

STATE OF VERMONT  
PUBLIC UTILITY COMMISSION

Case No. 18-0974-TF

Tariff filing of Green Mountain Power Corporation requesting a 5.45% increase in its base rates effective with bills rendered January 1, 2019, to be fully offset by bill credits through September 30, 2019.

PREFILED SURREBUTTAL TESTIMONY OF  
CHRISTOPHER C. DAWSON  
ON BEHALF OF THE  
VERMONT DEPARTMENT OF PUBLIC SERVICE

OCTOBER 8, 2018

Summary: On behalf of the Department of Public Service, Mr. Dawson responds to comments made by Green Mountain Power witness Mr. Smith related to Green Mountain Power's hedging program consisting of short-term purchases for energy and capacity requirements and sales of Renewable Energy Credits. Mr. Dawson also responds to comments made by Green Mountain Power witnesses Mr. Castonguay and Mr. Smith related to the Tesla Powerwall 2.0 Program, specifically related to whether that program is beneficial, appropriate treatment of battery degradation, avoided cost modeling approaches, and proper valuation perspective.

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

Exhibit PSD-CCD-2 – Powerwall Transmission Degradation Example

Surrebuttal Testimony  
of  
Christopher C. Dawson

**I. QUALIFICATIONS AND SUMMARY**

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**Q1. Please state your name, occupation and business address.**

A1. My name is Christopher C. Dawson. I am a consultant with GDS Associates, Inc. (“GDS”). My business address is GDS Associates, Inc., 1850 Parkway Place, Suite 800, Marietta, GA 30067.

**Q2. On whose behalf are you testifying?**

A2. The Vermont Department of Public Service (the “Department”).

**Q3. Have you testified previously in this Docket?**

A3. Yes, I submitted direct prefiled testimony in this Docket on August 10, 2018.

**Q4. What is the purpose of your testimony?**

A4. The purpose of my testimony is two-fold. First, I respond to comments made by Green Mountain Power Corporation (“GMP”) witness Douglas C. Smith in his rebuttal testimony regarding my recommendations for improving GMP’s short-term energy, capacity and Renewable Energy Credit (“REC”) sales hedging strategy and procedures. Second, I respond to comments made by GMP witnesses Douglas C. Smith and Joshua Castonguay in their rebuttal testimonies related to the Tesla Powerwall 2.0 program.

1 **II. HEDGING DISUCSSION**

2 **Q5. Please state the hedging recommendations that you made in your direct testimony.**

3 A5. I recommended the following action items for GMP's hedging activities:

- 4 1. GMP develops a corporate Risk Management Plan for its energy, capacity,  
5 and REC forward sales hedging. This document would, at a minimum,  
6 detail the specifics of the hedging strategy, procedures related to setting  
7 acceptable risk parameters and risk limits, policies for risk reporting and  
8 permitted transaction and product types;
- 9 2. GMP improves its analytical energy modeling tools to facilitate more  
10 granular data analysis, such as hourly simulation models;
- 11 3. GMP codifies its energy transaction process which would incorporate the  
12 improvements that I have identified above;
- 13 4. GMP contracts with an independent auditor to review its hedging practices  
14 and procedures on a triennial basis.

15  
16 **Q6. What views did Mr. Smith share in his rebuttal testimony regarding the first**  
17 **recommendation that GMP develop a Risk Management Plan?**

18 A6. With respect to my concerns that GMP lacked centralized codification and specificity  
19 regarding its energy, capacity and REC hedging strategy and process, Mr. Smith  
20 acknowledged that:

21 GMP can improve the clarity and transparency of its transaction process in  
22 some ways that would be responsive to Mr. Dawson's comments. I  
23 recommend that GMP and the Department collaborate (presumably

1 outside the context of this rate case), to identify appropriate refinements  
2 along these lines.<sup>1</sup>

3 I appreciate Mr. Smith's recommendation and look forward to the outcome of the  
4 collaboration between GMP and the Department, and I defer to Mr. McNamara for the  
5 Department's specific recommendations on this point.

6  
7 However, Mr. Smith also shared a concern "that the resulting process(es) and routines used  
8 to impart clarity and transparency should not impart undue rigidity into the timing and  
9 structuring of transactions."<sup>2</sup>

10

11 **Q7. Was it your intention to recommend that improvements to GMP's hedging strategy**  
12 **and processes should be unduly rigid?**

13 A7. No. It was not my intention to suggest that GMP's hedging strategy and process should  
14 be *unduly* rigid by having a more thoroughly codified hedging strategy and risk  
15 management plan. Based on GMP's discovery responses, there was a lack of codification  
16 and my intention was to emphasize the importance of GMP having additional structure to  
17 its hedging strategy and process and the associated benefits of doing so. This is  
18 particularly important given that GMP, in both discovery responses and rebuttal  
19 testimony, emphasizes the use of discretion and judgement as part of its "rolling" short  
20 term procurement strategy.<sup>3</sup>

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<sup>1</sup> Smith pf reb. at page 31, lines 17-21.

<sup>2</sup> Smith pf reb. at page 32, lines 1-3.

<sup>3</sup> Smith pf reb. at page 52, lines 17-19.

1           However, my suggestion for additional rigor does not need to inhibit appropriate  
2           flexibility in GMP's procurement options. They are not mutually exclusive concepts and  
3           indeed a strategy can benefit from having both concepts present.<sup>4</sup>

4  
5           It is important for a utility to work within the context of a holistic risk management plan  
6           to help ensure its procurement activities are contained within that framework.

7           Notwithstanding this, at times it will be appropriate to alter the plan based on changing  
8           circumstances and having a codified and approved plan would then naturally require a  
9           more robust justification in order to diverge from the plan.

10  
11   **Q8.    What views did Mr. Smith share regarding your third recommendation that GMP**  
12    **improve its energy transaction process?**

13    A8.    Mr. Smith describes the "live-pricing" event for the procurement transaction, the concept  
14    of which I had suggested GMP employ, as an administratively burdensome practice and  
15    suggested that a full-service brokerage or a "live auction" service would need to be  
16    acquired or purchased.<sup>5</sup>

17  
18    **Q9.    Do you agree with Mr. Smith's concerns?**

19    A9.    I would like to reassure Mr. Smith that a so-called "live-pricing" event does not need to  
20    be administratively burdensome and does not require a full-service brokerage or a "live

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<sup>4</sup> Refer to my direct testimony at page 9, lines 11–19 for more detail on this point.

<sup>5</sup> Smith pf reb. at page 42, lines 8–15.

1 auction” service to be of value. A “live-pricing” event, may just involve the following  
2 steps: (1) making a request to qualified counterparties (i.e. qualified counterparties that  
3 have enabling agreements with GMP) to submit, via email, specific product pricing to the  
4 utility at a specific time and date; (2) immediately evaluating the submitted proposals and  
5 having an authorized representative from the utility decide whether to proceed, and with  
6 which counterparty, or not to proceed; (3) contacting the counterparty who submitted the  
7 ‘winning’ bid and confirming the arrangement, typically with a phone call on a recorded  
8 line and a subsequent email; and (4) executing the transaction confirm shortly thereafter.<sup>6</sup>

9  
10 Additionally, an earlier indicative pricing round can assist with creating a short-list of  
11 suppliers that offer the most competitive pricing and which meet the specific  
12 requirements of the product being sought. Therefore, the evaluation mentioned in step 2  
13 can focus on a limited number of criteria with more in-depth analysis taking place earlier  
14 in the procurement process. It is expected that these steps, as described above, would  
15 normally result in a minimal cost to an electric utility.

16  
17 **Q10. What are the benefits of a “live pricing” event for a utility?**

18 A10. In general, a “live pricing” event helps promote a competitive, transparent process as  
19 each counterparty is aware that it is competing with other suppliers for specific products  
20 at a specific time. It can be important to keep this element of competition in the

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<sup>6</sup> The steps outlined are provided as an example to help elaborate on what can be involved with a “live pricing” event and are not designed to be specific process recommendations.

1 procurement process up until the utility procures the product in order to ensure  
2 competitive pricing from counterparties. It can be an appropriate tool to employ for both  
3 standardized products and also utility specific customized power supply products.  
4

5 **Q11. Did Mr. Smith agree with the fourth recommendation that GMP retain an**  
6 **independent auditor to review its hedging practices and procedures on a triennial**  
7 **basis?**

8 A11. Mr. Smith did not agree with the need for an independent auditor to review its practices  
9 and procedures.<sup>7</sup> He further states that “I am not clear as to what purpose would be  
10 served by incurring the costs of a new independent auditor, and don’t presently see the  
11 need for such a role. As discussed below, however, GMP is open to working with the  
12 Department to identify improvements in the clarity and transparency of GMP’s internal  
13 documents associated with its trading activities.”<sup>8</sup>  
14

15 **Q12. Is there an alternative approach to retaining an independent auditor that would**  
16 **address your concerns?**

17 A12. Yes, an appropriate alternative could involve a regular collaboration, every one or two  
18 years, between GMP and the Department to review GMP’s hedging and risk management  
19 plan together with its procurement practices. A periodic review with an outside party  
20 provides an ideal opportunity for GMP, including its corporate governance committee, to

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<sup>7</sup> Smith pf reb. at page 43, line 15.

<sup>8</sup> Smith pf reb. at page 35, lines 20–22 and page 36, lines 1–2.



1 assess its risk management plan and to continuously improve its procurement practices  
2 and procedures.

3  
4 **III. POWERWALL DISCUSSION**

5 **Q13. Please state the conclusions and recommendations related to GMP's Tesla**  
6 **Powerwall 2.0 home batteries ("Powerwall Program") from your testimony.**

7 A13. I conclude that key assumptions used in GMP's analysis are questionable and that GMP  
8 did not conduct important feasibility analysis, specifically a least-cost analysis  
9 comparison to alternative resource options and uncertainty or a sensitivity analysis  
10 around critical assumptions. Because of these concerns, I conclude that the Powerwall  
11 Program cannot be deemed necessary or cost-effective.

12  
13 **Q14. Do you agree with Mr. Castonguay's assessment that your testimony confirms that**  
14 **the Powerwall Program is beneficial?**<sup>9</sup>

15 A14. No, as discussed in the previous question, that is the opposite of the conclusion of my  
16 testimony. Mr. Castonguay's reference to my testimony is to my discussion of the results  
17 of GMP's own analysis. I factually state that GMP's analysis shows a net benefit and  
18 provide other information for the contextual benefit of the reader. The remainder of my  
19 testimony discusses the deficiencies in GMP's analysis, which includes my conclusion  
20 that the Powerwall Program cannot be deemed necessary or cost-effective.

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<sup>9</sup> Castonguay pf reb. at page 6, lines 5–8.

1 **Q15. Did Mr. Castonguay’s description of GMP’s modeling of battery degradation for**  
2 **capacity and transmission benefits of the Powerwall Program address the concerns**  
3 **you raised in your testimony?<sup>10</sup>**

4 A15. No, it did not. Mr. Castonguay purports that the 28% and 38% de-rate factors of capacity  
5 and transmission benefits, respectively, address battery degradation. However, a review  
6 of GMP’s modeling and discovery responses reveal that the company does not address  
7 battery degradation when calculating capacity and transmission benefits. Specifically,  
8 Mr. Castonguay stated in discovery that “we estimate 5kW per unit maximum peak  
9 shaving capability with a de-rate of 38% for RNS and 28% for FCM *not including the*  
10 *degradation over time*” (emphasis added).<sup>11</sup> In addition, GMP states that the “available  
11 energy is reduced by the degradation factor of 3%. Capacity and Transmission reduction  
12 is handled differently... This degradation factor can be found on the Annual Simulation  
13 Results tab starting at cell R60 to cell R74.”<sup>12</sup> Those cells refer to transmission  
14 degradation and the average value of the first ten years of those cells is 98%. The  
15 adjacent cells refer to capacity degradation and are a constant 100%.

16  
17 For clarity, I will provide a detailed description of GMP’s calculation of the 28%  
18 capacity de-rate factor to illustrate what it does and does not account for. Although I  
19 discuss the capacity de-rate factor for specificity, the conclusions and process are  
20 mirrored for the 38% transmission de-rate factor. GMP provides percentage factor

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<sup>10</sup> Castonguay pf reb. at pages 14–16.

<sup>11</sup> GMP discovery response DPS2.Q66.e.

<sup>12</sup> GMP discovery response DPS2.Q61.

1 assumptions for three items to derive this value. First, “FCM Physical Effectiveness” is  
2 100% and corresponds to the degradation factor which I mentioned in the previous  
3 paragraph. Second, “FCM Forecast Accuracy,” which is meant to reflect that a forecast  
4 for unknown and uncertain capacity peak occurrences will be less than perfect, is 80%.  
5 Finally, “Communication Availability,” which is included to reflect that GMP may not be  
6 able to dispatch its full battery fleet perfectly due to hardware or software issues, is 90%.  
7 The product of these three factors equals the 72% applied factor (correspondingly a 28%  
8 de-rate factor) which GMP applies to capacity benefits.<sup>13</sup>

9  
10 Although forecast error and communication issues are valid items for GMP to consider  
11 and model, they do not displace the need to model a battery degradation factor when  
12 calculating capacity and transmission benefits. Mr. Castonguay states that the batteries  
13 are expected to be needed for a duration of 2.5 to 4.0 hours for capacity and transmission  
14 peak shaving purposes but only available for 2.7 hours at the full 5 kW on day one.<sup>14</sup> As  
15 time goes on and the batteries degrade, this duration, meaning the length of time the  
16 batteries can be dispatched at the full 5 kW level, will decrease. To adjust for this reduced  
17 capability, GMP will have to modify battery output to achieve longer durations. For  
18 example, with 13.5 kWh available prior to any degradation, a battery may provide full  
19 output at 5 kW for 2.7 hours (i.e., 13.5 kWh / 5 hours). However, if that battery is needed  
20 to provide output over 4 hours in order to successfully shave a transmission or capacity

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<sup>13</sup> GMP discovery response DPS1.Q131.c

<sup>14</sup> Castonguay pf reb. at page 15, lines 3–7.

1 peak, its output would need to drop to 3.375 kW (i.e. 13.5 kWh / 4 hours). As time goes  
2 on and the battery's 13.5 kWh energy capability degrades, the maximum output available  
3 for the required duration would also be reduced.

4  
5 I quantify the dollar impact in an illustrative example for one month of transmission  
6 benefits in 2018 (prior to degradation) and in 2023 (with degradation) in Exhibit PSD-  
7 CCD-2. The first page of that exhibit provides a summary of results, and the remaining  
8 pages provide detailed, supporting calculations. The results demonstrate that at the  
9 longer, 4 hour duration in 2018, the transmission benefits (for one month) are reduced  
10 from GMP's modeled level of \$63.4k to \$43.2k. Under similar assumptions in 2023, the  
11 transmission benefits are reduced from GMP's modeled level of \$77.2k to \$45.7k.

12 Additionally in 2023, the benefits are reduced due to battery degradation even at the  
13 shorter, 2.5 hour duration from GMP's modeled level of \$77.2k to \$73.0k. This reduction  
14 in benefits at the shorter duration is significant, not only for transmission peak shaving  
15 throughout the year, but also for capacity peak shaving which typically occurs in the  
16 summer months where the expected peak hours are more concentrated than in the rest of  
17 year. This illustrative example demonstrates the large extent to which GMP's modeled  
18 benefits are altered when key modeling parameters are altered.

19  
20 As a result, battery degradation will reduce the capacity and transmission benefits of the  
21 Powerwall Program over time. Although GMP has modeled other important factors  
22 which also account for reduction in the capacity and transmission benefits, the

1 diminishing effect of battery degradation has not been included. While GMP's analysis  
2 concludes the Powerwall Program is beneficial, it is due to the battery degradation issue  
3 and other issues with their analysis, which I discussed in my testimony, that result in my  
4 conclusion that the Powerwall Program cannot be deemed necessary or cost-effective.

5  
6 **Q16. Did Mr. Smith's description of GMP's avoided cost modeling allay your concerns**  
7 **related to GMP's cost-benefit modeling of the Powerwall Program?**<sup>15</sup>

8 A16. No, it does not. I will focus on Mr. Smith's discussion of capacity and transmission price  
9 assumptions as they are the most pertinent drivers for the Powerwall Program's benefits  
10 in GMP's modeling. Mr. Smith's discussion in each of these areas is a qualitative  
11 discussion of possible future factors which, if they came to pass, would cause upward  
12 price pressure. Although discussion of these factors is useful and pertinent, it is not a  
13 substitute for the recommendations in my testimony. For example, in the context of  
14 capacity prices, Mr. Smith suggests that high-cost existing units or reduced imports for  
15 New York will drive higher capacity prices. Although this could occur, a qualitative  
16 discussion of such factors is not a replacement for a quantitative modeling of supply /  
17 demand fundamentals to determine a non-arbitrary increase to equilibrium pricing.

18  
19 Although I continue to find GMP's price projections aggressive and optimistic, my  
20 testimony also suggested a need for a sensitivity analysis around key parameters and  
21 assumptions (which should include capacity and transmission pricing) as well as a

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<sup>15</sup> Smith pf reb. at pages 19-24.

1 comparison to other alternative options. GMP has not presented a sensitivity analysis nor  
2 has it presented a thorough least-cost analysis for the Powerwall Program.

3  
4 **Q17. Mr. Smith states your capacity price figure (Figure 6) starting in 2019 is interesting**  
5 **as it omits a recent high-priced year.<sup>16</sup> Please explain why your capacity price chart**  
6 **begins in 2019.**

7 A17. I include several figures in my exhibit depicting GMP's price projections for the benefit  
8 of the reader. They all begin in 2019 as this corresponds to GMP's modeling of the  
9 related program benefits beginning in 2019. In order to achieve benefits related to the  
10 current capacity year of June 2018 to May 2019, GMP would have needed to peak shave  
11 the capacity peak during the summer of 2017. The current ISO-NE capacity year price is  
12 not pertinent to the Powerwall Program.

13  
14 **Q18. Do you agree with Mr. Smith's contention that the Powerwall Program has value**  
15 **from a portfolio perspective rather than a stand-alone evaluation?<sup>17</sup>**

16 A18. No, I disagree with both valuation perspectives Mr. Smith presents. The first perspective  
17 which Mr. Smith raises is that the Powerwall Program will act as a hedge against certain,  
18 volatile market costs and will help stabilize power costs and, therefore, provide value.  
19 While it is true that hedging tools can provide value, the cost of the hedge has to be taken  
20 into account to determine if the hedging tool is worthwhile. As an extreme illustration,

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<sup>16</sup> Smith pf reb. at page 19, line 22.

<sup>17</sup> Smith pf reb. at pages 29–30.

1 consider a homeowner contemplating purchasing fire insurance. If the premium for that  
2 insurance was extremely high, say equivalent to the cost of building a new house, it  
3 would not be a good hedge. Similarly, utilities must carefully consider the cost of hedges  
4 and their benefits. Further, since GMP did not perform a sensitivity analysis to consider  
5 the range of possible benefits or conduct a least-cost analysis that considered alternative  
6 options, GMP cannot reasonably ascertain the potential hedging benefits of the  
7 Powerwall Program.

8  
9 Second, Mr. Smith argues that if the market outcomes are poor for the Powerwall  
10 Program, GMP's overall position will be improved as it will be able to leverage low  
11 market prices in fulfilling open positions (i.e. energy or capacity obligations which have  
12 not already been purchased). This justification, if believed, would give GMP complete  
13 latitude to model high market prices to justify expensive capital projects. In GMP's cost-  
14 benefit modeling, the market prices may be set high enough to show a net benefit, and if  
15 those market prices do not materialize GMP will point to lower market prices for meeting  
16 its open position and help justify its original decision. Instead of this, GMP's projects  
17 should be carefully evaluated on their own merits and portfolio considerations should be  
18 limited to concepts such as risk management and diversity. Although a portion of GMP's  
19 power supply strategy is to operate with a certain amount of long-term, open market  
20 positions for capacity and energy, this should not be construed as meaning that the  
21 prudence of GMP's projects are excused from the risk of low market price outcomes.

22

1 **Q19. Does this conclude your testimony?**

2 A19. Yes.