STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 17-2813-PET

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"	Hearings at Montpelier, Vermont December 4, 2017

Order entered: 01/22/2018

PRESENT: John C. Gerhard, Esq.
Hearing Officer

APPEARANCES: Sheila Grace, Esq.
for the Vermont Department of Public Service

Donald Einhorn, Esq.
for the Vermont Agency of Natural Resources

Victoria Westgate, Esq.
Geoff Hand, Esq.
Dunkiel, Saunders, Elliott, Raubvogel & Hand, PLLC
for Green Mountain Power Corporation

I. INTRODUCTION

This case involves a petition filed by Green Mountain Power Corporation ("GMP" or the "Petitioner") with the Vermont Public Utility Commission ("Commission"),[1] pursuant to 30 V.S.A. § 248(j) and Commission Rule 5.400, requesting the issuance of a certificate of public good ("CPG") for the construction and operation of a battery storage system with a capacity of 1 MW/4 MWH located on the site of the GMPSolar Panton Project in Panton, Vermont, to be known as the "GMP Panton Battery Storage Project" (the "Project").

In today's proposal for decision, subject to the conditions contained herein, I recommend that the Commission find that the Project is of limited size and scope, will promote the general good of the State, and that the public interest is satisfied by the procedures authorized by 30 V.S.A. § 248(j).

II. PROCEDURAL HISTORY

On April 10, 2017, GMP filed its petition with the Commission. At the time of filing, copies of the petition were provided to the following entities: the Town of Panton Planning Commission; the Panton Selectboard; the Addison County Regional Planning Commission; the Agency of Natural Resources ("ANR"); the Department of Public Service ("Department"); the Division for Historic Preservation; the Agency of Transportation; the Department of Health; the Agency of Agriculture, Food, and Markets; and the Attorney General. GMP also provided notice to adjoining property owners.

On May 12, 2017, the Commission issued a memorandum requesting that any comments on the Project be filed by June 9, 2017.

On June 1, 2017, GMP filed a completed System Impact Study ("SIS") for the Project.[2]

On June 7, 2017, the Department filed comments on the Project stating that the Project raised significant issues with respect to Section 248 criteria (b)(2) (need) and (b)(4) (economic

[1] Pursuant to Section 9 of Act 53 of the 2017 legislative session, the Vermont Public Service Commission's name was changed to the Vermont Public Utility Commission, effective July 1, 2017. For clarity, activities of the Vermont Public Service Commission that occurred before the name change will be referred to in Commission documents as activities of the Commission unless that would be confusing in the specific context.

[2] GMP's SIS, filed on June 1, 2017, was not admitted into the record as evidence during the December 4, 2017, evidentiary hearing. I hereby enter the SIS as exhibit Commission-3. Any party objecting to the introduction of the SIS shall file its objection no later than 5 business days after the entry of this order.

benefit) and potentially raised significant issues with (b)(3) (system stability and reliability) and (b)(7) (compliance with electric energy plan). The Department asked the Commission to hold an evidentiary hearing on these issues.

On June 9, 2017, ANR filed comments stating that it believed the Project raised a significant issue with respect to greenhouse gas ("GHG") impacts under criterion (b)(5) and recommended that this issue be investigated in a hearing.

On June 16, 2017, GMP filed a response to the Department's and ANR's comments. GMP did not object to the Commission holding an evidentiary hearing on the criteria requested by the Department but disagreed with ANR's contention that the Project raised a significant issue with respect to GHG impacts.

On June 23, 2017, ANR filed a reply to GMP's June 16 response.

On July 14, 2017, a status conference was held at the Commission, attended by GMP, DPS, and ANR. At the conference, GMP stated, among other things, that it would not oppose going forward with a hearing on the GHG issue.

No other comments on the Petition were received by the Commission.

On August 31, 2017, the Commission issued an order finding that significant issues existed concerning criteria (b)(2), (b)(3), (b)(4), and (b)(7) on which an evidentiary hearing would be held and further finding it appropriate to include a review of GHG emissions as part of the evidentiary hearing. The order also assigned me as the hearing officer for this proceeding.

On October 17, 2017, ANR and DPS filed direct testimony and exhibits. In its cover letter, DPS also noted that it had reviewed the SIS for the Project and had no remaining concerns about the SIS or the Project under the Section 248 (b)(3) criteria.[3]

On October 23, 2017, I held a public hearing in Vergennes, Vermont. No members of the public attended.

On November 11, 2017, GMP filed rebuttal testimony and exhibits.

On November 30, 2017, I held a status conference by telephone.

On December 1, 2017, GMP filed a stipulation between GMP and ANR, as well as an affidavit from witness Carla Fenner making a minor correction to her testimony.

[3] The Department's October 17, 2017, letter was not admitted into the record as evidence during the December 4, 2017, evidentiary hearing. I hereby enter the Department's October 17, 2017, letter as exhibit Commission-2. Any party objecting to the introduction of the SIS shall file its objection no later than 5 business days after the entry of this order.

On December 4, 2017, I held an evidentiary hearing in Montpelier, Vermont.

On December 13, 2017, GMP filed a revised proposed order and findings.

On December 20, 2017, the Department filed a letter stating that it did not object to GMP's revised proposed order and findings.

On January 11, 2018, GMP filed a proposed study plan ("Study Plan") with the Commission, and the Department filed a letter supporting the Study Plan.[4]

III. FINDINGS

Based upon the evidence of record in this proceeding, I hereby report the following proposed findings to the Commission in accordance with 30 V.S.A. §8(c).

Description of the Project

1. The proposed battery storage system is a 1MW/4MWH Tesla Powerpack 2.0 system, which will be located entirely within the current fence line of the existing GMPSolar Panton Project, a 4.9 MW solar facility off Panton Road in Panton, Vermont. Kirk Shields, GMP ("Shields") pf. at 3.

2. The Project site was reviewed as part of the Section 248 proceeding for the GMPSolar Panton Project in Docket 8637. A CPG was issued for the GMPSolar Panton Project on July 8, 2016. Shields pf. at 3; *Petition of GMPSolar Panton*, Docket 8637, order of 7/8/2016.

3. The battery storage system will be placed on a small, sub-leased portion of the solar project directly off the access road near the southwestern corner of the arrays. The sub-leased portion is approximately 4,000 square feet. Shields pf. at 3; exh. GMP-KS-2.

4. The proposed location is on the area of the solar project site that was created for staging and storing materials and equipment during construction of the solar project and has adequate space for the battery storage system. Shields pf. at 3.

5. The total footprint of the battery storage system is approximately 4,000 square feet and consists of a 26-foot by 37-foot concrete pad on which the battery packs, inverters, switchgear, control cabinet, pad-mounted transformer, and vault-mounted recloser will be

[4] The Study Plan was not admitted into the record as evidence during the December 4, 2017, evidentiary hearing because it was filed after the hearing. I hereby enter the Study Plan as exhibit Commission-4. Any party objecting to the introduction of the Study Plan shall file its objection no later than 5 business days after the entry of this order.

located. The tallest Project component is seven feet, two inches. Shields pf. at 3; exhs. GMP-KS-2, GMP-KS-3, and GMP-DB-3.

6. The battery storage system will be enclosed by an approximately 8-foot fence that will be covered with noise-dampening mats. Shields pf. at 3-4; exhs. GMP-KS-3 and GMP-IJ-2.

7. The battery storage system will include three inverter blocks, each block consisting of an inverter and up to ten Tesla Powerpack Units, which are batteries made up of multiple small format, cylindrical lithium-ion ("Li-Ion") cells. Shields pf. at 4; exhs. GMP-KS-2 and GMP-DB-3.

8. Each Tesla Powerpack unit consists of a series of cylindrical Li-Ion battery cells assembled in serial and parallel arrays, together with an isolated DC/DC converter, traditional Battery Management System ("BMS") functions, and liquid thermal management in a dust and waterproof IP67 steel enclosure. The liquid thermal management system is located on the inner face of the Powerpack unit door and is a fully closed loop subsystem that includes a radiator and pump system that circulates approximately 26 liters of a 50/50 ethylene glycol/water coolant mixture through the battery to maintain thermal control. The thermal subsystem also includes 400 grams of R134a (1,1,1,2-Tetraflouroethane) refrigerant in a sealed system. Dan Belarmino, GMP (Belarmino") pf. at 3; exh. GMP-DB-3.

9. Each Powerpack unit is also equipped with safety features, including an open-door sensor that shuts down all Powerpack units within an inverter block. Each Powerpack Inverter that converts DC power to AC power (discharge mode) or AC power to DC power (charge mode) is also equipped with thermal management system and associated safety features. Belarmino pf. at 3-4; exh GMP-DB-3.

10. GMP represents that the Powerpack system and the associated equipment meet or exceed the applicable industry regulations and standards. Belarmino pf. at 3.

11. The battery component will connect via underground line to the terminating cabinet installed on the GMPSolar Panton Project site. Shields pf. at 4; exh. GMP-KS-2.

12. The Powerpack system will have a power output of 1000 kW and energy capacity of 4000 kWh, or a C/4 rating. The battery storage system is capable of exporting, at full charge, 1000 kW of power for 4 hours. Under a capacity maintenance agreement ("CMA") with Tesla, this rating is guaranteed for 20 years or within the predetermined number of annual cycles (or

equivalent throughput) on the battery storage system, without experiencing the typical battery degradation. Belarmino pf. at 4.

13. Tesla sold GMP the Powerpack system, which includes the Li-Ion batteries and cabinets, inverters, cooling system, and associated control systems. The Powerpack system is under warranty by Tesla for ten (10) years. Belarmino pf. at 4-5.

14. Under the CMA, Tesla assumes responsibility for managing the expected degradation of the battery storage system over the contract term. Belarmino pf. at 5-6.

15. In order to maintain the rated power and energy, Tesla expects to add capacity in the form of battery packs on a periodic basis up to a maximum of 29 Powerpack Units. Site infrastructure, including the concrete pad for the battery system, is designed and sized at the outset to accommodate these future additions or replacements over time with minimal additional infrastructure and at the lowest incremental cost. Belarmino pf. at 6.

16. GMP proposes to sublease a small area of the solar project site from GMPSolar-Panton, LLC and would own and operate the battery storage system itself on behalf of customers. The Project will utilize some of the existing solar interconnection equipment, but the solar and battery systems will each be metered separately and operated as two distinct systems. Shields pf. at 5.

17. GMP will be able to determine when and how the battery storage system is charged with solar energy produced from the array and when it is most valuable for customers to discharge the battery. The GMPSolar Panton Project will continue to own, operate, and maintain the solar project on its own, and GMP will own, operate, and maintain the battery storage system as a distinct and separately owned and operated energy system. Shields pf. at 5.

18. Construction for the Project is expected to take between 4 and 5 months from the start of construction to commercial operation. Shields pf. at 6.

19. At the end of the life of the battery storage system, GMP will be responsible for decommissioning the battery storage system as a utility project. GMP will remove all infrastructure from the site and will restore stockpiled primary agricultural soils to the site. Shields pf. at 6-7.

20. The Project footprint is 4,000 square feet and is entirely within the fenced area of an existing facility subject to Section 248 approval and oversight. Shields pf. at 7.

21. The Project will be accessed using the existing access road constructed for the GMPSolar Panton Project, which is located off Panton Road. A small parking area is proposed in the area between the batteries and the transformer and recloser. Shields pf. at 4; exh. GMP-KS-2.

22. The Project is set entirely within the fence line of the GMPSolar Panton project site, which the Commission found to comply with Vermont's statutory setback requirements. Therefore, the battery storage system will also comply with the setback requirements in Section 248(s). Shields pf. at 5; exh. GMP-KS-2.

Orderly Development of the Region

[30 V.S.A. § 248(b)(1)]

23. The Project will not unduly interfere with the orderly development of the region, with due consideration having been given to the recommendations of the municipal and regional planning commissions, the recommendations of the municipal legislative bodies, and the land conservation measures contained in the plan of any affected municipality. This finding is supported by findings 24 through 28, below.

24. The Town of Panton supports the Project. Shields pf. at 6.

25. While the town and regional plans clearly identify the need for sensitivity to scenic resources in the development of land, these documents do not provide specific, clear, written community standards that are designed to preserve the aesthetics or scenic beauty of the area in which the Project would be built. Mark Kane, GMP ("Kane") pf. at 9.

26. The Project is consistent with recommendations and any specific land conservation measures included in the Town of Panton's Town Plan ("Town Plan"). The lands encompassing the Project site have not been identified for specific land conservation measures or indicated as conservation lands. These lands are indicated as "Rural Residential/Agricultural" areas in future land use and on current zoning maps. While the Town Plan addresses natural resource conservation issues, such as wetlands, on a more general basis, the Project has avoided impacts to these resources in its design. Kane pf. at 7; exh. GMP-KS-3.

27. Given the small footprint of the Project and its proposed location within an existing solar facility, the design of the Project would not frustrate the intent of the Town Plan's recommendations, goals, and objectives. Kane pf. at 9.

28. The Project is consistent with the Addison County Regional Plan ("Regional Plan"). The co-location of the Project within the limits of an existing solar facility, set well back from public view, and with existing and new fencing and previously proposed landscape mitigation, will mitigate the Project's impact and is aligned with the broad policy objectives of the Regional Plan. Kane pf. at 8-9; exh. GMP-KS-4.

Need for Present and Future Demand for Service
[30 V.S.A. § 248(b)(2)]

29. 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 30 through 36, below.

30. The Project will help meet the need for present and future demand for service by providing backup power and load management. Andrew Quint, GMP ("Quint") pf. at 10-14.

31. The Project includes a load management device that allows load to be shifted from a period of high demand to a period of lower demand, wherein a battery is charged when loads or power market prices are relatively low and then discharged during periods of high load or high market power prices. Quint pf. at 10.

32. When teamed with battery storage, the GMPSolar Panton Project allows GMP to leverage the load reduction benefits of the solar array by extending the hours when load management benefits can occur. Additionally, with its own inverter, the battery can be additive to the solar array's load reduction capability when peak loads occur during hours of solar output. Quint pf. at 11.

33. The Project will complement Vermont's Renewable Energy Standard ("RES"), which has a Tier 2 requirement mandating that an increasing portion of electric energy come from distributed generation that connects to and supports the distribution system. Quint pf. at 11.

34. The Project is consistent with RES goals because it will help GMP manage the rapid growth of renewable generation in Vermont, which has primarily been solar but also includes wind and hydro. Quint pf. at 11.

35. The Department concluded that the Project meets the requirements of 30 V.S.A. § 248(b)(2). Joanna White, Department ("White") pf. at 7.

36. The Project has the potential to provide distribution grid benefits (voltage and reactive power support), conservation voltage reduction, resiliency (islanding a portion of the distribution grid), and future opportunities to manage high penetrations of distributed energy resources. Anne Margolis, Department ("Margolis") pf. at 3.

Discussion

The Department initially argued that the Project raised a significant issue under 30 V.S.A. § 248(b)(2). In part, the Department made this argument because, in its opinion, there was insufficient information in the initial filings regarding this criterion.[5] After receiving additional information through the discovery process, the Department has modified its initial position and now concludes that the Project meets the requirements of 30 V.S.A. § 248(b)(2).

Having reviewed the record, I am persuaded that the Project meets the requirements of 30 V.S.A. § 248(b)(2) and recommend that the Commission rule as such. GMP has provided sufficient evidence to show that the Project will meet the need for present and future demand for service because it will provide backup power and load management services to the distribution grid, both of which are tools for meeting the need for present and future demand for service. Furthermore, depending on how the battery is utilized, the Project also could provide distribution grid benefits, such as voltage and reactive power support; conservation voltage reduction; resiliency, such as islanding a portion of the distribution grid; and opportunities to manage high penetrations of distributed energy resources. In addition, the Project advances RES goals because it will enable GMP to better manage the growth of renewable generation in Vermont.

For all of these reasons, I recommend that the Commission rule that the Project meets the requirements of 30 V.S.A. § 248(b)(2).

Impact on System Stability and Reliability

[30 V.S.A. § 248(b)(3)]

37. The Project will not adversely affect system stability or reliability. This finding is supported by findings 38 through 41, below.

[5] *See*, Tr. of 7/24/17, at 6-8 (White & McNamara).

38. The addition of the Project to the GMPSolar Panton site will not have an adverse impact on system stability and reliability. Belarmino pf at. 11-12.

39. GMP submitted a completed SIS on June 1, 2017, and the Department has no concerns with the SIS or the Project under this criterion. Letter from Sheila Grace, Department Staff Attorney, to Judith C. Whitney, Clerk of the Commission, filed on 10/17/17. Exhs. Commission-2 and Commission-3.

40. Provided all recommendations in the SIS are implemented, the addition of the battery storage system would have no adverse impact on the safe, reliable, and stable operation of the GMP electric system. Belarmino pf. at 11.

41. With the infrastructure upgrades already in place to interconnect the GMPSolar Panton Project, the addition of the battery storage project should not necessitate any further distribution system upgrades. Belarmino pf. at 11.

Discussion

The Department initially argued that the Project raised a significant issue under 30 V.S.A. § 248(b)(3). The Department made this argument because the Project did not at the time of the Department's comments have a complete System Impact Study ("SIS"). After receiving the completed SIS, which GMP filed on June 1, 2017, the Department modified its initial position and now concludes that the Project meets the requirements of 30 V.S.A. § 248(b)(3).

Having reviewed the SIS and considering the Department's revised position on this criterion, I conclude that GMP has satisfied the requirements of 30 V.S.A § 248(b)(3). Therefore, I recommend that the Commission rule that GMP has satisfied the requirements of 30 V.S.A § 248(b)(3).

Economic Benefit to the State

[30 V.S.A. § 248(b)(4)]

42. The Project will provide an economic benefit to the State and its residents. This finding is supported by findings 43 through 50, below.

43. The Project benefits that were modeled include peak shaving, regulation, and energy arbitrage, with a total net present value ("NPV") of $3.3 million over 25 years under a base-case approach. Quint pf. at 12; Quint rebuttal pf. at 2; exh. GMP-AQ-2 (Rev.).

44. Property and income tax expenses associated with the Project will provide benefits to the Town of Panton, the State, and their residents. Quint pf. at 12; White pf. at 6.

45. There are additional benefits, such as the multiplier effect related to the construction phase of the Project and grid reliability, that have not been quantified. However, it is appropriate to recognize them as positive contributions when determining whether the Project will provide an economic benefit to the State and its residents. Quint pf. at 12-13; White pf. at 3.

46. The Department had initial concerns about the cost-effectiveness of the Project and discussed these concerns with GMP. Primarily these concerns involved the payback period and expected NPV of the Project. White pf. at 2.

47. Following GMP's initial testimony, GMP was able to reduce the capital costs of the Project from the original approximately $3.3 million to approximately $2.7 million, which resulted in improvements to the cost/benefit ratio and the payback period. White pf. at 2.

48. The net changes result in an increased benefit of approximately $340,000 to GMP's customers. Quint rebuttal pf. at 1-3.

49. With the revised budget, the Department's witness concluded that the Project will likely result in net financial benefit to GMP customers. White pf. at 2.

50. In order to monitor the cost and benefits of the Project, GMP prepared a Study Plan, which the Department supported and that will document the Project's capital, operations, and maintenance costs; its operation in terms of hourly charging and discharging and the system benefits it is able to capture; its deployment to capture other system benefits, such as reactive power support, conservation voltage reduction, energy losses, increased distributed generation hosting capacity, and distribution islanding, including the costs and benefits from such deployment (e.g., any netting out of system market and power supply benefits). Exh. Commission-4.

Discussion

In its comments, the Department raised questions about the Project's costs, operations, and benefits. Subsequent reductions to the Project's budget by GMP caused the Department's witness to conclude that the Project will likely result in net financial benefit to GMP customers. On this basis, the Department states that GMP has met its burden under 30 V.S.A. § 248(b)(4).

Additionally, the Study Plan will document the Project's costs, operations, and benefits for a period of three years following Project commissioning. The Study Plan will provide further transparency and information about the actual operation of the Project and its economic benefit to the State.

Having reviewed the filings, including the Study Plan, I am persuaded that the Project will meet its burden under 30 V.S.A. § 248(b)(4). Therefore, I urge the Commission to rule that the Project will satisfy the requirements of 30 V.S.A. § 248(b)(4).

Aesthetics, Historic Sites, Air and Water Purity, the Natural Environment, the Use of Natural Resources, and Public Health and Safety
[30 V.S.A. § 248(b)(5)]

51. The Project will not have an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment, the use of natural resources, or public health and safety, with due consideration having been given to the criteria specified in 10 V.S.A. §§ 1424a(d) and 6086(a)(1) through (8) and (9)(K), and greenhouse gas impacts. This finding is supported by findings 52 through 131, below, which give due consideration to the criteria specified in 10 V.S.A. §§ 1424a(d) and 6086(a)(1) through (8) and (9)(K).

52. GMP's environmental expert performed a natural resource assessment over the entire GMPSolar Panton Project site, of which the proposed Project location is a small part, in 2015 as part of the site review in that proceeding. GMP's expert concluded that the proposed solar project would not have an undue adverse effect under any of the Section (b)(5) environmental criteria, and the Commission made the same findings. Carla Fenner, GMP ("Fenner") pf. at 2; *Petition of GMPSolar Panton*, Docket 8637, order of 7/8/2016.

Outstanding Resource Waters

[10 V.S.A. § 1424a; 30 V.S.A. § 248(b)(8)]

53. The Project will not affect any outstanding resource waters as defined by 10 V.S.A. § 1424a(d) because there are no outstanding resource waters in the Project area. Exh. GMP-CF-2.

Air Pollution and Greenhouse Gas Impacts

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

54. The Project will not result in undue air pollution, sound, or GHG emissions. This finding is supported by findings 55 through 62, below.

Air Pollution

55. The construction of the battery storage system may result in temporary emissions of a minimal level of air pollutants generated by typical construction equipment, but the battery system's operation will not increase hydrocarbon emissions. Shields pf. at 8.

Greenhouse Gas Impacts

56. The Project will help reduce the need for fossil fuel use by offsetting GMP's need for energy, including energy from non-renewable generating resources, during peak times. Shields pf. at 11.

57. ANR recommended that GMP commission a life-cycle analysis of the Project in order to estimate the Project's GHG emissions. Woods pf. at 9.

58. GMP agreed to commission a life-cycle analysis of the Project, working with ANR to learn more about the GHG benefits of battery storage technology. Shields rebuttal pf. at 5.

59. The life-cycle analysis commissioned by GMP considered the manufacturing, installation, operation, maintenance, and end-of-life of the Project, including cradle-to-grave GHG emissions associated with the upstream materials and manufacturing of the system. Shields rebuttal pf. at 4-5; exh. GMP-KS-5.

60. The life-cycle analysis also considered three different operating scenarios: 1) where the battery is charged during off-peak hours and discharged during peak load hours; 2) where the battery reduces the need for a new natural gas plant or enables an existing plant to be

decommissioned; and 3) where the battery is charged from renewable sources and then discharged during peak load hours. Shields rebuttal pf. at 5-6; exh. GMP-KS-5.

61. GMP and ANR agree that, based on the results of the life-cycle analysis and given the operating scenarios anticipated for the Project and the proposed CPG condition regarding GHG reporting, the Project will not result in an undue adverse impact on the natural environment, with due consideration having been given to GHG impacts. Exh. GMP- ANR-Joint-1.

62. GMP and ANR have further agreed to a proposed CPG condition regarding GHG reporting. Exh. GMP-ANR-Joint-1.

Discussion

ANR originally raised concerns about GHG impacts of the Project, particularly from embedded GHG impacts. However, after GMP conducted a life-cycle analysis of the Project, ANR and GMP entered into a stipulation (Exh. GMP-ANR-Joint-1) so that the Project will not result in an undue adverse impact on the natural environment with due consideration having been given to GHG impacts.

Having reviewed the record and the ANR and GMP agreement, I am persuaded that the Project satisfies 30 V.S.A. § 248(b)(5) and 10 V.S.A. § 6086(a)(1). Therefore, I urge the Commission to rule that the Project, subject to the parties' stipulation, will satisfy the requirements of the GHG criterion.

Water Pollution

[10 V.S.A. § 6086(a)(1)]

63. The Project will not result in undue water pollution. This finding is supported by findings 64 and 65, below.

64. The Project is not located near any outstanding resource waters, a headwaters area, a floodway or flood fringe, or on or adjacent to any stream banks or shoreline. Exh. GMP-CF-2.

65. The Project will not require the use of water during the construction phase (unless required for dust control) or during the operational phase. Any water that may be required will be brought to the site on small maintenance vehicles. Ian Jewkes, GMP ("Jewkes"), pf. at 5

Headwaters
[10 V.S.A. § 6086(a)(1)(A)]

66. The Project will not have an undue, adverse impact on any of Vermont's headwaters because the site location does not meet any of the subcategories that define headwaters; thus, the Project site is not considered to be in a headwaters location. Exh. GMP-CF-2.

Waste Disposal
[10 V.S.A. § 6086(a)(1)(B)]

67. The Petitioner represents that the Project will meet all applicable health and the Department of Environmental Conservation's regulations regarding the disposal of waste and will not involve the injection of waste materials or any harmful or toxic substances into groundwater or wells. This finding is supported by findings 68 through 73, below.

68. The proposed transformer will use non-petroleum oil, which biodegrades in the environment in the event of an accidental spill. As an extra measure of precaution, and based on ANR recommendations, the battery transformer will include the construction of a secondary oil containment system. Jewkes pf. at 2-3; exh. GMP-KS-2.

69. Per the ANR Natural Resources Atlas, there are no groundwater source protection areas, surface water source protection areas, or water supply wells mapped within the vicinity of the Project site. Additionally, the transformers are not located within a wetland buffer. Exh. GMP-CF-2.

70. In the event of a transformer leak, oil would be contained in the unit's secondary containment system and would prevent a release of oil. Accordingly, the proposed pad-mounted transformer does not pose a potential for adverse impacts to sensitive receptors. Exh. GMP-CF-2.

71. Project construction will generate minor amounts of scrap and waste material during installation. This waste will be disposed of or recycled at an approved off-site disposal facility. No tree clearing is proposed for the Project. Jewkes pf. at 3.

72. The Project will use the existing access road from the GMPSolar Panton Project. A gravel area that was used for staging during construction of the GMPSolar Panton Project will be expanded off the access drive, which will house all battery project components and provide places for workers to park utility vehicles. Jewkes pf. at 3; exh. GMP-KS-2.

73. All topsoil in this area will be removed and stored on site within the same map unit (Vergennes clay) and separated by soil horizon in the location indicated on the site plan. Jewkes pf. at 3; exh. GMP-KS-2.

Floodways
[10 V.S.A. § 6086(a)(1)(D)]

74. The Project is not located within a floodway or floodway fringe and therefore will not restrict or divert the flow of flood waters, significantly increase the peak discharge of a river or stream within or downstream from the Project, or endanger the health, safety, or welfare of the public or of riparian owners during flooding. Exh. GMP-CF-2.

Streams
[10 V.S.A. § 6086(a)(1)(E)]

75. The Project will not have an undue adverse effect on streams. This finding is supported by findings 76 through 79, below.

76. Three streams mapped by the Vermont Hydrography Dataset ("VHD") are present within the area assessed by the Petitioner's expert for the GMPSolar Panton Project. Exh. GMP-CF-2.

77. Field assessments on August 25, 2015, and September 18, 2015, confirmed that no streams are present within the proposed site location for the Project. Exh. GMP-CF-2.

78. No Project construction work will be conducted within 50 feet of any VHD-mapped stream. Exh. GMP-CF-2.

79. The Project will not directly or indirectly affect any streams. Exh. GMP-CF-2.

Shorelines
[10 V.S.A. § 6086(a)(1)(F)]

80. The Project is not located near or along a shoreline. Exh. GMP-CF-2.

Wetlands
[10 V.S.A. § 6086(a)(1)(G)]

81. The Project will not have an undue adverse effect on wetlands. This finding is supported by findings 82 through 84, below.

82. Two wetlands and four delineated wetlands listed on the Vermont Significant Wetlands Inventory ("VSWI") are within the site area assessed for the Project. Exh. GMP-CF-4.

83. There are no mapped or delineated wetlands within the proposed Project location. The closest delineated wetland to the Project is a Class III feature approximately 160 feet northwest of the Project location. Exh. GMP-CF-4.

84. No construction work on or for the Project will take place within 50 feet of any field-delineated or VSWI-mapped wetland. Exh. GMP-CF-4.

Sufficiency of Water and Burden on Existing Water Supply
[10 V.S.A. §§ 6086(a)(2) and (3)]

85. The Project will not require any water use beyond the minimal water brought to the site for dust control, and therefore will not place any additional demand or burden on the existing water supply in the Project area. Jewkes pf. at 5-6.

Soil Erosion
[10 V.S.A. § 6086(a)(4)]

86. The Project will not cause unreasonable soil erosion or reduction in the capacity of the land to hold water. This finding is supported by findings 87 through 98, below.

87. The area proposed to be disturbed by the construction of the Project was previously disturbed during the construction phase of the GMPSolar Panton Project solar array. Jewkes pf. at 3.

88. The construction footprint necessary to install the battery Project is approximately 12,500 square feet (0.29 acre). Jewkes pf. at 3; exh. GMP-KS-2.

89. GMP represents that the Project will be a "Low Risk" project. Jewkes pf. at 3-4.

90. Given the Project location, the Erosion Prevention and Sediment Control ("EPSC") measures required for the construction of the Project will be the same as those used for the GMPSolar Panton Project. These measures will include, but will not be limited to, the stabilized construction entrance, a new silt fence along the underground conduit trench from the Project site to the terminating cabinet located 500 feet north of Panton Road on the access drive, an existing silt fence and construction limit barrier for the GMPSolar Panton Project site, and the large stabilized construction staging area surrounding the Project equipment. Jewkes pf. at 4; exh. GMP-KS-2.

91. The Project will follow the guidance and standards contained in the *Vermont Low Risk Site Handbook for Erosion Prevention and Sediment Control*, August 2006. Jewkes pf. at 4.

92. The EPSC measures will ensure that stormwater runoff is effectively managed as required under the Construction General Permit for Low Risk projects. Jewkes pf. at 4.

93. GMP represents that its Notice of Intent for Stormwater Discharges Associated with Construction Activities on Low Risk Sites for GMPSolar Panton Project ("NOI"), permit No. 7532-9020, has not yet been terminated and is valid until February 17, 2018. Jewkes pf. at 4.

94. GMP expects that the installation of the Project will be completed under the existing NOI, after amending the NOI as needed. If the Project is not completed by that date, an extension of the NOI will be sought. Jewkes pf. at 4.

95. With respect to impervious surface area, the addition of the Project's infrastructure to the GMPSolar Panton Project site will slightly increase the designed impervious area on the site from 0.89 acre to 0.96 acre. Jewkes pf. at 4; exh. GMP-KS- 2.

96. The total permanent impervious surface of the two Projects will remain less than one acre; therefore, GMP states that no operational phase stormwater management or permit is required for either Project. Jewkes pf. at 4-5; exh. GMP-KS-2.

97. The permanent impervious surface from the Project will represent only 0.23% of the total fenced area on the Project site, and no tree clearing is needed for the Project. Jewkes pf. at 5.

98. The small amount of new impervious surface in conjunction with the proposed re-vegetation of the staging area disturbance will result in the Project having no adverse impact on the capacity of the land to retain water. Jewkes pf. at 5.

Discussion

In its comments, ANR raised concerns about the Project's creation of impervious surfaces. GMP and ANR agreed to the inclusion of a condition to ameliorate ANR's concern. Because both parties agree to the condition and because the inclusion of the condition in a CPG will decrease the likelihood that the Project would cause unreasonable soil erosion or reduction in the capacity of the land to hold water, I recommend that the Commission adopt the agreed-to condition.

Transportation
[10 V.S.A. § 6086(a)(5)]

99. The Project will not cause unreasonable traffic or congestion. This finding is supported by findings 100 and 101, below.

100. Operation and maintenance activities will be relatively limited, with periodic visual inspections by one or two workers in a pickup truck or similar vehicle. The battery system is monitored and controlled by remote equipment, and no permanent onsite personnel presence is required. Shields pf. at 8.

101. With the infrequent site visits by maintenance personnel, the battery system will not cause any significant increase in traffic to the Project site, or cause unreasonable congestion or unsafe conditions. Shields pf. at 8.

Educational Services
[10 V.S.A. § 6086(a)(6)]

102. The Project will not place an unreasonable burden on the ability of any municipality to provide educational services because the Project will not require or affect educational services. Shields pf. at 9.

Municipal Services
[10 V.S.A. § 6086(a)(7)]

103. The Project will not place an unreasonable burden on the ability of the affected municipality to provide municipal or government services because the Project will not require or affect local services. Shields pf. at 9.

Aesthetics, Historic Sites, and Rare and Irreplaceable Natural Areas
[10 V.S.A. § 6086(a)(8)]

104. The Project will not have an undue adverse impact on aesthetics or on the scenic or natural beauty of the area, nor will the Project have an undue adverse effect on historic sites or rare and irreplaceable natural areas. This finding is supported by findings 105 through 123, below.

Aesthetics - Sound

105. Operational noise on the site will be produced by the following equipment from both the existing solar array and the Project: solar inverters, transformers, tracker motors, proposed Tesla Powerpacks (batteries), and proposed Tesla Powerpack inverters. Jewkes pf. at 6; exh. GMP-IJ-2.

106. To minimize the additional noise from the batteries, the Powerpack system will be surrounded by a chain-link fence mounted with sound-dampening fabric. Per the fabric manufacturer's specifications, the fabric will reduce the sound levels around the battery units by approximately 27 dBA, which will substantially reduce the sound impact of the battery infrastructure. Jewkes pf. at 6.

107. The maximum sound levels generated by the various Project equipment and the solar facility equipment, based upon the manufacturers' specifications, are as follows:

a. 50 dBA at a 3-meter distance for all of the existing solar array Solectra inverters,
b. 62 dBA at a 3-meter distance for the two existing solar array transformers,
c. 60.5 dBA at a 3-meter distance for all the existing solar array NEXTracker motors,
d. 45.5 dBA at a 3-meter distance for the proposed battery project Tesla Powerpacks (72.5 dBA – 27 dBA with the sound dampening fabric),
e. 33.5 dBA at a 3-meter distance for the proposed battery project Tesla Inverters (60.5 dBA – 27 dBA with the sound dampening fabric), and
f. 60 dBA at a 3-meter distance for the proposed battery project's 1,500 kVA transformer.

Jewkes pf. at 6-7; exh. GMP-IJ-2.

108. The closest off-site residence is approximately 1,165 feet from the closest solar module. Exh. GMP-IJ-2.

109. After combining the operational sound produced by all of the noise-generating components from both the Project and the GMPSolar Panton Project, and accounting for the attenuation of sound over distance, it is estimated that the maximum noise level at the nearest residence will be 39 dBA during daylight hours and 21 dBA at night. Jewkes pf. at 7.

110. These levels are close to what was approved by the Commission in the GMPSolar Panton CPG proceeding, where the sound levels were 38.8 dBA during daylight hours and 18 dBA at night. Jewkes pf. at 7.

111. GMP represents that the sound levels for the Project would be below the residential noise guidelines established by the U.S. Environmental Protection Agency. Jewkes pf. at 7.

Aesthetics - Visual

112. The Commission found that the GMPSolar Panton Project would not have an undue adverse effect on aesthetics or on the scenic or natural beauty of the area. *Petition of GMPSolar - Panton, LLC for a certificate of public good*, Docket # 8637, order of 3/25/17, at finding 106.

113. The Project will have a very small footprint within the larger, existing solar facility, and the scale and size of the Project's components will be smaller than the surrounding arrays within which they are set. This will have the effect of providing screening for areas to the north, west, and east of the Project site. Kane pf. at 10.

114. From potential vantage points to the south of the Project along Panton Road, the Project is on the lower portion of the site and more than 900 feet away from public vantage points. Kane pf. at 10; exh. GMP-MK-2.

115. The GMPSolar Panton Project, which occupies most of the site, has approved landscape mitigation plantings that extend along and outside of the eastern and southern fence line of the Project. Kane pf. at 4-5.

116. The Tesla battery Powerpack units and associated components look like other equipment commonly observed within solar projects (inverters, cabinets, transformer). Additionally, the sound attenuation fencing will entirely encompasses the Powerpack units themselves and, at eight feet in height and solid in appearance, will provide another layer of screening for the Project. The dark color of the attenuation fencing will further lessen any offsite visual impact. Kane pf. at 10; exh. GMP-MK-2.

117. A comprehensive planting plan was approved as part of the GMPSolar Panton proceeding to screen views of the proposed solar project. The composition and location of these

plantings will place them directly in the foreground for views from Panton Road, thereby screening the Project from view. Kane pf. at 11; exh. GMP-MK-2.

118. The Project does not require any tree clearing. No grading or intensive infrastructure (roads, poles, etc.) is required. The result is that the Project will not introduce a change in use into the area that will be visible to the public on Panton Road, particularly given the existing GMPSolar Panton Project. Kane pf. at 11; exh. GMP-MK-2.

119. The local (Panton Town Plan) and regional (Addison County Regional Plan) plans have no clearly written community standard with which the Project would conflict. Kane pf. at 11; exhs. GMP-MK-2, GMP-MK-3, and GMP-MK-4.

120. Within the broader landscape and within the context of the existing solar project, the Project does not alter the existing scenic qualities. The Project is set on a site that does not permanently degrade or diminish long-range views, and the Project does not impede or degrade regional landscape forms visible in the surrounding areas. Kane pf. at 11-12; exh. GMP-MK-2.

121. Through its co-location with the GMPSolar Panton Project, the Project takes advantage of planned landscape mitigation. In both the short and long term, the components that comprise the Project will remain well screened and visually indiscernible from the existing solar project. Kane pf. at 12; exh. GMP-MK-2.

Discussion

Having reviewed the filings, I recommend that the Commission find that the Project will not have an undue adverse effect on aesthetics or on the scenic or natural beauty of the area. I make this recommendation because: (1) the Project will reside within the existing GMPSolar Panton Project site; (2) the Project's equipment will blend in with and be mostly screened by the existing equipment associated with the solar array; (3) the vegetation mitigation required for the GMPSolar Panton Project will also screen the Project's equipment; and (4) the most visible portion of the Project will be more than 900 feet away from the nearest public vantage point.

For all of these reasons, I recommend the Commission find that the Project will not have an undue adverse effect on aesthetics or on the scenic or natural beauty of the area.

Historic Sites

122. The Project will not have an undue adverse effect on historic properties because the Project will be located entirely within the area that was assessed in 2015 for the GMPSolar Panton Project and that was determined to contain no significant historical resources that will be adversely affected by the Project. Charles Knight, GMP ("Knight"), pf. at 2.

Rare and Irreplaceable Natural Areas

123. There are no rare and irreplaceable natural areas at the Project site. Fenner pf. at 3; exh. GMP-CF-2.

Necessary Wildlife Habitat and Endangered Species

[10 V.S.A. § 6086(a)(8)(A)]

124. The Project will not have an undue, adverse impact on any necessary wildlife habitat ("NWH") or rare, threatened, or endangered species ("RTE"). This finding is supported by findings 125 through 128, below.

125. No NWH is mapped or located within the GMPSolar Panton Project site, which consists of agricultural lands and a hedgerow. Exh. GMP-CF-2.

126. There is an existing osprey nest on the eastern edge of the GMPSolar Panton site. As part of the GMPSolar Panton proceeding, GMP agreed to delay construction activities until after August 1st if there were osprey using the nest as of May 1st of the construction year. Fenner pf. at 4; exh. GMP-CF-3.

127. Operational noise from the Project will be mitigated by the installation of noise blocking and absorbing material on the approximately eight-foot-tall perimeter fence around the Project and associated components. Fenner pf. at 4; exhs. GMP-CF-2 and GMP-KS-2.

128. The noise level of the Project will not exceed the noise levels of the approved GMPSolar Panton Project or other existing heavy farm equipment used in the general vicinity of the Project. Fenner pf. at 4; exh. GMP-IJ-2.

Discussion

In its comments, ANR raised concerns about the Project's impact on the osprey nest in the vicinity of the Project site. ANR and GMP agreed on the inclusion of a condition related to

osprey in any CPG issued for the Project. Because the parties agree and because the condition is likely to reduce the impact of the Project on nesting osprey, I recommend that the Commission include the proposed condition in any CPG issued for the Project.

Development Affecting Public Investments

[10 V.S.A. § 6086(a)(9)(K)]

129. The Project will not unnecessarily or unreasonably endanger any public or quasi-public investment in the facility, service, or lands, or materially jeopardize or interfere with the function, efficiency, or safety of, or the public's use or enjoyment of or access to the facility, service, or lands. This finding is supported by findings 130 and 131, below.

130. The only nearby public investments are Panton Road and Panton Memorial Park. Shields pf. at 9.

131. The Project is located within the interior of the fence line of the GMPSolar Panton Project, and the footprint of the existing solar array is unchanged by the addition of a battery storage system. Therefore, public use of Panton Road and Panton Memorial Park will not be affected by the Project. Shields pf. at 9.

Public Health and Safety

[30 V.S.A. § 248(b)(5)]

132. The Project will not have any undue adverse effects on the health, safety, and welfare of the public. This finding is supported by findings 133 through 137, below.

133. The battery storage system is located within the interior of the fence line of the GMPSolar Panton Project and will not be accessible to the general public without GMP personnel present. Shields pf. at 10; exh. GMP- KS-2.

134. The batteries will be located within a gated and locked fence, and the Project has been designed to meet applicable safety standards of the National Electrical Code and National Electrical Safety Code. Shields pf. at 10; exh. GMP- KS-2.

135. All switchgear equipment will be inside a locked, UL-listed, code-approved electrical enclosure, and the electric lines will be buried underground. The transformer will be installed with a secondary containment system to protect against any transformer oil leaks. Shields pf. at 10; exh. GMP-KS-3.

136. The batteries contain UL 1642 listed lithium-ion cells, which are hermetically sealed and will not produce off-gasses during normal operation. The batteries do not contain any solid metallic lithium and are not water-reactive. Shields pf. at 10; exh. GMP-KS-4.

137. The system uses glycol as a coolant, similar to automotive cooling systems, inside a closed-loop thermal management system and contained inside sealed enclosures. In the unlikely event of a spill, the response is similar to automotive-type spills and involves absorbing the glycol and removing any affected soils. Additionally, Tesla states that both the Powerpack and the enclosure around the Powerpack were designed to meet or exceed the requirements of UL 1973 and other industry standards. Shields pf. at 10; exh. GMP-KS- 4.

Consistency with Company's Least-Cost Integrated Plan
[30 V.S.A. § 248(b)(6)]

138. The Project is consistent with the principles for resource selection expressed in GMP's most recently approved least-cost integrated resource plan ("IRP"). As discussed GMP's 2014 IRP, GMP proposed exploring opportunities for batteries, including pairing solar and battery technologies, and using batteries to address distribution reliability gaps. This project provides an opportunity for GMP to enhance the existing GMPSolar Panton solar project with battery storage to gain experience with colocation of solar and batteries. Quint pf. at 13.

Compliance with Twenty-Year Electric Plan
[30 V.S.A. § 248(b)(7)]

139. The Project is consistent with the 2016 Comprehensive Energy Plan approved by the Department under 30 V.S.A. § 202(f). The Department issued a letter so certifying. Belarmino pf. at 10-11.

Waste-to-Energy Facility
[30 V.S.A. §248(b)(9)]

140. The Project does not involve a waste-to-energy facility; therefore, this criterion is not applicable.

Existing or Planned Transmission Facilities
[30 V.S.A. § 248(b)(10)]

141. The Project can be served economically by existing or planned transmission facilities without undue adverse effects on Vermont utilities or customers because the system does not require any transmission upgrades associated with the transformer replacement and the Project will improve system reliability. Belarmino pf. at 12; exh. GMP-DB-4.

Woody Biomass Facilities
[30 V.S.A. § 248(b)(11)]

142. The Project will not produce electric energy using woody biomass; therefore, this criterion is not applicable.

IV. CONCLUSION

In this proposal for decision, I recommend that the Commission approve the request by GMP under 30 V.S.A. §248(j) to construct and operate a battery storage system with a capacity of 1 MW/4 MWH on the site of the GMPSolar Panton Project in Panton, Vermont.

The parties have waived their rights to file comments on the proposal for decision in this proceeding. Therefore, I have not circulated this proposal for decision with the parties for their review or comment pursuant to 3 V.S.A. § 811.

Dated at Montpelier, Vermont, this 22nd day of January, 2018.

John C. Gerhard, Esq.
Hearing Officer

V. ORDER

IT IS HEREBY ORDERED, ADJUDGED, AND DECREED by the Public Utility Commission ("Commission") of the State of Vermont that:

1. The findings, conclusions, and recommendations of the hearing officer are adopted.

2. In accordance with the evidence and plans submitted by Green Mountain Power Corporation (the "Petitioner") in this proceeding, the construction and operation of a battery storage system with a capacity of 1 MW/4 MWH located on the site of the GMPSolar Panton Project in Panton, Vermont, to be known as the "GMP Panton Battery Storage Project" (the "Project") will promote the general good of the State of Vermont pursuant to 30 V.S.A. § 248, and a certificate of public good to that effect shall be issued in this matter.

3. Operation and maintenance of the Project shall be in accordance with the plans and evidence submitted in this proceeding. Any material deviation from these plans or substantial change to the Project must be approved by the Commission. Failure to obtain advance approval from the Commission for a material deviation from the approved plans or substantial change to the Project may result in the assessment of a penalty pursuant to 30 V.S.A. §§ 30 and 247.

4. Prior to commencing site preparation or construction of the Project, the Petitioner shall obtain all other necessary permits and approvals. Construction, operation, and maintenance of the Project shall be in accordance with such permits and approvals, and with all other applicable regulations.

5. The Petitioner shall restrict construction activities to the hours between 7:00 A.M. and 7:00 P.M. Monday through Friday and between 8:00 A.M. and 5:00 P.M. on Saturdays. No construction activities shall occur on Sundays or state or federal holidays.

6. The Stipulation between the Agency of Natural Resources ("ANR") and the Petitioner, filed December 1, 2017, is hereby adopted.

7. The Study Plan filed by the Petitioner on January 11, 2018, agreed to by the Department of Public Service, and identified as Exhibit Commission-4, is hereby adopted.

8. The Petitioner shall comply with the conditions contained in the certificate of public good accompanying this order.

Dated at Montpelier, Vermont, this 22nd day of January, 2018.

Anthony Z. Roisman) PUBLIC UTILITY
)
Margaret Cheney) COMMISSION
)
Sarah Hofmann) OF VERMONT

OFFICE OF THE CLERK

Filed: January 22, 2018

Attest: Judith C. Whitney
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

Sheila M. Grace, Esq. (for Vermont Department of Public Service)
Vermont Department of Public Service
112 State Street, 3rd Floor
Montpelier, VT 05620-2601
sheila.grace@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

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