

**STATE OF VERMONT  
PUBLIC UTILITY COMMISSION**

Case No. 25-0719-TF

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Tariff filing of Green Mountain Power Corporation for approval of a Zone 4 Energy Storage Program Service tariff to be effective with bills rendered on or after May 30, 2025	
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**PREFILED DIRECT TESTIMONY OF  
BILL JORDAN**

**ON BEHALF OF THE  
VERMONT DEPARTMENT OF PUBLIC SERVICE**

August 11, 2025

Summary: My testimony provides an analysis of reliability considerations as to Green Mountain Power Corporation's ("GMP") proposed "Zone 4 Energy Storage Program" tariff ("Zone 4 Tariff") from an engineering perspective, including how customer reliance solely on energy storage during an outage may differ from electric utility service.

**Mr. Jordan Sponsors the Following Exhibit:**

**Exhibit DPS-BJ-1** Outage Scenarios Involving Storage

**PREFILED DIRECT TESTIMONY OF BILL JORDAN**

1 **Q1. Please state your name, title, and business address.**

2 A1. My name is Bill Jordan. I am the Director of Engineering at the Vermont  
3 Department of Public Service (“Department” or “DPS”). My business address is  
4 112 State Street, Montpelier, Vermont 05620.

5 **Q2. Please describe your educational background and experience.**

6 A2. I have worked for the Department since February 2007, and have held the positions  
7 of Electrical Engineer, Assistant Chief Engineer, and Director of Engineering. In  
8 my current role, I oversee the Department’s Division of Engineering, which  
9 includes Electrical, Gas Pipeline, and Nuclear Engineers. Prior to working for the  
10 Department, I worked for the Vermont Public Service Board (now the Public Utility  
11 Commission) as a Utilities Engineer. I hold both bachelor’s and master’s degrees  
12 in electrical engineering.

13 **Q3. Have you previously testified before the Vermont Public Utility Commission**  
14 **(“Commission”)?**

15 A3. Yes. Over the past 18 years, I have provided testimony in numerous cases, most  
16 recently in Case No. 25-0284-PET.

17 **Q4. What is the purpose of your testimony in this proceeding?**

18 A4. My testimony describes reliability considerations as related to GMP’s proposed  
19 Zone 4 Energy Storage tariff. [Note: much of this testimony is an updated version  
20 of a portion of my testimony in Case No. 23-3501-PET (GMP Zero Outages  
21 Initiative).]

22

1 **Q5. What are the reliability standards to which GMP is currently held?**

2 A5. Title 30 of the Vermont Statutes Annotated requires utilities “to furnish reasonably  
3 adequate service, accommodation, and facilities to the public.”<sup>1</sup> However, the  
4 statute does not define “adequate service.” The powers given to the Department by  
5 Title 30 include: “supervision and evaluation under chapters 5 and 77 of this title  
6 of the quality of service of public utility companies.”<sup>2</sup> Each utility has a Service  
7 Quality and Reliability Plan (“SQRP”) approved by the Commission under the  
8 authority of 30 V.S.A. §§ 209(a)(1), 209(a)(3), and 219.<sup>3</sup> Alternative regulation  
9 under 30 V.S.A. § 218d also requires a Commission finding that the alternative  
10 regulation will “deliver safe and reliable service” and “promote improved quality  
11 of service, reliability, and service choices.”<sup>4</sup> GMP’s current SQRP contains a  
12 variety of performance standards relating to service quality, including the two  
13 reliability metrics System Average Interruption Frequency Index (“SAIFI”) and  
14 Customer Average Interruption Duration Index (“CAIDI”).<sup>5</sup> SAIFI is a measure of  
15 the average number of times a customer has experienced an outage, and CAIDI is  
16 a measure of the average length of time, in hours, that was required to restore  
17 service to customers who experienced an outage. These terms are also defined in  
18 Commission Rule 4.900 (Electricity Outage Reporting).<sup>6</sup> Rule 4.900 also defines

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<sup>1</sup> 30 V.S.A. § 219.

<sup>2</sup> 30 V.S.A. § 2(a)(3).

<sup>3</sup> See *Investigation into Proposed Revisions to Green Mountain Power Corporation's Service Quality and Reliability Performance, Monitoring and Reporting Plan*, Docket No. 8231, Order of July 23, 2014 at 3.

<sup>4</sup> See Case Nos. 21-3707-PET and 22-0175-TF, Order of 6/23/22 (GMP MYRP approval).

<sup>5</sup> Green Mountain Power, Service Quality & Reliability Plan at 11, Revised August 30, 2024, available at [https://puc.vermont.gov/sites/psbnew/files/doc\\_library/gmp-service-quality-plan.pdf](https://puc.vermont.gov/sites/psbnew/files/doc_library/gmp-service-quality-plan.pdf) (as approved in Case No. 24-2825-PET, Order of 12/9/24).

<sup>6</sup> Commission Rule 4.900, effective 11/01/2000, <https://puc.vermont.gov/document/commission-rule-4900-electricity-outage-reporting>.

1 “outage” as “a zero-voltage event, exceeding five minutes, to one or more  
2 customers.” One of the challenges, from a regulatory perspective in reviewing  
3 GMP’s proposed Zone 4 Tariff is that there is no definition (in statute or rule) of  
4 adequate service to which we can compare the proposed Tariff. While GMP does  
5 have reliability performance measures in its Commission-approved SQRP, these  
6 are system-wide averages, which allow individual customers to experience a wide  
7 variability of reliability.

8 **Q6. Please explain how Rule 4.900 relates to GMP’s SQRP.**

9 A6. Rule 4.900 requires electric utilities to report on an annual basis (due by January  
10 30 for the preceding calendar year), the system-wide, calendar year values for  
11 SAIFI and CAIDI, a breakdown of customer hours out by outage cause, and an  
12 overall assessment of reliability addressing locations and causes of outages. The  
13 Rule also allows, at the utility’s option, the inclusion of supplemental indices that  
14 net the effect of outage anomalies. Rule 4.900 contains the formulas for calculating  
15 SAIFI and CAIDI and definitions of terms. The Rule 4.900 report includes all  
16 outages and is an informational filing (with no standards or penalties).

17 By comparison, GMP’s SQRP contains a total of 16 performance standards  
18 related to service quality, including the two reliability standards SAIFI and CAIDI  
19 as defined in Rule 4.900. The utilities file quarterly SQRP reports, but only report  
20 on SAIFI and CAIDI on an annual basis in the fourth quarter report due by January  
21 30 each year. Each of the SQRP performance standards has a “performance  
22 measure” associated with it, and if the utility fails to meet the performance measure,  
23 the SQRP contains a formula for calculating a financial penalty. GMP’s

1 performance measure for SAIFI is 2.4, and GMP’s performance measure for CAIDI  
2 is 2.7. This means that the yearly system-wide average of the number of outages  
3 experienced by GMP customers should not be more than 2.4, and that the yearly  
4 system-wide average outage duration should not be more than 2.7 hours. If GMP  
5 fails to satisfy either of these performance measures, it may be subject to a penalty.  
6 However, GMP’s (and the other utilities’) SQRP allows it to exclude “major  
7 storms” that meet all three of the following criteria: (1) extensive mechanical  
8 damage to the utility infrastructure has occurred; (2) more than 10% of the  
9 customers in a service territory are out of service due to the storm or the storm’s  
10 effects; and, (3) at least 1% of the customers in the service territory are out of  
11 service for at least 24 hours. Presumably, when the GMP SQRP was developed, it  
12 was deemed reasonable to allow the utilities to exclude (then rarer) severe storms  
13 beyond the utilities’ control from the calculations of SAIFI and CAIDI because a  
14 financial penalty is associated with failing to meet the performance measures.  
15 Therefore, when GMP submits its SQRP report in January of each year, the values  
16 of SAIFI and CAIDI are net of major storms.

17 In summary, the major distinctions between the Rule 4.900 and SQRP  
18 reports are that Rule 4.900 includes *all* outages and is informational only (no  
19 standards or penalties), while GMP’s SQRP is net of major storms but does include  
20 standards and penalties. The Rule 4.900 report is what the utility’s customers  
21 actually experienced, while the SQRP is for what the utility is held financially  
22 accountable.

1 **Q7. Has GMP been meeting its SQRP performance measures for SAIFI and**  
2 **CAIDI?**

3 A7. For the 11 calendar years (2013-2023) after the merger of legacy GMP and the  
4 former CVPS, the current version of GMP has met its SQRP performance measures  
5 each year *with major storms excluded* (which is the standard for SQRP). In  
6 calendar year 2024, GMP met its SAIFI performance measure, but did not meet its  
7 CAIDI performance measure (2.77 versus performance measure of 2.70). As  
8 illustrated in the Zero Outages Initiative proceeding (Case No. 23-3501-PET), it  
9 should be emphasized that even if GMP is meeting its reliability metrics (which are  
10 a system-wide average), it is likely that the Zone 4 customers are experiencing more  
11 frequent and longer duration outages than the customers in Zones 1, 2, and 3 (closer  
12 to the substation).

13 **Q8. What is your assessment of whether a customer relying upon battery storage**  
14 **should be considered as an outage?**

15 A8. As noted by Mr. Poor, it is not clear whether GMP is proposing the Zone 4 Tariff  
16 to provide effectively “zero” outages, or simply to reduce the number and duration  
17 of outages by some amount.<sup>7</sup> Regardless, under the Zone 4 Tariff, it appears that  
18 there would still be outages to the *system*, but GMP is expecting storage to keep  
19 customers from *experiencing* these outages due to storage in the home. GMP’s  
20 testimony regarding the proposed Zone 4 Tariff indicates that it expects to be able  
21 to restore outages on its system before the storage devices in the homes are

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<sup>7</sup> See TJ Poor, Vermont Department of Public Service, pf. (8/11/25) at 16.

1 depleted.<sup>8</sup> While this may be possible for the residential applications contemplated  
2 in the proposal, it cannot be guaranteed – and I remain concerned that it may prove  
3 to be much more challenging with respect to any commercial and industrial  
4 applications in Zone 4.

5           There is also the question of whether it is fair to consider reliance on storage  
6 as preventing an outage. Is operating under storage equivalent to utility service?  
7 GMP’s energy storage agreement advises customers that the duration of backup  
8 power depends on the amount of energy stored and the customer’s energy  
9 consumption during the outage.<sup>9</sup> **Exhibit DPS-BJ-1** shows several possible  
10 scenarios while operating under storage. Time proceeds from left to right in  
11 columns B through E. Column B is prior to an outage on the utility system, columns  
12 C and D (if applicable) are during the outage, and column E is the utility service  
13 coming back online. Row 3 is the status of the storage device, which is in standby  
14 or charging prior to the outage, discharging during the outage (column C), possibly  
15 depleted if the outage lasts longer than the storage capacity (column D), and  
16 recharging once the utility service is restored (column E). Scenario 1 is that the  
17 storage rides through the entire outage and the customer does not change behavior  
18 (for example, either because the customer is unaware of the outage of utility service  
19 or otherwise chooses to behave normally). In Scenario 1, operating under the  
20 storage device is equivalent to utility service, and I have assigned this an “outage  
21 score” of “0” in column F, meaning that this should not be considered an outage to

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<sup>8</sup> See Joshua Castonguay, Green Mountain Power Corp. pf. (4/15/25) at 6.

<sup>9</sup> See Exhibit GMP-JC-2.

1 this customer at all. In Scenario 2, the storage device rides through the outage, but  
2 the customer does change behavior by conserving electricity due to worrying that  
3 the storage device might not make it through the outage otherwise. In column C, I  
4 label this a “partial outage” and assigned it an outage score of 0.25. In Scenario 3,  
5 the customer does not change behavior while operating under storage, but the  
6 storage does not make it through the entire outage, resulting in the customer being  
7 completely out for the later part of the outage. I assigned Scenario 3 an outage  
8 score of 0.5 because the customer behaved as if there were no outage for the first  
9 portion of the outage and then was completely out for the later portion of the outage.  
10 In Scenario 4, the customer changes behavior by conserving while operating under  
11 the storage and the storage does not make it through the entire outage. Scenario 4  
12 was assigned an outage score of 0.75 because the customer behaved differently  
13 during the first part of the outage (0.25) and then was completely out during the  
14 later part of the outage (0.5). Scenario 5 (no storage) is included for completeness  
15 to indicate how outages are currently treated (a score of “1” is a full outage). A  
16 complicating factor here is that we will likely never know if the customer changes  
17 behavior and conserves during an outage, and it is for this reason that I am hesitant  
18 to consider it a “zero outage” even if the storage device rides through the entire  
19 outage – because the customer *may* behave as if normal utility service is *not* present.  
20 Another factor relating to storage that has not been explored is that in Zone 4 there  
21 may be large enough loads that GMP’s standard battery offering would not be  
22 sufficient.  
23

1 **Q9. Based on the above testimony what are your overall conclusions?**

2 A9. While battery storage for customers in Zone 4 will certainly help reduce the effects  
3 of outages on the GMP system, it will likely not eliminate the effects due to: some  
4 customers not being able to participate in the storage program, outages lasting  
5 longer than the battery storage capacity, large loads, and customers changing their  
6 behavior when on battery storage. For the same reasons, it is not clear whether  
7 battery storage as contemplated in the proposed Zone 4 Tariff will provide an  
8 equivalent degree of reliability improvement as compared to the other measures  
9 and practices contemplated under the broader ZOI. I conclude that GMP's Zone 4  
10 Tariff proposal does not provide sufficient information to demonstrate equivalence  
11 with reliability measures such as undergrounding or hardening, particularly given  
12 that customer reliance on energy storage during an outage may differ from reliance  
13 on electric utility service. My recommendation is that the definition of "Outage" be  
14 amended in Rule 4.900 to account for storage. I don't have a recommended  
15 definition at this time because amendments to this rule will be a stakeholder  
16 process.

17 **Q10. Does this conclude your testimony?**

18 A10. Yes, it does.