

STATE OF VERMONT  
PUBLIC UTILITY COMMISSION

Case No. 17-2813-PET

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| Petition of Green Mountain Power for a Certificate of Public Good pursuant to 30 V.S.A. § 248(j), authorizing the installation and operation of a battery storage system on the GMPSolar Panton Project site located in Panton, Vermont, to be known as the “GMP Panton Battery Storage Project” |  |
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Order entered: 10/29/2020

**ORDER GRANTING AMENDMENT TO CERTIFICATE OF PUBLIC GOOD**

**I. INTRODUCTION**

This order concerns a motion filed with the Vermont Public Utility Commission (“Commission”) by Green Mountain Power Corporation (“GMP”) seeking a non-substantial change determination, or in the alternative, an amendment to the certificate of public good (“CPG”) issued in this case on January 22, 2018, pursuant to 30 V.S.A. § 248(j), authorizing the construction and operation of the GMP Panton Battery Storage Project (the “Battery Project”).<sup>1</sup> Specifically, GMP seeks to make additions and improvements to the existing Battery Project that will allow it to “island” a portion of the Town of Panton in the event of an outage situation.<sup>2</sup> These proposed changes might fairly be described as a first-of-its-kind implementation in its use of islanding based on renewable generation and storage technology.

In today’s order the Commission determines that the changes proposed by GMP are substantial under Commission Rule 5.408 because they have the potential for significant impact under the following criteria of Section 248(b): need ((b)(2)); system stability and reliability ((b)(3)); economic benefit ((b)(4)); water pollution ((b)(5) and 10 V.S.A. § 6086(a)(1)); and

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<sup>1</sup> GMP filed its proposed changes as a motion in this case, Case No. 17-2813-PET. However, since the implementation of ePUC, the Commission has directed CPG holders who want to amend their CPGs or who want a non-substantial change determination to file those requests as new cases in ePUC. Accordingly, GMP should have filed its request as a petition in a new case in ePUC. Given the current posture of the case, the Commission has decided to issue an order in this proceeding rather than require GMP to refile its request as a petition in a new case.

<sup>2</sup> GMP uses the terms “island” and “microgrid” interchangeably to describe a network of electricity customers with a local source of supply that is normally attached to a broader distribution grid but is also able to function independently of the larger grid. GMP petition at 1.

waste disposal ((b)(5) and 10 V.S.A. § 6086(a)(1)(B)). However, the Commission also finds that those changes will not result in any undue impacts under the affected criteria. Therefore, the Commission is also issuing an amendment to the CPG issued in this case on January 22, 2018, and amended on February 16, 2018, authorizing the construction of the proposed changes to the Battery Project.

## **II. PROCEDURAL HISTORY**

On April 10, 2017, GMP filed its petition for the Battery Project with the Commission. That petition sought authority to construct and operate the Battery Project at the site of the previously approved 4.9 MW GMPSolar Panton Project site in Panton, Vermont.<sup>3</sup>

On January 22, 2018, the Commission issued an Order and CPG approving the Battery Project.

On February 16, 2018, the Commission issued an amended Order and CPG for the Battery Project that corrected minor clerical mistakes.

On July 15, 2020, GMP filed its current motion (“GMP Motion”).

On July 29, 2020, the Vermont Agency of Natural Resources (“ANR”) filed comments on the GMP motion (“ANR Comments”).

On August 7, 2020, the Department filed comments on the GMP motion (“Department Comments”).

On August 11, 2020, GMP filed a reply to ANR’s and the Department’s comments (“GMP Reply”).

Because no party has requested an evidentiary hearing and because no party has contested any of the factual allegations contained in the following documents, the following are admitted into the evidentiary record as if presented at a hearing: Affidavit of Greg Dixon; Affidavit of Mark Kane; Affidavit of Paul Nadeau; Affidavit of Kirk Shields; GMP Attachment 1 (revised site plans); GMP Attachment 2 (Town of Panton letter dated June 25, 2020); GMP Reply; Department Comments; and ANR Comments.

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<sup>3</sup> See Case No. 8637, Order of 7/8/16.

### **III. FINDINGS**

The findings below begin with a description of the proposed modifications and then address only the substantive criteria of Section 248 that the proposed modifications have the potential to significantly affect.

#### **The Proposed Modifications**

1. GMP proposes to install the following improvements to the previously approved Battery Project:

- One 1500 kVA transformer.
- One pad-mounted recloser containing new microelectronic relays and communication devices.
- Three new line reclosers, also containing microelectronic relays and communication equipment, to be installed on existing GMP power poles along Panton Road and Jersey Street.
- Approximately 1,140 square feet of new impervious surface.
- Communications equipment to be installed in the existing relay cabinet at the Panton Battery Project.

Dixon Affidavit at 2; Nadeau Affidavit at 1-2; Shields Affidavit at 2-3; GMP Attachment 1.

2. The new equipment will create the potential for the Battery Project to operate as a distribution “island” for a defined geographic area in Panton. Creation of such an island would enable customers in that area to be disconnected from the bulk grid yet still receive electrical service during planned outages and emergency situations (e.g., storm damage) from local distributed energy and energy storage. Shields Affidavit at 1.

3. The new equipment will take approximately 60 days to install, with limited trips for delivery and construction vehicles. After the new equipment is installed, there will be no additional traffic to the site outside of regular maintenance, as per normal operation of the Battery Project. Shields Affidavit at 4.

4. Automated fault detection and switching is a key component of the islanding function. In the event of an outage, the island will begin to function without any human intervention and will automatically transition back to normal grid operation at the end of the

outage. This automation is designed to be quick enough so that it is not noticeable to the customers within the island. Shields Affidavit at 4.

5. Because the new transformer and recloser will be installed within the existing fence line, impacts from the proposed changes will be limited. Shields Affidavit at 4.

6. Initially, the proposed changes will serve an “island” made up of 51 customers — 45 residential customers, the Panton Town Hall, Panton Town Garage facility, one farm, and three other commercial customers. Shields Affidavit at 5.

7. Once the initial island has been established and tested, GMP will explore increasing the number of customers that will be served by the island to potentially several hundred more customers located within the area. Shields Affidavit at 4-6.

8. The proposed changes do not require any upgrades to the transmission system. As a result, there is no potential for impact on the Battery Project’s ability to be served economically by existing transmission facilities without undue adverse effect on GMP or its customers.

Nadeau Affidavit at 2.

#### Discussion

Commission Rule 5.408 requires a project developer to seek an amendment to a CPG when proposed changes to a previously approved project are substantial. A substantial change is one that has “the potential for significant impact with respect to any of the criteria of Section 248(b) or on the general good of the state under Section 248(a).”<sup>4</sup> Based on the findings of fact below, we conclude that the proposed changes have the potential for significant impact under the following criteria of Section 248(b): system stability and reliability ((b)(3)); economic benefit ((b)(4)); water pollution ((b)(5) and 10 V.S.A. § 6086(a)(1)); and waste disposal ((b)(5) and 10 V.S.A. § 6086(a)(1)(B)).

However, based on the evidence submitted by GMP, the Commission also concludes that, provided the proposed changes are constructed consistent with the representations in GMP’s witness affidavits and revised site plan, the proposed changes will not result in any undue adverse impacts under those criteria and an amendment to the CPG authorizing the changes will therefore be issued.

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<sup>4</sup> Commission Rule 5.408.

**Findings under the Potentially Affected Criteria of Section 248(b)**

**Need for Present and Future Demand for Service**

[30 V.S.A. § 248(b)(2)]

9. The Project will meet the need for present and future demand for service which could not otherwise be provided in a more cost-effective manner through energy conservation programs and measures and energy efficiency and load management measures, including but not limited to those developed pursuant to the provisions of 209(d), 218c, and 218(b) of Title 30. This finding is supported by findings 10 and 11, below.

10. Adding islanding capability to the Project will increase GMP's ability to continue providing electricity to customers in the Town of Panton during a blackout or other emergency, and will also provide GMP with valuable data and experience that bridge the gap between theory and successful application. Shields Affidavit at 5.

11. The islanding protection scheme implementation will provide operational and protection experience that GMP will be able to apply to other areas of its distribution system. Shields Affidavit at 5.

**Discussion**

We are concerned that GMP has not demonstrated that storage is the least-cost solution for the reliability needs of the customers that would be served by the proposed island. We agree with the Department that storage-based reliability for specific GMP customers paid for by all GMP customers is not appropriate without a specific understanding of the reliability needs of the customers served and a demonstration that storage is the least-cost solution to achieving the defined level of reliability desired. The Commission recognizes, however, that the proposed changes to the Project will allow GMP to gain experience operating islands and this experience is needed before GMP can apply islanding to other parts of the system. Therefore, the Commission finds that the proposed changes meet the need criterion, subject to the reporting requirements and conditions discussed under the economic benefit criterion, below.

**Impact on System Stability and Reliability**

[30 V.S.A. § 248(b)(3)]

12. The proposed changes will not have an adverse effect on system stability and reliability. This finding is supported by findings 13 through 17, below.

13. GMP worked with Schweitzer Engineering Laboratories (“SEL”) and Tesla to determine what interconnection equipment was needed and how to safely interconnect and operate the islanding equipment. Nadeau Affidavit at 2.<sup>5</sup>

14. The proposed changes will require the installation of new protection devices that will improve system stability and reliability during normal grid operations through better fault clearing. During outage conditions, the customers served by the island will be able to maintain electrical service. When the island is disconnected from the power system, stability will be achieved by the addition of a grounding transformer near the Battery Project. This grounding transformer will be connected to the system under both normal and islanded configurations and will have no negative effects on power quality. Nadeau Affidavit at 2-3.

15. Creating a distribution island with the Battery Project would provide GMP with the potential for industry-wide interest in the Project and GMP’s advancement of inverter-based islanding. To date, distribution circuit islanding has been largely limited to generation technology using a rotating machine, such as a diesel generator, to provide the stability needed to maintain the island. Shields Affidavit at 2.

16. GMP has been working with SEL and Tesla to design an islanding system for the Battery Project. Between SEL’s expertise with protection and control systems, Tesla’s knowledge of battery systems, and GMP’s knowledge of the distribution system, GMP designed an inverter-only-based islanding system that it believes will operate reliably and safely. Shields Affidavit at 2.

17. Extensive engineering analysis was required to determine what pieces of protection and control equipment would be required on the Battery Project site and in the distribution system to implement the islanding function. Shields Affidavit at 2.

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<sup>5</sup> Mr. Nadeau’s Affidavit states on page 2 that the proposed changes will not have an undue adverse impact on GMP’s distribution system. However, criterion (b)(3) prohibits any adverse impact to system stability and reliability, not just those that are also undue.

### Discussion

We find that the installation of the proposed changes has the potential for significant impact on the stability and reliability of GMP's distribution network served by the Battery Project. The affidavits filed by GMP in support of its motion describe not only an emerging technology, but one that might fairly be described as a first-of-its-kind implementation in its use of islanding based on renewable generation and storage technology. The evidence submitted also demonstrates appropriate caution by GMP in its initial, limited implementation of the new technology, with expansion of its application envisioned only after it is successfully tested on a total of 51 customers. As a result, we are not prepared to conclude that these changes have no potential for significant impact on the stability and reliability of GMP's grid.

However, the evidence submitted by GMP leads us to also conclude that, provided GMP implements the proposed changes as described in its motion and supporting documents, the changes can be implemented without adverse effects on GMP's distribution system.

### **Economic Benefit to the State**

[30 V.S.A. § 248(b)(4)]

18. Subject to conditions, the proposed changes will result in an economic benefit to the State and its residents. This finding is supported by findings 19 through 21, below.

19. The costs of the proposed changes are estimated to be \$628,000. Shields Affidavit at 6.

20. GMP estimates that the economic benefits attributable to its ability to island the initial 51 customers to be \$100,000 in net present value ("NPV") over a 40-year benefit timeframe. Shields Affidavit at 5.

21. If GMP is able to expand the customer base that is served by the island after its testing phase is complete, the economic value would increase. For example, GMP estimates that extending the island to 551 customers (approximately one-half of the customers on the circuit) would increase the economic benefits to about \$1.2 million NPV. Shields Affidavit at 6.

### Discussion

GMP presents its economic benefit analysis on two fronts. First, GMP asserts that adding the new equipment to the existing Battery Project somewhat reduces the NPV benefits of that

larger project but does not eliminate them. Second, GMP asserts that if the islanding function is successful and is expanded to serve several hundred customers, then the islanding function will create its own economic benefits.

We are concerned that GMP's first approach to the economic benefit requirement is reliant on a previously approved project — a project over which the Commission expressed concerns under the economic benefit criterion, which resulted in the imposition of reporting requirements on GMP regarding the project's costs and benefits.

We are also concerned that GMP's second approach to the economic benefit criterion relies on an as-yet-unknown expansion of service by the islanding function. If GMP is successful, then the proposed changes may indeed yield an economic benefit. However, we are unable to state conclusively that there is no potential for significant impacts under this criterion based on the limited information submitted by GMP.

Further, the Department has expressed concerns that the cost/benefit estimates provided by Mr. Shields require further review if they are to be the basis of a determination of compliance with this criterion. The Department does, however, believe that the cost of the proposed changes is justified because the proposed changes will clarify the additional equipment needed, costs incurred, and benefits stemming from inverter and renewables-based islanding. The Department's position is conditioned on the "difficult-to-quantify benefits of gaining experience with islanding an inverter-based system."<sup>6</sup>

We agree with the Department that the cost/benefit information provided by GMP is not adequate by itself for us to reach the needed determination on economic benefit. We also agree with the Department that there is some value to be realized by allowing GMP to proceed with the proposed changes in the form of operational experience through this unique project modification.

Because of these concerns, our approval of the proposed changes under this criterion is based on GMP filing a report within six months of its initial implementation of the islanding function detailing the results of its initial implementation, including any unforeseen failures and costs, its expected timeline for expansion of the islanding function, the number of customers it expects to serve with that function and the schedule under which they will be served, and the

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<sup>6</sup> Department comments at 1-2.

trajectory of expected economic benefits that will result from that expansion. We emphasize that our acceptance of GMP's proposal is based on our understanding that the expansion of the island to the larger customer group described in Mr. Shield's affidavit can be achieved based on the \$628,000 estimate in that affidavit. If GMP intended to convey in Mr. Shield's affidavit that there would be additional costs to the expansion, GMP must immediately provide detailed information on those anticipated increased costs and must do so before it begins installation of the new equipment.

### **Water Pollution and Waste Disposal**

[30 V.S.A. § 248(b)(5)] and [10 V.S.A. § 6086(a)(1)] and [10 V.S.A. § 6086(a)(1)(B)]

22. The proposed changes will not result in undue adverse impacts to the natural environment or on water purity from either water pollution or waste disposal. This finding is supported by findings 23 through 25, below.

23. The proposed changes include the addition of a 1,500 kVA transformer to the existing 1,500 kVA transformer at the Battery Project. Shields Affidavit at 3.

24. The new transformer will contain 410 gallons of transformer oil. GMP Attachment 1 at 2.

25. The new transformer will include a secondary oil containment system with 110% of the fluid capacity of the transformer plus 5" of freeboard to provide additional protection in the event of a spill. Dixon Affidavit at 2.

### **Discussion**

GMP's proposed changes include the addition of a new pad-mounted transformer that will contain 410 gallons of transformer oil. We conclude that a spill of the full oil content of the new transformer has the potential for significant impact on the natural environment and water purity from water pollution and waste disposal. However, we also conclude, based on GMP's plans to install adequate secondary containment, that undue impacts can be avoided in the event of a spill provided GMP installs the secondary containment system as represented in its witness affidavits and revised site plan.

#### IV. ORDER

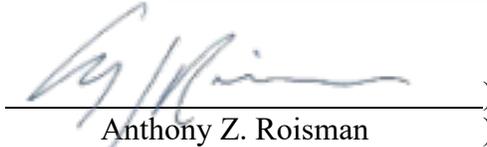
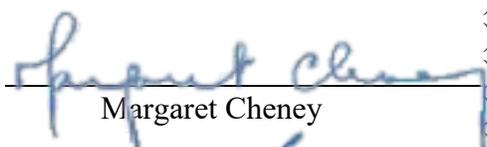
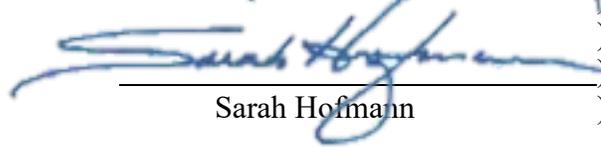
IT IS HEREBY ORDERED, ADJUDGED, AND DECREED by the Vermont Public Utility Commission (“Commission”) that:

1. The changes to the GMP Panton Battery Storage Project constructed and operated by Green Mountain Power Corporation (“CPG Holder”) in the Town of Panton, Vermont (the “Project”), as described in the evidence submitted in this proceeding in support of the CPG Holder’s July 15, 2020, motion for a non-substantial change determination or in the alternative an amendment to its certificate of public good, will promote the general good of the State of Vermont pursuant to 30 V.S.A. § 248, and an amendment to the certificate of public good (“CPG”) issued in Case No. 17-2813-PET on January 22, 2018, and amended on February 16, 2018, to that effect shall be issued in this matter.

2. All future compliance filings related to the GMP Panton Battery Storage Project shall be made in the compliance subcase of this case, Case No. 17-2813-PET, using ePUC.

3. As a condition of this Order, the CPG Holder shall comply with all terms and conditions set out in the certificate of public good issued in Case No. 17-2813-PET, the amendment to it, and the amendments issued in conjunction with this Order.

Dated at Montpelier, Vermont this 29th day of October, 2020.

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| <br>_____)   | ) | PUBLIC UTILITY<br>COMMISSION<br>OF VERMONT |
| Anthony Z. Roisman   | ) |  |
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| <br>_____) ) | ) | PUBLIC UTILITY<br>COMMISSION<br>OF VERMONT |
| Margaret Cheney  | ) |  |
| _____) )   | ) |  |
| <br>_____) ) | ) | PUBLIC UTILITY<br>COMMISSION<br>OF VERMONT |
| Sarah Hofmann  | ) |  |
| _____) )   | ) |  |

OFFICE OF THE CLERK

Filed: October 29, 2020

Attest:   
Clerk of the Commission

*Notice to Readers: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Commission (by e-mail, telephone, or in writing) of any apparent errors, in order that any necessary corrections may be made. (E-mail address: puc.clerk@vermont.gov)*

*Appeal of this decision to the Supreme Court of Vermont must be filed with the Clerk of the Commission within 30 days. Appeal will not stay the effect of this Order, absent further order by this Commission or appropriate action by the Supreme Court of Vermont. Motions for reconsideration or stay, if any, must be filed with the Clerk of the Commission within 28 days of the date of this decision and Order.*

PUC Case No. 17-2813-PET - SERVICE LIST

Parties:

Donald J. Einhorn, Esq. (for Vermont Agency of Natural Resources)  
Vermont Agency of Natural Resources  
1 National Life Drive, Davis 2  
Montpelier, VT 05602-3901  
donald.einhorn@vermont.gov

Eric B. Guzman (for Vermont Department of Public Service)  
Vermont Department of Public Service  
112 State Street  
Montpelier, VT 05620  
eric.guzman@vermont.gov

Geoffrey Hand, Esq. (for Green Mountain Power Corporation)  
Dunkiel Saunders Elliot Raubvogel & Hand,  
PLLC  
91 College Street  
PO Box 545  
Burlington, VT 05402  
ghand@dunkielsaunders.com

James Porter, Esq. (for Vermont Department of Public Service)  
Vermont Department of Public Service  
Vermont Public Service Department  
112 State St  
Montpelier, VT 05620  
james.porter@vermont.gov

\*James Porter, Director of Public Advocacy (for Vermont Department of Public Service)  
Vermont Department of Public Service  
DPS-PA@vermont.gov

Victoria M. Westgate, Esq. (for Green Mountain Power Corporation)  
Dunkiel Saunders Elliott Raubvogel & Hand,  
PLLC  
91 College Street  
P.O. Box 545  
Burlington, VT 05402-0545  
vwestgate@dunkielsaunders.com