STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 18-0974-TF

Tariff filing of Green Mountain Power 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	)

Green Mountain Power's Responses to the Second Set of Discovery Requests Served by the Department of Public Service

Green Mountain Power ("GMP" or "Petitioner"), by and through the undersigned counsel, hereby responds to the second set of discovery requests served by the Department of Public Service ("Department" or "DPS") on July 27, 2018.

General Objections

The following General Objections of Petitioner GMP are incorporated by reference into its responses to each Interrogatory, Request to Produce, and Request for Admissions reproduced below, whether or not an objection is stated in any particular response. Any response to one of the Interrogatories, Requests to Produce, or Requests for Admission given below is given without waiver of any objection, whether or not an objection is stated.

1. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission reproduced below to the extent that it is overbroad, irrelevant, unduly burdensome, or not proportional to the needs of the case.

2. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission reproduced below to the extent that it calls for the disclosure of information or production of material privileged under the attorney-client, work-product, or any other applicable privilege.

3. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission reproduced below to the extent that it is unreasonably cumulative or duplicative, or calls for the disclosure of information or production of material that is obtainable from some other source that is more convenient, less burdensome, or less expensive, including, but not limited to, information or material that is publicly available or that has already been disclosed or produced to you in connection with another proceeding.

4. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission reproduced below to the extent that it calls for the disclosure or production of confidential or proprietary information, trade secrets, or material.

5. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission reproduced below to the extent that it is vague, unintelligible, requires speculation as to the information being sought, or is otherwise incapable of a reasonable answer.

6. Petitioner objects to each Instruction and Definition listed in the requesting party's discovery requests to the extent that it exceeds the bounds of permissible discovery or is unduly burdensome.

7. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission to the extent that the request exceeds the scope of Petitioner's testimony and exhibits.

8. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission to the extent that the request would require Petitioner to conduct extensive document review, additional studies, analyses, and/or tests as part of its response.

9. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission to the extent that the request exceeds the scope of the requesting party's intervention.

10. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission to the extent that the request exceeds the scope of the issues on review.

11. Petitioner objects to each Interrogatory, Request to Produce, and Request for Admission to the extent that it calls for a legal conclusion.

INTERROGATORIES AND REQUESTS TO PRODUCE

General Finance Requests

DPS2.Q1. Please refer to the attachments that Mr. Ryan provided on behalf of GMP in response to request Q:PSD:GMP.1.1 from the Department's June 1, 2018 discovery requests for the following requests.

a. Please provide a spreadsheet or other document that identifies GMP's share of synergy savings from the Operations and Maintenance ("O&M") "Platform" in the same or similar format to the spreadsheet entitled "Cumulative Customer Synergies". If this information is not available in spreadsheet format, please state GMP's share of Platform savings to date by year;

b. With respect to the spreadsheet entitled "Rate Drivers," please state whether the following information is included in this spreadsheet: (1) Income from investments in the transmission subsidiaries; and (2) the year one benefits of the Joint Venture Microgrids projects as described by Mr. Ryan on pages 19–20 of his prefiled direct testimony. If yes, please state where this information is located in the "Rate Drivers" spreadsheet.

DPS2.A1.

(a) See Attachment GMP.DPS2.Q1.a.

(b) The "Rate Driver" spreadsheet includes the income from investments in the transmission subsidiaries in the line "Change in Equity-in-Earnings." The year one benefits from the Joint Venture Microgrids (JV Solar/Battery) are included in the line "Change in Regulatory Amortizations. . . (includes JV Solar/Battery and Utopus)…".

Person/s Responsible for Response: Eddie Ryan
Title of Person/s: Controller
Date: July 16, 2018

DPS2.Q2. Please confirm that if the year-one benefits of the JV Micogrids (i.e. the accelerated return of the developer fee described by Mr. Ryan on page 19 of his prefiled testimony) were excluded or not approved by the Commission, then GMP's requested rate increase would be 8.05%. If not, please provide the correct percent value for GMP's rate increase assuming that the JV Microgrid projects are included in rate base, but the accelerated return of the developer fee is not approved by the Commission.

DPS2.A2.

Only if all benefits associated with the JV Microgrid investment are removed from the 9-month 2019 rate period and yet the $31.6M investment remains in rate base would this calculation be correct. The Company would not propose that outcome in any circumstance where the projects remain in rate base because it believes associated benefits related to the Day 1 Gains and Developer Fee should be included for customers, including the 2019 rate period if the investment is in rate base for that year. There is a range of possible rate impacts depending upon when and how the benefits are returned to customers. See Attachment GMP.DPS2.Q2 for summary of possible rate impacts due to different assumptions related to the return of these benefits. GMP continues to believe that returning the Day 1 Gains and Developer Fees promptly to customers is both appropriate and beneficial and has asked the PUC to approve this treatment in the rate filing.

Person/s Responsible for Response: Eddie Ryan
Title of Person/s: Controller
Date: July 16, 2018

DPS2.Q3. Please refer to GMP's response to request Q:PSD:GMP.1.34 from the Department's June 1, 2018 discovery requests. The Department's initial request was not intended to seek access to the actual software tool, but rather useful outputs of the software tool. It is the Department's understanding that financial models/forecasting tools such as UI have standard and/or custom reports, or queries, that allow the users to digest the information in the model. These outputs may also be used to transfer information to another analytical or reporting tool. Through some combination of the process described, GMP produces proforma financial analysis in support of financial decision making. Please provide examples of the following reports, queries and analysis or other information:

a) Pro Forma Income statement, earnings estimate or Cost of Service;

b) Pro Forma Balance sheets;

c) Pro Forma Cash Flows Statement;

d) Pro Forma tax calculations;

e) Credit ratio projections;

f) Capital project forecasts;

g) Other similar summary outputs.

DPS2.A3.

(a-d) See Attachment GMP.DPS2.A3.1
(e) See Attachment GMP.DPS2.A3.2.
(f) Capital project forecasts can be located in the cash flow statement as "Utility Plant Expenditures".
(g) Net cash provided by operating activities, investments in associated companies, issuance of long-term debt, changes for paid in capital and cash dividends can also be located in the cash flow statement.

Person/s Responsible for Response: Dawn Bugbee
Title of Person/s: Chief Financial Officer
Date: July 16, 2018

DPS2.Q4. Please refer to Attachment GMP.DPS1.Q2.3, which GMP produced in response to the Department's June 1, 2018 discovery requests. Please provide copies of the financial forecast model outputs (as described in request PSD:GMP.2.3 above), if any, that were used to support the information in the "10 Year Growth Strategy Presentation."

DPS2.A4.

Please see Attachments GMP.DPS2.Q4.a through -.d, which are the Excel files with outputs underlying the estimate charts in the referenced strategy presentation. The presentation itself was a "what if" exercise used for leadership to think about possible long-term impacts and innovative responses under various scenarios; GMP used the base S&P model as of November 2017 (see below Q5) to make the several different iterations of stretch estimates shown in the presentation but did not finalize these separate runs or utilize or rely upon any of these for actual financial modeling or decision making. The base model is Attachment GMP.DPS2.A5.1, and GMP can provide these individual estimate runs for review if desired. Please note that these analyses were based upon projections/assumptions at the time the document was created which differ from current projections.

Person/s Responsible for Response: Rob Bingel
Title of Person/s: Manager, Forecasting & Analytics
Date: July 16, 2018

DPS2.Q5. Please refer to Attachment GMP.DPS1.Q25.b2, which GMP produced in response to the Department's June 1, 2018 discovery requests. Please provide copies of the financial forecast model outputs (as described in request PSD:GMP.2.3 above), if any, that were used to support the information in the presentation entitled "Vermont's Energy Transformation Company" dated November 17, 2017.

DPS2.A5.

See Attachment GMP.DPS2.A5.1. Please note that these analyses were based upon projections/assumptions at the time the document was created which differ from current projections.

Person/s Responsible for Response: Dawn Bugbee
Title of Person/s: Chief Financial Officer
Date: July 16, 2018

DPS2.Q6. Please refer to Attachment GMP.DPS1.Q6.a, which GMP produced in response to the Department's June 1, 2018 discovery requests. Please provide copies of any financial forecast model scenarios and/or revenue requirement calculations and/or Cost Service models, or other outputs (as described in request PSD:GMP.2.3 above), used by GMP to calculate the full year and nine month rate increase numbers shown in Exhibit GMP.DPS1.Q6.a. If none exist please so state.

DPS2.A6.

Please see Attachments GMP.DPS2.Q6.a and -.b. Please note that these analyses were based upon projections/assumptions at the time the document was created which differ from current projections.

Person/s Responsible for Response: Dawn Bugbee, Rob Bingel
Title of Person/s: Chief Financial Officer; Manager, Forecasting & Analytics
Date: July 16, 2018

DPS2.Q7. Please provide a summary of the amounts and purpose of all receivables and payables (or other non-cash transactions) recorded on the books of Northern New England Energy Corporation ("NNEEC") and GMP for income taxes related the operation of the tax sharing agreement for the years 2014, 2015, 2016, 2017 and 2018.

DPS2.A7.

See Attachment GMP.DPS2.Q2.7.

Person/s Responsible for Response: George Gulian, Joann Janssen
Title of Person/s: Director of Taxes; Senior Tax Accountant
Date: July 16, 2018

DPS2.Q8. Please provide copies of any analyses performed by NNEEC to determine the value of GMP for accounting purposes, to the extent available to GMP.

DPS2.A8.

As noted in response to DPS1.Q15, GMP has not located in its files any analyses used to value the combined company at the time of the merger apart from any documentation that would have been produced in discovery by the parties as a part of Docket No. 7770 and does not have in its files any responsive documents to this request.

Person/s Responsible for Response: Dawn Bugbee
Title of Person/s: Chief Financial Officer
Date: July 16, 2018

DPS2.Q9. Please refer to GMP's response to question Q:PSD:GMP.1.16 from the Department's June 1, 2018 discovery requests. Please provide copies of all loan documents associated with the acquisition debt incurred by NNEEC as described in GMP's response.

DPS2.A9.

GMP did not receive and does not have any loan documents pertaining to NNEEC transactions.

Person/s Responsible for Response: Dawn Bugbee
Title of Person/s: Chief Financial Officer
Date: July 16, 2018

DPS2.Q10. Please refer to GMP's responses to question Q:PSD:GMP.1.18 from the Department's June 1, 2018 discovery request. Please describe how the numerical targets related to the performance metrics in GMP's short-term incentive plan are determined.

DPS2.A10.

The individual performance goals in our short-term incentive plan are developed annually in advance of the fiscal year by identifying the key strategic, customer-focused goals for the fiscal year and allocating relative weight for each goal to each participant based on the participant's responsibility and accountability. Importantly, all the goals are incorporated into each participant's result, but the weight of each goal varies for each participant based on his or her area of responsibility in the organization or involvement in initiatives. For example, goals relating to implementing innovation programs to support our customers will be assigned greater weight to participants who are primarily responsible for innovative products and services, and goals relating to enhancing communication options for customers and improving customer service will be assigned greater weight to participants who are primarily responsible for customer service and communications. The weighting is determined in advance of the fiscal year when the performance goals are determined.

Person/s Responsible for Response: Mari McClure
Title of Person/s: VP, Chief Talent Officer, System & Support Operations
Date: July 16, 2018

DPS2.Q11. Please provide copies of any benchmarking analysis, or other comparison to or analysis of industry best practices (whether performed by GMP or an outside consultants retained by GMP) relating to all the numerically quantified performance metrics in the short-term incentive plan, if any such analysis exists.

DPS2.A11.

We do not have copies of formal benchmarking analyses or other comparison to or analysis of industry best practices relating to the numerically quantified performance metrics, but we do periodically compare our incentive compensation programs through publicly available proxy filing information from public peer organizations as available, such as Eversource Energy and Unitil Corporation, as well as through our relationships with similar-sized utilities.

In this comparison, we have found our executive short-term incentive plan is unusual in its level of customer focus. In fact, when we compare our incentive plan to others, we expect it to be unusual because we are committed to innovating and embracing the new energy future to mitigate otherwise dramatic cost increases and partnering with customers to provide products and services in Vermont's changing energy landscape. Our short-term incentive plan performance goals reflect this, as well as goals to ensure we deliver on and exceed core metrics of customer service, control costs, and deliver savings to customers, more so than we have found in our periodic comparisons to peer compensation plans.

Person/s Responsible for Response: Mari McClure
Title of Person/s: VP, Chief Talent Officer, System & Support Operations
Date: July 16, 2018

DPS2.Q12. Please refer to GMP's response to question Q:PSD:GMP.1.51 (regarding the St. Albans digester project) from the Department's June 1, 2018 discovery requests. Please provide the following additional information:

- **a. If available, a monthly chronology showing when the costs described in GMP.DPS1.Q51 were incurred including their purpose and accounting category;**
- **b. Please identify which items described in Attachment GMP.DPS.Q51 were included in the subtotals described in subsection c of the narrative response;**
- **c. Please state whether any of the costs are being deferred for future recovery and the rationale for believing they may be eligible for recovery;**
- **d. The rationale for expensing $219,376.72 of the costs to Platform accounts in FY 2017 verses writing them off.**

DPS2.A12.

(a) Please see Attachment GMP.DPS2.Q12.a for the monthly chronology of expenditures.

(b) Please see Attachment GMP.DPS2.Q12.b for the breakdown of costs by project account.

(c) With the exception of the $219,376.72 that was identified as having already been expensed, the remaining costs reside in either a preliminary survey & investigation account, or in an unrecovered plant and regulatory study account. The amount is being deferred for future recovery under 30 V.S.A. §§ 218(f) which permits recovery of renewable project development costs.

(d) These costs are not incremental costs but represent GMP internal labor and employee costs which were included in the Platform when it was established.

Person/s Responsible for Response: Kirk Shields
Title of Person/s: Director, Development & Risk Management
Date: July 16, 2018

Power Supply Requests

Energy/Capacity Hedging

DPS2.Q13. With respect to GMP's short-term energy purchases, please describe generally GMP's energy hedging strategy and process. Please include any documents or manuals that describe or outline GMP's efforts, including details on timing, procurement amounts, pricing decisions, etc. Within your response, please describe how GMP determines what quantities of energy to purchase and in what time periods, including hourly periods and monthly periods. Please also describe how GMP models its forward open energy position.

Objection: GMP reasserts General Objections 1 and 2. The phrase "any documents" is not time or otherwise limited and therefore is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. It may also call for production of privileged materials. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A13.

Short-term energy purchasing is a feature of GMP's portfolio approach to addressing customer energy requirements. The role of these short-term purchases has been summarized in GMP's last Integrated Resource Plan, provided as Attachment GMP.DPS2.Q13.8, as a tool to stabilize GMP's net power costs and retail rates, while maintaining a degree of long-term flexibility so that customers can benefit with regionally competitive retail rates even when market prices fall (see, for example, pages 1-20, 3-29, and 7-2).

More specifically, GMP presently sources a portion of its energy requirements each year through fixed-price, fixed-volume forward energy purchases from the New England wholesale energy market. These purchases reduce our customers' exposure to year-over-year volatility in power supply costs that could occur if GMP purchased substantial fractions of its retail load requirements through spot market purchases or very short-term bilateral contracts. GMP typically implements these forward market purchases on a layered basis, with terms up to five years. This approach is intended to provide the short-term price stability noted above while ensuring that beyond five years the company's power supply costs maintain some significant linkage to the New England wholesale energy market, thereby limiting the degree to which GMP's retail rates could diverge from those in neighboring states. It also leaves flexibility to procure new longer-term supply sources that may not be specifically anticipated today while limiting the extent to which the portfolio could become imbalanced in the event that retail load requirements decline relative to current projections.

Significant considerations in GMP's purchase strategy for these "rolling" short term purchases include GMP's judgment about the relative attractiveness of forward market prices at the time, along with a goal to diversify the timing of these purchases (so as not to "put all of our eggs in one basket" by purchasing GMP's entire open position at one time, under one set of market conditions). These purchases may be around-the-clock or shaped on a seasonal or peak/off-peak basis to match the shape of GMP's projected net short position. Specifically, GMP makes these purchases regularly over time with the goal to hedge essentially all expected energy and capacity requirements leading into an operating year. GMP seeks to accelerate these short-term purchases during times when energy and/or capacity markets are perceived to be relatively attractive, with the goal of reducing the expected cost of energy and capacity to our customers.

The process for identifying procurement amounts, pricing decisions, and timing is as follows: GMP monitors and updates projections of future energy requirements during the year for periods ranging between 1 month into the future out to 5 years or more. Typically this is accomplished by updating versions of the energy model provided to DPS on April 16 titled, "6._Energy_Model_2019_RC.xlsx" to reflect changes in committed supply sources (e.g., expirations of existing resources, additions of new supply sources, or projections of future growth in net metering volumes) and updating the projections of future energy requirements when updates to GMP's Itron load forecast (see Attachment GMP.DPS1.Q61.1) become available. Concurrently, GMP collects and includes market pricing indications from daily broker reports on the traded prices in standardized energy forward contracts (see Attachment GMP.DPS2.Q13.1). We assess the relative attractiveness of market conditions based on judgment of the power supply team, which is informed by our review of spot market prices, industry literature, and subscription publications that address the New England market, and review our findings with senior leadership at regular power supply risk meetings and periodically with the Board of Directors and/or Audit Committee. For examples, see Attachments GMP.DPS2.Q13.2 and GMP.DPS2.Q13.3.

During this review process the GMP power supply team evaluates the timing for new short purchases by assessing market conditions relative to recent trends, comparing forecasted unmet energy needs to established goals for overall hedging goals (see Attachments GMP.DPS2.Q13.4, GMP.DPS2.Q13.5). Generally, this approach is designed to achieve a staggered and regular replacement of expiring short-term energy transactions with new transactions that reflect current pricing available in the market. During any particular delivery year the combined pricing within this resource category typically reflects the average of pricing available in one or more years prior to that delivery year (see Attachment GMP.DPS2.Q13.6 staggered volume illustration). As conditions arise to support this strategy the power supply team

will make recommendations and request trading authorizations from senior leadership during regular power supply risk meetings and the GMP Board of Directors. See Attachment GMP.DPS2.Q13.7 for the form of a typical authorization.

Upon receiving authorization, the Power Supply team begins market inquires to brokers and leading suppliers to assess the likelihood of achieving competitive responses to a GMP solicitation by suppliers that meet GMP contracting requirements (i.e., creditworthiness, existing enabling agreements). To the extent that conditions are favorable and there is a high likelihood of receiving indicative proposals, GMP will solicit binding offers from multiple potential suppliers for the quantities that GMP is seeking, requesting offers at an established future date and time. When offers are received they are ranked by least cost and compared to available broker indications to ensure that they reflect GMP's understanding of generally available market conditions. Awards are made to the extent that offers achieve the goals of the solicitation and the leading supplier(s) meets GMP's contracting requirements. The volumes and prices for the newly awarded contracts are then included in the next update to the Energy Model for future assessments.

For additional detail with respect to how this approach was implemented for short-term bilateral energy transactions for delivery in the rate year please see Response DPS2.Q14.

Person/s Responsible for Response: Chris Cole
Title of Person/s: Director, Market Operations
Date: July 16, 2018

DPS2.Q14. With respect to GMP's bilateral energy purchases which are in effect for the rate period, please provide a detailed description of the transactions GMP executed and the justification for these transactions including final pricing, transaction dates, applicable terms, and evaluation. Please provide supporting documentation which should include, to the extent available: (a) any request for proposal documents; (b) pricing responses; (c) evaluation analysis; (d) material shared or presented to the GMP senior management and/or Board as part of the GMP approval process; and (e) any other pertinent material.

Objection: GMP reasserts General Objections 1 and 5. The phrase "other pertinent material" is vague notwithstanding the nonexclusive list of supporting documentation stated in the request. Moreover, the request is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A14.

See answer to DPS2.Q13 above, describing generally GMP's energy purchase strategy and process. For the rate period there are four bilateral purchases in effect from GMP's short-term energy hedging program: a BP system energy transaction, a Citigroup system energy transaction, a Shell system energy transaction, and a NextEra system energy transaction.

The BP system purchase executed in 2014 provides for various energy delivery schedules starting in 2015 that range between 75 MW during some peak periods to as low as 50 MW in periods featuring lower historical needs. During the rate year the contract provides for a 50 MW fixed price baseload (i.e. 7 x 24) energy delivery profile in all months (with the exception of April and May) that continues to the end of 2019. The purchase was made after evaluating the results from a solicitation sent to twelve of the regional energy suppliers at the time. (See previously provided Attachment GMP.DPS1.Q79.2 for an example of the form of the solicitation sent). For a summary of pricing responses received see Attachment GMP.DPS2.Q14.1. For detailed transaction pricing, delivery dates, and scheduled volumes see the previously provided transaction confirmation Attachment GMP.DPS1.Q79.1. The BP solicitation evaluation process at the time of the trade also took into consideration available energy pricing information from regional energy brokers and traded natural gas pricing. See Attachments GMP.DPS1.Q79.3 and GMP.DPS1.Q79.4. For additional energy evaluation material relevant to this purchase see Attachments GMP.DPS2.Q14.2 and GMP.DPS2.Q14.3.

For the bilateral transactions with Shell, Citigroup, and NextEra GMP has largely repeated the process described for the BP transaction. The relevant documentation for these transactions is described below.

The Shell system energy purchase executed in 2015 features energy delivery schedules that started in 2018. During the rate year it provides 25 MW of fixed priced, baseload energy schedules for the entire year and continues to the end of 2020. For the form of request sent to suppliers in this solicitation see Attachment GMP.DPS2.Q14.4, and for a GMP summary of the responses to this solicitation see the "offers" tab of Attachment GMP.DPS2.Q14.5. For Shell's detailed transaction pricing, delivery dates, and scheduled volumes see Attachment GMP.DPS2.Q14.6. For available energy pricing information from regional energy brokers reviewed at the time of the trading date as part of the Shell evaluation see the "broker" tab of Attachment GMP.DPS2.Q14.5. For additional energy evaluation material relevant to this purchase see Attachment GMP.DPS2.Q14.7.

The Citigroup system energy purchase executed in 2015 features energy delivery schedules beginning in 2017 that provided 25 MW of fixed price energy in periods featuring higher historical GMP energy needs (i.e. winter and summer months). During the rate year this delivery pattern continues with most of the purchased energy concentrated in higher usage winter and summer months. The contract provides a baseload profile of energy schedules (i.e. 25MW, 7 x 24) from late 2019 until its conclusion in December of 2020. For the Citigroup form of solicitation see Attachment GMP.DPS2.Q14.8. Attachment GMP.DPS2.Q14.9 is a table providing responses to solicitations, including Citigroup's. For Citigroup's detailed transaction pricing, delivery dates, and scheduled volumes see Attachment GMP.DPS2.Q14.10. For available energy pricing information from regional energy brokers reviewed at the time of the trading date as part of the Citigroup evaluation see Attachment GMP.DPS2.Q14.11. For additional energy evaluation material relevant to this purchase see Attachments GMP.DPS2.Q14.12 and GMP.DPS2.Q14.13.

The NextEra system energy purchase executed in 2015 features delivery schedules starting in 2017 providing 25 MW of fixed price energy in periods featuring higher historical needs (i.e. winter and summer months). During the rate year the contract provides a 25 MW fixed price baseload (i.e. 7 x 24) energy delivery profile and continues with this profile until its conclusion in December of 2020. For the NextEra solicitation form see Attachment GMP.DPS2.Q14.14, and for the responses to this solicitation see Attachment GMP.DPS2.Q14.15. For NextEra's detailed trade pricing, delivery dates, and scheduled volumes see Attachment GMP.DPS2.Q14.16. For available energy pricing information from regional energy brokers reviewed at the time of the trading date as part of the NextEra evaluation see Attachment GMP.DPS2.Q14.17. For additional energy evaluation material relevant to this purchase see Attachment GMP.DPS2.Q14.18.

Person/s Responsible for Response: Chris Cole

Title of Person/s: Director, Market Operations
Date: July 16, 2018

DPS2.Q15. Please describe the sales which GMP made in 2017 as referenced in the presentation included in the Attachment GMP.DPS1.Q25.b2 that GMP provided in response to the Department's June 1, 2018 discovery requests.

DPS2.A15.

Based on our conservation with GDS Associates, we understand that the "sales" in question referred to the sale of existing short-term GMP energy contracts to NextEra in the contract executed in March of 2017.

In the NextEra contracts negotiated in March 2017, GMP resold to NextEra existing purchase contracts at original negotiated prices and largely repurchased these volumes at the same original prices (2018 delivery period prices were adjusted downward). The primary purpose of this exchange within the larger purchase transaction was to improve the emission profile of the sold existing transactions from "Nepool residual" to non-emitting attribute sourced from NextEra's regional nuclear generation and reflected in the GMP Nepool GIS account. A small portion of these existing purchases that were resold to NextEra (the quantities for delivery in March through May in the remaining delivery periods of the contracts) were not re-purchased from NextEra due to GMP's reduced need for energy to meet projected energy requirements during these times.

Specifically, the following existing system contracts were sold and repurchased from NextEra to improve the emissions profile:

- Shell system energy dated 12/16
- NextEra system energy dated 7/15
- JP Morgan system energy dated 2/6/2014
- Citigroup system energy dated 5/15/2015

Person/s Responsible for Response: Chris Cole
Title of Person/s: Director, Market Operations
Date: July 16, 2018

DPS2.Q16. With respect to GMP's bilateral capacity purchases, please describe generally GMP's capacity hedging strategy and process. Please include any documents that describe or outline GMP's efforts, including details on timing, procurement amounts, pricing decisions, etc.

Objection: GMP reasserts General Objections 1 and 2. The phrase "any documents" is not time or otherwise limited and therefore is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. It may also call for production of privileged materials. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A16.

Similar to the approach taken to meet anticipated energy requirements described in Response DPS2.Q13, GMP uses a portfolio approach to address projected capacity requirements, with the goal of seeking low costs for our customers and managing potential volatility in net power costs and retail rates. The description of this portfolio approach as it relates to these outcomes was addressed in each of GMP's recent Integrated Resource Plans ("IRP"). In fact, capacity was a highlighted topic in the 2014 plan (s*ee* Attachment GMP.DPS2.Q13.8) because the ISO-New England Forward Capacity Market ("FCM") was transitioning from a surplus market with an administrative floor price to a more balanced and potentially volatile market. This reflects one of the key evolving issues in the New England power market. The IRP identified additional stable-priced capacity sources as a key portfolio consideration for GMP, to reduce the risks of unfavorable outcomes in the FCM. Following this IRP conclusion, GMP pursued a long- and short-term hedging strategy to significantly reduce the identified exposure to volatile capacity market prices.

The first transaction resulting from this strategy was a long-term purchase with NextEra in early 2015, for the purchase of significant additional capacity (and much smaller amounts of energy) from the Seabrook nuclear generation facility. In testimony requesting Section 248 approval for this transaction in Docket No. 8445, GMP witness Douglas Smith explained how the purchase would address GMP's need for capacity, the economic benefits expected from the transaction, its consistency with GMP's IRP, and the other statutory criteria. The testimony also described GMP's process for identifying the transaction and assessing the capacity market environment (*see* Smith testimony pages 19-22 in Docket No. 8445).

For the short-term capacity portfolio, which features bilateral transactions largely executed subsequent to the NextEra Seabrook contract, we have employed a similar hedging approach to the one described in the Seabrook docket. In particular GMP's short-term capacity hedging strategy seeks to use layered, bilateral capacity contracts to limit annual exposure to each ISO New

England Forward Capacity Auctions ("FCA") to no more than 10 to 15 percent of expected obligations. The goal of this strategy is to achieve a more stable cost trajectory for GMP's expected capacity obligations while also ensuring that our customers can benefit (and that GMP's retail rates do not diverge excessively from those in neighboring states) in the event that capacity market prices fall in the future.

The process used to implement our strategy for future FCA obligations employs a number of the same internal review and evaluation steps described in response to DPS2.Q13 pertaining to energy hedging. Specifically, in the case of capacity GMP also employs load and peak projections that are developed from, or informed by, Itron (see Attachment GMP.DPS1.Q61.1) and recent outcomes with respect to GMP's load requirements at the time of the ISO-NE annual peak to populate a multi-year model. The capacity model also compares these expected obligations with estimates of the future capacity ratings of GMP's previously committed resources (see filed titled "7._Capacity Model_2019_RC.xls", previously provided to DPS on April 16, for an example of this model).

The default source of capacity for a load serving entity like GMP to meet capacity obligations that are not covered by owned generating units or power purchase agreements is purchases from ISO-NE under the FCM. The effective price of such purchases in each year is determined primarily by the clearing price(s) of capacity in the Annual FCA, along with the volume of capacity that is purchased based on the administrative demand curve. There is only one annual FCA per year so there is less readily available capacity market data than exists for energy, and capacity forward pricing quotes are generally not available from brokers or exchanges. For these reasons, GMP relies more heavily on our review of consultant market assessments and forecasts for market price evaluations within this process (see Confidential Attachment GMP.DPS2.Q16.1 - ESAI example) to develop a GMP view of "base case" FCA price expectations, along with an understanding of potential alternative price outcomes.

After establishing near-term expectations for capacity market pricing and GMP's potential volume needs, the GMP Power Supply team reviews our findings with senior leadership and periodically with the Board of Directors and/or Audit Committee. See, for example, Attachments GMP.DPS2.Q13.2 and13.3. We explore opportunities with counterparties to "lock in" a portion of our requirements at a fixed/stable price that is at or below the market price outlook for the desired delivery period.

The annual timing of these activities and solicitations is largely driven by the annual FCA, which is administered about three years in advance of the delivery period. As a result, GMP tends to focus capacity hedging activity in the few

months leading up to the FCA date in late January or early February. This timing allows GMP to leverage the most current information for the annual peak-based obligations from the previous summer, and it allows GMP to consider more current market analysis for the upcoming auction. As with energy, GMP seeks to purchase stable-priced capacity from sellers who are creditworthy or can provide credit support from another creditworthy entity. To the extent that contracts are awarded, the associated volumes and prices are then included in the next update to the Capacity Model for future assessments.

For additional detail with respect to how this approach was implemented for short-term bilateral capacity transactions for delivery in the rate year please see Response DPS2.Q17.

Person/s Responsible for Response: Chris Cole
Title of Person/s: Director, Market Operations
Date: July 16, 2018

DPS2.Q17. With respect to GMP's bilateral capacity purchases which are in effect for the rate period, please provide a detailed description of the transactions GMP executed and the justification for these transactions including final pricing, transaction dates, applicable terms, and evaluation. Please provide supporting documentation which should include: (a) any request for proposal documents; (b) pricing responses; (c) evaluation analysis; (d) material shared or presented to the GMP senior management and/or Board as part of the GMP approval process; and; (e) other pertinent material.

Objection: GMP reasserts General Objections 1 and 5. The phrase "other pertinent material" is vague notwithstanding the nonexclusive list of supporting documentation stated in the request. Moreover, the request is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A17.

For the rate period, there are two bilateral capacity purchases in effect from GMP's short-term capacity hedging program: a three-year NextEra purchase executed in early 2015 and a three-year Dynegy purchase executed in late 2015. The NextEra contract features a delivery period which begins in FCA 9 (June 2018–May 2019) while the Dynegy delivery period begins in FCA 10 (June 2019–May 2020). The description and documentation of each transaction is as follows.

For the NextEra purchase made in early 2015, GMP purchased 100 MW for three years in the form of a financial capacity transaction featuring fixed prices for monthly settlement starting in FCA9 (see Attachment GMP.DPS2.Q17.1 - term sheet). This short-term NextEra agreement was executed at the same time as the long-term Seabrook capacity agreement (which was reviewed and approved by the Commission in Docket No. 8445) and resulted from the same process and evaluation that lead to the Seabrook contract (*See* Response DSP2.Q16). For the market evaluation materials and GMP open position analysis used at the time including consultant forecasts, see Confidential Attachment GMP.DPS2.Q16.1, Attachment GMP.DPS2.Q17.2, Confidential Attachment GMP.DPS2.17.3, and Attachment GMP.DPS2.Q17.4. For a summary of the proposals received and documentation of their review see Attachment GMP.DPS2.Q17.5 - 2014 proposal review.

For the Dynegy purchase made in late 2015 GMP purchased 75MW of fixed price physically delivered capacity for three years in the form of a fixed-price capacity load obligation transaction. For the specific terms, quantities, and prices in the transaction see GMP.DPS1.Q62.1 the transaction confirmation (i.e. term sheet). For this purchase GMP conducted a solicitation for capacity offers in the fall of 2015. See Attachments GMP.DPS1.Q62.2 for a summary of capacity offers and explanations of the analysis of each offer; see Attachment

GMP.DPS2.Q17.6 for the offers themselves. A term sheet sent to counterparties to help structure their proposals is provided as Attachment GMP.DPS2.Q17.7. For the GMP preapproval process documentation to senior leadership and the GMP Board including GMP open position capacity analysis at the time of the transaction consistent with Response DPS2.Q16 see Attachment GMP.DPS2.Q17.8 - Power Supply update to the BOD dated 8/12/2015.

Person/s Responsible for Response: Chris Cole
Title of Person/s: Director, Market Operations
Date: July 16, 2018

DPS2.Q18. In evaluating capacity procurement options, please state whether GMP considered new owned fossil-fuel capacity resources, including but not limited to combined-cycle turbine or single-cycle turbine units? If so, please provide details related to GMP's alternatives considered for owned fossil-fuel capacity resources. Please include cost details including capital cost, financing details, and operations and maintenance cost for a combustion turbine and combined cycle or other technology options not described already in this case. If not, please describe the reasons or justifications, if any.

DPS2.A18.

GMP's consideration of new owned fossil fuel capacity resources has focused primarily on the potential re-powering opportunities at existing, owned fossil-fuel generation sites within GMP's service territory rather than evaluating "new build" fossil-fuel plants. This is primarily because, in recent years, observed FCA clearing prices and forecasted future clearing prices have generally been significantly lower than the estimated cost of entry for new-build fossil fuel plants (e.g., simple cycle and combined cycle combustion turbine plants). In addition, deployment of fossil-fired capacity on a large scale could potentially be inconsistent with Vermont and GMP goals for limiting greenhouse gas emission reductions and achieving a highly renewable long-term power supply.

In particular, GMP has reviewed the existing Gorge simple cycle gas turbine location in Colchester, VT. This particular location had been identified starting in 2008 as a site where generation could potentially be built as an alternative to defer or displace the need for a set of transmission upgrades (known as the Gorge Area Reinforcement project, or "GAR"), and later as a potential partial alternative to a bulk transmission project in central Vermont. Attachment GMP.DPS2.Q18.1 provides a summary of capital cost and several other characteristics that were used at the time to screen potential types and configurations of power plants at the Gorge site. GMP determined that a Gorge repowering project would have some infrastructure advantages over potential "greenfield" alternatives, although it would lack the scale economies of larger peaking projects that could potentially be built in the region.

GMP qualified one configuration of the potential Gorge repowering project in the FCM, in order to confirm the project's feasibility as a local reliability resource and to establish a path to receiving capacity revenues. While the capacity market was not the driving consideration for this evaluation, it was a significant element in the evaluation of Gorge repowering as an alternative to GAR, because the net costs of the repowering-focused alternative would depend substantially on future capacity market prices (i.e., the net cost of the repowering project to customers would be higher in a relatively low capacity market price environment, and lower in a relatively high capacity market price

environment.) The GAR project was ultimately chosen as the preferred reliability solution for the Gorge area, based primarily on a combination of projected net costs and relative robustness of the solutions, and the potential Gorge repowering project did not clear the FCA. The central Vermont bulk transmission project, which was the subject of a multi-party working group, was ultimately determined by VELCO and ISO-NE to not be needed in the foreseeable future, based in part on updated forecasts of future Vermont peak loads and the build-out of distributed generation in Vermont.

Beyond the Gorge evaluation, GMP has not identified ownership of new fossil fuel resources as a leading FCM hedging strategy in the near term. In general, GMP believes that the FCA bilateral transaction approach it has pursued largely replicates the capacity hedging benefits of owned fossil fuel generation in the short-term (and some of the leading potential bilateral sellers are owners of existing fossil fuel plants), without the up-front cost and degree of long-term commitment associated with the ownership and operation of new generation. In addition, GMP's current FCM market outlook features annual clearing prices well below the net cost of entry for newly constructed combustion turbine capacity for at least the next several years. This erodes the cost-competitiveness of new capacity (or a substantial repowering project) and reduces the likelihood that such capacity would be able to clear the FCM and receive associated capacity market revenue.

Person/s Responsible for Response: Douglas Smith
Title of Person/s: Chief Power Supply Executive
Date: July 16, 2018

RECs & RES Compliance

DPS2.Q19. Please refer to Exhibit GMP-DCS-21, line "RES," column "2017 test period Energy $" for the following requests

a. Please confirm that the figure provided for 2017 RES compliance is incorrect due to a linking error;

b. If your answer to subpart a above is affirmative, please provide the corrected amount for 2017 RES compliance;

c. Please confirm that there were no actual expenses associated with HQVJO in 2017;

d. Please state whether the overall revenue requirement for power supply affected by this linking error. If not, please provide an explanation and documentation supporting your conclusion.

DPS2.A19.

(a) Confirmed.

(b) The correct value is $1.032 million. This value was inadvertently transposed into the HQVJO column, shown in line 26 of the Excel version of DCS-21. The correct value was properly incorporated into line 19 (Excel line 34) of Exhibit DCS-1, line 31 of Exhibit DCS-4, and line 865 and 1470 of the tab "Test Period Inc St" in the so-called 2 5 Report workpaper provided to DPS with the April 13, 2018 Rate Filing.

(c) There were costs in 2017 related to the HQVJO, but not during the test period. As noted above, the 2017 RES value was transposed into this cell.

(d) There is no error in the overall revenue requirement due to this linking error, as (1) the total test period power costs are correct in total in Exhibit DCS-21 (as compared to the test year costs as shown in the 2 5 Report workpaper "Trial Bal" tab, cell O303, and various other Exhibits, including GMP Exhibit ER-1, Schedule 1, the sum of lines 18, 19, and 24, less line 20), and (2) the rate period value was developed independently from the test year value.

Person/s Responsible for Response: Chuck Watts
Title of Person/s: Power Supply Analyst
Date: July 16, 2018

DPS2.Q20. There appear to be several places where renewable energy certificates ("RECs") are included as a line item in GMP's rate base in this rate case. For example, please refer to the file named "GMP COS Filing 4-13-18 FINAL", tab "COS RB Summary", row 118, line item "17420~Renewable Energy Certificates" and tab "RB", row 25, line item "REC Inventory". Please also refer to file named "RATEBASE Test YR – 10 month actuals thru Sep 30 2017," tab "WP 10 Mo Avg RB", row 58, line item "17420~Renewable Energy Certificates" and tab "EBS_132 – GL Account Balance –", row 297. With respect to the inclusion of RECs in rate base in the spreadsheets listed above, please provide the following information:

a. Please explain why the 10 month average of RECs from the test year ($4.295 million) was not adjusted for the rate year;

b. Please clarify whether the $4.295 million line item for RECs included in rate base is limited to the value of RECs that GMP has banked to comply with its Vermont RES obligations, or whether it also includes excess amounts that GMP plans to sell to other entities. If the line item includes both, please provide the relative percentages of the banked RECs and the RECs that GMP intends to sell from the total included in rate base.

c. Please provide the amount of RECs included in rate base for 2016, 2017, 2018 and the rate period for 2019 including the following detail: The number of REC, date acquired and their value segregate by vintage.

Objection: GMP reasserts General Objections 1 and 8 to subsection c of this request. Requesting information concerning every REC included in rate base for the period of interest is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. Moreover, identifying and segregating every REC would require GMP to conduct extensive document review and recalculation. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A20.

(a) Based on recent history, using the actual Test Period average REC inventory was a good proxy for the Rate Period REC inventory included in rate base because the Test Period average has generally been consistent with the actual Rate Period balance. The following table shows recent rate case (test year) 13-month values and the actual 13-month values. (Of course, we do not yet have actual 2018 or 2019 13-month averages.)

	Final 2016 Cost of Service	Final 2017 Cost of Service
Forecasted Rate Year 13 month average balance in Base Rate Filing*	$ 3,906,902	$ 3,930,497
Actual Rate Year 13 month average balance as reported in ESAM Filing	$ 3,818,451	$ 4,071,525
Variance	$ 88,451	$ (141,028)

* For all years, Rate Year average balance is consistent with Test Year average balance

(b) The $4.295 million average balance contained in the current rate case includes the inventory amounts of both RECs produced and sold to other entities but not yet delivered, and RES Tier 1 and Tier II RECs that have not yet been retired. As RES only began in 2017, and the average price of those RECs is low, the portion of its related rate base amount to the total was only about 5%.

(c) Please see the table below for the REC inventory (rate base) included in rate cases for 2016–2019. In each case the value is the actual test period amount. Please note that 2016, 2017, and 2018 values are based on a 13-month average and 2019 is based on a 10-month average.

	Final 2016 Cost of Service	Final 2017 Cost of Service	Final 2018 Cost of Service	2019 As Filed 4-13-18 Cost of Service
Rec Inventory Included in Ratebase*	$ 3,906,902	$ 3,930,497	$ 3,807,351	$ 4,294,538

* For all years, Rate Year average balance is consistent with Test Year average balance

Person/s Responsible for Response: Karen Young, Chuck Watts
Title of Person/s: Budget/Forecasting Supervisor; Power Supply Analyst
Date: July 16, 2018

DPS2.Q21. With respect to GMP's forward renewable energy credit ("REC") sales, please describe GMP's hedging strategy and process. Please include any documents that describe or outline GMP's efforts, including details on timing, sales amounts, pricing decisions, etc.

Objection: GMP reasserts General Objections 1 and 2. The phrase "any documents" is not time or otherwise limited and therefore is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. It may also call for production of privileged materials. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A21.

The GMP power supply resource portfolio contains a number of renewable sources of generation, both contracted and owned, that have specific characteristics (vintage, size, fuel source/technology) that qualify these resources for eligibility to satisfy the renewable purchasing requirements in one or more surrounding New England states ("RPS" eligibility). Beginning with the Vermont SPEED program requirements advanced in 2012 under 30. V.S.A. § 8005, GMP developed a process to sell eligible portfolio RECs into these surrounding state programs such that the revenues that GMP received from the sales could be used to reduce retail electric rates for GMP's customers.

Generally, the goals and approach of GMP's REC sales strategy is similar to the strategies described in Response DPS2.Q13 and DPS2.Q16 for GMP's short-term energy and capacity hedging process: to create more stability in GMP's net power costs and retail rate outcomes by reducing the risk to rates from potential unfavorable changes in market prices (for GMP REC sales, a decline in regional market prices would be unfavorable) for the benefit of our customers. In the case of the REC sales program, many of the details relative to timing, volumes, transaction duration, and vintage are limited by the unique features of these state-administered compliance markets (which are the overwhelming source of demand).

The GMP REC sale hedging process relies primarily on layered forward sales with terms reaching out one to four years, with the goal that each of the upcoming delivery vintage year's revenues reflects average pricing conditions from the previous few years (see Attachment GMP.DPS2.Q21.1 for typical targeted sales volume percentages). Because individual state renewable requirements programs are much smaller than the regional energy market, and there are many RPS compliance buyers seeking to meet RPS requirements that are uncertain (based in part on when and how often retail customers switch their retail generation suppliers) GMP has found that implementing this volume strategy for the GMP REC supply requires the use of a significant number of

transactions (often using regional REC brokers) to limit the potential pricing impacts of GMP sales on these relatively illiquid markets. This consideration (e.g., if GMP sought to quickly sell 100,000 MWh of RECs for a particular vintage, we could meaningfully depress the market price) sometimes limits the amount of GMP flexibility on sale timing, and correspondingly reduces the impact of pricing decisions for any single transaction and results in a hedging process that is more programmatic in nature.

The design and progress toward achieving the goal of the REC sales program is reviewed with senior leadership and periodically with the Board of Directors and/or Audit Committee. Regularly throughout the year the GMP Power Supply team updates a REC tracking model (see the previously provided "8.REC_Model_2019_RC.xls" for a version of this spreadsheet) for currently available broker indications (see previously provided Attachment GMP.DPS1.Q88) and expected supplies.

Person/s Responsible for Response: Chris Cole, Melinda Humphrey
Title of Person/s: Director, Market Operations; Power Marketing Analyst
Date: July 16, 2018

DPS2.Q22. Please provide copies of any documents or written communications which pertain to GMP's most recent forward REC sale transaction. Within your response, please include request for proposal documents, pricing responses, evaluation analysis, and other pertinent material.

Objection: GMP reasserts General Objections 1 and 5. The phrase "other pertinent material" is vague notwithstanding the nonexclusive list of supporting documentation stated in the request. Moreover, the request is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A22.

GMP's most recent forward REC sale was to Constellation Exelon on May 2, 2018. The sale was conducted using a REC broker and consisted of 30,000 MA Class I RECs per year for Vintage years 2019, 2020, 2021, and 2022 at a price of $29.00.

For the requested proposal documents, pricing responses, and evaluation analysis see Attachment GMP.DPS2.Q22.1 and Confidential Attachments GMP.DPS2.Q22.2 through -.6. For additional information pertinent to this REC sale and all of GMP's REC sales see Response DPS2.Q21.

Person/s Responsible for Response: Melinda Humphrey
Title of Person/s: Power Marketing Analyst
Date: July 16, 2018

DPS2.Q23. Please provide GMP's latest forecast of Vermont Tier 1 REC prices. Within your response, please describe GMP's purchases of such RECs for the rate year from Hydro Quebec, including term, quantity, and price. Within your response, please describe any efforts or plans by GMP to extend this REC purchase or identify alternative sources of relatively low-cost Vermont Tier 1 RECs.

DPS2.A23.

In Docket No. 8827 (seeking a CPG for the acquisition of certain hydroelectric units formerly owned by Enel), GMP presented a forecast of Vermont Tier 1 REC prices that began at about $1/MWh in 2017, increasing gradually to about $5/MWh by the mid-2020s, then increasing more slowly (i.e., at the rate of general inflation) thereafter. GMP has not subsequently updated this price outlook, since the key market considerations that drove the outlook (i.e., sufficient current regional supply of existing hydroelectric RECs but controlled by relatively few sellers, other New England states putting increasing attention to the acquisition of additional renewable supply, and achievement of greenhouse gas emission goals) appear to remain in place. Similarly, recent broker price indications (e.g., for Maine Existing) have not provided a strong basis for refining the price outlook; they are directionally supportive of the gradual upward price trend in GMP's forecast, but they only extend one or two years and they feature a significant (in percentage terms) bid/ask spread.

GMP has acquired significant Tier 1 eligible Hydro Quebec RECs as a result of two transactions: (a) the long-term HQUS PPA executed in August 2010 (this is a joint utility purchase which provides a total of about 225 MW to GMP and several other Vermont utility buyers); and (b) a GMP transmission lease agreement executed in October 2016. In the joint utility purchase GMP receives an equal volume of renewable attributes (reflecting the HQ-Production supply mix, which in the most recent year exceeded 99 percent hydroelectric) to energy deliveries for the 25-year term of the contract. There is not an explicit price for the renewable attributes (see Attachments GMP.DPS1.Q85 HQUS PPA**)**. Under the lease transaction, GMP leases to HQ our share of import capability on the Phase I/II HVDC interconnection between New England and Quebec, while HQ provides hydroelectric renewable attributes associated with HQ Production's imports into the region. The lease provides for an annual quantity of attributes between 1,200,000 and 1,700,000 MWh beginning in January 2017 through October 2020 (the end of GMP's current lease for Phase I/II). The agreement does not specify an explicit price for the REC component. GMP has imputed a price according to our current accounting practices and available estimates of similar traded attributes at the time the transaction was executed (see Attachments GMP.DPS2.Q23.1 - Tier 1 Prices and

GMP.DPS2.Q23.2 - HQUS Imputed REC prices for this calculation).

GMP has not developed any specific plan to extend these REC agreements, in part because the long-term status of the Phase II interconnection is uncertain. We are actively monitoring the market for Tier 1 resources in New England (which are not eligible for markets that command higher prices) with the expectation that significant additional Tier 1 resources will be needed to satisfy GMP's RES obligations during the 2020's. These efforts include conversations with owners of existing hydro plants, regular review of trade press and consultant reports on the regional renewable market and factors that affect supply and demand, and review of limited broker indications for regional compliance markets that feature broad resource eligibility.

Person/s Responsible for Response: Chris Cole, Douglas Smith
Title of Person/s: Director, Market Operations, Chief Power Supply Executive
Date: July 16, 2018

DPS2.Q24. Please provide, to the extent available, a table which defines GMP's accounted for cost of RECs by resource. Within this response please signify which REC cost rates are explicit or imputed. For those which are imputed, please provide a detailed description of how they were imputed.

DPS2.A24.

There are only two REC resources for which there are explicit REC prices: Moretown ($20) and Gas Watt ($25). All others are imputed. Please see Attachment GMP.DPS2.Q24 - REC Costs for details. Generally, the calculation(s) were based on the GMP's projection of future REC prices. The values in columns C thru E represent actual REC allocation percentages and rate period prices. Values in columns I through K represent REC costs reflected in the rate case filing, if different.

Please note that any imputed REC charge would be booked as a power supply (energy) cost if it were not reclassified as a REC expense.

Person/s Responsible for Response: Chuck Watts, Erica Senecal
Title of Person/s: Power Supply Analyst; Senior Financial Accounting and Reporting Analyst
Date: July 16, 2018

DPS2.Q25. Please provide detail supporting the net REC revenue number recorded in the test period. Please include REC sales quantity, sales price, and recorded cost.

DPS2.A25.

Attachment GMP.DPS2.Q25 - Test Period RECs contains the requested information.

Person/s Responsible for Response: Douglas Smith; Chuck Watts
Title of Person/s: Chief Power Supply Executive; Power Supply Analyst
Date: July 16, 2018

DPS2.Q26. Please describe how GMP's option to meet a 5% increased Tier I RES will increase the value of GMP's Tier III compliance measures. If practicable, please quantify this benefit and provide the associated calculation.

DPS2.A26.

VSA Title 30, Chapter 89, Section 8005 prescribes that for purposes of applying an energy transformation project to a utility provider's annual Tier III requirement, the net fossil fuel consumption resulting from the project be converted to an electric MWh equivalent figure. Consistent with the approach that was vetted at the Technical Advisory Group, that conversion takes into account the fraction of the utility provider's energy supply mix that is estimated to be obtained from fossil fuel sources. Thus, all else equal, increasing the renewable (non-fossil fuel) portion of GMP's energy supply by 5% will increase the amount of credit that an energy transformation project receives toward the Tier 3 requirement by 5%.

Attachment GMP.DPS2.Q26 illustrates the estimation of Tier III value for a hypothetical energy transformation project, based on two GMP energy supply mixes. The tab with the label "Tier 3 Value – Actual" has the calculations based on a projection of fuel mix in GMP's portfolio over the assumed 30-year life of the measure in the example. These projections can be found in the spreadsheet on the '%non-FF' tab. The tab labeled "Tier 3 Value - 5% More FF" shows how the MWh calculation would be different if the GMP fuel mix contained 5% more fossil fuel; the result is about a 5% difference in the estimated Tier III value of the transformation project. Please note that the effects of actual changes in GMP's future supply mix on Tier III value will depend on the duration of those changes; for simplicity this example assumes a 5% change over the measure's life.

Person/s Responsible for Response: Douglas Smith, Jeff Monder
Title of Person/s: Chief Power Supply Executive; Innovation Champion
Date: July 16, 2018

DPS2.Q27. Please explain why certain GMP hydro assets qualify under non-Vermont REC programs and others do not. Please include a table of the hydro assets which specifies which assets (both contracts and owned units) qualify to produce RECs in other states, and which RECs they produce (e.g. Class I, Class II etc.).

DPS2.A27.

The eligibility of renewable generation assets for compliance with one or more state's Renewable Portfolio Standard ("RPS") or Renewable Energy Standard ("RES") depends on factors such as commercial operation date, nameplate capacity, and operational characteristics (e.g. run-of-river for hydro generation). These eligibility criteria, which are typically defined by state law or public utility regulations, can vary significantly from state to state. GMP works to optimize the value of its generation fleet, and consequently controls costs for customers by reviewing the potential REC eligibility of specific assets for the Vermont RES and for RPS programs in other New England states. By registering assets for participation in multiple states' RPS programs, GMP is able to manage its portfolio of RECs to meet Vermont's annual RES obligations while also selling RECs with high market value for compliance in other jurisdictions to lower net power costs for customers. Not all hydro units qualify for favorably priced RECs so GMP strategically registers those that qualify for Massachusetts Class II, Connecticut Class I, or New Hampshire Class IV.

Please see Attachment GMP.DPS2.Q27 - Hydro Assets.

Person/s Responsible for Response: Melinda Humphrey; Douglas Smith
Title of Person/s: Power Marketing Analyst; Chief Power Supply Executive
Date: July 16, 2018

DPS2.Q28. Please provide a quantitative assessment of GMP's Tier I and Tier III compliance strategy. For example, what are GMP's projections regarding its Tier I and Tier III obligations and REC holdings for 2017, 2018, 2019, 2020 and 2021 after planned REC sales and purchases. Within your response, please provide detail by resource generation type. If practicable, please provide this information in a manner consistent with the Attachment GMP.DPS1.87 that was provided by GMP in response to the Department's June 1, 2018 discovery requests.

DPS2.A28.

Please see Attachment GMP.DPS2.Q28 - Tier I and III.

Person/s Responsible for Response: Chuck Watts
Title of Person/s: Power Supply Analyst
Date: July 16, 2018

DPS2.Q29. Please refer to Page 28, lines 17–20 of Mr. Brian Otley's prefiled direct testimony. Please provide supporting documentation in native file format for the 2017 Tier III performance used to project the $825,000 forecast of 2019 Tier III costs discussed by Mr. Otley in his testimony.

DPS2.A29.

Please see Attachment GMP.DPS2.Q29.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

Capacity Costs

DPS2.Q30. Please provide GMP's latest SD_FCMCLOSTLDTL – Forward Capacity Market Capacity Load Obligation Settlement Details Report from ISO-NE. If the latest such report does not pertain to the 2018-19 capacity commitment period, please indicate when such a report will be available.

DPS2.A30.

See Attachment GMP.DPS2.Q30.

Person/s Responsible for Response: Chuck Watts
Title of Person/s: Power Supply Analyst
Date: July 16, 2018

DPS2.Q31. Please refer to the "ISO New England Installed Capacity Requirement, Local Sourcing Requirements and Capacity Requirement Values for the System-Wide Capacity Demand Curve for the 2019/20 Capacity Commitment Period."[1] Please explain the differences between the 14.4% Annual Resulting Reserve Margin described in that report and the ~30-50% values that GMP describes and uses in its modeling.

DPS2.A31.

While both measures explain the volume of capacity that ISO-NE participants are required to procure for each FCM year relative to load, the two measures use significantly different inputs with respect to the capacity requirements and load. GMP typically expresses its FCM Reserve Margin based on its settled annual coincident ISO-NE peak load (Customer Peak Contribution) and its "gross ICAP" obligation (Customer Capacity Requirement) as reported in ISO-NE's SD_FCMCLOSTLDTL report (see Attachment GMP.DPS2.Q31.1 - Reserve Requirement). The Customer Capacity Requirement is a gross value that includes GMP's share of the HQICC. For the period of June 1, 2012 through June 30, 2018 GMP's FCM Reserve Margin ranged from a low of 124% to a high of 154%, meaning that GMP was required to provide between 124% and 154% of its coincident peak load to the pool for those FCM years. As shown in Attachment GMP.DPS2.Q31.2 - Pool Calculation, the 14.4% Reserve Margin cited in the question is based on the ISO-NE's Net ICR "Installed Capacity Requirement" excluding the HQICC (Hydro Quebec Interconnection Capability Credit)[2] divided by the Peak Load (50/50) a forecast of what the peak loads will be on average. Based on Attachment GMP.DPS2.Q31.3 - Historical Peaks, the average peak load over the last seventeen years has been 25,405 MWs which is significantly below the 29,861 MWs used in the ISO-NE calculation. This is generally reflective of the fact that in the context of the FCM, ISO-NE treats Demand Resources (which in recent years have amounted to several thousand MW) as a capacity resource and not a reduction of Peak Loads, which is how they would actually be treated if they respond to a peak event. Actual metered peak loads in the region will therefore tend to be several thousand MW lower than the peak loads (prior to demand side resources) that are used to establish the regional ICR. This difference explains a significant portion of the apparent difference in reserve margins. Row 24 on Attachment GMP.DPS2.Q31.2 shows GMP's adjusted calculation of the ICR to reflect the value of the HQICC and to reduce loads to

[1] This report is available online at https://www.iso-ne.com/static-assets/documents/2016/01/icr_values_2019_2020_report_final.pdf

[2] In practice, the HQICC is part of the overall requirement and the entitlement holders of the HQICC (of which GMP is one) receive a credit against their obligation in their monthly settlement calculations (see HQICC values in rectangles in Attachment).

reflect the benefit of demand resources. These two changes yield a Reserve Margin of approximately 35% which may be understated if the actual annual ISO-NE peak is lower than 27,115 MWs for FCA#10.

Person/s Responsible for Response: Chuck Watts, Andrew Quint
Title of Person/s: Power Supply Analyst; Power and Markets Analyst
Date: July 16, 2018

Power Supply Resources

DPS2.Q32. Please refer to the power purchase agreement ("PPA") for Deerfield Wind, which GMP provided in response to question Q:PSD:GMP.1.85 from the Department's June 1 discovery requests. Please provide a detailed explanation as to whether each condition precedent from the PPA was satisfied. If not, please provide a detailed explanation as to why the PPA was not terminated and please provide any supporting material relied upon in reaching this decision.

DPS2.A32.

Section 3.2 of the ("PPA") provided for a number of conditions precedent negotiated by the parties to allow for a termination of the agreement under specific circumstances in the event that, after reasonable commercial efforts, certain milestones important to preserving the original intent of the parties could not be met. Specifically;

(a) By no later than December 31, 2016, Seller obtaining the rights to the site for the Project necessary or desirable for the construction, operation, and maintenance of the Project on terms and conditions acceptable to Seller in its sole discretion;
(b) By no later than December 31, 2016, Seller entering into a turbine supply agreement for the Turbines and the construction contract(s) necessary for the construction of the Project, all on terms and conditions satisfactory to Seller in its sole discretion;
(c) By no later than the Commercial Operation Date (original or extended as applicable), all final, non-appealable permits, consents, licenses, approvals, or authorizations as listed in Annex E have been obtained by Seller and remain effective, on terms and conditions reasonably acceptable to Seller, and where, applicable Buyer;
(d) By no later than November 30, 2017, Seller entering into the Interconnection Agreement, any initial temporary transmission arrangements necessary for test energy and any transmission facilities and any permits related to any or all of the same, on terms and conditions satisfactory to Seller in its sole discretion;
(e) Buyer filing any required notice to the Public Service Board ("Board") under Rule 5.200 and the required notice period shall have expired by September 1, 2015.

Each of these items has been satisfied under the agreement. Specifically, items (a) – (d) have been met either through a combination of the activities of the Seller in the commencement of construction of the project, the absence of notice to Buyer that a condition was not in satisfactory form (in their sole discretion), and/or the passage of time. Item (d) was specifically satisfied with the execution of the three-party Interconnection Agreement between GMP, Seller,

and ISO New England dated June 30th 2016. Item (e) was satisfied when GMP filed the notice under Rule 5.202 on July 2nd and subsequently executed the agreement on October 9th 2015.

Person/s Responsible for Response: Chris Cole, Chuck Watts
Title of Person/s: Director, Market Operations; Power Supply Analyst
Date: July 16, 2018

DPS2.Q33. Please provide GMP's latest estimates of going forward costs (i.e. costs that will be incurred for continued operation of the plant) for the Stonybrook Combined Cycle plant and the McNeil biomass plant.

DPS2.A33.

Please see Attachment GMP.DPS2.Q33.1 - McNeil Budget and Attachment GMP.DPS2.Q33.2 - Stony Brook Budget.

Person/s Responsible for Response: Chuck Watts
Title of Person/s: Power Supply Analyst
Date: July 16, 2018

DPS2.Q34. For the three-year period of 2015–17, please provide historical generation data and bilateral energy trades for all resources or bilateral purchases GMP utilized to hedge its ISO load requirements on an hourly basis. Please also include the hourly, day-ahead LMPs which correspond to the delivery location of those resources or bilateral purchases.

DPS2.A34.

Based on a discussion with Matt King and Breandan Mac Mathuna of GDS Associates GMP determined that due to file size constraints we would provide hourly settlement data in MWs by unit and/or resource per hour for Calendar Year 2017. Please see Attachment GMP.DPS2.Q34.1 – Hourly Settlement Data Calendar Year 2017.

Person/s Responsible for Response: Andrew Quint
Title of Person/s: Power and Markets Analyst
Date: July 16, 2018

DPS2.Q35. Please refer to GMP's response to Q:PSD:GMP.1.89 from the Department's June 1,2018 discovery requests. Please provide the same ISO settlement-level GMP load data referenced for 2017 on an hourly basis for 2015 and 2016.

DPS2.A35.

See Attachment GMP.DPS2.Q35 - Settled Load.

Person/s Responsible for Response: Andrew Quint
Title of Person/s: Power and Markets Analyst
Date: July 16, 2018

DPS2.Q36. Please refer to Exhibit GMP-DCS-20, which was filed with Mr. Smith's prefiled direct testimony. Please describe which generation resources are included in the row labeled "Misc Independent."

DPS2.A36.

The resources included in Misc Independent are the following:

- Gas Watt Landfill Gas
- Boltonville Hydro
- North Hartland Hydro
- Gilman (Ampersand) Hydro
- Sweetwater Hydro
- Lower Village Hydro
- Lower Valley Hydro*

* Please note that Lower Valley is included in error. GMP recently purchased this project and it is also included in rate period generation as a $0/MWh energy "GMP hydro" source.

Person/s Responsible for Response: Chuck Watts
Title of Person/s: Power Supply Analyst
Date: July 16, 2018

DPS2.Q37. Please describe and provide applicable documentation in native file format of GMP's analysis or determination of required level of dispatchable or operable generation resources to effectively hedge energy requirements.

Objection: GMP reasserts General Objections 1 and 5. The request, as worded, is vague and ambiguous. Moreover, the request is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A37.

GMP's supply portfolio contains significant generation sources which are fully or partially dispatchable and feature a range of characteristics and variable costs. Almost 200 MW of GMP's sources are fully dispatchable, in that their output can typically be increased or decreased in response to changing market conditions or other factors. These are primarily power plants fueled by oil and wood, with a high degree of dispatchability subject to their physical characteristics and constraints (e.g., ramping rates, minimum load levels). A similar magnitude of wind and hydroelectric plants can also dispatched to reduce output to less than their potential output based on available wind/streamflow. The following table identifies these dispatchable supply sources, along with some pertinent characteristics that affect how that dispatchability can be used.

Source	Plant Type	Degree of Dispatchability	Approximate GMP MW	Relative Variable Cost	Comment
McNeil	Biomass steam	High	17	Moderate	Produces RECs along with energy. Notable time & cost associated with shutdown & startup.
Stony Brook	Natural gas combined cycle; distillate oil backup	High	45	Moderate	Three units which can be operated independently.
Wyman 4	Residual oil steam	High	18	High	Relatively long start time.
GMP Peakers	Simple cycle combustion turbine & internal combustion units. Distillate oil / kerosene fuel	High	101	Very high	Quick start, flexible.
Dispatchable GMP Hydro	Hydroelectric with ponding	High	16	Low	Dispatchable energy can depend on streamflow conditions.
Subtotal: Highly Dispatchable Resources			**196**		
Kingdom Community Wind	Wind	Downward (i.e., limit output to less than available wind)	55	Very low	
Granite Reliable PPA	Wind	" "	81	Very low	
Deerfield Wind PPA	Wind	" "	30	Very low	
Sheldon Springs Hydro PPA	Hydro (largely run-of-river)	Downward (i.e., limit output to less than available hydro)	20	Low	
GMP Hydro	Hydro (largely run-of-river)	" "	Variable	Low	
Subtotal: Dispatchable (Primarily Downward)			**186**		

GMP has not performed a recent quantitative analysis of the appropriate amount of dispatchable generation resources for the purpose of effective energy hedging. The following observations indicate that the amount of dispatchable capacity presently in the portfolio is reasonable:

- The collective scale of GMP's current dispatchable resources is significant relative to GMP's total load requirements, and relative to its potential net short energy positions. During events of very high energy spot market prices (e.g., in excess of $200/MWh), almost 200 MW of highly dispatchable resources can be deployed to provide energy, limiting GMP's financial exposure during regional shortage events.
- A subset of the highly dispatchable resources (about 80 MW from the Stony Brook, McNeil, and Wyman plants) features variable costs that are typically well below those of New England's peaking generation fleet (e.g., combustion turbine and internal combustion plants). These sources are sufficient to cover much of the weather-driven variance in GMP's load requirements (e.g., differences between a hot/cold day and an average day in a particular month), and they can limit the magnitude of GMP's potential financial risk during periods of high load and/or low GMP generation.
- Two other substantial GMP energy resources are not dispatchable, but are significantly shaped in ways that tend to limit the need for dispatchable generation for energy hedging purposes. First, the HQUS long-term PPA features a fixed "7x16") (7 days/week, 16 hours/day) delivery schedule. These deliveries occur during hours when GMP's load requirements tend to be high. During the off-peak hours when the HQUS PPA does not deliver energy, energy market prices tend to be less volatile, posing less financial risk. Second, fixed-volume bilateral energy purchases and sales that GMP makes for terms of up to five years are shaped substantially (with differences of many tens of MW between some months) to follow GMP's projected net short position, on a monthly and peak/off-peak basis. As existing forward energy purchases expire periodically, their shapes purchases can be refined if needed to reflect the changing shape of GMP's projected needs.
- The New England power market is relatively well supplied. The generation fleet includes over 13,000 MW of combined cycle capacity (most of which features high thermal efficiency) which is not fully utilized during most hours of the year. In addition, under the Forward Capacity Market's demand curve construct, in recent auctions ISO-NE has procured more than the target Installed Capacity Requirement. These features tend to limit the frequency and magnitude of spikes in locational marginal prices. As a result, during many times when GMP has a significant net short energy position due to high loads and/or low

output from GMP generation sources, the Stony Brook and Wyman plants are not needed because lower-priced supplies are available in the region (and reflected in Locational Marginal Prices that GMP pays to purchase its energy load requirements).

I would also note that GMP plans to develop the capability to represent its portfolio (loads and resources) in a simulation model of the ISO-NE energy market. It is possible that this type of model, if well calibrated, could provide insights that inform GMP's assessment of its portfolio structure.

Person/s Responsible for Response: Douglas Smith
Title of Person/s: Chief Power Supply Executive
Date: July 16, 2018

Congestion

DPS2.Q38. Please refer to GMP's response to Q:PSD:GMP.1.76 from the Department's June 1, 2018 discovery requests. Please provide the rationale behind congestion/losses costs changing on a proportional basis with LMPs. That is, please explain why congestion/loss should be represented as a percentage of total energy revenue and scaled according to LMP projections.

DPS2.A38.

GMP does not have a model capable of replicating ISO calculations, and changing conditions on the Pool transmission system (which could be caused by generation and load conditions) could affect marginal loss and/or congestion values for GMP resources and load. Therefore, the rate period forecast assumption is that conditions remain the same with the exception of energy market prices and GMP resource and load volumes. However, loss and congestion values are directly (though not 100% as explained above) related to the level of energy market prices, so those prices are a (if not the most) significant factor in the calculation of marginal loss and congestion values given generally stable conditions in the ISO system.

Person/s Responsible for Response: Chuck Watts
Title of Person/s: Power Supply Analyst
Date: July 16, 2018

JV Microgrid Projects

DPS2.Q39. Please describe whether and/or where the battery PPA costs associated with the Joint Venture ("JV") Microgrid projects are included in GMP's power supply costs. Within your response please identify the file name for the appropriate Excel spreadsheet and refer to the specific cell where the information is located.

DPS2.A39.

There are no battery PPA costs related to JV Microgrid (or other) projects included in the rate period power costs.

Person/s Responsible for Response: Chuck Watts
Title of Person/s: Power Supply Analyst
Date: July 16, 2018

DPS2.Q40. Please provide the latest draft or executed form of the contemplated Capacity Maintenance Agreement with Tesla. Please provide information on the incremental cost of the Capacity Maintenance Agreement in both the contemplated 10 and 20 year forms. Please describe if this incremental cost is one-time, upfront cost or a recurring payment.

DPS2.A40.

A draft CMA is provided as Confidential Attachment GMP.DPS2.Q40. The cost of the 20-year CMA is a one-time, upfront cost and is included in the overall project budget.

Person/s Responsible for Response: Kirk Shields
Title of Person/s: Director, Development & Risk Management
Date: July 16, 2018

DPS2.Q41. Please explain how GMP's FCA load obligation would have hypothetically been reduced if one battery were discharging at 2 MWh during the prior ISO-NE system peak which was applicable in 2017-18. Please include a step-by-step calculation detailing how GMP's ISO settled coincident peak load would be reduced (from its ~668 MW value) and how that reduced value would flow into a lower GMP capacity load obligation (reduced from its 936 MW value).

DPS2.A41.

Because the output of a battery would not be included as generation in the ISO energy settlement process (i.e., counted in the calculation of load), GMP's settlement load would have been 2 MW lower than it actually was. This would have made the calculation of GMP's ISO peak hour coincident load 666 (rounded) instead of 668; therefore its share of the ISO peak load would have been (668-2)/(11,644-2) instead of 668/11,644, or 4.0871% vs 4.0989%. Given a "rest-of-Pool" 16,297 MW requirement, GMP's requirement would have dropped from 935.065 to 932.426 MW, a 2.639 MW reduction.

Please see Attachment GMP.DPS2.Q41 - Capacity Obligation Calculation, which contains both the actual settlement and the settlement with the assumed battery discharge.

Person/s Responsible for Response: Chris Cole, Chuck Watts
Title of Person/s: Director, Market Operations; Power Supply Analyst
Date: July 16, 2018

DPS2.Q42. Please refer to the "Solar_Valuation_Engine" sheet from Attachment GMP.DPS.1.Q116 that GMP provided in response to the Department's June 1, 2018 discovery requests for the following requests:

a. Please provide all supporting documentation relied upon by GMP for the estimated value of the following items:

a. Marginal Energy Loss reduction value of 1.08

b. Marginal Capacity Loss reduction value of 1.15

c. Transmission Loss Adj Multiplier value of 1.15

b. Note (4) on this sheet states "Marginal transmission loss multiplier is similar to the capacity loss value, but slightly lower because transmission is billed on a monthly basis." Please provide a detailed explanation why the same 1.15 value is allocated to the Marginal Transmission Loss and the Marginal Capacity Loss values used in the analysis.

c. Please justify the differing losses values used in this analysis versus both the 5% transmission losses used in the Battery Avoided Cost Model, the 8.9% used in the GMP_Tesla-Financial Model, and the 10% (described in response to Q:PSD:GMP.1.132 part b as a portion of a total 50% include reserve requirement) used in Exhibit GMP-JC-3. Please explain why these values should be different in each setting or why inconsistencies exist.

DPS2.A42.

(a) GMP relied on operational experience and industry standards to determine the losses associated with transmission and distribution of energy from its point of generation to the customers consuming the energy. In general, we assume that average losses across all hours are approximately 5%. When we look at on-peak hours, we assume that losses are slightly higher due to greater demand and have generally assumed losses of between 8% and 9%. During hours with the highest loads we assume that losses will be between 15% and 20% of the load being served. The highest losses would typically occur when both loads and temperatures are high.

(b) We determined that using a slightly lower marginal capacity loss multiplier would make the model slightly more conservative, although the marginal capacity loss multiplier could be as high as 1.20 during peak load and temperature conditions. We continue to believe that it is appropriate to assume that the transmission loss adjuster multiplier is reasonable at 1.15 as there are a number of months where line loading conditions would lead to significant losses. At the same time, we note our model assumes minimal Transmission benefits due to the limited solar production during

Transmission peak hours and that the loss adjustment multiplier has virtually no impact on the estimated value of solarv output.

(c) As discussed in (a) above there are a range of line losses that occur based on the load and weather conditions. Using different loss factors may be appropriate in different circumstances, as long as they are a reasonable representation of system losses. This difference reflects some level of uncertainty as to what losses will be at any specific moment in time, and reflect different levels of conservativism for different applications. In our view, using a 5% loss factor for the Battery Avoided Cost Model is conservative as it provides a lower value for products such as Capacity and RNS. That is because the value of avoided costs is calculated based on output during the appropriate peak hour multiplied by an availability factor and then grossed up for losses before being multiplied by the appropriate month or annual rate. Using the lower loss factor provides a lower Avoided Cost benefit for the Project. The 8.9% loss factor used in the GMP_Tesla-Financial Model was developed several years ago and was based on a loss factor that fell within the expected range of loss factors. While we do not typically include losses in our discussion of Reserve Requirement, the specific response to DPS1.Q132 part b was "we estimate that our losses during peak times exceed 10%," which is consistent with our loss assumptions, particularly as it is focused on peak period. Losses were added to the Reserve Requirement to bring the Reserve Requirement in line with the average Reserve Requirement of 48% seen over the last four capacity years.

Person/s Responsible for Response: Andrew Quint
Title of Person/s: Power and Markets Analyst
Date: July 16, 2018

DPS2.Q43. Please refer to the "Solar_Valuation_Engine," "Input-Output," and "Total PPA Summary" sheet from Attachment GMP.DPS.1.Q116 that GMP for the following requests:

- **a. Please provide supporting documentation or justification for GMP's use of FCM coincidence starting at a 2015 value of 50% and reducing according to a 95% decrease each year. Please provide comparisons to historical GMP solar project FCM coincidence in the last several years.**
- **b. Please justify the use of a constant $24.5/MWh REC value for years 2021-2036 before a drop to $10/MWh in 2037.**
- **c. Please describe and provide the results of any sensitivity or scenario analysis GMP performed around varying Energy, RECs, Capacity, or Transmission prices or avoided cost.**
- **d. In the calculation of avoided energy costs, please describe how the solar output is decremented to reflect energy used to charge the battery.**
- **e. Please describe or explain any costs GMP modeled or included to reflect the increasing intermittency of GMP's portfolio as a result of additional solar power.**

DPS2.A43.

(a) see Attachment GMP.DPS2.Q43.1 which is an analysis of FCM peak coincidence over the past several years for a number of the Standard Offer solar projects and the GMP Solar projects. The reduction in peak coincidence is 5% per year and not 95% per year. This is reflective of the small decrements that we have seen over the past several years.

(b) The current REC price outlook is based on current broker prices for Class I RECs. This outlook was informed by recent proposed changes to the RPS in Massachusetts that could increase the goal from 1% to either 2% or 3%. While this incremental demand would incent new projects it would also lead to more robust near-time prices. In the longer term we assume that the projects are no longer eligible for a premium REC but that the projects still retain some value in the market.

(c) GMP has presented what we believe is a base case outlook for the various products. We have refreshed our analyses as our market outlooks have changed, but we have not performed sensitivity analyses on our current outlook.

(d) Solar output is not decremented for energy used to charge the battery, rather we show both the value of PV solar output and the cost associated with

charging the battery during specific hours. To the extent that we both purchase and sell energy during the same hour, we effectively zero out the value of the output for the hour, or in the case of the hours during which we are charging a battery.

(e) GMP has made a downward adjustment to the value of energy for solar generation versus around-the -clock energy based on the value of solar generation over the last several years. Based on the Value as % of LMP analysis in Attachment GMP.DPS2.Q43.1, the relative value of solar-shaped output is slightly below 100%, accordingly GMP has used 95% as a multiplier in the Solar Valuation Engine to adjust for this decline in value. This reflects the increased penetration of solar generation in New England that has served to flatten energy prices during the hours when solar PV is typically available for generation.

Person/s Responsible for Response: Andrew Quint
Title of Person/s: Power and Markets Analyst
Date: July 16, 2018

DPS2.Q44. Please refer to the Excel filed named "Milton Battery Avoided Cost Model 2018 03 01 Values," which GMP previously provided to the Department. Please then refer to the "Assumptions," "Peak Assumptions," and "Value of Avoided Costs" tabs from this file for the following requests:

a. Please explain the nature of regulation quantity sold changing from years 1-5 to a more than doubling in the remaining years.

b. Please describe in which hours of the day the battery is assumed to be typically charging and the availability of attached solar power at those times. Please describe any limitations on battery operations that were considered due to availability of solar power and related ITC impacts.

c. Please explain the 5% losses (added for capacity and transmission value) value and contrast it to the losses figure used in other analyses. Please explain why the losses adder for capacity starts in year 11.

d. Please provide any documentation or analysis that supports that the conclusion that discharging four days (for four hours per day) will be sufficient to meet peak shaving goals. Please explain whether or not running on several consecutive days may be necessary during a protracted summer or winter weather event.

e. Please explain the contrasting assumptions of RNS/FCA peak shaving success versus that assumed in the residential Tesla Powerwall analysis based on historical success (67% for RNS and 72% for FCM) and that assumed in GMP's power supply model for the Stafford Hill JV Solar/Battery site (25% for RNS and 25% for FCM).

DPS2.A44.

(a) During the first five years of operation we assume that the battery is primarily participating in the Regulation Services Market during daylight hours so that the Project does not drop below a target 85% charging from the solar array due to the ITC recapture rules. After the fifth year of operation the ITC recapture rules will no longer be applicable and we assume that the battery will generally be participating in the Regulation Services Market when it is not in use for peak shaving.

(b) The battery was generally assumed to charge beginning during daylight hours for the first five years of operation. To the extent that the battery is required to charge during hours with limited solar availability there is the ability to charge from the grid for up to 15% of the energy used for charging the battery in each of the first five years.

(c) The 5% loss factors added to capacity and transmission values assume average system losses and were used as a means of ensuring a conservative

estimate of the value of output from the Project's battery storage component. While we believe that the avoided losses during near-peak hours (e.g., monthly Vermont peaks that determine GMP's RNS transmission charges, and annual ISO-NE peaks that determine GMP's FCM obligations) will be greater than 5%, the use of this relatively low estimate created a higher hurdle for screening the Project.

(d) The assumption of discharging four days per month for a period of four hours per event is based on a review of monthly hours with peak or near peak loads for the last several years. Please see Attachment GMP.DPS2.Q44.1 - ISO Peaks and Attachment GMP.DPS2.Q44.2 - Vermont Zonal Peaks. In general, we assumed that some number of months (e.g. winter months) will require three attempts to hit peaks due to the distribution of peak and near-peak loads, while other months would generally require between four and five attempts to hit peaks. In general, attempts to shave peaks are based on an hourly load forecast, either for GMP or for ISO-NE depending on which peaks GMP is attempting to shave. Peak shaving attempts can occur on consecutive or nonconsecutive days depending on forecast loads and market expectations.

(e) The historical success rate for the Tesla Powerwall is actually an analysis prepared to measure how frequently GMP has been able to respond to peak events since 2014. When we look at the last twenty-four months GMP has correctly identified twenty-one out of twenty-four RNS peaks (87.5% versus the modeled 83% success rate modeled for the Powerpack). Over the past four years GMP called peak events for three of the four ISO-NE FCM coincident peaks. The only miss occurred last summer when there was an unusually low pool peak which was the lowest in the last seventeen years. GMP has now changed its process for identifying peaks to look at forecast loads starting at levels above 22,500 MWs, or about 1,000 MWs lower than the 2017 peak. While this may require a limited number of additional attempts to hit peaks, GMP believes that this won't significantly change the total number of attempts required to hit the annual FCM peak. Stafford Hill was GMP's first combined Solar PV/Battery Storage project and features two battery technologies, lead acid and lithium-ion, for a total of 4 MWs of battery storage with 3.4 MWhs of storage, with lithium-ion storage accounting for 2 MWs and 1 MWh. The total available MWs and MWhs of battery storage limits the amount of peak shaving that the batteries are able to provide to a maximum of 3.4 MWhs over an assumed peak event lasting between three and four hours or approximately 25% of nameplate capacity. Due to the sizing and location of the inverter, the site, including solar and battery storage, has a maximum power output of 2MWs at any point in time, which could limit battery discharge for system peaks occurring during solar PV generation hours. The Milton project features batteries that are sized to offer four hours of discharge and are all a single technology, lithium-ion.

Additionally, the supplier offers more advanced control and optimization software that should enhance GMP's peak management efforts.

Person/s Responsible for Response: Andrew Quint
Title of Person/s: Power and Markets Analyst
Date: July 16, 2018

DPS2.Q45. Please refer to the "Model20180305 GAAP" tab from the Excel file named "GMP JV Solar-Battery Investment and Reg Asset Rate Year 2019 FINAL," which GMP previously provided to the Department for the following requests:

a. Please refer to row 63, Assets, Construction in Progress and row 64, Assets, Fixed Assets. Please provide a detailed build-up of the items that comprise each monthly value for each referenced Excel row.

b. Please refer to row 63, Assets, Construction in Progress. Please confirm whether a return on capital is included in the monthly Construction in Progress values. If yes, please provide a detailed breakdown of this return on capital. This should include, but not be limited to, the capital structure, return on equity value and cost of debt.

c. Please refer to row 63, Assets, Fixed Assets. Please confirm whether an Allowance For Funds Used During Construction (AFUDC) is included in the monthly Fixed Assets values. If yes, please provide a detailed breakdown of the AFUDC value and its calculation. This should include, but not be limited to, the capital structure, return on equity value and cost of debt.

DPS2.A45.

(a) Please refer to the confidential attachment titled "Confidential – JV Solar-Battery Model" provided in Response DPS1.Q1. Project level detail for Construction in Progress and Fixed Assets can be found on Tab PRJ |I 1 for the Milton project, PRJ|I 2 for the Ferrisburgh project and PRJ|I 3 for the Essex Project. Also see Response to DPS2.Q46.

(b) No return on capital is included in the values.

(c) No Allowance for Funds Used During Construction (AFUDC) is included in the values.

Person/s Responsible for Response: Eddie Ryan, Karen Young
Title of Person/s: Controller; Budget/Forecasting Supervisor
Date: July 16, 2018

DPS2.Q46. Please refer to Attachment GMP.DPS.1.Q116, tabs "PRJ 1", "PRJ 2" and "PRJ 3", Excel row 83, line item Development Costs. Please provide a detailed explanation and supporting detail that demonstrates the composition of each value of the referenced Excel rows. Please provide copies of all invoices received in respect of these development costs.

DPS2.A46.

Please see Attachment GMP.DPS2.Q46.a for the requested cost detail and explanations of the costs. Supporting information is also provided as CONFIDENTIAL Attachment GMP.DPS2.Q46.b, CONFIDENTIAL Attachment GMP.DPS2.Q46.c, and Attachments GMP.DPS2.Q46.d through GMP.DPS2.Q46.h.

Person/s Responsible for Response: Kirk Shields
Title of Person/s: Director, Development & Risk Management
Date: July 16, 2018

DPS2.Q47. Please refer to Sheet 1 of Excel file named "15. Battery Load Reductions 2019_RC," which GMP previously provided to the Department. Please provide a detailed explanation for and the actual calculations used to determine the following percentage values for RNS and FCM impacts: a) Tesla (cells C27 and C28); b) Generation (Castonguay) Initiatives (cells C43 and 44; c) Stafford Hill Battery (cells C58 and 59); and d) Micro-grids (cells C73 and C74).

DPS2.A47.

(a) Please refer to DPS1.Q131 for a response regarding how the Tesla FCM and RNS peak value rates were developed.

(b) Generation Initiatives refers to the Panton Storage project. Given the full 4-hour capability of the system and given that 2019 is the first year in the life cycle of this project, we estimated 100% battery peak value. Note this is a different factor than the "peak capture rate" that is built into the financial model. The financial model is looking at the total expected value against the total available peaks. In the "15.Battery Load Reductions 2019_RC" file the percentage factor is the amount of anticipated total output during the months that we accurately anticipate hitting the peak. In this model, we anticipate hitting the peak 9 months of the year, and when we do, we will have 100% effectiveness from the storage system

(c) Please see response to DPS2.Q44.e. As in (b) above and (d) below, the percentage factor is the amount of anticipated total output during the months that we accurately anticipate hitting the peak.

(d) In the case of the micro-grids, the anticipated total battery value during the months that we hit the peak is estimated at 75%. Note that this is a different factor than the "peak capture rate" that is built into the financial model. The financial model is looking at the total expected value against the total available peaks. In 15. Battery Load Reductions 2019_RC, the percentage factor is the amount of anticipated total output during the months that we accurately anticipate hitting the peak. In the case of the micro-grid projects, we estimated hitting 10 out of the 12 RNS peaks, and when we do we will have 75% effectiveness from the storage system.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q48. Please refer to GMP's response to question Q:PSD:GMP.1.121 from the Department's June 1, 2018 discovery requests. With respect to GMP's approach to ratemaking treatment (as opposed to accounting treatment) of the hypothetical liquidation at book value ("HLBV") and developer fees for the JV Microgrid projects, please provide:

- **a. All analysis conducted by the company of alternative methods for reflecting these items in rates;**
- **b. Any communications with (to and from) the company's corporate auditor regarding this approach;**
- **c. All internal communications, presentations and analysis within GMP related to the choice of ratemaking treatment and its impact on GMP rates;**
- **d. Examples of other regulated utilities that use an approach that is similar to GMP's for ratemaking purposes, to the extent GMP is aware of any such examples.**

DPS2.A48.

(a) GMP prepared an analysis which calculated the net present value (NPV) of returning the day 1 gains and developer fees to customers under three scenarios: in the 1st year; over 15 years; and over 25 years. Please see Attachment GMP.DPS1.Q117 previously provided by the Company.

(b) See Attachment GMP.DPS1.Q121.b which was previously provided by the Company.

(c) See Attachment GMP.DPS2.Q48.c which is a spreadsheet entitled, *Zero Rates Update: January 20, 2017*. The Summary tab at lines 42 and 43 address Day One Gains and Developer Fees for new JV projects. Please note the spreadsheet is not based upon modeling and analysis of an actual Microgrid project.

(d) GMP is not aware of any other regulated utilities that use an approach similar to GMP's.

Person/s Responsible for Response: Kirk Shields, Eddie Ryan
Title of Person/s: Director, Development & Risk Management; Controller
Date: July 16, 2018

DPS2.Q49. Please refer to GMP's response to question Q:PSD:GMP.1.123 from the Department's June 1, 2018 discovery requests, where Mr. Shields responded that "GMP ratemaking includes both sides of the estimated costs and benefits ledger and GMP assumes the risk of not achieving those outcomes as described above." With respect to this response, please provide the following:

a. Please identify the specific risk or risks that Mr. Shield's response refers to;

b. Please describe the potential financial impact of such risks to GMP investors or shareholders.

DPS2.A49.

(a) GMP generally categorizes the risks for the solar/storage projects in terms of project performance risk, execution risk, market risk, and regulatory risk. Project performance risk is the risk that a project performs as expected over its life and that the project is available and able to perform its functions (i.e., generating, storing, and discharging electricity) when expected. Execution risk in this instance relates only to the battery component of the JV MicroGrid projects and is GMP's ability to forecast peaks successfully and to discharge the battery during those forecasted peaks. Market risk is the risk that future forecasted market prices reasonably approximate actual prices, on average, over the life of the project. Finally, regulatory risk relates to the risk that future ratemaking proceedings could result in disallowance of recovery of the investment.

(b) It is worth noting that none of the 4 risks described above are unique to the JV MicroGrid projects. All are applicable to GMP power supply procurement activities in the normal course of business. The financial impacts of each of the 4 risks to GMP's shareholders are discussed further below.

Performance. The performance risk associated with the projects is fairly low due to the maturity of solar technology, and the growing track record of battery storage technology with regard to reliability and/or load reduction. If the projects significantly underperform and fail to provide the promised services to GMP customers, the project LLCs would not receive sufficient PPA revenues to pay their operating costs (i.e. insurance, taxes, O&M, lease payments, etc.). In that case, the project LLCs would have to be recapitalized (infused with additional capital) in order to pay their bills. The cost of recapitalization would be borne by GMP's shareholder—not customers—in each year that the project underperforms. It is also worth pointing out that once financing has closed, the transaction structure is extremely rigid, meaning there is

no opportunity for GMP to change the expected performance or output metrics of the financing transaction in order to realign with any changes in operational, cost, or revenue expectations over the projects' lives. GMP's shareholder bear the cost of recapitalization if actual performance is significantly under modeled expectations and the projects require recapitalization.

Execution. This risk relates only to the battery, because the solar component is a static generating resource requiring no dispatch decisions. The battery's execution risk could be considered somewhat higher than its performance risk, as frequent fluctuations in operating variables such as weather, ISO load forecasts, and customer behavior make it challenging to accurately predict peaks. This risk already exists for GMP's power supply and load management assets and is mitigated through intensive, internal load management and forecasting activities and use of multiple sources for weather and load forecasts. If inaccurate forecasting or poor battery dispatch execution by GMP results in lower value to customers than was estimated in ratemaking, GMP bears the risk that it will earn less than its authorized rate of return.

Markets. Market price risk is an inherent risk in GMP's entire power supply portfolio, including generation and demand resources. Many decisions that GMP makes on behalf of customers rely on actual historical market prices to forecast future prices. Whether a resource is procured via a direct investment or through a PPA, GMP makes reasoned assumptions about the benefits that will accrue to customers based on estimates of future market prices; those assumptions are included in ratemaking. Differences in actual market prices relative to forecasts are expected, though prices are generally expected to approximate the forecast on average over the planning horizon for a typical resource. However, GMP has no control over this outcome. To the extent that benefits to customers are lower than what was forecasted and included in rates, GMP bears the risk that it will earn less than its authorized rate of return.

Regulatory. Regulatory risk recognizes that regulators can disallow recovery of costs incurred and investments made on behalf of customers if found to be imprudent at the time the decision was made. Future regulatory regimes or ratemaking proceedings may determine that some or all of certain costs are not allowed for recovery in rates. GMP's shareholder bears the entirety of this disallowance risk.

Person/s Responsible for Response: Kirk Shields
Title of Person/s: Director, Development & Risk Management
Date: July 16, 2018

Innovative Services and Energy Transformation Initiatives

DPS2.Q50. Please provide copies of any least-cost analyses conducted by GMP for alternatives to the Tesla Powerwall projects that have not previously been provided to the Department. Please also state whether GMP investigated products from other manufacturers that are comparable to the Tesla Powerwall in functionality. If so, please identify any such product and manufacturer and describe in detail the reasons for rejecting any such alternatives to the Tesla Powerwall.

DPS2.A50.

Yes, GMP has been continually evaluating residential scale, behind-the meter battery systems over the last few years. For example, GMP purchased a Sunverge residential energy storage system to test its functionality and usefulness as a distributed energy resource on GMP's grid. Information regarding this capital project was provided in the capital folder named "Residential Battery Storage," and it is an example of an alternative battery system that was tested by GMP. Prior to selecting the Tesla Powerwall, GMP evaluated three alternatives battery vendors. Information regarding these alternatives was provided in the capital folder for the Tesla program. As shown in the analyses provided in the capital folder, the Tesla Powerwall 2 continues to be the least cost residential scale battery solution.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q51. Please refer to Attachment GMP.DPS1.Q130 that GMP provided in response to the Department's June 1, 2018 discovery requests for the following requests:

a. Please refer to Sheet 1, Column B, Individual Measure Tier. With respect to each program's individual measure tier value, please provide a detailed explanation of how the value was determined and provide supporting calculations in native format.

b. Please refer to Sheet 1, row 6, line item Battery Storage Program. Please provide a detailed explanation and pertinent calculations of how battery storage meets Tier III compliance requirements.

DPS2.A51.

(a) GMP, like all DUs, relied on the Technical Advisory Group ("TAG") to derive the Tier III value of the prescriptive programs, Cold Climate Heat Pumps, Heat Pump Water Heaters and Electric Vehicles. Attachment GMP.DPS2.Q51.a provides the worksheet that was developed initially by the DPS to calculate these values based on our power supply carbon profile for every prescriptive measure that was reviewed by the TAG. Note in the case of heat pumps and heat pump water heaters, we used an assumed blended average to come up with a single value since each heat pump and heat pump water heater size will have a different Tier III value.

(b) Tier III savings are accomplished by reducing fossil fuel and the emission of greenhouse gases attributable to the consumption of fossil fuels. Please see Attachment GMP.DPS2.Q51.b which provides a detailed explanation and pertinent calculations of how battery storage meets Tier III compliance requirements. This document was filed with the Commission on March 15, 2018 as part of GMP's Tier III savings claim.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q52. Please refer to GMP's response to question Q:PSD:GMP.1.127 from the Department's discovery requests, where Mr. Castonguay responded that "[a]s of June 12, 2018, we have installed 445 Powerwall batteries." Please provide a table that details the monthly number of customers that have Powerwall batteries installed since the start of the test period, January 1, 2017, through the most recent date with data available.

DPS2.A52.

See below – note that this number totals 486 as there have been more installs since the filing.

		Total Customers	**Total Powerwalls**
October	2017	11	17
November	2017	31	46
December	2017	20	27
January	2018	19	25
February	2018	55	80
March	2018	57	81
April	2018	50	73
May	2018	50	71
June	2018	47	66
Total		340	486

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q53. Please refer again to GMP's response to request Q:PSD:GMP.1.127 from the Department's June 1, 2018 discovery requests, where Mr. Castonguay responded that "GMP has paid one invoice from Tesla for 415 Powerwalls to ensure the availability of 415 Powerwalls to GMP customers." With respect to the invoice(s) identified by Mr. Castonguay in this response, please provide the following additional information:

a. What the word "contracted" is intended to mean on each of the invoices provided in Word format (i.e. the invoice line that refers to "Units (Powerwall) contracted during period");

b. Please provide the actual date for each invoice provided by GMP in response to the request.

DPS2.A53.

(a) "Contracted" means the number of batteries where a customer signed a contract for installation.

(b) GMP.DPS1.Q127.2, -.3, and -.4 were provided to GMP on January 12th, 2018. GMP.DPS1.Q127.1 was provided on June 22, 2018.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q54. Please refer to Page 8, Line 23 through Page 9, Line 1 of Mr. Castonguay's prefiled direct testimony. Mr. Castonguay testifies that "we have customers signed up for delivery and installation throughout the rest of 2018". Please confirm the number of participants that have a signed agreement with GMP for Powerwall batteries but which have not yet been installed. For each signed agreement, please provide the expected date of installation.

DPS2.A54.

See Attachment GMP.DPS2.Q54. As of July 9, 2018, GMP had 380 customers signed up for the delivery and installation of 511 batteries.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q55. Please refer to Page 9, Lines 1–2 of Mr. Castonguay's prefiled direct testimony. Mr. Castonguay testifies that GMP expects "to have nearly 2,000 customers participating in [the Powerwall] program through early 2019." Please provide all supporting material and analysis relied upon to substantiate this expectation.

DPS2.A55.

GMP currently has 1096 customers in the process working with Tesla, including the customers referenced in Attachment GMP.DPS2.Q54. This equates to approximately 1400 batteries since some number of customers purchase 2 units. Additionally, 415 battery units already have been installed. We anticipate that of the 1096 customers, some will drop out at some point in the process, however we continue to receive approximately 40-60 new requests per week even though we have not performed any new outreach since initial roll out. This trajectory puts us on track to have all 2,000 units contracted and/or installed by early 2019.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q56. Please refer to Page 8, Lines 10–11 of Mr. Castonguay's prefiled direct testimony. Mr. Castonguay testifies that "the cost of the battery unit is reduced to either a monthly charge of $15/month for ten years or a one-time charge of $1,500." Please provide a detailed explanation of how GMP determined to charge directly participating customers these charges rather than higher/lower charges. Please provide supporting calculations and material in native format.

DPS2.A56.

Setting program pricing levels attempts to balance several needs in order to have a successful program. The pricing level needs to be acceptable to the participating customers relative to the value delivered in order to create demand for the program, while providing value back to non-participating customers in order to justify the use of customer funds to deliver the program. Like any of the pilot programs that GMP undertakes, we want to pilot innovative programs that achieve rate reducing benefits for all customers, attract enough participating customers to do so, and to further our efforts on grid and customer transformation while providing useful data that can be applied to future programs and offerings such as our recent Bring Your Own Device offering. Our target was to produce over $2M of net present value to non-participating customers. As you can see in the Capital Folder for the Tesla program, the financial analysis "GMPTesla-Financial Model – 3.6.18 Updated.xlsm" produces an NPV of approximately $2.9M in cell D58 on the 'Scenarios Summary' tab. This exceeds our target of $2M. This was a shift from the earlier revisions of the financial model. As previously mentioned, we originally started with a much larger program in mind – as much as 40MWs, and also included in the NPV calculation revenues from the frequency regulation market. A program that size, with those revenues, supported an approximate $10/month charge. However, after review and analysis, we determined that the scale of the program (at 40MW) was too large to achieve continued peak shaving capability. Moreover, we determined that the regulation market for behind-the-meter aggregated resources was too new to rely on. We then had to reduce the power supply values and shrink the size of the program which increased the monthly fee. We made other small changes (e.g., not including sales tax in the monthly price and collecting that separately). With these changes, we calculated that $15/month, exclusive of sales tax, would achieve the NPV for non-participating customers that we were targeting.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q57. Please refer to Page 8, Lines 7–10 of Mr. Castonguay's prefiled direct testimony. Mr. Castonguay testifies that "our Grid Transformation/Tesla Powerwall 2.0 pilot program, which enables customers to get a home battery with a capacity of 13.5 kWh that can be used for backup power in the case of an outage." Please state whether GMP has conducted a quantitative analysis of the benefits that direct participants in this program receive. If so, please provide a copy of that analysis in native file format.

DPS2.A57.

We have not produced a quantitative analysis. Like all of our innovation programs, customers choose to participate for various and differing reasons that are based on their personal value systems. For example, with our Powerwall program, some customers choose to participate in order to replace their fossil-fuel backup generators; some choose to participate in order to have backup power for the first time; some customers choose to participate to extend the impact of their solar PV systems; and some choose to participate simply to do their part to reduce greenhouse gases by reducing personal fossil fuel use during outages as well as regional fossil fuel use during peak events. All of these customers receive some benefit related to their personal value systems for their participation in addition to the overall benefit that all customers, participating and non-participating, receive. Because the value of resiliency at a residential scale is so unique and customer-dependent, it would not be possible or accurate to try to determine a fixed monetary or non-monetary value for each participating customer.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q58. Please refer to the workpaper document titled "GMP_Tesla-Financial Model - 3.6.18 Updated," which GMP previously provided to the Department, for the following requests:

a. Please describe and provide the results of any sensitivity or scenario analysis GMP performed around varying Energy, RECs, Capacity, or Transmission prices or avoided cost;

b. Please refer to the tab Annual Cash Flows, rows 20 and 21. Please describe how the residential batteries would operate and participate in the ISO NE Day Ahead Energy and Operating Reserve markets;

c. Please refer to the tab Annual Cash Flows, row 38. Please provide a detailed description of the Customer Makewhole Payments and what this line item represents.

DPS2.A58.

(a) In its original pilot filing, GMP provided the financial information in summary form and additionally provided the full model to the DPS. In March 2018, prior to this case being filed, GMP performed an updated sensitivity analysis based on an updated FCM and RNS forecast (which was lower than in the 2017 model) as well as changes in the federal tax rate. This analysis is the document referred to in the question and provided in the capital folder. We have not performed a sensitivity analysis around energy, and RECs are not included in the financial model.

(b) The batteries can be aggregated and bid into these markets based on the recent updates to the Price Responsive Demand ("PRD") market. GMP anticipated that we would need some time to understand the changes to the PRD market so we did not include these benefits in the model until 2019. Additionally, we also may be able to obtain similar benefits outside of the day-ahead energy markets through energy arbitrage by discharging during the peak energy times and allowing recharge to occur during times of low LMP such as the overnight hours.

(c) The Customer Make-whole Payment is designed to compensate customers for the amount of energy lost related to the efficiency losses that occur when the battery is cycled. The battery and inverter have a roundtrip efficiency, which consumes a very small amount of energy when the battery is cycled.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply

Date: July 16, 2018

DPS2.Q59. Please refer to GMP's response to request Q:PSD:GMP.1.131 from the Department's June 1, 2018 discovery requests, where Mr. Castonguay responded that "[t]he Annual Simulation Results tab was an analysis performed by Tesla to understand the impact of battery degradation over the life of the performance utilizing three 'test' years as a basis and projecting out for 15 years beyond there. This projection was then used to inform the values for the energy and reserves as the battery degraded over time. Input assumptions such as the real time LMP energy pricing during each of those test years were developed by Tesla and were not included in this model. Results on an hourly basis are not available." With response to this response, please also provide the following information:

- **a. Please provide a copy, in native format, of the analyses, documentation and/or reports produced by Tesla and shared with GMP as part of the modeling work.**
- **b. Please provide a detailed description of the collaboration between GMP and Tesla in the development of modeling relied upon in cost benefit analysis of the Tesla Powerwall pilot program.**
- **c. Please provide a detailed description of the review that GMP undertook to confirm the robustness of the analysis and results produced by Tesla. Please provide all documentation and supporting evidence regarding GMP's review of the Tesla modeling.**
- **d. Please provide a detailed explanation as to why GMP did not produce its own analysis to support the cost benefit analysis of the Tesla Powerwall pilot program.**
- **e. Please provide all correspondence between GMP and Tesla discussing the modeling approach, modeling inputs, modeling results and other pertinent matters related to the modeling efforts undertaken by Tesla.**
- **f. Please state whether GMP requested the hourly modeling results from Tesla. If not, please explain why it was not requested.**
- **g. Please state whether GMP, when preparing its response to request Q:PSD:GMP.1.131, attempted to contact Tesla in order to receive the input assumptions and results of the modeling effort on an hourly basis in native format. If yes, please provide all correspondence. If not, please explain why it was not requested.**

Objection: GMP reasserts General Objections 1 and 5 with regard to subsection (c) and (e) of this request. The phrase "other pertinent matters" in subsection (e) is vague notwithstanding the nonexclusive list of topics stated in the request. This request, and the requests for "all documentation" in subsection (c), is overbroad, not proportional to the needs of the case, and imposes a production burden that outweighs its likely benefit. Without limiting or waiving this objection, GMP responds as follows.

DPS2.A59.

(a) See Attachment GMP.DPS2.Q59.f for the detail behind the Annual Simulation provided by Tesla.

(b) GMP and Tesla worked together in development of the cost benefit model. Tesla analysts and GMP Power Supply team members collaborated through the development of the cost benefit analysis. GMP provided perspective on the New England markets, as well as peak prediction rates. We further eliminated the more uncertain value stream of frequency regulation from the modeling. Due to the uncertainty around aggregating assets for this market (as opposed to deploying a single asset such as Panton battery storage), we felt less certain about achieving this value. See response to GMP.DPS2.Q56.

(c) As stated in response to b above, the cost benefit analysis is the result of multiple iterations and collaboration between GMP and Tesla. Tesla provided analysts who produced various runs of the analysis with GMP's input and review. This included direct collaboration with the Power Supply team at GMP. See DPS2.A59e below.

(d) The final document provided is GMP's analysis of the costs and benefits of the Tesla Powerwall pilot program. It was developed through collaboration between GMP and Tesla in order to leverage the relative expertise of each and negotiation regarding pricing and other components of the program. This was not simply an analysis provided to GMP. It was developed between both parties from the ground up.

(e) Many of the analysis reviews occurred via phone conference calls. Email correspondences are attached as Attachment GMP.DPS2.Q59.e.

(f) The original models included the full hourly detail, however as we iterated the model, in order to reduce the file size, Tesla included just the summary that is shown. The original detail behind the Hourly Simulations is provided as Attachment GMP.DPS2.Q59.f.

(g) GMP contacted Tesla to provide the detailed description of the Annual Simulation Results tab but did not request the hourly simulation results. We have requested those now and they are attached as part of response above.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q60. Please refer to Attachment DPS1.Q128 (the Tesla peak reduction performance guarantee), which GMP produced in response to the Department's June 1, 2018 discovery requests for the following requests:

a. Please refer to Schedule A, Part ii of this attachment, where it states that "[a]vailable Battery Portfolio MWh will be based on energy retention capacity that degrades at a rate of 3.2% per year." Please state whether and describe how GMP took into account this assumed degradation in its cost-benefit modeling.

b. Please describe the expected capacity degradation as compared to the 70% energy capacity degradation minimum level guaranteed in the warranty.

DPS2.A60.

(a) The degradation is included in the cost-benefit modeling—it reduces the available energy from the battery over its life. Referring to the cost benefit model, the degradation value is on tab 'Annual Cash Flows', cell D5.

(b) The financial model is using 3% degradation factor per year—over 10 years this is a 30% degradation factor, which results in the guaranteed 70% capacity available at the end of 10 years.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q61. Please refer to the workpaper document titled "GMP_Tesla-Financial Model - 3.6.18 Updated," which GMP previously provided to the Department. Please further refer to the tab Annual Cash Flows, rows 20 and 21. Please explain how GMP accounted for battery degradation in each of capacity, transmission, operating reserve, and energy value.

DPS2.A61.

For rows 20 and 21, Day Ahead Energy and Operating Reserve, the degradation factor is included in the Annual Simulation Results tab which in turn feeds these rows in the model. The available energy for Energy and Reserves is found in Column P of the Annual Simulation Results tab. Each year, this available energy is reduced by the degradation factor of 3%. Capacity and Transmission reduction is handled differently. Because these are related to the power output and not just the energy capacity, a different degradation factor is used. This degradation factor can be found on the Annual Simulation Results tab starting at cell R60 to cell R74.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

DPS2.Q62. Please refer to GMP's response to subpart (e) of its response to question Q:PSD:GMP.1.132 from the Department's June 1, 2018 discovery requests. Please provide copies of the supporting documentation referenced in GMP's response in native file format.

DPS2.A62.

As noted in GMP's response to Q:PSD:GMP.1.132, the documentation for the $70 per MWh approximate margin due to higher retail sales associated with heat pumps and heat pump water heaters was supplied for GMP's Innovative Products Tariff Filing (Docket No. 8794) by an analyst in the Energy Innovation Center who has since left the company. Figure 1 in Q:PSD:GMP.1.132 was an image captured from a portion of that email. Attachment GMP.DPS2.Q62.2 shows the content of the email.

Docket No. 8794 was filed over a year ago. Today, the incremental revenue per MWh for residential customers (rate class E01) is $157. Attachment GMP.DPS2.Q62 contains a current estimated incremental cost per MWh of additional load (shaped similar to GMP's existing load profile) of about $88, including energy, capacity, and transmission (RNS), which results in a net margin of about $69 per MWh. This estimate is based on market prices and transmission costs that are reflective of the 2019 rate period (including what appears to be a temporary high point in Forward Capacity Market prices), and for simplicity ignores the lag between electricity consumption and GMP's capacity requirements. Considering the dependency on factors such as fluctuations of market prices, load shape, contribution to peak, and time lags, as well as the fact that due to its nature this calculation is meant to be indicative rather than absolute, the use of a $70 per MWh approximate net margin for higher heat pump and heat pump water heater sales still appears to be reasonable.

Person/s Responsible for Response: Rob Bingel
Title of Person/s: Manager, Forecasting & Analytics
Date: July 16, 2018

DPS2.Q63. Please state GMP's highest and lowest marginal cost of power ($/MWh) on an hourly basis in 2017.

DPS2.A63.

After a discussion with GDS Associates, GMP understands this question to pertain to ISO New England ("ISO-NE") market settlement information. Please see Attachment GMP.DPS2.Q63.1 which is an analysis of hourly Real-Time LMPs settling at the Vermont Zone (Node 4003). The LMPs have been adjusted to reflect ISO-NE wholesale costs (Column J on the Graph Data tab) including capacity, NCPC, and ancillaries as shown in Exhibit 3.3.3 in Attachment GMP.DPS2.Q63.2 and the Wholesale Charges tab. We have provided the highest and lowest hourly adjusted LMP (e.g. hourly wholesale cost) in cells P2 and P3 of the Graph Data tab ($704.87/MWh and ($114.24/MWh) respectively) and have also provided the averages of the top and bottom 10% of hourly costs in cells P5 and P6 on the same tab ($108.19/MWh and $15.03/MWh respectively). ISO-NE participants settle all generation as nodal sales and load as purchases at the appropriate load zone through the pool. To the extent that a pool participant serves an incremental MW of load it would settle through the pool at a load zone. As such GMP believes that the provided Real-Time LMPs as adjusted for wholesale costs are the closest indicator of GMP's marginal cost for serving its load.

Person/s Responsible for Response: Andrew Quint
Title of Person/s: Power and Markets Analyst
Date: July 16, 2018

Demand Response

DPS2.Q64. Please refer to Page 15, Lines 1–12 of Mr. Shields prefiled direct testimony. Please state whether GMP has conducted a quantitative assessment to compare the value of battery storage against the other load management alternatives discussed by Mr. Shields. If so, please provide this analysis in native file format.

DPS2.A64.

Yes. GMP has calculated the cost and benefits for alternative load management programs and compared them against the same measure for battery. The results are summarized in Attachment GMP.DPS2.Q64.a. The analysis for each alternative program is also provided in Attachments GMP.DPS2.Q64.b and GMP.DPS2.Q64.c along with the calculation of the same measure for the battery in Attachment GMP.DPS2.Q64.d. GMP concluded that battery storage is competitive with alternative programs, having a net benefit higher than six of the eight alternative programs.

Person/s Responsible for Response: Kirk Shields
Title of Person/s: Director, Development & Risk Management
Date: July 16, 2018

DPS2.Q65. Please refer to the workpaper document titled "PowerWall 2.0 Pilot – Financial Analysis 3.6.18," which GMP previously provided to the Department. On page 6, it states that "GMP has also considered alternative methods to reduce 10 MW of peak power." Please provide a copy and detailed explanation of the quantitative assessment undertaken to compare the battery storage to these alternative methods. Please provide this analysis in native format.

DPS2.A65.

Please refer to Response DPS2.Q64. This outlines many of the initiatives currently being explored, however, as the response in the Financial Analysis notes, while some of these can provide a better cost/kW, achieving a full 10MWs from any one of these is impractical and therefore our strategy is to achieve more through a portfolio of demand resources including battery storage, load control, rate programs, and other offerings. Our view is that it is very important to gain an early understanding of what can and cannot be done utilizing various demand management resources. We are ultimately responsible to maintain the safety and reliability of the system, so these various pilots also produce much needed information to shape how we move forward and expand to include third party participation for example.

Person/s Responsible for Response: Josh Castonguay, Douglas Smith
Title of Person/s: VP & Chief Innovation Executive and Power Supply; Chief Power Supply Executive
Date: July 16, 2018

DPS2.Q66. Please refer to the workpaper document titled "PowerWall 2.0 Pilot – Financial Analysis 3.6.18," which GMP previously provided to the Department. On page 6, it states that "We currently have a suite of demand response programs, and we are continually looking for new programs". Please respond to the following questions:

a. Please provide a comprehensive list of all demand response programs in place or planned to be in place during the test period, the interim period and rate period;

b. For existing programs, please confirm when each program was started and how the peak shaving capability has evolved since program inception. For planned programs, please confirm the anticipated start date and peak shaving capability.

c. Please provide a copy of all Evaluation, Measurement and Verification Reports completed in respect of each existing program.

d. Please provide the dollar cost per kW of each existing/planned demand response programs.

e. Please provide a quantitative assessment of the peak shaving effectiveness of existing demand response programs. This assessment should include but not be limited to (a) cost benefit analysis (b) stating max peak shaving capability (c) monthly actual peak shaving outcome for the last three years (d) curtailable customers' actual peak shaving contribution when GMP requests a load reduction as compared to the customers' max peak shaving capability.

f. Has GMP performed studies of the demand response potential in the GMP service territory to determine the (a) technical potential (i.e. program potential regardless of cost) and/or (b) economic potential (i.e. consideration of cost-effectiveness)? If yes, please provide a copy of the complete studies in native format.

g. Please provide a copy of the most recent Demand Side Management Potential Study completed for the GMP service territory. If a Potential Study has not been completed please provide a detailed explanation of why one has not been completed.

h. Please confirm when GMP intends to undertake its next Demand Side Management Potential Study for its service territory. If GMP does not intend on undertaking a Potential Study in the future please provide a detailed explanation why this is the case.

i. Please provide a detailed description of the future programs or expansion of current programs that GMP is investigating. Please provide a copy of the quantitative assessment undertaken in respect of these investigations.

DPS2.A66.

a. Please provide a comprehensive list of all demand response programs in place or planned to be in place during the test period, the interim period and rate period;

eWater – Using a retrofit control device for resistance water heaters to turn down water heaters during peak events.

eCharger – Using shared access Level 2 residential electric vehicle chargers to curtail car charging during peak events.

Sensibo/CCHP – Using a third-party add-on device (Sensibo) to manage cold climate heat pumps during peak events. Heat pumps were previously offered through the heat pump pilot program and now are offered through the VSECU Credit Union pilot program.

HPWH – GMP is working with a heat pump water heater vendor to test its new control and plans to have it rolled out in the rate year.

Powerwall 2.0 – Residential battery – discharge stored energy during peak events.

Powerwall 1.0 – Residential battery – discharge stored energy during peak events.

Bring Your Own Device – Currently for residential batteries provided directly by customer or third-party providers. Will add additional resources to the device list such as residential level 2 car chargers in the rate year.

In addition to these programs, GMP continues to offer a group of tariff retail rates that encourage demand management through different options such as time-of-use, curtailable options, critical peak pricing, and others.

b. For existing programs, please confirm when each program was started and how the peak shaving capability has evolved since program inception. For planned programs, please confirm the anticipated start date and peak shaving capability.

eWater – 4/1/2017 – Shared access to water heaters continues to provide a peak resource, this builds on the legacy water heater control rate that has existed for many years. The biggest difference is that the water heater will automatically kick on when the tank temp drops below a threshold, and we have the ability to dynamically control the system. Our distributed energy software platform, Virtual Peaker, is the tool used to dispatch most of our demand resources. Please see Attachment GMP.DPS2.Q66.c1.

eCharger – 7/1/2017 – GMP has added a second L2 charger manufacturer to the fleet of chargers being installed. Peak shaving capability is growing with each charger added. Please see Attachment GMP.DPS2.Q66.c2.

Sensibo/CCHP – 9/1/2017 – GMP continues to utilize the Sensibo for shared access with heat pumps. We are still learning the total amount of demand reduction capability through the control of temperature set points. Please see Attachment GMP.DPS2.Q66.c6.

Powerwall 2.0 – 9/1/2017 – The Powerwall 2.0 (Grid Transformation) Pilot is the second iteration of the GMP Powerwall program. See Attachment GMP.DPS2.Q66.c3.

Powerwall 1.0 – 1/1/16 – GMP deployed 20 Powerwall 1.0 and then evolved the program into the current Powerwall 2.0 pilot. See Attachment GMP.DPS2.Q66.c4.

BYOD – 3/1/2018 – GMP will continue to seek expansion of manufacturers and devices to increase peak shaving capabilities over time. See Attachment GMP.DPS2.Q66.c5See Response to part i of GMP.DPS2.Q66 for future programs.

c. Please provide a copy of all Evaluation, Measurement and Verification Reports completed in respect of each existing program.

See Attachments GMP.DPS2.Q66.c1 – GMP.DPS2.Q66.c6 (pilot status updates).

d. Please provide the dollar cost per kW of each existing/planned demand response programs.

See response to question 64 above, specifically Attachment GMP.DPS2.Q64.a.

e. Please provide a quantitative assessment of the peak shaving effectiveness of existing demand response programs. This assessment should include but not be limited to (a) cost benefit analysis (b) stating max peak shaving capability (c) monthly actual peak shaving outcome for the last three years (d) curtailable customers' actual peak shaving contribution when GMP requests a load reduction as compared to the customers' max peak shaving capability.

eWater

a. See Attachment GMP.DPS2.Q66.c1.

b. We estimated 500 watts maximum peak shaving capability per unit and we de-rate slightly for FCM by 25% for a FCM total of 376 watts.

Peak Captured	kW Reduction	Total Units	kW/Unit
7/19/17	1.17	na	na
9/26/17	-0.11	12	-0.01
11/10/17	0.88	28	0.03
2/2/18	71	54	1.31
3/19/18	37	92	0.41
4/3/18	48	100	0.48

c. See table in part b.

d. See table in part b for total units and kW/unit.

eCharger

a. See Attachment GMP.DPS2.Q66.c2.

b. We estimated a maximum peak shaving capability of 4.3kW per charger, however, we de-rate this value for availability during peak times by 75% for the RNS peak and by 90% for the FCM peaks which results in 1.08kW for RNS and 430 watts for FCM peak.

Date	kW Reduction	Total Units	kW/Unit
2/2/18	5.54	na	na
3/19/18	89.96	44	2.04
4/3/18	85.06	40	2.13
5/31/18	59.36	46	1.29

c. See table in part b.

d. See table in part b.

Sensibo/CCHP

a. See Attachment GMP.DPS2.Q66.c6.

b. We estimate 358 watts maximum peak shaving capability and assume a 25% de-rate for FCM and RNS for a total of 268 watts per heat pump

c. Data not yet available.

d. See part b.

Powerwall 2.0

a. See Attachment GMP.DPS2.Q66.c3.

b. We estimate 5kW per unit maximum peak shaving capability with a de-rate of 38% for RNS and 28% for FCM not including the degradation over time. This results in approximately 3.1kW for RNS and 3.6kW for FCM.

Peak Captured	kW Reduction	Total Units	kW/Unit
2/2/18	315	63	5
3/19/18	760	152	5
4/3/18	905	181	5
5/31/18	1570	314	5

c. See table in part b.

d. See part b.

Powerwall 1.0

a. See Attachment GMP.DPS2.Q66.c4.

b. We estimate 3.5kW per unit maximum peak shaving capability with a de-rate of 38% for RNS and 28% for FCM not including the degradation over time. This results in approximately 2.17 kW for RNS and 2.52kW for FCM.

Peak Captured	kW Reduction	Total Units	Units/kW
10/26/16	29.33	10	2.93
2/9/17	44.00	20	2.20
5/18/17	41.19	20	2.06
11/10/17	55.17	20	2.76
2/2/18	45	20	2.27
3/19/18	50	20	2.50

4/3/18	44	20	2.18
5/31/18	52	20	2.59

c. See table in part b.

d. 3.5kW

BYOD

a. See Attachment GMP.DPS2.Q66.c5.

b. The maximum peak shaving capability varies, but the maximum allowed for any device is 10kW

c. Not yet available because no devices have been installed yet.

d. See part b.

f. Has GMP performed studies of the demand response potential in the GMP service territory to determine the (a) technical potential (i.e. program potential regardless of cost) and/or (b) economic potential (i.e. consideration of cost-effectiveness)? If yes, please provide a copy of the complete studies in native format.

No, GMP has not performed this type of study. Our opinion is that, while a study like this can provide you with 'potential' it does not provide one of the most important aspects of deploying programs like this which is: does it make sense for, and provide value to, the host customer. We strongly believe that our approach continues to create the greatest value for customers. We quickly pilot and confirm the valuation that we expect from devices while at the same time make a determination of how much incentive or value sharing is needed to have it make sense for the host customer. Ultimately, we strive for three key goals in the development of these offerings: 1) provide enough value to the participating customer, 2) provide real value to non-participating customers either through new revenues earned or by reducing real operating costs such as power supply, and 3) provide GMP with new tools to operate a transformed and highly distributed energy system.

We have shown that different programs will provide different amounts of value to non-participating customers but we should not fall into the trap of simply relying on the single highest value offering. A portfolio approach will continue to be important to allow diversity, not only in the types of demand side resources, but also in the models and providers of these services.

g. Please provide a copy of the most recent Demand Side Management Potential Study completed for the GMP service territory. If a Potential Study has not been completed please provide a detailed explanation of why one has not been completed.

See response to part f above. Assuming this is referring to a peak demand capability study across the entire service territory, GMP has a number of demand rates that have been available to customers and also has roll out the pilot programs mentioned above. Ultimately, it has to make sense for both the participating customer as well as all non-participating customers financially. Before any program is implemented with potential peak shaving technology, GMP ensures the functionality of each technology in multiple ways. First, GMP uses industry information and relies on independent studies that will provide context for how much value a particular device can provide to GMP customers. Second, GMP determines if the technology will benefit participating customers in a way that will be appealing to help increase adoption of the technology onto GMP's grid. Third, GMP verifies that the technology can do, and in fact does, what the manufacturer represents. This is done by installing one to several units in GMP locations for internal testing. Finally, GMP verifies that the technology will communicate and integrate with Virtual Peaker in order to provide the streamlined access process across all device types.

h. Please confirm when GMP intends to undertake its next Demand Side Management Potential Study for its service territory. If GMP does not intend on undertaking a Potential Study in the future please provide a detailed explanation why this is the case.

See response to parts f and g above.

i. Please provide a detailed description of the future programs or expansion of current programs that GMP is investigating. Please provide a copy of the quantitative assessment undertaken in respect of these investigations.

GMP continuously evaluates and tests technology and works with manufacturers and other stakeholders to develop new innovative programs or expand existing programs for the benefit of our customers. For example, we are working to roll out controllable component for our Heat Pump Water Heater program in the near future. This will become a mandatory component of the program where available. To date, only one manufacturer, Rheem, has shown the capabilities needed for us to enable access to HPWHs. Other manufacturers show some promise, but their technology is not as far along.

We are also working with another heat pump manufacturer that is showing some promise toward integrated access to each unit. This work is in the early

stages, however GMP is currently an integral part of this manufacturer's strategy surrounding utility access to the hardware.

We will seek to expand the Bring Your Own Device ("BYOD") Pilot to include Level 2 Residential Vehicle chargers. This will enable any customer with an electric vehicle to purchase a number of different charger types that will be able to tie into GMP's Demand Energy Resource Management ("DERM") platform. Doing so will increase the number of distributed resources on GMP's grid. Data from GMP's eCharger Pilot shows that on average, cars that use an L2 charger can provide 6.7kW of demand reduction each.

Additionally, we are exploring new ways to enable more C&I customers to participate in our distributed resource efforts beyond the traditional rate options. There are a number of building management systems on the market, some with potential for utility integration. We are exploring pilot opportunities with third parties and C&I customers that can provide demand side load response.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP & Chief Innovation Executive and Power Supply
Date: July 16, 2018

Taxes

DPS2.Q67. Please refer to Attachment PSD.Q134, which GMP produced in response to the Department's June 1, 2018 discovery requests. Please refer to the ADIT tab, page 4, and provide the following:

a. A detailed explanation for the $1,778,762 reduction in the Actual February 2018 Excess Tax Reg Liability balance;

b. The actual balances for the Excess Tax Reg Liability for the months of March through May 2018; and

c. Clarification as to whether GMP has begun to amortize the Projected Excess Tax Reg Liability balance as of January 1, 2018. If yes, please provide a detailed explanation for GMP's basis to begin amortizing the balance starting on January, 2018 and copies of all the journal/transaction entries recorded by GMP for the months of January – May 2018

DPS2.A67.

(a) GMP is a 9/30 fiscal year-end tax payer. For FY 2018 (10/01/2017 to 09/30/2018) our Federal tax rate is 24.5287%, a blended rate as required under IRC §15. For FY 2019 and forward the Federal tax rate will be 21%. Our final balance will not be determined until 09/30/2018, subject to any true-up related to the provision to actual adjustment when the FY 2018 return is filed in 2019. The $1,778,762 change in the Excess Tax Reg Liability balance from Jan 2018 to Feb 2018 represents the monthly change in deferred tax activity and refinements to the calculation.

(b) The actual balances for the Excess Tax Reg Liability are:

i. $(176,318,487) March 2018
ii. $(176,363,300) April 2018
iii. $(176,528,883) May 2018

(c) No, as of January 1, 2018 GMP has not started amortizing the Projected Excess Tax Reg Liability balance. GMP has started returning tax reform tax benefits to customers beginning in February 2018 in the form of customer bill credits. GMP expects to return approximately $6M to customers by December 31, 2018. The $6M represents the over collection of 2018 federal income tax expense offset by the impacts tax reform is having on Transco's 2018 earnings. The net Projected Excess Tax Reg Liability will be trued-up to reflect these items.

Person/s Responsible for Response: George Gulian, Joann Janssen, Eddie Ryan, Karen Young

Title of Person/s: Director of Taxes; Senior Tax Accountant; Controller; Budget/Forecasting Supervisor
Date: July 16, 2018

DPS2.Q68. Please refer to GMP's response to subpart (c) of question DPS1.Q137 from the Department's June 1, 2018 discovery requests. The normalization rules which determine whether an ADIT item is "Protected" or "Unprotected" are based on the use of accelerated tax depreciation. Please provide a detailed description of GMP's basis to categorize each of the following items as being related to "accelerated tax depreciation":

a. CIAC;

b. Gain/Loss on Disposition of Assets;

c. IRC Section 263A capitalized interest;

d. Casualty loss; and

e. Cost of plant removal.

DPS2.A68.

a-e. To clarify our response to Set 1 Question 137(c), the CIAC, gain/loss on disposition of assets, IRC Section 263A capitalized interest, and cost of plant removal are "Unprotected Plant." These items are not accelerated tax depreciation-related so by definition cannot be "Protected Plant." Each item represents a deferred tax asset versus a deferred tax liability. The Company is proposing to use the same amortization period as "Protected Plant," 33 years to collect these items from customers. If collected immediately from our customers, the one-time bill credit would be lower by $6.6M.

The casualty loss is included in the protected plant bucket because this item is being amortized and the accumulated amortization was included in protected plant.

GMP is proposing this treatment to maximize the immediate return of tax reform benefits to customers.

Person/s Responsible for Response: George Gulian, Joann Janssen, Eddie Ryan, Karen Young
Title of Person/s: Director of Taxes; Senior Tax Accountant; Controller; Budget/Forecasting Supervisor
Date: July 16, 2018

Dated at Burlington, Vermont this 16th day of July, 2018.

As to Objections:

Geoffrey H. Hand, Esq.
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STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 18-0974-TF

Tariff filing of Green Mountain Power 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	)))))

LIST OF DOCUMENTS PRODUCED
ROUND 2 DPS DISCOVERY RESPONSES

July 16, 2018

Round	Question	Document
2	1	GMP.DPS2.Q1.a.xlsx
2	2	GMP.DPS2.Q2.xlsx
2	3	GMP.DPS2.A3.1.xlsx
2	3	GMP.DPS2.A3.2.xlsx
2	4	GMP.DPS2.Q4.a.xlsx
2	4	GMP.DPS2.Q4.b.xlsx
2	4	GMP.DPS2.Q4.c.xlsx
2	4	GMP.DPS2.Q4.d.xlsx
2	5	GMP.DPS2.A5.1.xlsx
2	6	GMP.DPS2.Q6.a - 9 month.xlsx
2	6	GMP.DPS2.Q6.b - 12 month.xlsx
2	7	GMP.DPS2.Q7.xlsx
2	12	GMP.DPS2.Q12.a - St Albans Digester Chronological Costs.xlsx
2	12	GMP.DPS2.Q12.b - St Albans Digester Project Cost Subtotals.xlsx
2	13	GMP.DPS2.Q13.1 - broker sheet.xls
2	13	GMP.DPS2.Q13.2 - Risk Report - january 2017.pptx
2	13	GMP.DPS2.Q13.3 - Power Trading Update.pptx
2	13	GMP.DPS2.Q13.4 - price trends and hedge activity.pptx
2	13	GMP.DPS2.Q13.5 - hedging target illustration.pptx
2	13	GMP.DPS2.Q13.6 - Energy and REC buying plan.pptx
2	13	GMP.DPS2.Q13.7 - RESOLUTION form example.doc
2	13	GMP.DPS2.Q13.8 - Integrated Resource Plan.pdf
2	14	GMP.DPS2.Q14.1 - Bid Analysis.msg
2	14	GMP.DPS2.Q14.2 - 08.19.14 Audit Power Supply Update.pptx
2	14	GMP.DPS2.Q14.3 - approval email MP.msg

Round	Question	Document
2	14	GMP.DPS2.Q14.4 - request for offers example.msg
2	14	GMP.DPS2.Q14.5 - Shell Deal Sheet & Offers.xlsx
2	14	GMP.DPS2.Q14.6 - Shell 2018-2020 trade sheet and confirm.pdf
2	14	GMP.DPS2.Q14.7 - Power Supply Risk.pptx
2	14	GMP.DPS2.Q14.8 - GMP request for offers.msg
2	14	GMP.DPS2.Q14.9 - offer summary.xlsx
2	14	GMP.DPS2.Q14.10 - Citigroup confirmation.pdf
2	14	GMP.DPS2.Q14.11 - broker sheet.xls
2	14	GMP.DPS2.Q14.12 - energy risk material for april meeting.ppt
2	14	GMP.DPS2.Q14.13 - planning material.pdf
2	14	GMP.DPS2.Q14.14 - GMP request example.msg
2	14	GMP.DPS2.Q14.15
2	14	GMP.DPS2.Q14.16 - confirmation.pdf
2	14	GMP.DPS2.Q14.17 - broker sheet - NextEra.xls
2	14	GMP.DPS2.Q14.18 - preapproval slides.ppt
2	16	CONFIDENTIAL - GMP.DPS2.Q16.1 - ESAI October 2014 Capacity Watch.pdf
2	17	GMP.DPS2.Q17.1 - NextEra capacity termsheet.pdf
2	17	GMP.DPS2.Q17.2 - open postion model 2014.xlsx
2	17	CONFIDENTIAL - GMP.DPS2.Q17.3 - ESAI FCM Scenarios Nov 20 2014.xlsx
2	17	GMP.DPS2.Q17.4 - pre-Nextera capacity material for BOD.pptx
2	17	GMP.DPS2.Q17.5 - 2014 proposal review.xlsx
2	17	GMP.DPS2.Q17.6 - 2015 offers
2	17	GMP.DPS2.Q17.7 - Solicitation term sheet.pdf
2	17	GMP.DPS2.Q17.8 - pre-Dynegy capacity material for BOD.pptx
2	18	GMP.DPS2.Q18.1.pdf
2	21	GMP.DPS2.Q21.1 - REC sales targets.pptx
2	22	GMP.DPS2.Q22.1 - 20180502 Exgen MAI V19-22 auth.pdf
2	22	CONFIDENTIAL - GMP.DPS2.Q22.2 - 20180502 Exgen MAI V19-22 broker.pdf
2	22	CONFIDENTIAL - GMP.DPS2.Q22.3 - 20180502 MAI V19-22 confirm.pdf
2	22	CONFIDENTIAL - GMP.DPS2.Q22.4 - 20180502 MAI V19-22 trade.pdf
2	22	CONFIDENTIAL - GMP.DPS2.Q22.5 - pre-trade email.docx
2	22	CONFIDENTIAL - GMP.DPS2.Q22.6 - Smith evaluation email.docx
2	23	GMP.DPS2.Q23.1 - Tier 1 Prices.xlsx
2	23	GMP.DPS2.Q23.2 - HQUS Imputed REC prices.xlsx
2	24	GMP.DPS2.Q24 - REC Costs.xlsx
2	25	GMP.DPS2.Q25 - Test Period RECs.xlsx

Round	Question	Document
2	26	GMP.DPS2.Q26.xlsx
2	27	GMP.DPS2.Q27 - Hydro RECs.xlsx
2	28	GMP.DPS2.Q28 - Tier I and III.xlsx
2	29	GMP.DPS2.Q29
2	30	GMP.DPS2.Q30 - June FCM file.xlsx
2	31	GMP.DPS2.Q31.1 - Reserve Requirement.xlsx
2	31	GMP.DPS2.Q31.2 - Pool Calculation.xlsx
2	31	GMP.DPS2.Q31.3 - Historical Peaks.xls
2	33	GMP.DPS2.Q33.1 - McNeil Budget.pdf
2	33	GMP.DPS2.Q33.2 - Stony Brook Budget.pdf
2	34	GMP.DPS2.Q34.1 - Hourly Settlement Data Calendar Year 2017.xlsx
2	35	GMP.DPS2.Q35 - Settled Load.xlsx
2	40	CONFIDENTIAL - GMP.DPS2.Q40 - DRAFT Tesla Services Agreement.docx
2	41	GMP.DPS2.Q41 - Capacity Obligation Calculation.xlsx
2	43	GMP.DPS2.Q43.1 - Solar Peak Coincidence.xlsx
2	44	GMP.DPS2.Q44.1 - ISO Load.xlsx
2	44	GMP.DPS2.Q44.2 - Vermont Zonal Load.xlsx
2	46	GMP.DPS2.Q46.a - Project Costs.xlsx
2	46	CONFIDENTIAL - GMP.DPS2.Q46.b - Milton EPC.pdf
2	46	CONFIDENTIAL - GMP.DPS2.Q46.c - Tesla Battery and CMA Pricing.pdf
2	46	GMP.DPS2.Q46.d - Milton Facilities Study.pdf
2	46	GMP.DPS2.Q46.e - Milton Developer Fee Estimate.xlsx
2	46	GMP.DPS2.Q46.f - Ferrisburgh Facility Study.pdf
2	46	GMP.DPS2.Q46.g - Ferrisburgh Developer Fee Estimate.xlsx
2	46	GMP.DPS2.Q46.h - Essex Developer Fee Estimate.xlsx
2	48	GMP.DPS2.Q48.c.xlsx
2	51	GMP.DPS2.Q51.a - Tag Characterization Tool.xlsx
2	51	GMP.DPS2.Q51.b - GMP Exh 4 - Battery Storage Program.pdf
2	54	GMP.DPS2.Q54 -Tesla Scheduled Installations.xlsx
2	59	GMP.DPS2.Q59.e - Tesla Model Correspondence
2	59	GMP.DPS2.Q59.f - Tesla Financial Model Settlement Data.xlsm
2	62	GMP.DPS2.Q62.xlsx
2	62	GMP.DPS2.Q62.2.png
2	63	GMP.DPS2.Q63.1 - Marginal Pricing.xlsx
2	63	GMP.DPS2.Q63.2.pdf
2	64	GMP.DPS2.Q64.a - Comparison Battery and Alt Load Mgt Programs.xlsx
2	64	GMP.DPS2.Q64.b - Load Management - Pilot Programs.xlsx
2	64	GMP.DPS2.Q64.c - Load Management - Tariff Programs.xlsx

Round	Question	Document
2	64	GMP.DPS2.Q64.d - Battery Net Benefit Calc.xlsx
2	66	GMP.DPS2.Q66.c1 - eWater
2	66	GMP.DPS2.Q66.c2 - eCharger
2	66	GMP.DPS2.Q66.c3 - Powerwall 2
2	66	GMP.DPS2.Q66.c4 - Powerwall 1
2	66	GMP.DPS2.Q66.c5 - BYOD
2	66	GMP.DPS2.Q66.c6 - CCHP - Sensibo

Dated at Colchester, Vermont this 28th day of June, 2018.

Respondent Signature

By: _____
Rob Bingel
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

_____
Notary Public
Name of Notary: Penny Collins
Commission Expires: 2-10-19

Dated at Colchester, Vermont this 13th day of July, 2018.

Respondent Signature

By: Dawn Bugbee
Dawn Bugbee
Green Mountain Power

Subscribed and sworn before me this 13th day of July, 2018.

Kenny J Collins
Notary Public
Name of Notary: Kenny Collins
Commission Expires: 2-10-19

Dated at Colchester, Vermont this 13th day of July, 2018.

Respondent Signature

By: _____
Josh Castonguay
Green Mountain Power

Subscribed and sworn before me this 13th day of July, 2018.

_____
Notary Public
Name of Notary: Penny Collins
Commission Expires: 2-10-19

Dated at Colchester, Vermont this 13th day of July, 2018.

Respondent Signature

By: _____
Chris Cole
Green Mountain Power

Subscribed and sworn before me this 13th day of July, 2018.

_____
Notary Public
Name of Notary: Penny Collins
Commission Expires: 2-10-19

Dated at RUTLAND, Vermont this 28th day of June, 2018.

Respondent Signature

By: George Gulian
George Gulian
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

Notary Public
Name of Notary: Joseph McKeown
Commission Expires: 2-10-19

Dated at Colchester, Vermont this 13th day of July, 2018.

Respondent Signature

By: _____
Melinda Humphrey
Green Mountain Power

Subscribed and sworn before me this 13th day of July, 2018.

_____
Notary Public
Name of Notary: Penny Collins
Commission Expires: 2-10-19

Dated at Rutland, Vermont this 28th day of June, 2018.

Respondent Signature

By: _____
Joann Janssen
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

_____
Notary Public
Name of Notary: 2/10/2019
Commission Expires: 2-10-19

Dated at Colchester, Vermont this 28 day of June, 2018.

Respondent Signature

By: _____
Mari McClure
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

_____
Notary Public
Name of Notary: Penny Collins
Commission Expires: 2-10-19

Dated at Rutland, Vermont this 16th day of ~~June~~ July, 2018.

Respondent Signature

By: _____
Jeff Monder
Green Mountain Power

Subscribed and sworn before me this 16th day of ~~June~~ July, 2018.

_____
Notary Public
Name of Notary: Melissa Stevens
Commission Expires: 2-10-19

Dated at Rutland, Vermont this 28th day of June, 2018.

Respondent Signature

By: Andrew R. Quint
Andrew Quint
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

Notary Public
Name of Notary: BONNIE L. O'ROURKE
Commission Expires: 2-10-19

Dated at RUTLAND, Vermont this 28th day of June, 2018.

Respondent Signature

By: Eddie Ryan
Eddie Ryan
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

Notary Public
Name of Notary: Joseph McKearin
Commission Expires: 2-10-19

Dated at Rutland, Vermont this 16th day of July, 2018.

Respondent Signature

By: Erica Senecal
Erica Senecal
Green Mountain Power

Subscribed and sworn before me this 16th day of July, 2018.

Penny J Collins
Notary Public
Name of Notary: Penny Collins
Commission Expires: 2-10-19

Dated at Rutland, Vermont this 28 day of June, 2018.

Respondent Signature

By: _____
Kirk Shields
Green Mountain Power

Subscribed and sworn before me this 28 day of June, 2018.

_____
Notary Public
Name of Notary: Melissa Stevens
Commission Expires: 2-10-19

Dated at Colchester, Vermont this 28th day of June, 2018.

Respondent Signature

By: Douglas C. Smith
Doug Smith
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

Penny J. Collins
Notary Public
Name of Notary: Penny Collins
Commission Expires: 2-10-19

Dated at Rutland, Vermont this 28th day of June, 2018.

Respondent Signature

By: _____
Charles "Chuck" Watts
Green Mountain Power

Subscribed and sworn before me this 28th day of June, 2018.

_____
Notary Public
Name of Notary: BONNIE L. O'ROURKE
Commission Expires: 2-10-19

Dated at Rutland, Vermont this 13th day of July, 2018.

Respondent Signature

By: _____
Karen Young
Green Mountain Power

Subscribed and sworn before me this 13th day of July, 2018.

_____
Notary Public
Name of Notary: Melissa Stevens
Commission Expires: 2-10-19