

May 12, 2025

Via ePUC

Holly Anderson, Clerk
Vermont Public Utility Commission
112 State Street
Montpelier, Vermont 05620-2701

Re: Case No. 25-0719-TF – Tariff filing of Green Mountain Power Corporation for a proposed Zone 4 Energy Storage tariff to be effective with bills rendered on or after May 30, 2025

Dear Ms. Anderson,

Green Mountain Power (“GMP”) hereby responds to the information requests of the Public Utility Commission (“PUC” or “Commission”) issued by Memorandum dated May 6, 2025. An affidavit from Josh Castonguay sponsoring these responses is attached.

1. On page 19 of the prefiled testimony of Josh Castonguay, GMP states that there are “1,200 customers in Zone 4 on these four circuits, spanning approximately 34 rural towns.” Do any of these customers currently participate in any of GMP’s other storage program offerings? If so, will these customers be expected to continue to pay for their storage equipment? Or will they be given the opportunity to shift to the Zone 4 Tariff?

Response: On these four circuits, 80 of the approximately 1,200 eligible customers are participating in GMP storage programs. 60 of these customers are enrolled in the ESS program, 5 are BYOD customers, 13 received storage at no cost through the Grafton Resiliency Zone, and 2 received storage also at no cost through a VLITE program. Existing storage lease customers will be contacted as part of our targeted outreach within the four circuits and will be able to cease lease payments and receive pro-rata reimbursement if they opted for upfront payment and then shift to the Zone 4 Energy Storage Tariff with their existing equipment.

2. On page 24 of Mr. Castonguay’s prefiled testimony, GMP states that it used a 20-year model in the cost-benefit analysis rather than the 15-year model used in GMP’s prior versions of cost-benefit analyses related to energy storage systems. Please provide a cost-benefit analysis of the Zone 4 Tariff using a 15-year model and a narrative describing the different results.

Response: Please see the attached version of the model, which adjusts the 20-year model to 15-years (Att. PUC-Info Request-2). The 20-year model is based on



GMP's many years of experience with residential storage systems. The initial 15-year term for prior models was selected early in the deployment of these systems when there was limited real-world experience with new battery storage technology. With almost ten years of history with this use-case, we have updated assumptions to reflect actual performance of the systems. Using a 20-year model is also supported by our experience with larger-scale battery systems, which use similar battery cell technology and will be operating for 20 years or longer.

In using the 20-year model, we adjusted other assumptions that would need to shift to reflect accurately and appropriately expected outcomes in a 15-year model. For example, the model includes an assumption for availability of systems during events at a rate that is lower than what we are observing in our existing fleet now. In a 15-year model, it is appropriate to use the known, existing availability rate rather than the more conservative assumption on availability utilized in the 20-year model. It is also appropriate to change the assumption on the numbers of systems ceasing operation each year based on experience to date, keeping more systems operating through the entire period.

The attached version of the model makes these appropriate adjustments and assumes a 15-year life but with the same rate of systems ceasing operation used in the 20-year model. This produces an NPV range from \$1,833 to -\$256.

3. Will implementation of the Zone 4 Tariff program be affected by supply chain issues? Does GMP already have energy storage systems on hand? If so, how many of each type?

Response: There are no current supply chain constraints with our ongoing deployment under the Energy Storage System (ESS) Tariff and other energy storage programs. GMP does not expect implementation of the Zone 4 Energy Storage Tariff will be affected by supply chain constraints. The systems are procured through installers working directly with manufacturers and local distributors as needed for installations, and therefore GMP does not maintain an inventory of energy storage systems on hand. Also, because the maximum number of customers eligible in this phase of the Zone 4 Energy Storage Tariff is known and will be managed by GMP, we expect equipment procurement can be paced appropriately to meet installations.

4. Please describe the potential impacts of federal import duty tariffs on the purchase of equipment and associated materials to implement the Zone 4 Tariff program. Please provide a quantitative analysis that shows how increasing equipment costs would affect the cost-benefit analysis.

Response: GMP considered potential tariff impacts as it completed the Zone 4 Energy Storage Tariff filing although the actual tariff impacts remain uncertain. The model accounts for potential system cost variations including a range of

possible tariff impacts. GMP is in frequent discussions with battery partners about how tariff changes could impact final product costs; to date, no pricing changes have been implemented, and it is unclear whether costs will change. Many of the components are manufactured domestically and final assembly of battery systems occurs in the U.S., with battery cells being the component primarily manufactured overseas. If tariff impacts materialize, manufacturers may be impacted differently, and some manufacturers may absorb some or all the impact. This is one of the reasons GMP has been working to expand the range of battery systems eligible under its storage programs.

The model evaluates a range of possible system costs which accounts for this dynamic trade environment and the potential for some system cost variations for this and any other reason. This includes incorporating average cost assumptions which are \$1,200 to \$1,600 above existing system installation costs, per system. GMP will keep in close contact with battery manufacturing partners and in the event actual average system costs vary materially beyond modeled assumptions GMP will update the Department and the Commission promptly.

5. On page 28 of Mr. Castonguay's prefiled testimony, GMP states that the Zone 4 Tariff proposal is "a lower cost [as] compare[d] to other infrastructure solutions, such as undergrounding." Please provide a quantitative analysis and a narrative explanation to support this statement for the Zone 4 area.

Response: The design of the Zone 4 Energy Storage Tariff continues the approach outlined in the Zero Outage Initiative (ZOI) petition, which planned for a typical solution of undergrounding in Zone 3 and residential energy storage in Zone 4 based on which approach is more effective for each zone. The initial Zone 4 locations are those that serve less than 13 customers per line mile, because at that customer density the up-front capital cost of an energy storage solution is equivalent to the average estimated cost of single-phase undergrounding, approximately \$300,000 per mile. In practice, many of these segments will have a lower density and a corresponding lower relative cost for the energy storage solution. This analysis is based on the capital cost of both approaches to inform the initial zone identification and does not take into account the additional value provided by energy storage.

As an illustrative example of this analysis, GMP estimated undergrounding and residential energy storage solutions for four representative Zone 4 segments on the VH4A circuit, covering about 3 miles. Our supporting analysis is provided as Att. PUC-Info Request-5. These segments are typical for a Zone 4 area, with an average of 6 customers/mile and undergrounding cost estimates averaging \$320,977/mile. In total, undergrounding these four taps was estimated at \$960,500, compared to \$421,200 for the energy storage solution. When fully

planned out, Zone 4 Energy Storage projects will be supported by capital planning documentation as described in the Zero Outage Initiative Regulatory Accounting Procedure approved by the Commission in Case No. 23-3501-PET. This Zone 4 Energy Storage Tariff is further designed to be iterative with future program considerations informed by our experience with the first deployment. If other solutions or strategies emerge that are more cost-effective, we will adjust and present that for the next phase of this work.

6. On page 29 of Mr. Castonguay's prefiled testimony, GMP states that the Zone 4 Tariff program is opt-in for customers. Please explain how reduced participation would affect the potential benefits. For example, if only 25% of Zone 4 customers ultimately sign up for the tariff, will GMP's customers experience a "cost-shift" as described in question 8 below? Additionally, please provide an update to the cost benefit analysis to show the potential effects of reduced participation.

Response: Reduced participation would not impact the potential benefits because every individual installed battery storage system will produce a net benefit for all GMP customers. The program therefore does not shift costs to other customers. The benefits incorporated into the model are not dependent on location or the number of customers participating in each zone. While other benefits (such as potential cost savings associated with restoration time) will materialize as more customers participate in each zone, those future potential benefits would be additive to the present NPV positive model. Similarly, if a statewide resiliency value were adopted as part of the Commission process in Case No. 25-0339-PET, that also would be an additional benefit on top of existing modeled benefits. Those additional benefits are not assumed in the model and therefore no modification to the model is necessary to account for potential participation levels.

That said, based on experience with similar programs and prior communications with customers in the communities that are the focus of this first phase, participation is expected to be high. For example, the Grafton Resiliency Zone Pilot, upon which this storage program builds, currently has a 72% participation rate. Customers want to participate in these programs and the deployment of these systems will be accompanied by significant community outreach and individual customer engagement and support. The initial work is targeted at four of the least reliable circuits on GMP's system, which have been hard hit by storms in the last several years. Actual participation and customer uptake will inform future development of the program.

7. On page 29 of Mr. Castonguay's prefiled testimony, GMP refers to utility-scale storage, "such as the solar and storage microgrid in Pantou." Did GMP consider and analyze using utility-scale storage in Zone 4 as an alternative to the proposed Zone 4 Tariff? Please

provide any analysis completed to support GMP's determination to move forward with the Zone 4 Tariff in place of utility-scale storage. If GMP did not conduct such an analysis, please explain why it did not.

Response: GMP considered whether utility-scale or community-based storage solutions would benefit Zone 4 customers along with other solutions including line hardening and determined that residential energy storage is typically the best alternative to provide resiliency in the low density and heavily forested geography of a typical Zone 4 area. As described in the ZOI proceeding,¹ microgrids and related resiliency solutions are best deployed in more populated areas such as compact village centers or in specific areas of high importance to a community during emergency response and require that the isolated area is appropriately hardened itself. To achieve resilience for customers in the same Zone 4 area, a microgrid or utility-scale battery would need to be accompanied by undergrounding and other line hardening, increasing the cost compared to a solution that is a net benefit to all customers.

8. On page 30 of Mr. Castonguay's prefiled testimony, GMP states that "prioritization of Zone 4 energy storage as a grid asset in select areas is no different than identifying specific line upgrades for priority work in areas showing reliability challenges." GMP goes on to say that "storage is the most effective solution to achieve this and does not result in a cost-shift." Why is it appropriate for customers in other areas of the state to continue to pay for their storage equipment when customers in Zone 4 would receive the equipment at no cost?

Response: It is appropriate for customers in other areas of the state to continue to pay for their storage equipment because those customers are not located in a geographic area that has been identified and prioritized for required resiliency upgrade. Installations under the Zone 4 Energy Storage Tariff result from a prioritization process that identified geographic areas most in need of resiliency upgrades, focusing on GMP's least reliable circuits (pages 28-30 of Mr. Castonguay's testimony). The intent of upgrading grid assets in these areas—whether a section of underground line or a residential battery—is to provide customers in these identified areas with highly reliable and resilient service similar to what customers who live in less resiliency-challenged areas experience now at the same cost. This is no different than a customer currently benefitting from a needed reliability upgrade on their line—a cost born by all customers as part of providing service—except with storage, there are number of positive benefits to offset the cost along with the resilience values. By contrast, customers participating in the ESS program elect to participate voluntarily by paying for additional resilience above and beyond what other customers in the area receive

¹ See Case No. 23-3501-PET, Prefiled Direct Testimony of Josh Castonguay at 19 (filed Oct. 9, 2023).

and are not receiving a battery in place of an otherwise needed grid upgrade. While we have had robust customer interest and success in the ESS and other storage programs, these systems are deployed to a relatively small fraction (a few thousand) of GMP's customers, as further illustrated in the response to Question 1 above.

9. On page 32 of Mr. Castonguay's prefiled testimony, GMP refers to a "comprehensive report on the status of deployments, customer uptake, customer demographic data along with other agreed metrics." Please provide further details on the type of evaluations GMP will conduct to determine how to prioritize future deployment of energy storage to customers at no cost in other geographic areas. Please also provide more information on the content of the report.

Response: The purpose of the reporting is to collect, analyze, and present data that will help evaluate and measure the uptake and efficacy of the Zone 4 Energy Storage Program, together with our broader implementation of other components of ZOI across the individual targeted circuits. This will guide how and where to implement the next phase of this work and provide information for the Commission and Department to evaluate proposed next steps. We anticipate this work will continue to be focused on those rural portions of our service territory that have seen the most disruption from increasing climate change driven severe weather events. Tracking the deployment and performance of this initial phase of work, together with other ZOI projects, will help refine the program and ensure it is implemented in a manner that is most impactful for customers.

The reporting would build on the specific ZOI-related storage metrics proposed as part of GMP's Service Quality and Reliability Plan update pending in Case No. 25-0751-PET. GMP would look to work with the Department and Commission in this proceeding on a useful format for this reporting and on specific additional metrics that the Commission or Department would find useful in this exercise.

10. Why does the Zone 4 Tariff include a section on the Round Trip Efficiency ("RTE") Credit rather than rely on the Frequency Regulation Rider approved by the Commission in Case No. 24-3111-TF?

Response: The Round Trip Efficiency credit covers all losses, not just those attributed to Frequency Regulation ("FR") cycling. These systems will participate in FR as this capability is available (and more services in the future) and provides a benefit to all customers. The Zone 4 Energy Storage Tariff is intended to stand alone instead of relying on ESS tariff riders including the FR rider, therefore this tariff encompasses all RTE losses itself, with no participation credit because there is no customer payment.

11. GMP's existing Energy Storage System tariff includes a provision that eligible customers are current with all payments due to GMP. The Zone 4 Tariff does not include such a provision. Please explain why not.

Response: The storage systems installed as part of this tariff are a utility grid asset deployed based on specific resiliency criteria, similar to other grid upgrades that GMP implements where required and without means testing for the customers being served by the upgrade. In this case, the initial phases of the Zone 4 Storage Program work complement other on-going ZOI projects and are targeted at four identified circuits which consistently rank high on GMP's least reliable circuits list, or portions of which would independently be high on the list. There is no concern of outstanding collectibles or ability to pay in the same manner as the ESS tariff because customers are not paying under this Tariff unless they choose to exit the program without returning the storage system.


Sincerely,



Geoffrey Hand, Esq.
Malachi Brennan, Esq.
SRH Law PLLC

I, Josh Castonguay, sponsor GMP's responses to the Commission's information requests and declare that these responses are true and accurate to the best of my knowledge and belief and were prepared by me or under my direct supervision. I understand that if the above statement is false, I may be subject to sanctions by the Commission pursuant to 30 V.S.A. § 30.

Dated at Colchester, Vermont on the 12th day of May, 2025.



Josh Castonguay