad range of issues could still arise under the § 248 criteria. Review under § 248(j) or a similar process would expedite proceedings, while maintaining enhanced flexibility to address any concerns.

There are two avenues to consider as a means of incorporating the above into a storage-specific rule. The first option is, quite simply, a rule that directs projects in the relevant categories to apply for a certificate of public good (“CPG”) pursuant to 30 V.S.A. § 248(j). The second option is an adaptation of the 248(j) process incorporated into the rule itself, with the opportunity to make additions or adjustments as necessary. The first option would maintain a case-specific assessment of a project’s qualifications as one of “limited size and scope,” while the second could provide for new storage-specific definitions.

The projects yet to be addressed are those between 100 kW and 1 MW that are located within existing buildings or structures.³ It is the Department’s view that, in addition to their relatively small size, these projects have less potential to create significant impacts under most criteria. A storage rule specific to this category could further simplify the application and review processes, and to that end the Department suggests a process similar to the registration system used for rooftop solar projects in the net-metering program. Certain adjustments would be in order: in particular, the Department recommends modifications to address interconnection that ensure adequate collection of project information and time for review of potential issues by the interconnecting utility. Ideally, those modifications should track with any changes made in Commission Rules 5.100 and 5.500 to address these same considerations for large rooftop solar projects, as recently discussed in 19-0855-RULE proceedings.

When compared with full review under § 248, the proposal outlined above contemplates two simplified processes which together would cover three categories of projects ranging in size from 100 kW to 5 MW. Depending on the implementation, this approach could entail establishing a threshold larger than 1 MW for eligible projects – namely a 5 MW threshold – or maintaining

³ Although projects under 100 kW are not a focus of the Commission’s request for comments, the Department would anticipate a rule addressing those projects in some way – particularly in relation to system stability and reliability.

the existing 1 MW cap. In either case, the Department is interested in exploring processes that are expedient where possible and exacting when necessary. The Department would like to better understand other stakeholders' perspectives on the 1 MW size threshold, especially through the lens of the various § 248 criteria and potentially impacted stakeholders in the siting process, and recommends this be a focus of the first workshop in January.

Question 1.b. Conditional waivers: Which, if any, Section 248 criteria and requirements for a CPG should be conditionally waived?

As outlined under Question 1.a., the Department has in mind three different categories of storage projects relevant to the Commission's request for comments. The Department recommends that conditionally waived criteria and requirements for those categories be aligned to the extent possible with the conditionally waived criteria for comparable categories of solar projects, with modifications where appropriate. The three storage categories are addressed below.⁴

1. Storage projects between 100 kW and 1 MW, located within an existing structure

This category of projects is likely to present fewer potential impacts than other categories, particularly with respect to criteria regarding orderly development, aesthetics, historic sites, land use, and natural resources. In this way the category is analogous to net-metered rooftop solar projects. Thus, in this case the Department suggests that it is appropriate to consider conditional waiver of the § 248 criteria that are waived for net-metered rooftop solar projects up to 500 kW pursuant to Commission Rule 5.111. This would entail waiving all criteria except § 248(b)(3) (System Stability and Reliability). With respect to interconnection, the Department notes that requirements for this category should include or, ideally, carry over any modifications the Commission adopts in other current rulemakings to harmonize Rule 5.100 with Rule 5.500 and enable adequate information collection and evaluation of impacts. For storage, this should include consideration of the *load* impacts from charging behavior.

⁴ The Appendix to these comments consists of a table (Table 1) comparing the applicable § 248 criteria for certain solar projects with the Department's preliminary suggested criteria for storage projects.

2. Storage projects between 100 kW and 1 MW **not** located within an existing structure

As is the case with renewable energy plants, storage projects in this category could raise a broad range of issues under the § 248 criteria – albeit to a lesser degree than larger projects. Therefore, the Department recommends considering conditional waiver of the § 248 criteria that are waived for 150 kW to 2.2 MW “small renewable energy plants” pursuant to 30 V.S.A. § 8007(b) and the Commission’s *Order Re: Simplified Procedures for Renewable Energy Plants with a Capacity Between 150 kW and 2.2 MW* (“Section 8007(b) Order”).⁵ If that path were to be followed, it would entail conditionally waiving § 248(b)(7) (Compliance with Electric Energy Plan). While that is one point for discussion, the Section 8007(b) Order also contemplates conditional waivers of other criteria along with waivers for certain subsets of projects, which could be adapted as follows:

- § 248(b)(2) (Need), except for projects that are part of a wholesale aggregation;
- § 248(b)(4) (Economic Benefit), except for projects that are part of a wholesale aggregation;⁶
- § 248(b)(5) (as to the Natural Environment), waived only with respect to Water Conservation, Sufficiency of Water and Burden on Existing Water Supply, and Educational Services;
- § 248(b)(6) (Consistency with Least-Cost Integrated Resource Plan), except for utility-led projects.

In terms of applicable criteria, this approach represents a more stringent review when compared to storage projects of this size located within an existing building or structure. However, the Department’s proposal still contemplates expedited review through either the § 248(j) process or a rule adapted from the same. The Department maintains it is appropriate to require storage projects that are part of wholesale aggregations – and which therefore may bypass other avenues for review of aggregate grid and ratepayer impacts (such as utility tariffs or rate investigations) – to be subject to review under §§ 248(b)(2) (Need), (b)(4) (Economic Benefit), and (b)(10) (Existing or Planned Transmission).

⁵ See *Order re Simplified Procedures for Renewable Energy Plants with a Capacity Between 150 kW and 2.2 [MW]*, 8/31/10 at 8, http://puc.vermont.gov/sites/psbnew/files/doc_library/simplified-procedures-for-renewable-energy-plants.pdf

⁶ It may also be appropriate to waive § 248(b)(4) for projects that are part of a utility-operated retail program, where impacts to ratepayers and the grid are evaluated as part of the program design. A conditional waiver of § 248(b)(10) (Existing or Planned Transmission) may be appropriate for the same reason.

3. Storage projects greater than 1 MW

In the Department's view, storage projects greater than 1 MW should be subject to the § 248 criteria applicable to solar projects greater than 2.2 MW: in other words, all criteria should apply. Alternatively, the minimum threshold for a full suite of criteria could be set commensurate with solar, at 2.2 MW. The Department does not recommend this approach, because the 2.2 MW threshold was originally conceived in relation to the maximum eligible size of a Standard Offer project. The size, as the Department understands it, was tied to a specific wind turbine model under development by a Vermont company. With the Standard Offer program sunset, the Department suggests realignment of § 248 criteria and process thresholds to better match potential impacts. As stated under Question 1.a however, the Department looks forward to hearing other stakeholders' perspectives on the 1 MW size threshold as it relates to various § 248 criteria.

Question 1.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 Department recommends the Commission consider incorporating at least the following codes and standards for energy storage in the rule:

National Fire Protection Association: NFPA 855

NFPA 855 is the National Fire Protection Association's Standard for the Installation of Stationary Energy Storage Systems ("ESS").⁷ According to the NFPA: "The residential chapter of NFPA 855 addresses the installation of residential ESS units between 1 kWh and 20 kWh. After individual units exceed 20 kWh it will be treated the same as a commercial installation and must comply with the requirements of the rest of the standard. There are also limitations on how much total energy can be stored in certain areas of a household. If you go beyond those thresholds, then you need to comply with the requirements for commercial installations."⁸ Other aspects of the standard address location, fire detection, and electric vehicle use.

As noted in the Department's 2019 storage regulation recommendations ("Storage Report"), installations in buildings under the jurisdiction of the Vermont Department of Public Safety (public buildings) are required to adhere to their fire safety codes, including those from the

⁷ NFPA 855, *Codes & Standards*, NAT'L FIRE PROTECTION ASS'N. <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855>.

⁸ Brian O'Connor, *Residential Energy Storage System Regulations*, NAT'L FIRE PROTECTION ASS'N (Oct. 1, 2021), <https://www.nfpa.org/News-and-Research/Publications-and-media/Blogs-Landing-Page/NFPA-Today/Blog-Posts/2021/10/01/Residential-Energy-Storage-System-Regulations>.

NFPA.⁹ The Storage Report discussed the potential for extending this requirement to detached, single-family, owner-occupied buildings where many storage systems are currently being installed. Therefore, incorporating NFPA 855 in the Commission's interconnection and/or storage rules would effectively make NFPA 855 applicable in all building-sited storage and should serve to reinforce – and not contradict – the requirements from the Department of Public Safety.

UL 9540

This standard, titled Energy Storage Systems and Equipment, evaluates the compatibility and safety of the various components integrated into an energy storage system. The Commission may also wish to consider whether to incorporate UL 9540A,¹⁰ the test methodology that evaluates the fire characteristics of a battery energy storage system that undergoes thermal runaway, and other relevant standards applicable to subcomponents including UL 1973, UL 1642, and UL 1741 or UL 62109.

DNV: Recommended Practice 43

This recommended practice was developed by a consortium of industry stakeholders for safety, operation, and performance of grid-connected energy storage systems.¹¹

International Electrotechnical Commission: IEC 62933

This is a suite of standards for electrical energy storage systems prepared by the International Electrotechnical Commission.

Other

Because battery storage systems require an inverter to interconnect with the electric grid, the codes and standards listed in PUC Rule 5.510 that are applicable to inverter-based systems should also be incorporated into the rule. The Department suggests that further stakeholder work in this arena may be warranted, including outreach to other states implementing energy storage codes and standards. In addition, it would be prudent to further examine the best practices proffered by other jurisdictions and research entities.¹²

⁹ VT. DEP'T OF PUB. SERV., ENERGY STORAGE REPORT PURSUANT TO ACT 31 OF 2019, at 7 (2020), https://publicservice.vermont.gov/sites/dps/files/documents/Act%2031%20Legislative%20Recommendations_Final_0.pdf.

¹⁰ See UL 9540A Test Method, UL, <https://www.ul.com/services/ul-9540a-test-method>.

¹¹ See DNVGL-RP-0043: SAFETY, OPERATION, AND PERFORMANCE OF GRID-CONNECTED ENERGY STORAGE SYSTEMS, DNV, <https://rules.dnv.com/docs/pdf/DNV/RP/2015-12/DNVGL-RP-0043.pdf>.

¹² See, e.g., ENERGY STORAGE ASS'N, OPERATIONAL RISK MANAGEMENT IN THE U.S. STORAGE INDUSTRY: LITHIUM-ION FIRE AND THERMAL EVENT SAFETY (Sept. 2019), <https://energystorage.org/wp/wp-content/uploads/2019/09/Operational-Risk-Assessment-white-paper-final.pdf>; NYSERDA, BATTERY ENERGY

Question 1.d. Application materials: What application materials should stand-alone storage facilities be required to file to be considered administratively complete?

The Department's response to Question 1.a. outlines an approach to simplified siting for storage projects ranging from 100 kW to 5 MW in size, where two processes are employed to structure review. For projects between 100 kW and 1 MW located within existing structures, the Department has suggested a registration process. For projects between 100 kW and 1 MW that are not located within existing structures, and for all projects between 1 MW and 5 MW, the Department has suggested the § 248(j) process or a rule adapted from the same. With respect to application materials, the Department recommends aligning the application requirements with those two processes, noting that some additional considerations may be necessary to fully account for the potential impacts of storage.

1. Registration: Projects between 100 kW and 1 MW located within existing structures

For this category, the Department envisions a registration process akin to the process used for roof-mounted solar net-metering systems under Commission Rule 5.105. As in the net-metering context, this would require applicants to file a prescribed registration form containing identifying information and the relevant characteristics of the project.¹³ As previously discussed, it will be important to align any interconnection requirements with the solution adopted in Rules 5.100 and 5.500 to ensure adequate interconnection information is collected, made available to the interconnecting utility, and thoroughly reviewed.

2. Section 248(j) or similar: Projects between 100 kW and 1 MW **not** located within existing structures; All Projects greater than 1 MW and up to 5 MW¹⁴

For these categories, the Department recommends incorporating the application materials required for Projects of Limited Size and Scope pursuant to Commission Rule 5.402(F) and 30 V.S.A. § 248(j). Under those provisions, Petitioners must file a proposed certificate of public

STORAGE SYSTEM MODEL LAW, <https://www.nyserda.ny.gov/-/media/Files/Programs/clean-energy-siting/model-law.pdf>; Matthew Paiss, *Energy Storage Safety Codes & Standards* (PAC. NW. NAT'L LAB. 2020), <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=9cf958a4-f1e9-4e29-9847-1371f6a417df>; Josh Lamb & Matthew Paiss, *Safety Codes and Standards Update* (Winter 2019/2020), <https://www.osti.gov/servlets/purl/1595920>. See also OWEN ZINAMAN ET AL., AN OVERVIEW OF BEHIND-THE-METER SOLAR-PLUS-STORAGE REGULATORY DESIGN 62–64 (NAT'L RENEWABLE ENERGY LAB. 2020), <https://www.nrel.gov/docs/fy20osti/75283.pdf>.

¹³ The Commission's net-metering registration form can be found at

https://puc.vermont.gov/sites/psbnew/files/doc_library/NMRegistrationFormFINAL12-20-19_1.pdf

¹⁴ The Department suggests that storage projects greater than 5 MW go through the same application procedures as generation projects greater than 5 MW.

good and proposed findings of fact, along with the names and addresses of all adjoining landowners.¹⁵ Petitioners should also provide sufficient information for the Commission to evaluate the proposed project under the applicable criteria, including the following materials as appropriate:¹⁶

- Studies and permits which the Petitioner intends to rely upon in lieu of evidence to demonstrate compliance with the § 248(b) criteria;
- A U.S. Geological Survey topographic map showing the location of the proposed project;
- An aerial photograph of the proposed project site, or equivalent computer-generated image, that clearly marks existing structures and significant natural and man-made features;
- A site plan that includes: (i) proposed improvements; (ii) existing topography at the site and proposed changes in grading; (iii) existing significant natural and man-made features (including but not limited to water bodies, wetlands, tree lines, buildings, and roads); (iv) a cross-section of the site; (v) color photographs of the project site; and (vi) proposed measures to mitigate impacts of the proposed project.
- Prefiled evidence (testimony and exhibits) that explains how the proposed project complies with each of the applicable criteria of 30 V.S.A. § 248(b); including the criteria specified in 10 V.S.A. § 1424a(d) and 10 V.S.A. § 6086(a)(1) through (8) and (9)(K), incorporated through Section 248(b)(5).

Finally, the Department notes that additional application requirements for certain storage projects greater than 1 MW will come into effect on December 31 of 2022, pursuant to 30 V.S.A. § 248(4)(J). The following information will be required “unless the facility is located on a new or existing structure the purpose of which is not the generation of electricity”:¹⁷

- (i) the full limits of physical disturbance due to the construction and operation of the facility and related infrastructure, including areas disturbed due to the creation or modification of access roads and utility lines and the clearing or management of vegetation;
- (ii) the presence and total acreage of primary agricultural soils as defined in 10 V.S.A. § 6001 on each tract to be physically disturbed in connection with the construction and operation of the facility, the amount of those soils to be disturbed, and any other proposed impacts to those soils;
- (iii) all visible infrastructure associated with the facility; and

¹⁵ See 30 V.S.A. § 248(j)(2); Commission Rule 5.402(F)(3).

¹⁶ See Commission Rules 5.402(F)(1)–(2), 5.402(C)(1)(a)–(d).

¹⁷ The Department notes that the language concerning facilities “on a new or existing structure” predates the addition of storage to the statute. Because storage systems are much more likely to be located *within* a structure than *on* a structure, the relevance or implications of this language may be an area for further discussion.

(iv) all impacts of the facility's construction and operation under subdivision (b)(5) of this section, including impacts due to the creation or modification of access roads and utility lines and the clearing or management of vegetation.

3. Additional Considerations

For all storage projects, the Department is interested in further discussion and evaluation of appropriate application materials relating to interconnection, decommissioning, and public safety. As a starting point for interconnection, application requirements should carry over any updates the Commission adopts to harmonize Rule 5.100 with Rule 5.500 and enable adequate information collection and review of interconnection impacts. With respect to decommissioning and safety, storage systems present certain hazardous waste and fire risk concerns which could be addressed proactively through required application materials, new or adjusted planning requirements, CPG conditions, or a combination of the same.

Question 1.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?

The Department recommends that additions of storage to existing facilities be treated as amendments to the existing CPGs, allowing for the evaluation of both incremental and cumulative impacts under the criteria which were originally applicable to the project. The process should also allow for the evaluation of impacts relevant to any criteria that may have been conditionally waived for the existing project at the time it was undergoing permitting.

In the net-metering program, addition of storage should be considered a “major amendment” and the amendment application should address how the inverter, metering, and/or billing arrangements will ensure that only the solar production will receive net-metering compensation. Alternatively, the rule could require that (A) storage is allowed to charge only from the net-metering facility and is prohibited from charging via the grid; (B) storage is not allowed to export to the grid; and/or (C) grid charging, and/or exporting, are only allowed if the solar, load, and storage energy flows can be metered, tracked, and interpreted by the utility for the purposes of assigning appropriate net-metering credit.

Other states that have incorporated storage into their net-metering programs may provide examples for Vermont to follow. California, for instance, incorporated “paired storage” into their net-metering program pursuant to a 2019 decision that, among other things, describes eligible “use

cases” (“no grid charging” and “no storage export”) and various configurations for each.¹⁸ Further discussion of inverter and metering capabilities, utility billing capabilities, and desired outcome is warranted at the January workshops to ensure selection of the most cost-effective solution that does not preclude flexible and optimal use of storage.

The Massachusetts Department of Public Utilities (“DPU”) also evaluated storage in the context of net-metering and determined the following permissible configurations:¹⁹

	ESS only charges from net metering facility	ESS charges from net metering facility and electrical grid
ESS cannot export to the electrical grid	eligible to net meter	eligible to net meter
ESS can export to the electrical grid	eligible to net meter	not eligible to net meter

In the Massachusetts example, energy storage facilities that charge from the net-metering facility alone are eligible for paired net-metering whether or not the storage facility exports to the grid. However, energy storage facilities that charge from both the net-metering facility and the grid are only eligible for paired net-metering if the storage facility does not export to the grid. In reference to the latter configuration (called “Configuration 4”), the Massachusetts DPU noted:

[T]he [DPU] is not persuaded that allowing a paired system to net meter using Configuration 4 is appropriate. Although Configuration 4 allows customers the most operational flexibility, it also has the most associated costs and uncertainty with respect to compliance and enforcement of the net metering rules and regulations. . . . The [DPU] finds that, at this time under Configuration 4, the risk of irregularities or non-compliance with essential rules and regulations is too high for a customer to receive net metering credits for generation that does not come from an eligible net metering source. The [DPU] may consider such a configuration

¹⁸See generally *Decision Regarding Storage Devices Paired with Net Energy Metering Generating Facilities*, Decision No. 19-01-030 (Cal. P.U.C. Feb. 5, 2019), <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M263/K673/263673087.PDF>.

¹⁹ See *Permissible Configurations, Energy Storage and Net Metering*, MASS.GOV, <https://www.mass.gov/info-details/energy-storage-and-net-metering#permissible-configurations->; see also *Inquiry into the Eligibility of Storage Systems to Net Meter*, D.P.U. 17-146-A, at 19–29 (Mass. D.P.U. Feb. 1 2019), <https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/10333338>.

again once developers, the Distribution Companies, other stakeholders, and the [DPU] gain experience with the deployment of paired systems.²⁰

The facts in Vermont likely differ from those in Massachusetts, both in terms of the net-metering program rules and the tools available to distribution utilities to disentangle net-metering system, storage facility, and grid energy flows. The Department therefore suggests further discussion with distribution utilities, along with net-metering and storage developers.

Question 1.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)?

In general, the Department recommends 30 days as the appropriate comment period for storage projects. This period aligns with Commission Rule 5.116 in the net-metering context and provides sufficient time for parties and stakeholders to complete their review and offer meaningful comments. With respect to utilities and interconnection, there are unresolved conflicts between the net-metering program and interconnection rules which have created timing issues in some cases. The Department recommends that interconnecting utilities' comment period and interconnection review for storage projects should be addressed with reference to, and in alignment with, the ongoing interconnection rulemaking and efforts to harmonize Commission Rules 5.100 and 5.500 in Case No. 19-0856-RULE.

Question 1.g. Notice: Should the Commission modify the notice requirements of Title 30 for energy storage projects in the simplified process?

As described in previous responses, the Department has put forward an approach to simplified siting utilizing a registration process for one category of projects and a process based on § 248(j) for others. In keeping with that approach, the Department recommends aligning the notice requirements for storage projects with either the requirements for registration of rooftop solar net-metering projects under Commission Rule 5.100 or the requirements for Projects of Limited Size and Scope under Rule 5.400 and 30 V.S.A. § 248(j).

²⁰ *Inquiry into the Eligibility of Storage Systems to Net Meter*, D.P.U. 17-146-A, at 31 (Feb. 1 2019), <https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/10333338>.

1. Registration: Projects between 100 kW and 1 MW located within existing structures

The Department submits that notice requirements for this category can be adapted from the registration process established for rooftop solar net-metering projects under Commission Rule 5.105. At a minimum, this would require (1) notice of a complete filing sent to the Department and the interconnecting utility via e-PUC, and (2) copies of the complete filing sent to the Department, the Agency of Natural Resources, and the utility.²¹

In the absence of interconnection issues raised by the utility, Rule 5.105 provides that a CPG will be deemed issued by the Commission on either the eleventh business day or the thirty-first day after filing, depending on the size of the project. In the case of storage however, the Department recommends the latter 30-day period before deemed approval. While interconnection issues and other considerations for storage systems may be comparable to net-metering systems in many respects, a 30-day period will help ensure a thorough review and may allow for more efficient resolution of any concerns.

2. Section 248(j) or similar: Projects between 100 kW and 1 MW **not** located within existing structures; All Projects greater than 1 MW and up to 5 MW

For these categories, the Department recommends incorporating the notice requirements applicable to “Projects of Limited Size and Scope” pursuant to Commission Rule 5.402(F) and 30 V.S.A. § 248(j), with the possibility of certain additions. The baseline notice requirement would include service of the complete application, including the petition and proposed CPG, on the Attorney General; Department of Public Service; Department of Health; Agency of Natural Resources; Historic Preservation Division; Agency of Transportation; Agency of Agriculture, Food and Markets; the chair or director of the municipal and regional planning commissions; and the municipal legislative body for each town and city in which the proposed facility will be located.²²

Although the potential impacts of storage projects are different from net-metering projects in some respects, the Department suggests that there may be considerable overlap in terms of the types of stakeholders affected. With that in mind, the Department is interested in further discussion

²¹ Commission Rule 5.105; Net Metering Registration Form, https://puc.vermont.gov/sites/psbnew/files/doc_library/NMRegistrationFormFINAL12-20-19_1.pdf.

²² See 30 V.S.A. §§ 248(a)(4)(C), 248(j)(2).

of additional notice requirements drawn from the net-metering rules, Commission Rule 5.400, and 30 V.S.A. § 248 more broadly. In particular, the Department is considering the necessity or utility of the following:

- Notice of a complete application sent to adjoining landowners;²³
- 45-day advance notice to the appropriate municipal and regional planning commissions, along with municipal legislative bodies;²⁴
- 45-day advance notice to: adjoining landowners; the host landowner; the Department of Public Service; the Agency of Natural Resources; the Natural Resources Board, if the proposed project is located on a parcel subject to an Act 250 Land Use Permit; the Division for Historic Preservation; the Agency of Agriculture, Food, and Markets; and the interconnecting utility.²⁵

Question 1.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 facilities that qualify for simplified siting review should be treated in the interconnection process similarly to net-metering projects and follow as closely as possible the yet-to-be-revised timelines in the updated net-metering rule, Commission Rule 5.100, which are intended to work better with the timelines in the interconnection process. Storage projects should follow Rule 5.500 in the same way as any other project able to generate or export. To the extent feasible, the interconnection process should be kept separate from the siting process.

Though there are additional grid implications in siting of energy storage as compared to net-metering, in the Department's view it is reasonable to expect that facilities qualifying for simplified siting review will have limited capacity, will raise similar considerations as net-metering projects, and will not pose considerable risk above and beyond net metering-projects. As such, the interconnection of such storage facilities should be governed under rule 5.500.

Storage projects share another common trait with solar net-metering projects: they are inverter-based. Thus, with respect to size thresholds, the Department recommends that the Commission use the same thresholds as in the net-metering rule to dictate which type of evidence must be submitted under § 248(b)(3): for example, a letter from the utility or the results of the Rule

²³ See Commission Rule 5.402(B).

²⁴ See 30 V.S.A. § 248(f); Commission Rule 5.107.

²⁵ See Commission Rule 5.107.

5.500 interconnection process. The Department notes that applicants for other types of generation projects have historically submitted the results of the Rule 5.500 study process (Fast Track, Feasibility Study, System Impact Study), rather than an interconnection agreement. However, energy storage projects have both import and export capability, and have the potential to create adverse effects during times of peak demand. Considering these characteristics, it is reasonable for the Commission to require storage projects to file an executed interconnection agreement, in addition to the results of the interconnection study process. If waiting for an executed interconnection agreement would cause an undue delay, an alternative might be for utilities to develop standard tariff provisions for the interconnection of storage projects, and then the final step in the Rule 5.500 study process (Fast Track, Feasibility Study, System Impact Study) could be submitted rather than an interconnection agreement.

Question 1.i.. Other issues: What other issues should the Commission consider in establishing a simplified siting process for storage systems?

To serve the goals of (1) a simplified siting process and (2) maintaining consistency and clarity across rule sets, the Department's comments under this topic have underscored alignment with existing practices to the extent possible. While the Department has put forward its views as to a workable approach and a useful starting point for discussion, it wishes to avoid further entrenchment of processes and requirements which may otherwise benefit from updates or adjustments. As this proceeding moves forward, the Department remains open-minded and interested in the thoughts and concerns of all stakeholders. There will be opportunities to learn from experience as well, and any process adopted by the Commission could be refined through iteration over time.

II. Aggregations and interplay between owners, operators, and utilities

Question 2.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?

At present, it is unclear if or when customers of any Vermont distribution utilities will be eligible to participate in distributed energy resource aggregations under FERC Order 2222. Until that ambiguity is resolved, it is prudent to proceed under the assumption that some Vermont utility

customers may have such an opportunity at some point. If so, the utility involved would be implicated in the coordination provisions of compliant ISO-NE tariffs. These factors should be considered when evaluating potential aggregator requirements, including communications requirements, under a § 231 CPG.

ISO-NE's draft proposed changes to energy and ancillary markets tariffs, for instance, address the responsibilities of the "host utility" and the distributed energy resource (or "DER") aggregator. For example, "the Host Utility or its agent shall...confirm...that no individual Distributed Energy Resource (as identified by any retail billing account record of the Host Utility) is participating in a retail program that prohibits it from providing the requested service in the New England Markets."²⁶ The draft language includes other obligations for the Host Utility, including the obligation to verify that it has interconnection/operating agreements in place with the resource and that it has determined whether the resource may pose significant risks to safe and reliable operation of the distribution system.²⁷ The draft tariff would impose an obligation on the DER Aggregator to provide a list to both ISO-NE and the Host Utility of resources in the aggregation found to be eligible to participate in the aggregation by the Host Utility, along with the participation model and proposed markets.²⁸

As part of the registration and activation of the DER aggregation, "the ISO must receive confirmation from the Host Utility (or its agent) that the Distributed Energy Resource Aggregator has met all applicable requirements with respect to metering and telemetry to enable the Host Utility or Assigned Meter Reader to include the Distributed Energy Resource Aggregation's metering in the appropriate Load Asset and metering domain."²⁹ Additionally, the draft tariff language addresses operational coordination between the DER Aggregator, the Host Utility, and the ISO: "In the event that the Host Utility identifies conditions on the distribution system that result in actual or anticipated limitations on the operation of individual Distributed Energy Resources or Distributed Energy Resource Aggregations, the Host Utility shall notify the relevant Distributed Energy Resource Aggregator as soon as practicable."³⁰ Further, "The Host Utility may

²⁶ ISO-NE, *Order No. 2222 Participation of DERAs in Wholesale Markets – ISO-NE Tariff Redlines*, § III.6.7(c)(i)(2) (Dec. 1, 2021) [hereinafter "*ISO-NE Tariff Redlines*"], https://www.iso-ne.com/static-assets/documents/2021/12/a03a_mc_2021_12_07_09_order_2222_iso_tariff_redlines.zip.

²⁷ See *id.* §§ III.6.7(c)(i)(3)–(4).

²⁸ *Id.* § III.6.7(c)(iii).

²⁹ *Id.* § III.6.7(d)(ii).

³⁰ *Id.* § III.6.8(c).

temporarily override the ISO's dispatch of a Distributed Energy Resource Aggregation. Such override shall only occur in circumstances where needed to maintain the reliable and safe operation of the distribution system."³¹ Another provision addresses ISO communication with the Host Utility, including the possibility of Real-Time Dispatch Instructions.

Mirroring or referencing ISO-NE's tariff language related to communications and other aspects of aggregations – ideally after it is approved by FERC – would make sense in any aggregator § 231 CPG, to align with the practices DER aggregators will be adopting in the Northeast, with or without Vermonters' participation in Order 2222 aggregations. ISO-NE must file the final proposed revisions to FERC by February 2, 2022, at which point stakeholders will have a better idea of requirements.

Question 2.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?

In the Order 2222 realm, operator override of a DER aggregation's behavior is certainly contemplated as a necessary feature to maintain system stability and reliability. FERC has stated:

We agree with commenters that emphasize the importance of real-time coordination to ensure safe and reliable operation of the transmission and distribution systems. Consequently, to implement § 35.28(g)(12)(ii)(g) of the Commission's regulations, we adopt the NOPR proposal to require each RTO/ISO to revise its tariff to (1) establish a process for ongoing coordination, including operational coordination, that addresses data flows and communication among itself, the distributed energy resource aggregator, and the distribution utility; and (2) require the distributed energy resource aggregator to report to the RTO/ISO any changes to its offered quantity and related distribution factors that result from distribution line faults or outages. Further, we require each RTO/ISO to revise its tariff to include coordination protocols and processes for the operating day that allow distribution utilities to override RTO/ISO dispatch of a distributed energy resource aggregation in circumstances where such override is needed to maintain the reliable and safe operation of the distribution system.³²

As previously noted, ISO-NE's draft tariff language would enable the Host Utility to override ISO dispatch instructions to a DER Aggregation. The assumption seems to be that this is therefore technically feasible, though the language does not appear to specify how it would be

³¹ *Id.* § III.6.8(d).

³² *Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 172 F.E.R.C. ¶ 61,247, 62,705 (2020), https://www.ferc.gov/sites/default/files/2020-09/E-1_0.pdf at 310.

accomplished (such language may exist elsewhere). Other stakeholders in this case may have more specific thoughts on the technical feasibility of such an override.

Question 2.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?

If the premise of embracing or at least mirroring the Order 2222 framework is to be adopted, the provisions addressing changes to an aggregation are worth noting here. The draft proposed tariff language would require a DER Aggregator to update the registration information of an aggregation when a DER is added or removed, notify ISO-NE and the Host Utility, verify metering capability is in place for any added resource, and update the aggregation's performance capabilities. The Host Utility would have 60 days to confirm eligibility and review impacts of the addition or removal.³³

Apart from Order 2222, it may make sense to limit the number of times per year that changes to an aggregation can be made – just as there are limits on the number of times per year that allocations of credits in a group net-metering system can be modified under some utility net-metering tariffs. In addition, it may be appropriate to ensure that such changes can be made only on a prospective basis, as required under Commission Rule 5.130.

Question 2.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?

Disputes between storage operators and interconnecting providers that are squarely within the Commission's jurisdiction are likely to revolve around system stability and reliability, and potentially whether a distributed energy resource is improperly enrolled in both a retail program and a wholesale aggregation. To address those issues, the Department recommends the existing interconnection dispute resolution process under Commission Rule 5.508(D), or a new provision adapted from Rule 5.508(D). The provisions in Rule 5.130(A)(4), whereby a net-metering group

³³ ISO-NE Tariff Redlines, § III.6.7(e)(i)–(ii) (Dec. 1, 2021).

must file with the interconnecting utility a process for resolving disputes among members of the group, may also be worth considering.

Disputes between storage operators and owners of distributed energy storage resources, by contrast, may involve issues relating to private contracts, services, and finances. These types of disputes, which are closer to the realm of consumer complaints and consumer protection, may be outside the scope of issues properly before the Commission. To the extent that disputes between operators and owners are private in nature, the Department suggests that entities like the Vermont Attorney General's Office, Consumer Division, may be in the best position to assist in resolution or take the appropriate action.

There is the potential for disputes that blur the lines however, and these deserve further exploration. Such disputes may occur when, for instance, the contract between a storage aggregator and facility owner is unclear regarding the timing and volume of dispatch and use of the storage facility, or when the implications of the contractual language are otherwise contrary to the expectations of the facility owner. It may be important to ensure that any so-called "aggregator § 231 CPG" requires a contract template to be filed with the Commission that includes certain clear provisions, including language on the rights of the storage facility owner, the aggregator, and the utility to control the storage facility.

The Department also notes that FERC Order 2222 requires the inclusion of dispute resolution mechanisms within the ISO tariffs to address disputes over aggregation review between the ISO, distribution utility, and aggregator. ISO-NE's draft tariff language directs disputes to be handled in the contract, by the courts, by the retail regulatory authority, or by the ISO, depending on the nature of the dispute.³⁴

Question 2.e. Other issues: What issues outside system stability and reliability should the Commission consider when issuing a CPG for energy storage aggregators?

Even within the broader context of energy storage oversight, regulation of storage aggregators is a new and evolving area. In other § 231 contexts, the Commission has applied the following criteria in assessing whether authorizing the entity will serve the public good:³⁵ (1) technical expertise; (2) adequate service; (3) facility maintenance; (4) balance between customers

³⁴ See *Id.* § III.6.7(c)(v).

³⁵ See, e.g., *Petition of Lincoln Renewable Gas, LLC*, Docket No. 8596, 2016 WL 1612891, at 35-36 (Apr. 8, 2016).

and shareholders; (5) financial stability; (6) company’s ability to obtain financing; (7) business reputation; and (8) relationship with customers. While these criteria are framed in general terms, most are certainly relevant in evaluating whether to issue a CPG for storage aggregators. However, more specific considerations should be developed – whether they are adopted within the storage rule or elsewhere.

There are opportunities to consider existing requirements in other jurisdictions. Virginia, for example, has recently codified rules for the licensure of energy storage aggregators.³⁶ In addition to provisions regarding general financial fitness and business structure, the rules in Virginia require information to shed light on an applicant’s intentions, experience, and track record in the aggregation space. This information includes, among other things: proposed uses of the aggregated resources and the nature of intended participation in the wholesale electric markets; a list of other states in which the applicant conducts business as an energy storage aggregator, and a description of the business conducted; disclosure of denials, suspensions, or revocations of a license or authority to conduct the proposed business in other jurisdictions; a report of all violations of reliability standards in the provision of energy storage aggregation that were the fault of the applicant; and the standards of conduct to which the applicant adheres or agrees to adhere.³⁷

The Department has identified several additional or overlapping issues for the Commission to consider, and recommends further stakeholder feedback, research, and discussion of this topic at the January workshops. Preliminary considerations could include:

- Whether the aggregator has received any ISO-NE approval of a distributed energy resource aggregation enrollment, and whether the aggregator has previously enrolled and activated an aggregation;
- Whether the aggregator has prior operational experience with an aggregation in Vermont or other states, and whether the distribution utility has any experience in interacting with the aggregator;
- Inclusion of a contract template with provisions which clearly explain: rights to dispatch the energy storage resource; the distribution utility’s right to override that dispatch to maintain system stability and reliability; the customer’s ability to opt out of a dispatch signal from ISO-NE/the aggregator; the customer’s ability to opt out of the contract altogether; the expectations customers can have for their “own use” of the battery (including for backup power); the expected hours the battery will be performing services at the request of ISO-NE/the

³⁶ See 20 V.A.C. § 5-335-90 (2021).

³⁷ See *id.*

- aggregator; and the expected amounts and intervals of compensation to the customer;
- Prohibition of a resource from being double-booked in both a retail and a wholesale program;
- Provisions to ensure the load impacts of storage are appropriately reviewed by the interconnecting utility and do not negatively impact ratepayers;
- Provisions to ensure participation of the resource in the aggregation and the aggregation in the wholesale markets does no harm to the distribution utility or ratepayers.

III. **Role of energy storage**

The Department wishes to draw the Commission’s attention to a potentially useful resource published by the National Renewable Energy Laboratory (“NREL”) and U.S. AID in March 2020: *An Overview of Behind-the-Meter Solar-Plus-Storage Regulatory Design*.³⁸ This resource addresses many of the questions below (and above); from the role of storage to fairness and equity, to metering and technical configuration. Below, the Department provides a sampling of useful information from this timely resource, alongside additional thoughts, that can be further explored in this rulemaking.

Question 3.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?

In the Department’s view, optimization of resources is best achieved at the policy or programmatic level, rather than by focusing on any particular technology.³⁹ The Department’s recommendation in Case No. 19-0855-RULE, to assign greater value to solar production consumed behind the meter than to solar production exported to the grid, is one such example.⁴⁰ Such a framework – which could also be achieved by, or coupled with, time-of-use rates – would

³⁸ See OWEN ZINAMAN ET AL., AN OVERVIEW OF BEHIND-THE-METER SOLAR-PLUS-STORAGE REGULATORY DESIGN (NAT’L RENEWABLE ENERGY LAB. 2020), <https://www.nrel.gov/docs/fy20osti/75283.pdf>.

³⁹ See generally VT. DEP’T OF PUB. SERV., ENERGY STORAGE REPORT PURSUANT TO ACT 53 OF 2017, at 40–43 (2017), https://publicservice.vermont.gov/sites/dps/files/documents/Storage_Report_Final.pdf.

⁴⁰ See generally VT. DEP’T OF PUB. SERV., *Report on Public Utility Commission Net-Metering Information Requests*, Case No. 19-0855-RULE (filed Nov. 1, 2019), <https://epuc.vermont.gov/?q=downloadfile/384059/139251>

naturally both incentivize storage and better align demand and supply with system costs. A net-metering framework along these lines was recently submitted by Duke Energy and solar developers to the North Carolina Utility Commission for consideration.⁴¹ Ideally, an overarching policy framework would serve to point programs and technologies in the right direction.

Another example comes from Massachusetts, where the need to address peak-related costs led to the adoption of a Clean Peak Standard⁴² which incentivizes resources to supply energy during seasonal peak demand periods. Vermont's Renewable Energy Standard and net-metering program currently follow an annual netting framework that does not necessarily seek alignment with utility cost drivers (these programs can also be cost drivers, it is worth noting). In the absence of changes to policies and programs, the most proactive step the Commission may be able to take is to avoid imposing requirements that restrict utilities from making use of storage to help address these cost drivers (such as through aggregated use of customer-sited storage to reduce peaks in the Powerwall and Bring-Your-Own-Device tariffs), and to ensure that the deployment of storage, particularly storage not controlled by utility software or rate signals, does not exacerbate grid or power supply costs.

The NREL/U.S. AID report referenced earlier discusses various roles that distributed solar-plus-storage ("DPV-plus-storage") systems can play, "from exclusively serving customer needs, to being fully grid-interactive assets that provide a range of services to the distribution and/or transmission system, with many options in between."⁴³ These are varied, and are themselves only a subset of the broader spectrum of roles storage can play in the power system on its own. The report authors note that, "the extent of desired grid interactivity has significant implications for a wide range of regulatory decisions, including those relating to compensation mechanism design, metering, as well as technical configurations."⁴⁴ In the Department's view, this degree of complexity may be quite difficult to manage well at the technology-specific level, lending support for a broader, programmatic framework that leaves some flexibility at the technology level.

⁴¹ See generally *Joint Application of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Net Energy Metering Tariffs*, Docket Nos. E-7, SUB 1214, E-7, SUB 1219, (N.C. Util. Comm'n Nov. 29, 2021), <https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=1770f390-a67c-4709-9eb0-611ee42f22de>.

⁴² See *Clean Peak Energy Standard*, MASS.GOV, <https://www.mass.gov/clean-peak-energy-standard>

⁴³ OWEN ZINAMAN ET AL., AN OVERVIEW OF BEHIND-THE-METER SOLAR-PLUS-STORAGE REGULATORY DESIGN, at 15 (2020), <https://www.nrel.gov/docs/fy20osti/75283.pdf>.

⁴⁴ *Id.* at 16.

Question 3.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?

The Department does not recommend that the Commission impose charge and discharge requirements related to carbon intensity at this time. The Department's perspective on this issue is similar to system optimization and equity issues, with the additional note that this rulemaking is not addressing compensation for storage systems. In short, the Department suggests that carbon intensity issues should not be addressed on a case-by-case or technology-by-technology basis. While it is possible for energy storage to increase carbon emissions, the Department notes that given current market dynamics, it is more likely that storage projects will decrease carbon emissions.

The carbon impact of storage deployment depends on the timeframe within which the resource is analyzed. In the short term, the discharge of storage will avoid the emissions from the last generation resource that is used to meet demand at that time – the resource that is on the margin. While this is often natural gas, at high priced and peak times it is often less efficient natural gas or oil units that can be avoided. These are usually the most expensive units which create the market signals for storage resources to perform in the first place. When charging in the short term, the immediate market signal will have subsided and storage resources will almost always have a lesser carbon impact than when they were discharged. In the longer-term, utilities may be able to plan for when charging, in the aggregate, happens. In this instance, they can specifically plan to purchase power that meets supply and regulatory requirements.

One of those requirements is the Renewable Energy Standard, which obligates utilities to maintain a certain percentage of renewable power. Thus, in the long-term the load associated with charging is as clean as the utility's portfolio. Notably, Vermont's Greenhouse Gas Inventory and the tracking of progress toward the State's greenhouse gas requirements take this long-term approach to measuring emissions from the electric sector. Whether it is considered in the short- or long-term, storage is likely to have a beneficial carbon impact. In addition, storage resources that are proposed to be developed in concert and at the same time as generation resources are likely to be securing tax credits that are only available if the storage is charged with that renewable

resource itself. A regulation by the Commission is not likely to be significantly influential in this instance.

Finally, a carbon intensity requirement could take shape as a significant obligation to track, report, verify, and regulate carbon emissions – such that such the requirement could become an unnecessary disincentive to deploying storage, with little benefit. For the reasons above, the Department submits that a Commission regulation regarding carbon intensity should not be implemented as part of the energy storage rulemaking.

Question 3.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?

As with system optimization, the Department maintains the view that equitable access to energy storage can be best addressed at the programmatic level. This will involve both ensuring customers across all utility jurisdictions within the state have opportunities to participate in energy storage programs, and that those programs consider factors that have historically prevented certain communities from accessing the benefits of clean energy technologies.

To the Department’s knowledge, Green Mountain Power is the only utility in Vermont that currently offers a mechanism for customers to engage in residential energy storage programs, although Vermont Electric Cooperative is also evaluating such a program. One of the main barriers appears to be cost-effectiveness of obtaining the software programs that enable sharing of costs and benefits, along with the incremental costs of adding storage devices. Efforts to expand residential energy storage programs statewide will likely require additional resources to support distributed energy resource management systems. The Department is proposing to develop a program that would offer some assistance in this regard, using \$5 million in ARPA funding to advance flexible load projects and/or distributed energy resource management systems in the state.⁴⁵

In addition, ensuring equitable access to the benefits of energy storage will require consideration of how programs can reach customers who historically have not been able to

⁴⁵ The associated Request for Information, issued by the Department on December 10, 2021, is available at: <https://publicservice.vermont.gov/sites/dps/files/documents/VT%20PSD%20RFI%20-%20Flexible%20DER%20and%20Control%20Platforms%202021-12-10.pdf>.

participate, even when opportunities exist, due to issues such as lack of upfront capital or homeownership. Strategies could include, for example: programs that allocate a certain percentage of available funding or incentives to low-income or marginalized communities, explore community ownership models, or prioritize energy storage projects in communities with high percentages of renters or multifamily housing units. Such programs should ideally be developed in consultation with those communities, to ensure they are appropriately addressing community needs.

As the Commission seeks to ensure equitable sharing of the benefits from energy storage and other clean energy technologies, the Department believes these efforts should be advanced utilizing consistent frameworks and definitions across clean energy technologies and energy policies. Further, programs should endeavor to collect the requisite data to understand where inequitable distribution of benefits currently exists and then track and assess progress toward equitable access. Equity should also be included as a core criterion in any analysis to assess program viability and success, alongside criteria such as cost-effectiveness and environmental considerations. The *Guiding Principles for a Just Transition*⁴⁶ adopted by the Vermont Climate Council, and the related assessment questions and scoring rubric, will likely prove helpful resources in these efforts.

Finally, the Department notes that issues of equity can and do play out beyond Vermont's borders. The mining of rare earth minerals used in many advanced clean technologies, including lithium-ion batteries for energy storage, has environmental and human consequences for some of the most vulnerable populations on earth.⁴⁷ Finding ways to mitigate these impacts – including technology innovations and implementation of policy interventions such as recycled materials content requirements – is imperative. This may entail action at the federal level, but Vermont should use the tools it has to further this conversation.

⁴⁶ VT, CLIMATE COUNCIL, GUIDING PRINCIPLES FOR A JUST TRANSITION (2021), <https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/Guiding%20Principles%20for%20a%20Just%20Transition%20-%20Final%20Approved%208.2021.pdf>.

⁴⁷ See, e.g., *Lithium-ion Batteries Need to be Greener and More Ethical*, NATURE (June 29, 2021), <https://www.nature.com/articles/d41586-021-01735-z>.

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Respectfully Submitted,

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Appendix

Table 1: Applicable Criteria Comparison by Project Type

Applicable Criteria (not conditionally waived)	NM Solar ≤ 500 kW	NM Solar, Rooftop ≤ 500 kW	Non-NM Solar > 150 kW to ≤ 2.2 MW	Non-NM Solar > 2.2 MW	Storage not in Existing Structures ≥ 100 kW to ≤ 1 MW	Storage in Existing Structures ≥ 100 kW to ≤ 1 MW	All Storage > 1 MW
(b)(1) orderly development	X		X	X	X		X
(b)(2) need	(X only if RECs retained)		(X only if developed by utility)	X	(X only if part of wholesale aggregation)		X
(b)(3) system stability & reliability	X	X	X	X	X	X (This could potentially be waived if the storage is part of a utility-run program in which the utility assumes responsibility for interconnections)	X
(b)(4) economic benefit			X (except for Standard Offer projects)	X	X (consider waiver if part of utility-operated retail program)		X
(b)(5) aesthetics, historic, air & water, natural environment, natural resources, public health & safety, ag soils, GHG impacts	X		X (except for water conservation; sufficiency of water and burden on existing water supply; and educational services)	X	X (except for water conservation; sufficiency of water and burden on existing water supply; and educational services)		X
(b)(6) consistency with utility IRP			(X if developed by utility)	X (for utility-led projects only)	(X if developed by utility)		X (utility-led project only)
(b)(7) compliance with state electric plan				X			X
(b)(8) outstanding resource waters	X		X	X	X		X
(b)(10) existing or planned transmission			X	X	X (consider waiver if part of utility-operated retail program)		X