

**STATE OF VERMONT
PUBLIC UTILITY COMMISSION**

Case No. 23-3501-PET

Petition of Green Mountain Power for approval)
of its Zero Outages Initiative as a Strategic)
Opportunity pursuant to 30 V.S.A. § 218d and)
GMP’s Multi-Year Regulation Plan)

**Green Mountain Power’s Responses to the
First 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 first set of discovery requests served by the Department of Public Service (“DPS,” “PSD,” or “Department”) on December 15, 2023. Unless otherwise stated all responses refer specifically to the first phase of the Zero Outage Initiative.

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

Subject to the General Objections stated above, GMP responds as follows:

Q.DPS.GMP.1-1. Please provide System Average Interruption Duration Index (“SAIDI”), System Average Interruption Frequency Index (“SAIFI”), and Customer Average Interruption Duration Index (“CAIDI”) values for GMP’s transmission and distribution system for the past ten (10) years with and without:

- a. Major Storm as defined in GMP’s SQRP; and**
- b. Major Event as defined in IEEE Standard 1366.**

A.DPS.GMP.1-1.

- a. See Attachment GMP.DPS1.Q1a.
- b. **Objections 1, 8.** GMP does not maintain the information in the format requested, and thus responding to the request would be unduly burdensome and would require additional analysis not already available. Without waiving or otherwise limiting the response GMP responds as follows:

Vermont’s regulatory standards do not track events by IEEE standard 1366.

Person/s Responsible for Response: Ken Couture
Title of Person/s: Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-2. Please provide the raw data from GMP's Outage Management System for the past ten (10) years, including the following information for each outage:

- a. Start time of an event;**
- b. End time of an event;**
- c. Duration of the event;**
- d. Number of customers affected (without power);**
- e. Cause of event (animal, cable cut, equipment failure, scheduled, tree right-of-way ("ROW"), tree outside ROW, lightning, flood, etc.);**
- f. Weather Conditions (rain, snow, ice, clear, etc.);**
- g. Class of Equipment that failed (distribution overhead, distribution underground, substation, transmission, etc.);**
- h. Device(s) that failed (fuse, breaker, recloser, pole, elbow, cable, spacer cable, etc.);**
- i. Feeder(s) that failed;**
- j. Substation failures; and**
- k. Location of customers affected, as seen, for example, in Exhibit GMP-MB-9.**

A.DPS.GMP.1-2.

a-j. Please see Attachment GMP.DPS1.Q3a, "Outage Data 2013 - 2023" tab, for the data from GMP's outage management system for the period 1/1/13 to 12/20/23. Please note that f and j are not data fields that are explicitly tracked in our outage management system.

k. Objections 1, 8. The data request is over-broad and unduly burdensome and is not proportional to the needs of the case. Without waiving or otherwise limiting the objection, GMP responds as follows:

The amount of data requested (location of every outage over the past 10 years) is substantial, and GMP does not maintain the data in the format requested. In the event the Department is interested in seeing subsets of this information for specific locations or dates GMP will work with the Department on a narrower request or coordinate review of the data with GMP.

Person/s Responsible for Response: Ken Couture
Title of Person/s: Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-3. Please provide circuit-level SAIDI, SAIFI, and CAIDI data for the last ten (10) years, including:

- a. A breakdown of the outage data as defined in Commission Rule 4.903(B)(2); and**
- b. For each circuit, please provide a map of the area served.**

A.DPS.GMP.1-3.

- a. Please see Attachment GMP.DPS1.Q3a, "SAIFI CAIDI SAIDI" tab for a listing of SAIFI, CAIDI and SAIDI reliability stats for GMP's feeders. See the "Cause Code" tab in the same file for outage data by cause code.
- b. **Objections 1, 8.** The data request is over-broad and unduly burdensome and is not proportional to the needs of the case. Without waiving or otherwise limiting the objection, GMP responds as follows:

The amount of data requested (location of every outage over the past 10 years) is substantial, and GMP does not maintain the data in the format requested. In the event the Department is interested in seeing subsets of this information for specific locations or dates GMP will work with the Department on a narrower request or arrange review of the data with GMP.

Person/s Responsible for Response: Ken Couture
Title of Person/s: Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-4. Please provide copies of GMP's ROW Management Plan for distribution lines and transmission lines, including:

- a. Budgeted costs for ROW Management for the last ten (10) years; and**
- b. Actual costs for ROW Management for the last ten (10) years.**

A.DPS.GMP.1-4.

- a. See Attachment GMP.DPS1.Q4.
- b. See Attachment GMP.DPS1.Q4.

Person/s Responsible for Response: Ken Couture
Title of Person/s: Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-5. Please provide annual costs for underground locates for the last five (5) years. Please include:

- a. Cost per locate by year;**
- b. Number of locates by year;**
- c. Number of miles of undergrounded lines by year; and**
- d. Number of dig-ins/cable cuts per year.**

A.DPS.GMP.1-5.

- a. 2019-\$14.37
2020-\$15.73
2021-\$17.07
2022-\$17.71
2023-\$11.30 (note: 11-month average)

- b. 2019-24,226
2020-25,147
2021-25,850
2022-25,323
2023-28,685

- c. **Objections 3, 5 and 8.** The request for “number of miles undergrounded lines by year” in the context of this question is vague and ambiguous. GMP also objects to this request insofar as it calls for additional analysis not already available. Without waiving or otherwise limiting this objection, GMP responds as follows:

The number of underground miles located by year is not available, as it is not tracked by locating companies in that manner.

- d. 2019-60
2020-35
2021-30
2022-19
2023-38

Person/s Responsible for Response: Eric Lemery
Title of Person/s: Director, Field Technology Operations
Date: January 5, 2024

Q.DPS.GMP.1-6. Regarding Customers Experiencing Multiple Interruptions (“CEMI”) performance:

- a. Please provide all analyses performed by GMP in the last five (5) years regarding CEMI performance; and**
- b. Please provide a heat map in GIS format depicting CEMI performance.**

A.DPS.GMP.1-6.

- a. **Objection 1.** The request for all CEMI analysis prepared in the last five years is overbroad and unduly burdensome and not proportional to the needs of the case as it would require an extensive search of documents, including materials that may be prepared by individual GMP employees. Without waiving or otherwise limiting the objection, GMP responds as follows:

GMP has developed internal data analytic tools that show CEMI information in different ways. These tools are broadly available to our teams to use for a variety of purposes. In the event the Department is interested, we could show analysis for a specific request or arrange review of it at GMP.

- b. **Objections 1, 8.** The data request is over-broad and unduly burdensome and is not proportional to the needs of the case. Without waiving or otherwise limiting the objection, GMP responds as follows:

The amount of data requested (map with all CEMI information for past five years) is substantial, and GMP does not maintain the data in the format requested. In the event the Department is interested in seeing subsets of this information for specific locations or dates, GMP will work with the Department on a narrower request or arrange review of the data with GMP.

For available data from 2020 see:

<https://gmp.maps.arcgis.com/apps/instant/interactivelegend/index.html?appid=0a97e014037d4e58a4dfc29deb40b6c1>

Person/s Responsible for Response: Ken Couture

Title of Person/s: Leader of Grid Resiliency

Date: January 5, 2024

Q.DPS.GMP.1-7. Please provide design criteria for overhead power lines, including:

- a. Transmission weather-loading criteria, including load factors and strength factors; and**
- b. Distribution weather-loading criteria, including load factors and strength factors.**

A.DPS.GMP.1-7.

- a. The weather loading conditions GMP applies to new transmission structures is based on the NESC Rule 250B, combined ice and wind district loading. Under NESC Figure 250-1 and Table 250-1, Vermont is in the Heavy Loading Zone, which assumes 0.5-inch radial ice with 4 lbs./sq. ft. of wind at 0 degrees Fahrenheit (F).

Transmission structures are designed to Grade B of construction under NESC Section 24. GMP also applies the loading requirements of NESC Section 25 for transmission infrastructure design. This includes Rule 250, "General loading requirements and maps," Rule 251, "Conductor loading," Rule 252, "Loads on line supports," and Rule 253, "Load factors for structures, crossarms, support hardware, guys, foundations, and anchors."

GMP also follows NESC Section 26 and uses the strength factors in Rule 261 (Table 261-1). This information is used in conjunction with the loads and load factors of Section 25 (Rules 250, 251, 252 and 253) and is consistent with Figures 250-1, 250-2 and 250-3 and Tables 250-1, 253-1 and 261-1 for Grade B construction.

- b. Distribution weather loading is also dictated by NESC Rule 250B, and GMP designs its distribution structures assuming 0.5-inch radial ice with 4 lbs/sq. Ft. of wind at 0 degrees F.

Distribution structures are designed to Grade C of construction unless NESC Section 24 requires Grade B construction. GMP also applies the loading requirements of NESC Section 25 for distribution infrastructure design. This includes Rule 250, "General loading requirements and maps," Rule 251, "Conductor loading," Rule 252, "Loads on line supports," and Rule 253, "Load factors for structures, crossarms, support hardware, guys, foundations, and anchors."

For its distribution structures, GMP follows NESC Section 26 and uses the strength factors in Rule 261 (Table 261-1). This information is used in

conjunction with the loads and load factors of Section 25 (Rules 250, 251, 252 and 253) and is consistent with Figures 250-1, 250-2 and 250-3 and Tables 250-1, 253-1 and 261-1 for Grade C and Grade B construction as required.

Person/s Responsible for Response: Kamran Hassan
Title of Person/s: Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-8. For the design of the spacer cables, please provide weather-loading criteria, load factors, and strength factors used for design.

A.DPS.GMP.1-8.

GMP applies the same design criteria to all overhead distribution structures. See response to Q.DPS.GMP.1-7.

Person/s Responsible for Response: Kamran Hassan

Title of Person/s: Leader of Engineering

Date: January 5, 2024

Q.DPS.GMP.1-9. Does GMP use American Society of Civil Engineers (“ASCE”) Guidelines for Electrical Transmission Line Structural Loading, Manual of Practice 74 for design of transmission lines?

A.DPS.GMP.1-9.

See response to Q.DPS.GMP.1-7 for description of GMP’s design standards.
While GMP is aware of the ASCE guideline, it does not apply to GMP’s work.

Person/s Responsible for Response: Kamran Hassan
Title of Person/s: Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-10. Does GMP use extreme wind or extreme ice loading for distribution line design?

A.DPS.GMP.1-10.

GMP uses the standards described in response to Q.DPS.GMP.1-7. Rule 250C - Extreme wind loading and 250D - Extreme Ice with concurrent wind loading apply to structures or supported facilities exceeding 60' above ground or water level. These Rules are applied to specific structures in the rare event that the above grade height of a structure exceeds 60'. So, in general, GMP does not use that for distribution line design.

Person/s Responsible for Response: Kamran Hassan
Title of Person/s: Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-11. For extreme winding per National Electric Safety Code (“NESC”), since Vermont is in a special wind region, what wind speed does GMP use for structures or supported facilities?

A.DPS.GMP.1-11.

For transmission line criteria, GMP uses a wind speed of 90 mph. Distribution lines are built in accordance with response to Q.DPS.GMP.1-7 without further specific wind criteria.

Person/s Responsible for Response: Kamran Hassan
Title of Person/s: Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-12. Please provide the following regarding pole-age data for all distribution poles:

- a. birthmark wood that may be contained in GIS mapping;**
- b. GPS coordinates of wood poles; and**
- c. average number of wood poles replaced annually for the past (10) years.**

A.DPS.GMP.1-12.

- a. See Attachment GMP.DPS1.Q12a.
- b. See Attachment GMP.DPS1.Q12a.
- c. 3,642

Person/s Responsible for Response: Tom Williams, Eric Lemery
Title of Person/s: GIS Administrator; Director, Field Technology Operations
Date: January 5, 2024

Q.DPS.GMP.1-13. For each named storm in Exhibit GMP-MB-4 since 2020:

- a. Please provide the number of wood poles replaced; and**
- b. Please provide the GPS location of each wood pole replaced.**

A.DPS.GMP.1-13.

- a. Please see Attachment GMP.DPS1.Q13a.
- b. Please see Attachment GMP.DPS1.Q13b.

Person/s Responsible for Response: Mike Burke (Ashley sent data)
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-14. With regards to this petition, and the entire ZOI, please:

- a. Provide all plans and budgets for modifications to transmission lines;**
- b. Provide all plans and budgets for undergrounding service drops to residential homes or businesses; and**
- c. Provide all plans and budgets for underground secondary conductors.**

A.DPS.GMP.1-14.

- a. None proposed as a part of the first phase of the Zero Outages Initiative, and budgeting and plans for the remaining ZOI work after phase one will be informed by the work completed in the first phase.
- b. There is no specific budget for undergrounding service drops. Our plan is to get the primary lines underground and reconnect to the existing services. If there is an occasional service placed underground, it will be budgeted as part of the larger project.
- c. There is no specific budget to underground secondary conductors; if there is a section that needs to be undergrounded as part of a larger project, it will be budgeted within that project.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-15.

- a. Provide information regarding all customer complaints related to service outages and reliability concerns for the last five (5) years; and**
- b. To the extent able, provide the relative location of each customer's premises (for example, town, circuit, road, etc.) that filed a complaint with GMP regarding electric service outage.**

A.DPS.GMP.1-15.

- a. **Objections 1, 3, 8.** The data request is over-broad and unduly burdensome and is not proportional to the needs of the case. GMP does not maintain the data in the requested form. When customer concerns are filed with the PUC or DPS, that information is already available to the Department. Without waiving or otherwise limiting the objection, GMP responds as follows:

GMP receives over approximately 280,000 customer contacts annually on a wide variety of topics including anything from paying bills, moving in and out, and asking questions about various aspects of their service or GMP offerings. In addition, if a customer raises a question with the DPS or PUC, we receive those as well. During a customer interaction, GMP enters notes about the contact in our customer care system so we have a chain of history with the customer. Attempting to provide that information in a single list that only deals with customer issues regarding "reliability" is not feasible.

- b. See response to subpart (a).

Person/s Responsible for Response: Josh Castonguay, Liz Hart
Title of Person/s: VP, Chief Innovation and Engineering Executive; Customer Care Supervisor
Date: January 5, 2024

Q.DPS.GMP.1-16. Regarding the spacer cable proposed for Zone 1 on pages 28-29 of Mr. Burke's direct testimony, please:

- a. Confirm that spacer cable is insulated, but not safe for humans to touch;**
- b. Explain how GMP plans to protect the public when the spacer cable falls to the ground where humans may contact the cable;**
- c. Explain the overcurrent protection scheme GMP is deploying to sense and clear high impedance faults;**
- d. Provide any scientific studies reviewed by GMP that address how ultraviolet light affects spacer cable insulation/covering;**
- e. Provide the manufacturer's warranty for the cable service life; and**
- f. The standard pole height and class to be used for tangent poles with spacer cable in Zone 1.**

A.DPS.GMP.1-16.

- a. Confirmed, spacer cable is insulated and not safe for handling by the public, like all electric lines.
- b. For safety, all conductors of any type (e.g. bare or insulated wire) are assumed to be energized until GMP field personnel has de-energized and grounded the line. GMP communicates to the public the same safety warning and information regarding all downed wires regardless of type, even communications wires, so that the public treats all wire they encounter the same (spacer cable, bare wire and communications). GMP's operational practices are the same when approaching spacer cable or bare wire which has experienced a fault. This is because high impedance faults that do not cause an operation of an overcurrent protective device can and do occur for both types of conductors, bare or insulated wire.
- c. The overcurrent protection scheme GMP uses to protect distribution lines implements time overcurrent elements and is applied for both bare and spacer cable.
- d. See Attachment GMP.DPS1.Q16d.
- e. See Attachment GMP.DPS1.Q16e.
- f. 50' Class 2.

Person/s Responsible for Response: Mike Burke, Josh Castonguay, Kamran Hassan
Title of Person/s: VP, Field Operations; VP, Chief Innovation and Engineering Executive;
Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-17. Regarding the spacer cable construction for the VH4A line referenced in Mr. Burke's direct testimony on page 24:

- a. What is the budgeted cost for the construction of the spacer cable in Zone 1?**
- b. Please provide any actual costs for similar spacer cable construction projects, either completed or planned; and**
- c. Please provide the design drawings for the project(s) referenced.**

A.DPS.GMP.1-17.

- a. The VH4A project discussed on page 24 of Mr. Burke's testimony is located in Zone 2 not Zone 1. The cost estimate for the spacer cable sections of the projects was \$ 2,706,853.
- b. Athens L3 rebuild total cost was \$1,152,636.29. Randolph Line 7 rebuild total cost was \$2,240,517.12. Both projects were similar spacer cable rebuilds.
- c. See Attachments GMP.DPS1.Q17(c)(1) and (2) (zip folders with requested design drawings).

Person/s Responsible for Response: Mike Burke, Eric Lemery
Title of Person/s: VP, Field Operations; Director, Field Technology Operations
Date: January 5, 2024

Q.DPS.GMP.1-18. Regarding page 24 of Mr. Burke's direct testimony, please:

- a. Explain how spacer cables reduce outages from pole/car accidents;**
- b. Provide any changes to GMP ROW maintenance programs for distribution lines equipped with spacer cable(s);**
- c. Provide the data to support the statement that spacer cable projects will "avoid outage response costs."**

A.DPS.GMP.1-18.

- a. Our T&D line crews responding to car pole accidents have noted that even when poles are broken spacer cable lines stay energized at a safe clearance from the ground, likely due to the strength of the spacer cable and steel messenger and the fact that it is insulated. In those instances, the crew can replace the pole, and then lift the messenger on to the new poles and brackets, and customers do not experience and outage from the car pole accident.
- b. There are no changes to our right of way maintenance program for spacer cable.
- c. Spacer cable installation reduces the overall span of the wires from 8' in a cross-arm configuration down to 18'' for spacer cables. This reduction in width avoids tree damage that would have occurred with the wider cross-arm spans, eliminating the need for response in those instances. In other cases where a tree or branch is on the messenger but not causing a hazard or outage, we wait until other restoration is complete and then remove the trees, helping prioritize response at the height of the storm to where it is needed most. The data regarding outage avoidance based upon spacer cable and queried by upstream protective device is dynamic and GMP can discuss options for reviewing this information with the Department and its consultants.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-19. Please provide GMP's average annual repair costs for non-major storm outages for the past five (5) years.

A.DPS.GMP.1-19.

See Attachment GMP.DPS1.Q19.

Person/s Responsible for Response: Gary Sexton
Title of Person/s: Leader, GAAP Accounting
Date: January 5, 2024

Q.DPS.GMP.1-20. With respect to operating spacer-cable systems:

- a. When replacing poles equipped with spacer cables, will a planned outage be necessary?**
- b. To add a transformer or single-phase tap to a spacer cable, the three-layer insulation must be removed. Can this work be performed with the spacer cable energized, or will a planned outage be required?**
- c. If a spacer cable has fallen to ground, is it necessary to de-energize the cable to re-install the cable on pole?**
- d. Please provide any known instances when scheduled outages may be required for operating/maintaining the spacer cable systems.**

A.DPS.GMP.1-20.

- a. Line crews make professional judgements all the time about transferring conductors while energized based on the construction type, such as double dead-end construction, position of taps, buck arm construction, and more. Those decisions are not specific to spacer cable however. The majority of our work is done while energized with the knowledge and skills of lineworkers using personal protective equipment, line cover and safe work practices.
- b. This work is typically performed energized with the use of cover up or moving each phase out of the bundle with use of auxiliary arms to apply a transformer tap, at the discretion of the worker in charge.
- c. Yes, similar to all types of conductors.
- d. There are no specific known instances where a scheduled outage has been necessary for operating or maintaining spacer cables specifically. The possible need for an outage would be based on ease of moving conductors based on structure type, proximity to other energized lines, dead end, tangent, etc., as would be the case with any wire type.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-21. Regarding the 20 worst circuits criterion reference on page 25 of Mr. Burke's Direct Prefiled testimony please:

- a. Provide a summary of the 20 worst feeders over the last five (5) years;**
- b. Provide a list/description of upgrades or corrective actions for each of these feeders;**
- c. Provide the actual cost for upgrades and corrective actions; and**
- d. Provide the SAIFI/SAIDI/CAIDI for each feeders, including and excluding major storms, for each of the last five (5) years.**

A.DPS.GMP.1-21.

- a. See Attachment GMP.DPS1.Q21a.
- b. See Attachment GMP.DPS1.Q21b for example from the 2022 circuit list.
- c. See Attachment GMP.DPS1.Q21c for example from the 2022 circuit list..
- d. See Attachment GMP.DPS1.Q21d.

Person/s Responsible for Response: Ken Couture (a&d) and Eric Lemery (b&c)
Title of Person/s: Leader of Grid Resiliency; Director, Field Technology Operations
Date: January 5, 2024

Q.DPS.GMP.1-22. GMP has a self-healing system in place at the Burlington International Airport.

- a. Please confirm the distribution lines serving the airport are spacer cables;**
- b. Please provide a list of all sustained outages at the airport since the spacer cable and self-healing system was installed;**
- c. Please explain why self-healing systems also known as Fault Location, Isolation, and Service Restoration (“FLISR”) program are not being deployed within the ZOI; and**
- d. Does the age of GMP’s existing distribution system impact the decision not to use an advanced automation system like FLISR in the ZOI to improve system reliability? If so, please explain.**

A.DPS.GMP.1-22.

- a. The lines inside the self-healing zone are all storm hardened (approximately 90% with spacer cable and 10% covered tree wire).
- b. Zero.
- c. Self-healing systems are being deployed as a part of Zone 1. It is referred to in our testimony as self-healing and the technology needed to accomplish it.
- d. No, we have remote operated devices installed on many locations between circuits in use today in more urban parts of Vermont.

Person/s Responsible for Response: Kamran Hassan, Mike Burke
Title of Person/s: Leader of Engineering; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-23. Please explain how the health and safety of the public and GMP's employees fits into the prioritization of projects for the ZOI.

A.DPS.GMP.1-23.

Health and safety are at the core of our work every day, for customers and our teammates. As such, health and safety are the primary drivers of the Zero Outages Initiative.

Our society has seen major advancements in medical technology over the last several years and many Vermonters rely on such technology in their homes. For them, energy is a matter of safety and life. Additionally, our relationship to technology and connected devices has increased over the last several years and is often our source of communication to our family and loved ones. These technologies require energy.

For our teammates, the Zero Outages Initiative will provide a better, more efficient, and safer way to respond to outages. As our testimony outlines, we are prioritizing in the first phase, the parts of the system that are the most rural and the most susceptible to long-duration outages in the face of extreme weather. This part of our system is also often the hardest and most extreme terrain for our teammates to access and restore, requiring cross country treks in bad weather conditions. Storm hardening like spacer cable and self-healing technology, undergrounding and energy storage will all work together in this case to keep our customers and our teammates safe while we work to respond to a major weather event.

Our ZOI combines the best aspects of our system, all of which are currently deployed in various parts of the state, to create an energy system for all our customers that is not only more resilient and more affordable in the face of severe weather, but also one that is safe and sustainable.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-24. Regarding page 7 of Mr. Burke's direct testimony and his statement on a "dynamic, decentralized, technologically advance two-way system," please:

- a. Explain the two-way system;**
- b. Provide who owns, operates, and maintains the communication system;**
- c. Explain the residential BESS to be controlled with the system referenced; and**
- d. Does the customer have any responsibility for the communication system and, if so, what is GMP's responsibility?**

Objection 5. The question appears to misunderstand the testimony, which refers to GMP's grid, not a separate communication system. The question is therefore vague and would require speculation to answer as written. Without waiving or otherwise limiting this objection, GMP responds as follows:

A.DPS.GMP.1-24.

- a. The two-way system has energy flowing in both directions due to the proliferation of distributed generation and storage, as opposed to one that is primarily radial, one way delivery of energy. By way of example, we are operating this system now with our ESS and BYOD programs.
- b. This depends on the communication system to which the question refers. For example, the current AMI Mesh Radio network is owned by GMP. Any resources in customer homes that rely on the customer internet are using the customer owned system.
- c. Currently, residential BESS are managed via customer internet.
- d. Yes, the customer is responsible for maintaining communications with the BESS, consistent with the required customer agreement for this service. We monitor the systems and provide notice to the customer if a device is offline or no longer communicating.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-25. Regarding page 7 of Mr. Burke's direct testimony and his statement that Vermont's recent weather changes "create intense storm systems that hit more frequently and with more ferocity," please provide a 50-year history of storm frequency and ferocity for GMP's service territory.

Objections 1, 3, 8. The request is overbroad and unduly burdensome and not proportional to the needs of the case. GMP does not have access to 50 years of storm data for all GMP's current service territory, and collecting such data would require an extensive effort. Data on overall weather trends in Vermont is also available publicly. Without waiving or otherwise limiting the objection, GMP responds as follows.

A.DPS.GMP.1-25.

Data on specific weather events impacting GMP's system since 2013 are provided in Exhibit GMP-MB-4. Additionally, NOAA-VT's most recent Vermont State Climate Report, including weather data going back approximately 80 years was provided as Exhibit GMP-MB-3. Further publicly available Vermont weather data (going back approximately 100 years) can be found in Vermont's State Hazard Mitigation report, the latest draft of which is available at: <https://vem.vermont.gov/draft-2023-state-hazard-mitigation-plan>

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-26. Has GMP projected the frequency of major storms for the next ten (10) years? If so, please provide the projections and all references, supporting documentation, and calculations relied upon by GMP in making such projections.

A.DPS.GMP.1-26. No.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-27. Regarding Mr. Burke's direct testimony and his descriptions on pages 10-12 that some Vermonters have already experienced the benefits of the type of work planned under the ZOI:

- a. Please provide a list of feeders that already have facilities in service similar to the type of work planned under the ZOI; and**
- b. Please provide the SAIDI, SAIFI, and CAIDI for each of these feeders since these initiatives have been deployed by GMP.**

A.DPS.GMP.1-27.

- a. The feeders cited in Mr. Burke's direct testimony on page 10-12 include:
 - Sharon - Sharon SH-G35 circuit
 - Athens - Chester CH-G11 circuit
- b. Initiatives were deployed on the Sharon SH-G35 circuit as of November 1, 2017. The reliability statistics for the period from 11/1/17 to 12/20/23 were as follows:

CAIDI – 6.7, SAIFI (annualized) 7.0, SAIDI 47.2 (annualized)

Initiatives were deployed on the Athens (Chester CH-G11) circuit as of November 1, 2022. The reliability statistics for the period from 11/1/22 to 12/20/23 were as follows:

CAIDI – 12.2, SAIFI (annualized) 11.8, SAIDI 144.3 (annualized)

The definition of CAIDI/SAIDI/SAIFI is based upon the whole circuit.

Outages for any specific customer or group of customers on a section of line are dependent upon the storm hardening measures deployed upstream of those customers. When combined with energy storage solutions, ZOI is designed to install distribution upgrades for entire circuits in order to eliminate outages experienced by customers. For these two circuits, significant reliability upgrades were installed in specific areas of line; other areas remain to be addressed, including the addition of storage. When we look at the data at a granular level from the point of protective devices upstream of the storm hardened construction in, for example, the Sharon circuit, we see marked improvement in outages experienced, specifically where that section had experienced nine outages

between the summer of 2015 through the end of 2017, has since then only experienced one outage due to damage on that section of line, a large pine tree that broke a pole. For both of these circuits, there are distribution upgrades that remain (such as adding automated full feeder backup on the Sharon circuit to connect it to the adjacent Bethel circuit along with other single-phase undergrounding and overhead storm hardening.).

Person/s Responsible for Response: Mike Burke, Ken Couture
Title of Person/s: VP, Field Operations; Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-28. With regards to undergrounding distribution lines, please:

- a. Provide the cost/benefit analysis performed by GMP showing the cost-effectiveness of undergrounding distribution lines;**
- b. Provide all assumptions used in the analysis; and**
- c. Provide data in spreadsheet format.**

A.DPS.GMP.1-28.

- a. For an analysis based on FY21 data relevant to this topic please see Attachment GMP.DPS1.Q28a.
- b. See response to subpart (a)
- c. See response to subpart (a)

Person/s Responsible for Response: Mike Burke, Ken Couture, Rob Bingel (cost analysis of underground).

Title of Person/s: VP, Field Operations; Leader of Grid Resiliency; Manager, Financial Planning & Analysis

Date: January 5, 2024

Q.DPS.GMP.1-29. With regard to underground distribution cables in conduit (“CIC”), please:

- a. Provide GMP’s specification for underground primary cable;**
- b. Provide the manufacturer’s warranty for the cable;**
- c. Provide any statement from the manufacturer on the longevity of the service life of the cable; and**
- d. Provide GMP’s expectation of the service life of the primary underground cable and the basis for that opinion.**

A.DPS.GMP.1-29.

a. See Attachment GMP.DPS.Q29a

b. See Attachment GMP.DPS.Q29b

c. See Attachment GMP.DPS.Q29b

d. GMP expects the service life of the primary underground cable to exceed the 40 years guaranteed by the manufacturer. Although it is difficult to estimate the life of any cable, which can be impacted by various environmental factors, GMP’s history with direct buried cable gives us confidence in the longevity of cable in conduit. The cable is in a watertight conduit, has never been pulled under tension, leading us to believe that the cable will far outperform the warranty. For cable we have in conventional conduit systems, we have had anecdotally very few failures in comparison to the amount in service.

Person/s Responsible for Response: Mike Burke, Kamran Hassan
Title of Person/s: VP, Field Operations, Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-30. CIC has an expected advantage of allowing for the replacement of the primary cable if, and when, the cable fails.

- a. Please provide the specification for the CIC that GMP intends to deploy in this ZOI;**
- b. What is GMP's expectation of the service life of the conduit?**
- c. Has GMP attempted to use CIC for cable replacement in the last five (5) years?**
- d. Was 100% of the conduit usable for replacement of the cable, or did the conduit need to be replaced as well?**

A.DPS.GMP.1-30.

- a. See Attachment GMP.DPS1.Q30 for GMP's Construction Standards.
- b. Per the Plastic Pipe Institute (PPI), the typical benchmark for HDPE pipe is a life of 50 years, and may be more than 100 years.
- c. Yes, we have used it to replace direct buried cable, but not for replacement of cable in conduit.
- d. We have not had a failure of any cable in conduit.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-31. On page 11 of Mr. Burke's direct testimony, Mr. Burke stated that "3,000 of our customers have connected storage systems or owned through our Energy Storage System tariff."

- a. Understanding that GMP has communication with these battery systems, please provide hourly energy outflow from each of the batteries during system outages since the batteries were installed.**
- b. Please provide the hourly outflows from each of the battery systems since the systems were installed.**
- c. Please provide outage data for each battery customer since the batteries were installed, including the date, time, and duration of each outage by customer.**

A.DPS.GMP.1-31.

- a. Please see Attachment GMP.DPS1.Q31a which provides outage data on a per customer basis. Only the total energy exported during outages is available.
- b. **Objections 1, 8.** The data request is over-broad and unduly burdensome and is not proportional to the needs of the case. Without waiving or otherwise limiting the objection, GMP responds as follows:

The amount of data requested (hourly outflows for every battery since installation) is substantial and would be difficult to produce and transmit in a single data file. In the event the Department is interested in seeing subsets of this information for specific events GMP will work with the Department on a narrower request or coordinate review of the data with GMP.

- c. Please see Attachment GMP.DPS1. Q31a which provides outage data on a per customer basis.

Person/s Responsible for Response: Craig Ferreira
Title of Person/s: Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-32. Regarding service drops to homes:

- a. Please provide the number of overhead service drops to homes that have required repairs to restore power to the home in each of the last 5 years.**
- b. For each major storm listed in Exhibit GMP-MB-4, please provide the number of overhead service drops that had to be repaired prior to restoring service to the home.**

Objections 1, 8. The data requests are over-broad and unduly burdensome and is not proportional to the needs of the case or call for information in a format that is different from the manner in which it is usually stored. Without waiving or otherwise limiting the objection, GMP responds as follows:

A.DPS.GMP.1-32.

- a. See Attachment GMP.DPS1.Q32a for the number of service-related power outages that were restored each year. Data on service-related incidents that needed to be restored, but which did not cause an outage of the underlying customer(s), is not readily available and is not included in the totals.
- b. See Attachment GMP.DPS1.Q32b for a summary of the number of service-related power outages that were restored as part of each Major Storm. Data on service-related incidents that needed to be restored, but which did not cause an outage of the underlying customer(s), is not readily available and is not included in the totals.

Person/s Responsible for Response: Ken Couture
Title of Person/s: Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-33. Regarding page 20 of Mr. Burke's direct testimony concerning the cost of storm repairs:

- a. Please explain why undergrounding 50 miles of line (see the Direct Prefiled Testimony of Mr. Burke at page 11) has not reduced these repair costs;**
- b. Please provide the total miles of spacer cable currently in use on GMP's system; and**
- c. Please explain why deployment of spacer cable has not significantly reduced the cost of storm restoration.**

A.DPS.GMP.1-33.

- a. The installation of the underground lines has reduced maintenance costs for those miles of line. Cost reductions include trimming costs and outage restoration costs specific to those areas. The majority of outage restoration for customers on those miles remains related to the portions that are yet to be storm hardened. Non-storm hardened overhead infrastructure continues to create restoration costs on these circuits in the face of more frequent severe weather. The Zero Outages Initiative is a comprehensive plan that addresses entire circuits in each zone of the system.
- b. GMP currently has approximately 120 miles of primarily three phase spacer cable construction.
- c. See answer to subpart (a) above.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-34. Regarding Mr. Burke's direct testimony on page 22 and the improvements made to the Bristol and Lincoln, Vermont area, please:

- a. Provide outage data for the feeders in this area for the last six (6) years;**
- b. Provide the outage data since the storm hardening was complete;**
- c. Provide detail information regarding the storm hardening work deployed; and**
- d. Provide a detailed circuit map showing specific system upgrades;**
- e. Mr. Burke noted that the frequency of outages for this feeder (SAIFI) went from 7 down to a SAIFI of 2.0. Is the goal of the ZOI to achieve a SAIFI of 2.0? If not, what is the goal of SAIFI for this initiative?**

A.DPS.GMP.1-34.

- a. Please see Attachment GMP.DPS1.Q34a, for the 6-year outage data on the Hewitt Road (HR-G38) circuit.
- b. See Attachment GMP.DPS1.Q34a and the tab titled "Post Improvement."
- c. See Attachment GMP.DPS1.Q34c.
- d. See Exhibit GMP-MB-5.
- e. No. The goal of the ZOI is for customers not to experience outages. As noted in testimony, these positive results have been achieved in this area even though it has not yet had all the work that would be included in the ZOI. The elements of work done in this area show the significant benefits of doing the work, and bringing further ZOI solutions such as undergrounding and storage would drive the result to zero. ZOI is a comprehensive approach with all three aspects of the plan working together to deliver a highly resilient, affordable system at a time when our customers need it most.

Person/s Responsible for Response: Mike Burke, Ken Couture (a&b), Eric Lemery(c&d)
Title of Person/s: VP, Field Operations; Leader of Grid Resiliency; Director, Field Technology Operations
Date: January 5, 2024

Q.DPS.GMP.1-35. Regarding Mr. Burke's direct testimony on page 23, please explain what "automated controls" will be deployed.

- a. Please provide a description of the automation;**
- b. Please provide the cost of the automation; and**
- c. Please provide a defined benefit of this proposed automation.**

A.DPS.GMP.1-35.

- a. Self-healing systems or remote operation of healing systems will be deployed.
- b. An estimate of a typical installation of a self-healing system tying two circuits, with no additional upgrades required, is approximately \$200,000.
- c. The benefit is a reduction in outage time. The benefit is the difference between a full crew response to conduct a manual feeder back up, which can take up to 3 hours, compared to automatic or remote restoration. In many instances, the automatic controls can work within 5 seconds. So, a customer could go from a 3-hour outage down to a 5-second outage without sending a crew to do feeder back up. Technology like this is at the heart of a resilient grid.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-36. Regarding the selection of projects described on page 25 of Mr. Burke's direct testimony, please:

- a. Provide work papers used to select projects;**
- b. Provide any internal presentations at GMP showing the selection process;**
- c. Provide all supporting data including the type, age, and condition of assets; and**
- d. Provide any social or economic criteria used to prioritize projects.**

A.DPS.GMP.1-36.

- a. We used all of the data we have available such as reflected in the 20 worst circuits list, the outage heat map, local district experience and knowledge, communications with town officials and other stakeholders (as reflected in the presentations provided in Attachments GMP.DPS1.Q121(a)-(c)). See also response to subpart (b), below.
- b. The annual project planning process utilizes the climate plan and other criteria reflected in testimony and in project capital folders (See example capital folders provided as Attachments GMP.DPS1.Q36(a) & (b), and reflected in the material noted in subpart (a) above.
- c. See response to subpart (b) above.
- d. While for these specific projects we did not separately screen for these criteria, we are aware of the data used to rank Resiliency Zones previously referred to (including CDC SVI data) and the overall alignment of that data with the areas focused on for these projects.

Person/s Responsible for Response: Mike Burke, Tim Jones, Eric Lemery.

Title of Person/s: VP, Field Operations; Field Operations Project, Permitting, & Budget Coordinator; Director, Field Technology Operations

Date: January 5, 2024

Q.DPS.GMP.1-37. Regarding Resiliency Zone solutions in Guilford and Rockingham mentioned by Mr. Burke in his direct testimony on page 27:

- a. Please provide a detailed description of these improvements within these Zones;**
- b. How were these Zones selected?; and**
- c. Are the improvements within these Zones included in the MYRP, Climate Plan, or the ZOI?**

A.DPS.GMP.1-37.

- a. Please refer to Josh Castonguay's prefiled direct testimony at 22 for detailed descriptions of these two projects. As noted in the testimony, both projects are still in a discovery phase to identify the best resiliency solution(s).
- b. Please refer to Josh Castonguay's prefiled direct testimony at 20 and Exhibit GMP-JC-1, which explains how these two projects were selected as part of GMP's 2021 Integrated Resource Plan.
- c. Please refer to Mike Burke's prefiled direct testimony at 12 and Josh Castonguay's prefiled direct testimony at 23, which explain how Resiliency Zone projects are enabled through the Climate Plan and IRP and are planned under MYRP capital investments. In addition, we have and will continue to pursue federal funding and seek Commission approval as applicable.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-38. Please provide any data or documents that demonstrate how long a customer's battery will last when powering up the entire home during an outage.

- a. In general, with the BESS deployed by GMP, does the battery system power the entire home or a portion of the home?;**
- b. What portions of the homes are fed by a battery system during an outage?; and**
- c. With the return of utility power, is there a short outage to transfer from the battery backup system to the utility grid? If so, how long is the outage during the transfer?**

A.DPS.GMP.1-38.

- a. Generally, the systems being deployed are installed to provide power to the whole home. The amount of time a battery system can provide power to a home is dependent on how the customer uses energy when on battery power. GMP educates customers to avoid using high consuming appliances such as electric clothes dryers or ovens in order to extend the amount of time their battery can provide power to more essential loads in the home. When coupled with solar, the energy storage can run indefinitely assuming solar panels are clear and the sun is shining. This enables customers to become their own mini-grid or "island," and stay powered for many days.
- b. During an outage, the storage systems provide energy to the entire home. Customers manage their consumption by turning devices and/or breakers on and off to extend the duration of backup that their system can provide during an outage. There are some systems installed that provide backup to only a portion of the home. The circuits backed up during an outage are selected by the customer with their installer prior to installation.
- c. There is no outage when transferring from battery power back to grid power. The system goes through a rebalancing period of 5-6 minutes, and then seamlessly transfers back to grid power without any interruption to the customer.

Person/s Responsible for Response: Josh Castonguay, Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-39. Regarding page 20 of Mr. Burke's direct testimony and his reference to rural customers:

- a. Does GMP have an estimate of the percentage of customers on a feeder that are in Zone 4? If so, what is that percentage?;**
- b. A three-pole single phase tap off a main line (Zone 1) serving a single customer, is this an example of a Zone 4 customer?; and**
- c. For the analysis of the East Jamacia Circuit (GMP-MB-8), please provide the total number of customers by Zone.**

A.DPS.GMP.1-39.

- a. GMP estimates on average approximately 20% of customers, based on rural (higher) vs urban nature of circuits.
- b. This would be determined based on outage history and a field survey. If the 3-pole tap has no history of outages and is in a wide-open section of line, it would not be considered a Zone 4. If that 3-pole section is heavily treed and has a history of outages specific to that section of line, it could be considered a Zone 4.
- c. Estimated Customers per Zone, East Jamaica Circuit 1-278, 2-348, 3-1,586, 4-455.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-40. Regarding page 30 of Mr. Burke's direct testimony, referencing the ½ inch steel cable messenger:

- a. Please provide the exact specifications of the messenger;**
- b. Please confirm that the messenger will serve as the system neutral;**
- c. What is the impedance of the neutral conductor typing used for Zone 1 compared to the neutral impedance envisioned for the spacer cable?;**
- d. Regarding the photo on page 31 of Mr. Burke's direct testimony, please explain why the ½ inch steel messenger is covered on one side of the pole; and**
- e. Please provide the framing specification/construction specification for the spacer cable showing spacing of the poles, through bolt spacing, grounding details, how single-phase taps are connected to the spacer cable, and how transformers are connected to the spacer cable.**

A.DPS.GMP.1-40.

- a. GMP uses a 0.546 in. diameter Alumoweld-Aluminum (AWA) messenger, Part # MSG0052AA007-01. Please see Attachment GMP.DPS1.Q40e.
- b. Confirmed, the messenger also serves as the system neutral.
- c. The 0.546 in. Diameter AWA messenger has an impedance of 0.4757 Ω /mi. at 77°F. We run a 4/0 AAC conductor as the system neutral with 477 ACSR bare and covered primary conductor, which has an impedance of 0.4391 Ω /mi. at 77°F. Per our distribution construction standards, a second neutral conductor is installed below the spacer cable. This is utilized primarily to define the electric space for future third party attachments, but also has the added benefit of decreasing the overall neutral impedance as the messenger and lower neutral are electrically paralleled.
- d. The photo is a stock photo, not a specific GMP construction project. As an example, a cover of this type is sometimes used for a tap line coming off the spacer cable close to the unguarded neutral. Per manufacturer specifications the messenger must be covered no less than 18" above areas where the primary phase insulation has been stripped. GMP installs Hendrix Line-DUC for these applications.
- e. See Attachment GMP.DPS1.Q40e.

Person/s Responsible for Response: Mike Burke, Kamran Hassan
Title of Person/s: VP, Field Operations; Leader of Engineering

Date: January 5, 2024

Q.DPS.GMP.1-41. Regarding page 31 of Mr. Burke's direct testimony and referencing the use of tree wire and spacer cables:

- a. Please explain the difference between tree wire and spacer cable; and**
- b. What is GMP's outage experience for tree wire compared to spacer cable?**

A.DPS.GMP.1-41.

- a. Tree wire is a self-supporting covered wire of mostly 165mil, 3 layer insulated primary wire consisting of aluminum, aluminum alloy or ACSR wire. Spacer cable is a one, two or three layer insulated wire depending on voltage rating and consists of stranded hard drawn aluminum conductor which is supported by polyethylene spacers and a steel messenger wire.
- b. Tree wire also drastically reduces tree-related outages. Our experience has shown that spacer cable construction tends to have less damage in areas with dense vegetation and trees due to the smaller surface area and the existence of the messenger cable (not the spacer cable itself). Tree wire (which is installed on crossarms) has more surface area for falling trees to hit, and cross-arm construction can sometimes break pole tops where construction used for spacer cable will not, and in many cases, trees do not stay on the line with spacer cable. Crews on occasion have to take quick emergency outages to remove trees from tree wire, whereas with spacer cable construction, such trees can often be lifted off the steel messenger without an emergency outage. As a result, in general, we 1) use tree wire in heavily populated, high load areas where there is less tree threat, and 2) use spacer cable in areas less populated with a higher tree threat.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-42. Undergrounding single-phase lines as referenced by Mr. Burke in his direct testimony on page 32:

- a. What is the cost per mile for undergrounding single-phase lines using the CIC method?;**
- b. How do these costs change if there are significant conflicts with other underground utilities?;**
- c. What is the total expenditure that GMP is proposing for undergrounding the single-phase lines?;**
- d. Does this cost include replacement of overhead transformer with pad-mounted transformers?;**
- e. How many overhead transformers will need to be replaced and at what cost?; and**
- f. Mr. Burke suggested that 3,500 miles of single-phase lines will need to be addressed by 2030. Please provide the number of customers served by these 3,500 miles of line.**

A.DPS.GMP.1-42.

- a. An estimate based upon our recent experience is currently approximately \$300,000, using an average of customer and side taps required.
- b. In the rural areas that we are focusing on in this phase, there are very few conflicts with other underground utilities. Any change in costs would have more to do with having to use an alternative undergrounding method, like boring, or having to do an overhead section, such as needing to go overhead for a portion to avoid culvert crossings or bridges.
- c. See response to Q.DPS.GMP.1-67 for cost estimate discussion.
- d. No, we are not replacing all overhead transformers with pad-mounted transformers. We are utilizing the overhead transformers to continue to serve the customer and undergrounding the main line to avoid interruptions to all customers.
- e. We are not anticipating replacing any overhead transformers.
- f. Based on an average of approximately 18 customers per mile in rural areas, we estimate approximately 63,000 customers served by these 3,500 miles. Any customer beyond these 3,500 miles that are upgraded as part of the ZOI

would also directly benefit from reduced outages on those sections of line. The further benefit of the Zero Outages Initiative on these 3,500 miles would flow to all customers when the ZOI is in place through lowered costs overall and more efficient response when extreme weather does hit.

Person/s Responsible for Response: Mike Burke, Tom Williams, Eric Lemery
Title of Person/s: VP, Field Operations; GIS Administrator; Director, Field Technology Operations
Date: January 5, 2024

Q.DPS.GMP.1-43. Please explain what the costs for undergrounding or otherwise addressing other utility lines (such as telecommunications lines) on shared poles will be.

- a. Who will bear these costs?**
- b. How will such costs be handled or allocated?**
- c. How will lost pole rental revenue impact GMP's rates and the costs of the ZOI?**
- d. Please provide any and all documentation and calculations to support responses to this question and its subparts.**

A.DPS.GMP.1-43.

- a. The current method is, except for where the construction method supports a separate conduit for future fiber specific to GMP, working with the communication companies on these projects, and the communication companies paying for the relocation. This is underway now and has been successful. In the event the communications company does not choose to go underground, GMP would transfer the pole ownership to the communications company.
- b. With the level of overhead to underground we are proposing, we are exploring funding mechanisms, such as Vermont Community Broadband Board grants to fund communication companies' initial costs of getting their conduits in the ground.
- c. It will not.
- d. Pole attachment fees are set by tariff and implemented in accordance with the Commission's Rules; they cover pole cost and maintenance. See PUC Rule 3.700; GMP pole attachment tariffs available at: <https://greenmountainpower.com/wp-content/uploads/2021/02/CVPS-Pole-Attach-7-31-20.pdf> and <https://greenmountainpower.com/wp-content/uploads/2021/02/GMP-Pole-Attach-7-31-20.pdf>

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-44. Regarding page 33 of Mr. Burke's direct testimony, he references the Grafton pilot:

- a. Please provide a detailed description of the Grafton Pilot;**
- b. Please provide the cost for the pilot**
- c. Please provide the number of homes with BESS systems installed.**
- d. Please provide the number of homes with BESS paired with solar systems installed.**
- e. Please provide outage data for this area for the last five (5) years.**

A.DPS.GMP.1-44.

- a. Please see Attachment GMP.DPS1.Q44a for the Grafton Resiliency Zone Pilot filing.
- b. Please see Attachment GMP.DPS1.Q44b for the Grafton Resiliency Zone Pilot 6-month report.
- c. Please see Attachment GMP.DPS1.Q44b for the Grafton Resiliency Zone Pilot 6-month report.
- d. Four customers from the Grafton pilot have paired their batteries with solar systems.
- e. Please see Attachment GMP.DPS1.Q3a. "SAIFI CAIDI SAIDI" tab for feeder CH-G11.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-45. Please refer to the Direct Testimony of Michael Burke at page 33. GMP proposes that BESS systems for rural areas will be the preferred solution for the ZOI. Please explain how BESS will reduce storm restoration costs.

A.DPS.GMP.1-45.

Objection 5. Mr. Burke's testimony states that an example circuit shows how in Zone 4 "for many, storage will be the preferred solution." The request's reference to BESS systems for rural areas being "the preferred solution for the ZOI" is therefore vague and requires speculation. Construing that assertion to instead reflect Mr. Burke's cited testimony, and without otherwise waiving or limiting the objection, GMP responds as follows:

As we shift toward customers experiencing zero outages, our entire storm response strategy will evolve. For example, under our ZOI, Zones 1, 2 and 3 would likely remain on (e.g. spacer cable, undergrounding) or have minimal work necessary during an event, and we would be quickly shifting to Zone 4 locations to perform restoration of the system. Knowing which of our customers in Zone 4 will remain on for a certain amount of time because of the energy storage systems allows us to shift the sequencing, timing, and level of the restoration work to be safer and more efficient. Since the ZOI is a comprehensive approach with all three aspects of it working together, it is important to again note the importance of the presence of each aspect to accomplish a fully resilient circuit.

Person/s Responsible for Response: Mike Burke, Josh Castonguay
Title of Person/s: VP, Field Operations; VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-46.

- a. What impacts will more frequent rain and flooding events have on undergrounding both primary and distribution lines?**
- b. How can these and existing underground lines be made more resilient to withstand highly saturated surrounding soils and other subsurface materials, as well as faster growth of vegetative roots?**

A.DPS.GMP.1-46.

- a. With recent experience with flooding in Vermont, local knowledge of areas affected will influence where in certain areas to place the underground. Also, because cable in conduit is installed in long continuous sections of conduit, the conduit and cable tend to stay in place even in areas where there are washouts.
- b. We will continue to use the local knowledge of GMP professionals all over the state, along with working closely with Town Road Managers to understand the areas vulnerable to flooding. When installing in shoulders of roads, our experience is minimal conflict with root systems due to roadside mowing by the Town or State helping to keep vegetation down. In areas of cross-country installation of underground lines in existing electric rights of way, the area is already open of trees so there is even less root conflict with underground. We have over 1,500 miles of underground now and very little vegetation root conflict.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-47.

- a. How many miles, and where, of lines will be undergrounded, and how many miles, and where, will be kept overhead with spacer cable or tree wire?**
- b. What is the cost differential per mile between these two treatments?**

A.DPS.GMP.1-47.

- a. For single phase, the plan is to underground as much as possible because the cost of the rebuild, overhead or underground, is now on average about the same. For 3-phase main line feeder lines, this will be mostly constructed with spacer cable. Determination of the exact locations and number of miles that will be undergrounded in the first phase of the ZOI is underway now and have not yet all been identified. In general, for the first phase of ZOI in this filing, it will be the rural areas that have been experiencing more frequent and severe storm activity that have not already been storm hardened.
- b. The costs between these two construction methods are on average the same. See responses to Q.DPS.GMP.1-42, Q.DPS.GMP.1-67, and Q.DPS.GMP.1-71.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-48. On page 6 of Mr. Burke's direct testimony, he states "but it also allows us to incorporate ... federal funds and incentives that will lower the overall cost of these important investments." What are GMP's expectations of how much it is likely to receive in federal funds and incentives, and any other funding sources, and over what period of time, to help pay for the costs of this initiative?

A.DPS.GMP.1-48.

GMP continues to review federal and other funding opportunities that are available under the Inflation Reduction Act, Infrastructure Investment and Jobs Act, and other programs. As described in testimony, we have applied for a number of grants to date and will continue to do so in subsequent funding rounds. We also participate in a consortium through UVM to review and participate in federal funding opportunities for Vermont, stay in frequent touch with our federal delegation about developing opportunities, and work with the Department and other state agencies to help bring and deploy federal funding to Vermont for energy transformation. While the likelihood and timing of receiving any such funding is unknown and difficult to estimate, Vermont's scale, history of innovation in the energy sector, and ability to partner successfully make us a good place for federal investment in energy programs. We will continue to pursue grant opportunities to support this work, applying any funds received to offset needed investments.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-49. Please refer to page 7 of Mr. Burke's direct testimony where it states "[t]his will help customers weather any storm, and also better prepare Vermont to withstand any physical, cyber, or other threat from the regional grid." How will the proposed work to accomplish the ZOI help withstand cyber threats to the grid?

A.DPS.GMP.1-49.

Energy storage in customer homes along with microgrids with storage and generation capable of islanding from the rest of the distribution system allows our customers a level of protection against cyber threats, physical threats or regional grid issues. In this case, our customers stay powered up with energy from storage while the grid recovers from one of these events (similar to what happens during a weather event). Additionally, increasing our ability to isolate, re-route, and locally control elements on individual circuits will make the Vermont grid more resilient and our customers safer.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-50. Page 8 of Mr. Burke's direct testimony states "[a]dditionally, the longer growing season is resulting in ROW that will require much more expensive and frequent trimming. This will increase costs to an unsustainable level." Has GMP performed any studies or calculations of the ROW trimming costs that will be avoided by implementing the strategies proposed (undergrounding and storm-hardening)? If so, please provide.

A.DPS.GMP.1-50.

Attachment GMP.DPS1.Q50 highlights the annual cost increases associated with trimming a mile of line on both 5-year and 7-year distribution circuits. Overall, GMP has seen an average increase of 29% since FY2020 from contractors to trim a mile of distribution line.

See Attachment GMP.DPS1.Q28a ("Assumptions" tab) for an example of where GMP calculated that the annualized spending per mile associated with undergrounding single phase distribution line will drop from \$1,714 per mile per year to \$130 per mile per year using FY21 costs (vegetation management costs have increased since that time even and will continue to increase). This is just one example of the comparative analysis. Vegetation management costs have continued to increase and must be repeated at more frequent intervals. By contrast, maintenance needed for undergrounding is significantly less frequent and less costly, in addition to being more resilient for customers in the face of extreme weather.

Person/s Responsible for Response: Mike Burke, Ken Couture
Title of Person/s: VP, Field Operations; Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-51. Page 11 of Mr. Burke's direct testimony states "[t]he [ZOI] will ramp up delivery of customer storage systems directly to those neighbors ... so that they ... stay on." How does the customer know how much longer the storage system will provide power during an outage?

A.DPS.GMP.1-51.

Customers use an app that comes with the storage systems to see how much energy is left in their battery during a grid outage. The time can fluctuate from moment to moment based on what is being used in the home during an outage and it helps customers make decisions about what loads to use to maximize these systems. Generally speaking, the more customers reduce energy use in the home while on battery power, the longer the system will last.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-52. Page 18 of Mr. Burke's direct testimony states "[w]e must expect to see these types of extreme events here more frequently too, even events like tornadoes and fires that typically have not been impactful in Vermont." Aside from undergrounding lines, how will implementation of GMP's ZOI reduce or alleviate the impacts of fires on the grid?

A.DPS.GMP.1-52.

GMP's resiliency work in both current and past MYRPs and as we implement the ZOI applies similar wildfire mitigation strategies as utilities in higher threat wildfire areas, including undergrounding and covered overhead powerlines, along with continued vegetation management.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-53. Page 21 of Mr. Burke's direct testimony states "[e]ven with the smoothing under our regulation plan, the FY23 storms alone will add approximately 2.3% to rates over the next three years. Meanwhile, that same level of investment in T&D capital projects for undergrounding distribution lines and storm hardening main line feeders is spread over 45+ year life of these assets and creates a one-year rate impact that is many multiples lower than the cost of repair." Does this statement depend on how quickly the undergrounding and storm hardening of the main line feeders can occur? Please explain.

A.DPS.GMP.1-53.

No, the statement is an overall comparison of the expected ZOI project investments in this filing compared to recent major storm repair costs that have already occurred. The comparison of expected ZOI investments to annual repair costs for past major storm costs shows the benefit to customers for us to make this proactive investment now.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-54. Page 21 of Mr. Burke's direct testimony states "[t]he investment we are seeking approval for in this filing—up to \$250M for additional T&D projects and up to \$30M for additional energy storage between now and the end of FY26—would not exceed an annual 2% rate impact."

- a. For what period of time will the investment require an approximately 2% rate impact?; and**
- b. What would the rate impacts be after that period of time? Please provide the calculations GMP used to make this determination.**

A.DPS.GMP.1-54.

- a. The 2% cited in Mr. Burke's testimony is the expected maximum incremental annual rate impact associated with the level of investment included in phase one of ZOI, without showing any savings from associated benefits. This expected maximum potential annual impact for phase one is reached in year one.
- b. The impacts for this phase one investment reduce each year beyond that time period due to annual depreciation. See Attachment GMP.DPS1.Q54.

Person/s Responsible for Response: Mike Burke, Mathieu Lepage
Title of Person/s: VP, Field Operations; VP, Chief Financial Officer
Date: January 5, 2024

Q.DPS.GMP.1-55. Page 30 of Mr. Burke's direct testimony states "[i]n the future, when Zone 4 areas that are not storm hardened are due for replacement due to age, we will storm harden then with undergrounding preferred."

- a. What is the useful life expectancy of Zone 4 infrastructure? Please provide the number of Zone 4 areas in GMP's service territory that will require replacement in the next 1-5 years, 5-10 years, 10-15 years, 15-20 years, and beyond 20 years.;**
- b. What is the useful life expectancy of storage devices that GMP will provide in Zone 4 areas where storm-hardening is not cost-effective or feasible?;**
- c. What will happen with those storage devices when they reach the end of their useful life-expectancy and/or are removed because lines will be underground?;**
- d. Who will pay disposal costs, and how will they be paid?;**
- e. What will those disposal costs be? In the event a battery storage device catches fire, who will pay the costs of disposal, and for battery replacement?; and**
- f. Has GMP determined what these costs are?**

A.DPS.GMP.1-55.

- a. **Objection 5.**** The question is vague and would require speculation to answer as written. Without waiving or otherwise limiting this objection, GMP responds as follows:

In general, as assets in Zone 4 come up for replacement or reach the end of their useful lives, we will upgrade at that time with either overhead storm hardened construction or underground construction. If referring to battery systems in Zone 4, they have a warranted life of 10 years and are anticipated to last 15 years or longer.

- b.** The storage devices that will be used in Zone 4 come with a 10-year warranty. This is considered the minimum useful life of these systems; however, as set forth in Commission proceedings reviewing our ESS and BYOD programs, the actual use of these systems is expected to exceed 15 years.
- c.** Storage systems will be removed at the end of their useful life and recycled with the manufacturer or with another third-party recycling organization.

- d. GMP has already begun conversations with organizations that will pay for the used equipment that will eliminate or offset any potential disposal costs that might be needed.
- e. The disposal costs are not yet known. As mentioned however, in the initial conversations we have had with battery recycling companies, they would provide a credit for the recycled materials, so this would not be a cost to customers. Furthermore, we anticipate most installations will likely be replaced with the latest battery technology, so it's unlikely a full removal of the entire electrical system will be necessary, and more likely that storage systems will be swapped out at the end of life. In the event of a fire, similar to other electrical equipment in the home, homeowner's insurance will cover the cost of disposal and replacement.
- f. See answer to subpart (e) above.

Person/s Responsible for Response: Josh Castonguay, Mike Burke, Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; VP, Field Operations;
Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-56. Page 32 of Mr. Burke's direct testimony states "[w]e know that for many of these customers, individual residential storage solutions will be more cost effective now than the available storm hardening techniques, particularly when the multiple benefits of storage for those customers and the grid are considered."

- a. What is the estimated number of Zone 4 customers who would receive individual storage units, and over what period of time?;**
- b. How will these customers be given guidance/instruction, and who will do so, on how to use the storage units and how to determine how much power remains during an outage?;**
- c. Has GMP performed any analyses regarding where Zone 4 customers do not receive broadband service adequate or reliable enough to be able to accommodate battery storage?;**
- d. If so, how many potential Zone 4 customers fall into this category?; and,**
- e. How will GMP address this deficiency, and over what period of time?**

A.DPS.GMP.1-56.

- a. This filing is focused on the first 2 years of the ZOI and is being budgeted to provide storage solutions for approximately 1,400 customers in rural areas.
- b. At the time of installation, customers are shown how to use the app associated with the battery, which will show them the amount of energy left in the system during an outage. Both GMP and installers provide information on how to extend the duration of the backup power provided by the battery systems through conversation as well as active outreach ahead of major storms.
- c. Our Resiliency Zone work has incorporated cellular connectivity and proxies for broadband access based on fiber locations. The entire system has been reviewed for Zone 4 locations and broadband access. The state maintains data on connectivity for all locations in Vermont.
- d. We do not have this analysis for all potential Zone 4 locations at this time. The state maintains data on connectivity for all Vermont locations.
- e. The timing of the ZOI is important because just as we are ramping up our work, the State of Vermont, together with various entities, aggressively deploys broadband throughout the state, including to 'last mile' customers,

and GMP is helping facilitate this important work in various ways with CUDs and other providers, including through our Broadband Deployment rider as approved by the Commission. These two initiatives, ZOI and broadband deployment, are happening at similar times to create a much more resilient Vermont.

Person/s Responsible for Response: Josh Castonguay, Mike Burke
Title of Person/s: VP, Chief Innovation and Engineering Executive; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-57.

- a. Please provide a description of GMP's twenty worst performing circuits and where they are located.; and**
- b. How is worst-performing circuit defined?**

A.DPS.GMP.1-57.

- a. See Attachment GMP.DPS1.Q57a.
- b. Annually, GMP provides an updated list as set forth in our Rule 4.900 Report. The analysis generally looks at the prior 5-years' worth of outage data and the circuits are ranked based on combined rating of their CAIDI and SAIFI performance.

Person/s Responsible for Response: Ken Couture
Title of Person/s: Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-58. Please provide GMP's vegetation management plan for each of the past five (5) years.

A.DPS.GMP.1-58.

See Response to Q.DPS.GMP.1-4 above for most recent transmission plan and refer to GMP's most recent Integrated Resource Plan for further description of this work.

Person/s Responsible for Response: Ken Couture
Title of Person/s: Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-59. Please explain in detail any deviations from GMP's vegetation management plan each year for the past five (5) years explaining whether or not the planned activities were carried out, and why.

A.DPS.GMP.1-59.

While the question is not clear regarding what is meant by “deviations,” GMP has implemented its vegetation management program in each year consistent with its vegetation management plans and has not pursued any changes to methodologies. In any individual year, based upon many factors such as weather, speed/density of growth, and contractor availability, miles that had been expected to be included in one year may move to another year (and vice versa). See also responses to Q.DPS.GMP.1-4 (regarding budgeted and actual costs) and Q.DPS.GMP.1-50 (regarding cost changes).

Person/s Responsible for Response: Mike Burke, Josh Castonguay
Title of Person/s: VP, Field Operations; VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-60. The transcript of 12/7/23 workshop in this proceeding, page 50, lines 17-22, Michael Burke stated “[j]ust to finish that scenario we have also built standards where we can do emergency repairs with this type of underground where if we are not able to dig, there is still ways that we can get things reenergized without it being a long duration outage.”

- a. Please explain the ways the underground CIC can be repaired if GMP is unable to dig; and**
- b. Please explain how GMP is able to reenergize without repairing the CIC.**

A.DPS.GMP.1-60.

- a. NESC Section 31, Rule 311, allows for emergency installation of cable directly on grade if guarded or otherwise located so they do not unduly obstruct pedestrian or vehicular traffic. GMP can install a temporary section of CIC at ground level while faulted cable is repaired. Crews will make decisions based on estimated time of repair. See GMP Cable in Conduit (CIC Standard (Attachment GMP.DPS1.Q30).
- b. See response to subpart (a), customers can be re-energized with a temporary cable while the existing CIC is repaired.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-61. The prefiled testimony of Michael Burke, at page 32, states “[i]t is important to note that this underground work will focus on the primary lines, not the service lines, to individual homes.” Over the period 2020-2023:

- a. What percentage of total outage events were on service lines?; and
- b. What percentage of total customer outages were due to events on service lines?

A.DPS.GMP.1-61.

- a. See Attachment GMP.DPS1.Q61
- b. See Attachment GMP.DPS1.Q61

Person/s Responsible for Response: Mike Burke; Ken Couture
Title of Person/s: VP, Field Operations; Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-62. Please provide GMP's definition of "resiliency" and "reliability" as used in this Petition and supporting testimony.

A.DPS.GMP.1-62.

Our Climate Plan, developed in Case No. 20-0276-PET, provides our working definition of resiliency through input received in that proceeding:

“Reliability is about keeping the power on and describes GMP’s ability to deliver that planned outcome. Resiliency, on the other hand, is about the ability to recover from certain types of disaster and failure, including remaining functional from the customer’s perspective while recovering. Resiliency describes GMP’s efforts and projects to achieve reliability.” GMP Final Climate Plan, filed September 24, 2020 in Case No 20-0276-PET, at 4. Please see Page 4 of the Climate Plan for additional discussion of reliability and resiliency and how it relates to GMP’s operating model, in particular how GMP’s focus on resiliency is designed to prepare, operate through, and recover from longer and more significant storm events, which is “more urgent than ever given the increased frequency and ferocity of climate change driven storms.”

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-63. Mr. Burke's direct testimony on page 7, lines 6-7 describes building on GMP's success in proactive undergrounding and storm hardening lines.

- a. Please describe the 330 miles of distribution line in GMP's territory where GMP has already storm hardened and 50 miles where GMP has already undergrounded lines;**
- b. What the cost of this storm hardening and undergrounding was; and**
- c. Whether customers served by those lines experienced any outages since December of 2022 (and if so, the frequency and duration of those outages).**

A.DPS.GMP.1-63.

- a. 330 miles of storm hardening and undergrounding was done in a variety of ways. Some projects included reconductoring in place with new poles and tree wire, while other projects were full relocations to roadside with new poles and tree wire or spacer cable. In addition, all new line extensions that are built for either a new residential customer or a new solar site, are done with storm hardened construction. Undergrounding is also done in place of overhead lines, relocation roadside to underground and new customer line extensions.
- b. \$94,487,760
- c. GMP looked at a sample of three projects in Jericho, Danby and Corinth where the proactive hardening of lines was carried out. As expected, no outages took place in the section of lines that were hardened. The customers in these sections of line did experience power outages, but they were due to issues "upstream" of the grid hardening project area. This experience is why a comprehensive ZOI is needed with our three strategies working together to create a resilient system – storm hardening, undergrounding and energy storage.

Person/s Responsible for Response: Mike Burke, Ken Couture, Matt Haley, Tom Williams, and Eric Lemery

Title of Person/s: VP, Field Operations; Leader of Grid Resiliency; Manager, Treasury; GIS Administrator; Director, Field Technology Operations

Date: January 5, 2024

Q.DPS.GMP.1-64. On pages 22-23 of Mr. Burke's direct testimony, Mr. Burke describes projects in the Bristol and Lincoln area, showing benefits from storm hardening and also indicating that outages are still occurring.

- a. What is the cost of reaching zero outages in these two areas?;**
- b. Is there a cost beyond which GMP would be unwilling to pay to achieve zero outages in these areas (or anywhere in the service territory)?; and**
- c. Assuming GMP's willingness to pay for zero outages is not unlimited, what is the cost beyond which it no longer makes sense to continue to make these ratepayer investments?**

A.DPS.GMP.1-64.

- a. See response to Q.DPS.GMP.1-34e; customers are experiencing much improved reliability in these areas due to storm hardening but the ZOI requires a comprehensive approach. The remaining ZOI work for these areas will be scoped when the projects are developed.
- b. The ZOI is just an acceleration of work we are already doing to build a more resilient and cost-effective system in the face of extreme weather. It also results in the grid transformation necessary to achieve the electrification and decarbonization goals of Vermont. The ZOI is a more cost-effective solution than the status quo as all climate trends and predictions are showing an increase in severe storms in recent years, with 2023 being the worst (in addition to increasing threats from cyber and physical attacks).
- c. Please see response to subpart (b).

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-65. On page 25 of Mr. Burke's direct testimony, Mr. Burke describes criteria used to select recent grid investments. Does GMP plan to incorporate status as disadvantaged communities or otherwise consider equity in the selection process to prioritize investments?

A.DPS.GMP.1-65.

Yes. Our Zero Outages Initiative is about every customer having resiliency no matter their location or income. For example, in our Resiliency Zones, we already use CDC's Social Vulnerability data.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-66. On page 35 of Mr. Burke's direct testimony, Mr. Burke discusses the use of contract crews (line 16) to perform the work.

- a. To what level will the proposed work use contract crews rather than GMP employees?;**
- b. Has GMP evaluated ramping up staffing levels to use its own crews to complete the objectives of the proposal?; and**
- c. What are the additional costs associated with using contract crews?**

A.DPS.GMP.1-66.

- a. Under GMP supervision, most of this work is anticipated to be completed by external crews. GMP, while managing this important ZOI work, will also continue delivering on the everyday work we must provide, such as new customer work, broadband work, storm restoration and distribution maintenance, including pole replacements. This use of both external and internal crews is included in the estimations provided.
- b. Yes, the timeframe and cost to build up internally would not be the best option for our customers as, for example, the time to train a fully rated line worker is 4 or more years. It is more cost-effective for our customers to accomplish this work primarily with external crews.
- c. Please see response to subpart (a).

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-67. How many miles is the requested funding anticipated to support of each: undergrounding lines, and spacer cable and tree wire for overhead lines?

A.DPS.GMP.1-67.

At a high level and with the understanding that estimates of cost and savings evolve, we are currently estimating single-phase rebuilds overhead or underground at an average of \$300,000 per mile and 3-phase at an average of \$700,000 per mile. We will continue to evaluate options that could further lower costs (e.g., new or additional techniques may lower cost). Using these estimates, as an example, \$125,000,000 could rebuild approximately 210 miles of single-phase overhead or underground, and approximately 88 miles of main line spacer cable 3-phase, with self-healing and automated technologies utilized where applicable.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-68. Mr. Burke states on page 20 of his direct testimony that “[i]t is very costly to restore service after significant storm events. As indicated in Exhibit GMP-MB-4, the amounts incurred for just the most recent six major storms in the last twelve months are approximately \$45M. This is in addition to the approximately \$8M per year in routine and recurring smaller storm response. In total, since 2014, there has been over \$115M just in direct major storm costs, with 2023 being the highest ever experienced. More than 60% of that total is just in the last 5 years, and 40% in the last two years. See Exhibit GMP-MB-4 (Ten Year Major Storm Costs).”

- a. Absent the proposed spending under the ZOI, does GMP anticipate this level of storm response spending to stay the same or increase?; and**
- b. If increase, by how much (anticipated storm restoration costs over the next ten (10) years given recent past experience and GMP’s understanding of the changing climate)?**

A.DPS.GMP.1-68.

- a. Climate change impacts are increasing in frequency and severity. Already this fiscal year (since October 2023), there have been four storms in successive weeks throughout Vermont and the entire region causing widespread outages and restoration costs. During one of these storms, 66% of electric customers in Maine experienced outages. Climate experts are warning us that these severe storms and weather changes will continue and could get worse.
- b. See answer to subpart (a). Our experience and understanding of climate change tells us that weather is worsening and therefore what our customers experienced in 2023 and the past decade could not only repeat, but could be worse. Also, we know the threats of cyber and physical attacks increase each year as well.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-69. Please provide GMP's vegetation management costs for the last ten (10) years, including associated line miles and any other pertinent data informing variances in average costs per mile.

Objection 5. The phrase "other pertinent data informing variances" is not defined and therefore is vague and would require speculation to answer as written. Without waiving or otherwise limiting this objection, GMP responds as follows:

A.DPS.GMP.1-69.

See Response to Q.DPS.GMP.1-59.

Person/s Responsible for Response: Ken Couture, Josh Castonguay, Mike Burke
Title of Person/s: Leader of Grid Resiliency; VP, Chief Innovation and Engineering
Executive; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-70. Mr. Burke states on page 8 of his direct testimony “[a]dditionally, the longer growing season is resulting in rights- of-way that will require much more expensive and frequent trimming. This will increase costs to an unsustainable level.” Please provide a projection of future vegetation management costs including the additional increment related to more expensive and frequent trimming.

A.DPS.GMP.1-70.

See response to Q.DPS.GMP.1-50 for a discussion of cost increases associated with distribution trimming and the miles that will continue to be trimmed after undergrounding has taken place.

Person/s Responsible for Response: Ken Couture, Mike Burke, Josh Castonguay
Title of Person/s: Leader of Grid Resiliency; VP, Field Operations; VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-71. Mr. Burke states on page 11 of his direct testimony

“[u]ndergrounding is now often more cost-effective overall than storm hardening overhead single-phase distribution lines and we can also use undergrounding when conditions warrant on three-phase main lines.”

- a. What is the current average cost per mile of undergrounding for GMP?; and**
- b. Will any of those costs decrease with the scale of the proposed Initiative?**

A.DPS.GMP.1-71.

- a. With the current installation method for single phase underground, we estimate an average of \$300,000 per mile. The installed project costs for overhead and underground are similar, but importantly, the lifetime costs for underground installation are more cost-effective than overhead due to reduced trimming costs, reduced outage response and customer hours out and other reduced maintenance costs.
- b. Yes. We do expect to gain efficiencies as we mobilize and build teams throughout the state.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-72. Mr. Burke states on page 21 of his direct testimony “[t]he investment we are seeking approval for in this filing—up to \$250M for additional T&D projects and up to \$30M for additional energy storage between now and the end of FY26—would not exceed an annual 2% rate impact.” Please provide GMP’s benefit-cost analysis informing this conclusion, including anticipated cost savings to GMP’s ratepayers from reduced vegetation management and storm response, and identifying costs that would otherwise have been incurred due to asset condition.

A.DPS.GMP.1-72.

The rate impact cited in Mr. Burke’s testimony is the impact of the investments in isolation as shown in Attachment GMP.DPS1.Q54, without any benefits associated with cost reductions that will develop for customers. We have not performed any long-term speculative benefit-cost analysis, as the need for the ZOI is shown clearly by the impacts our customers and others have already seen from climate change-driven storms. We expect that the areas with significant cost savings include the following areas (with their current annual spending levels): vegetation management (~\$20M), minor storm restoration (~\$8M), major storm restoration (variable, \$45M last year), pole inspection (~\$0.6M) and overtime (variable). Additionally, we expect benefits from the grid transformation to a more two-way, decentralized system, as outlined in Mr. Castonguay’s testimony.

Person/s Responsible for Response: Mike Burke, Mathieu Lepage
Title of Person/s: VP, Field Operations; VP, Chief Financial Officer.
Date: January 5, 2024

Q.DPS.GMP.1-73. Mr. Burke states on page 20 and 37, respectively, of his direct testimony “i]n addition to these direct costs for outage repair, there are financial, social, and emotional costs to our customers every time an outage occurs—impacting their daily life and livelihoods, especially with an increased number of customers continuing to work from home,” and, “[f]ormulaic cost-benefit analysis and traditional tools like the Interruption Cost Estimate (ICE) method that attempts to place a system value on doing a project now versus deferring the project is highly inadequate and unsatisfactory for this work, as we described in the Climate Plan proceeding.” Has GMP attempted to use the ICE calculator, research other methodologies, develop other methodologies, or otherwise assign a value to these “indirect” costs?

A.DPS.GMP.1-73.

The value of resilience goes beyond simple calculations, especially because the value of avoiding outages will protect the health and safety of customers and their families. The traditional, formulaic cost-benefit analysis tools that might have worked in assessing the value of doing a project now versus some years from now cannot capture the full picture that we face together with climate change.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-74. Is GMP proposing to amend its SQRP metrics to align with the spirit of the ZOI? If so, how?

A.DPS.GMP.1-74.

Separate from the Zero Outages Initiative, GMP has started updating SQRP metrics and will be working with the Department through this process. We are anticipating changes to portions of the SQRP that have a direct correlation to the work happening through ZOI. For example, what we consider an outage may change when a customer has a battery that keeps them powered up. Even if the system feeding their home has a fault, their home remains on and would be considered powered up. We are not proposing to specifically align the ZOI and our SQRP but we do anticipate separately updating certain metrics to align accordingly.

Person/s Responsible for Response: Josh Castonguay, Mike Burke, Ken Couture
Title of Person/s: VP, Chief Innovation and Engineering Executive; VP, Field Operations;
Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-75. Mr. Burke states on page 34 of his direct testimony “[w]ith the solutions we know work now, we can address this inequity while lowering costs for all customers across the state.” Is there any benefit to non-GMP Vermont utility customers of the proposed ZOI? Please explain.

A.DPS.GMP.1-75.

Yes. Delivering a model that addresses the issues we are facing will help other utilities move quickly to address climate change and increasing costs. There may also be some direct benefit for customers from other Vermont distribution utilities that are fed from ties to GMP's distribution system.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-76. Mr. Burke states on pages 5-6 of his direct testimony that during Phase 1 of the proposed ZOI, GMP will, “build the statewide roadmap and systems to ramp up this work throughout all of our service territory so that customers will not experience any outages by 2030.” What systems does this refer to and what costs are included in Phase 1 that are not needed to complete Phase 1, but rather to prepare for Phase 2?

A.DPS.GMP.1-76.

This response does not refer to specific systems, but rather the processes we will use to implement specific ZOI measures across our system, as described in the ZOI petition and supporting testimony. These processes will be refined through Phase 1 and will inform how we implement work in later phases.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-77. Mr. Burke states on page 11 of his direct testimony “[m]any [customers with storage systems] who live in areas hit hard by this year’s storms stayed powered up while we repaired damage to infrastructure that caused outages for their neighbors.”

- a. How long will a typical battery storage system – under current GMP tariffs and as proposed in the Initiative – keep a typical customer home energized?**
- b. How does that vary in relation to the degree of weatherization and electrification that happen in the home?**

A.DPS.GMP.1-77.

- a. See response to Q.DPS.GMP.1-38.
- b. See response to Q.DPS.GMP.1-38.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-78. Mr. Burke states on page 28 of his direct testimony “[o]nce at scale, storage resources will also guide our restoration and damage response, allowing us to deploy a more efficient set of resources.” Please describe in more detail how GMP’s restoration and damage response will change as a result of deployment of storage resources.

A.DPS.GMP.1-78.

Please see response to Q.DPS.GMP.1-45 above.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-79. Regarding page 6 of Mr. Castonguay's direct testimony and the budget limit of \$30 million:

- a. Please confirm this cap of "up to" \$30 million is only for storage solutions; and**
- b. Will this \$30 million budget for storage solutions include the unrestricted sign up of the ESS & BYOD programs referenced in Mr. Castonguay's testimony?**

A.DPS.GMP.1-79.

- a. Confirmed.
- b. No. The ESS and BYOD program will remain with its own capital budget (for ESS) within our existing Multi-Year Regulation Plan.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-80. Regarding page 7 of Mr. Castonguay's direct testimony and "the targeted rural customer storage resilience work":

- a. Please describe the rural customer storage resilience work; and**
- b. How much of the \$30 million budget is dedicated to this rural work?**

A.DPS.GMP.1-80.

- a. The rural customer storage resilience work refers to the expanded and accelerated customer storage solutions used to support the Zero Outages Initiative described in detail in Section IV of Josh Castonguay's prefiled testimony.
- b. Zone 4 customers in most cases will be in rural parts of our service territory, so we expect the vast majority of the storage resiliency investment in the first phase of the ZOI to be in rural areas.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-81. Regarding page 12 of Mr. Castonguay's direct testimony, which provides that after GMP ramps up its storage programs, it will "continue to provide the latest storage innovations to support all [its] customers so that they do not experience outages in 2030."

- a. What level of investment beyond FY '25 and '26 does Mr. Castonguay believe is necessary to achieve sufficient storage for all relevant customers so that they do not experience outages?; and**
- b. Is GMP asking for the above level of investment in this proceeding?**

A.DPS.GMP.1-81.

- a. We are first focused on completing and delivering results in the first phase of the ZOI, which will inform us of the specific measures and levels of investment needed in future phases.
- b. No, GMP is seeking a two-year approval for the first phase of the ZOI.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-82. With regards to energy storage projects being incorporated into rates:

- a. Is the intent to include into rate base the energy storage units in individual dwelling units as they are complete?;**
- b. Is the intent to include the rural energy storage aspect of the ZOI into rate base, which would include BESS in multiple homes, when the program is complete?; and**
- c. How will stakeholders know if a residential energy storage unit is part of the MYRP or part of the ZOI?**

A.DPS.GMP.1-82.

- a. Yes. Our approach is to close these projects on a monthly or quarterly basis. Each month or quarter, all the systems installed and operational would be closed and added to a regulatory account for later inclusion into a rate filing. Per our proposal, the investment in these systems would not be included in rates until the following base rate filing. As a result, all customers could begin receiving the power supply benefits of these systems for some time prior to inclusion in rate base.
- b. As described in subpart (a), the units would be closed to plant on a monthly or quarterly basis.
- c. GMP will be tracking and accounting for ZOI projects separately from the ESS or BYOD tariffs, which are included in the MYRP. As GMP assesses and develops zones for each circuit, customers located within Zone 4 will be notified and we will begin the process of battery installation. All other customers not located in a Zone 4 area will continue to be able to participate in the ESS or BYOD programs.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-83. Regarding the residential storage to which Mr. Castonguay refers in his direct testimony on page 7:

- a. What percentage of energy storage units in the ESS program are whole-home backup?;**
- b. Please provide a listing of the battery capacity in kWh for whole-home backup systems;**
- c. Please provide a listing of the battery capacity for the specific critical loads; and**
- d. Please provide a list of meter numbers and locations of vehicles that connect to the home and can be used to support the grid.**

A.DPS.GMP.1-83.

- a. GMP does not explicitly track how many installs are partial-home or whole-home backup. 2,131 homes have two batteries installed, which are almost always a whole-home solution. 652 homes have single battery installs that may also provide whole-home backup but are more commonly providing partial-home backup.
- b. **Objection 5.** This request is vague and requires speculation as to which “whole-home backup systems” the request refers to. The cited testimony describes potential future use cases for storage that are still being scoped. Construing the question instead to refer to the battery systems installed as part of the ESS program inquired about in subpart (a) and without waiving or otherwise limiting the objection GMP responds as follows:

Single-battery installations are 13.5kWh, while two-battery installations are 27kWh. As described in subpart (a), either configuration may provide whole-home backup.

- c. As noted in the cited testimony, the use case for “smaller, more targeted storage systems that service specific critical loads” is one that is being scoped for future deployment; battery capacity would vary and depend on the available technology and the load it is designed to serve. For example, we have been testing the use of a mobile, small-scale battery storage system which has a little over 2kWh of stored energy. During a storm event, these can be deployed at a customer residence temporarily to keep small critical loads going such as cell phones, C-Pap machines and oxygen equipment to name a few.

- d. Currently, while GMP does not track whether customers have partial-home backup, if a customer were to use a battery for this use case now, the system sizes remain the same: single batteries are 13.5kWh, while two batteries contain 27kWh.

- e. There are currently no vehicles connected to a home that are supporting the grid. While GMP is working with several vendors to deploy this technology, it is a technology that is still emerging. We expect this technology to be available soon and, similar to all our innovative programs, we will test it with limited offerings before scaling.

Person/s Responsible for Response: Josh Castonguay; Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-84.

- a. If a residential battery is sized for whole-home backup, and the home adds electric load such as EVs, electric cooking, electric hot water, and/or electric heat, how will the ESS need to change to accommodate the load?; and**
- b. If a change is required, will GMP use the funding from ZOI to assist the customer with the change/upgrade?**

A.DPS.GMP.1-84.

- a. The storage system itself will not need to change. The ultimate duration that the system could backup the home may adjust if the customer operates heavier electric loads during outages without management. At the same time, EVs are advancing and may help the duration increase further by providing additional storage. It is important to note here that the overall ZOI strategy involves less restoration work in Zones 1, 2 and 3, which means we are able to more quickly restore the grid in Zone 4.
- b. No change will be required.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-85. Referring to Mr. Castonguay's direct testimony at page 8 and the statement that customers "experience uninterrupted service just like customers in more urban areas have now":

- a. Please identify feeders that serve "more urban" areas that have had not interruptions for the last five (5) years; and**
- b. Please identify the total number and general location of residential customers that have not experienced an electric interruption in the last five (5) years.**

A.DPS.GMP.1-85.

To answer this question, we reviewed the GMP territory to identify feeders relevant to this question and found:

- a. Substation level Circuit breakers on the following circuits have not opened in the past 5 years: 32G8, 36G1, 73G1, 73G5, 78G2. We did not query the whole state, but focused on known areas that see few outages. Though some customers on these circuits beyond the main line did experience outages, on average their overall experience is less than one outage per year for a duration of less than 2 hours.
- b. 4,044, generally in urban areas of Chittenden and Rutland Counties.

Person/s Responsible for Response: Mike Burke, Ken Couture
Title of Person/s: VP, Field Operations; Leader of Grid Resiliency
Date: January 5, 2024

Q.DPS.GMP.1-86.

- a. If a residential battery system is used for peak demand management, will the battery be capable of providing uninterrupted electric service to the residential home?**
- b. If so, for how long can the depleted battery supply energy to the home?**

A.DPS.GMP.1-86.

- a. Yes. GMP manages residential battery systems to be available for customers when outages occur. GMP does not use the batteries for peak demand management when there is weather forecast to cause grid outages. Instead, we ensure they are charged and ready should a customer face a grid outage.
- b. See response to subpart (a) and response to Q.DPS.GMP.1-38.

Person/s Responsible for Response: Josh Castonguay, Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-87.

- a. If a residential battery system is used to support system voltage, will the battery be capable of providing uninterrupted electric service to the residential home?**
- b. If so, for how long can the depleted battery supply energy to the home?**

A.DPS.GMP.1-87.

- a. Yes. When providing voltage support, it is actually the inverter that provides the service, not the battery itself.
- b. The battery will not be depleted as a result of voltage support.

Person/s Responsible for Response: Josh Castonguay, Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-88.

- a. If a residential battery system is used to support system frequency, will the battery be capable of providing uninterrupted electric service to the residential home?**
- b. If so, for how long can the depleted battery supply energy to the home?**

A.DPS.GMP.1-88.

a.& b. When residential battery systems are used for frequency support, they are prepositioned down to a state of charge between 60%-70%. Although as a general practice we do not utilize the batteries for any reason when weather is forecasted to cause outages, in the event of an outage that occurs during frequency support activity, the majority of the battery will be available to provide uninterrupted electric service to the customer. See also response to Q.DPS.GMP.1-38 and Q.DPS.GMP.1-86.

Person/s Responsible for Response: Josh Castonguay, Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-89. Given that GMP has identified at least four different use cases for residential battery (demand management, frequency support, voltage support, and uninterruptable power):

- a. Which of these cases will get priority on any given day?;**
- b. If emergency backup is given priority, then please explain how it is possible to deplete the battery for any other use and retain a sufficient charge for a longer duration outage; and**
- c. These batteries are charged with energy purchased by customers. Are customers compensated for the discharge of this charge for these other use cases? If not, why not?**

A.DPS.GMP.1-89.

- a. GMP always prioritizes our customers having backup power. When weather is forecasted to cause outages, GMP does not utilize batteries for the other uses. The remaining use cases are complementary. Frequency support and demand management can be operated in a manner that both can be accomplished on any given day. Frequency regulation occurs daily but is done during hours when peaks would be extremely unlikely to occur. Voltage support can be provided at any given time without impacting the battery systems. See also response to Q.DPS.GMP.1-86 and Q.DPS.GMP.1-88.
- b. Longer duration outages are generally tied to larger weather events that GMP is monitoring and well prepared for as we track multiple forecasts. Part of our storm preparation is to ensure that the battery systems are charged and available for customers.
- c. GMP meters monitor energy flowing in and out of the home. The energy that flows into the battery through the meter is registered as "consumed." Any energy flowing out of the battery back to the grid is registered as "returned." These two values are netted, meaning the customer only pays for the energy actually used in the home. For example, if 100kWh is registered as consumed, and 20kWh is registered as returned, the customer is billed for 80kWh.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-90. When a residential customer has a fixed energy storage system in their home, the battery is charged with purchased power from GMP or via solar on the home. When GMP deploys small portable backup batteries, who is responsible for the energy usage from these portable backup batteries?

A.DPS.GMP.1-90.

For these small portable systems, they are charged at a GMP facility prior to deployment. This energy is part of GMP's 'Own Use' and is part of GMP's overall cost of service.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-91. Regarding the DOE grant for Bethel BE-G28 circuit, GMP costs will be \$10 million over a timeline of five (5) years (Castonguay direct testimony page 14):

- a. How of the much \$10 million will be funded by the ZOI?; and**
- b. Please explain how GMP will fund this grant work.**

A.DPS.GMP.1-91.

- a. Since this testimony was filed, GRIP Grid Resilience Utility and Industry Program awards were announced by the Department of Energy. This proposal, under which GMP had a cost share of \$10 million, was not awarded, though further rounds are expected and we plan to resubmit it for consideration.
- b. See answer to subpart (a) above.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-92. Regarding the GRIP program, where GMP's share of the overall program would be \$58 million over multiple years (Castonguay direct testimony page 15):

- a. How of the much of the \$58 million will be funded by the ZOI?; and**
- b. Please explain how GMP will fund this grant work.**

A.DPS.GMP.1-92.

- a. Since this testimony was filed, GRIP Grid Resilience Utility Innovation Program awards were announced by the Department of Energy and the Department of Public Service's proposal, under which GMP had a cost share of \$58 million, was not awarded, though other rounds are expected and we plan to resubmit it for consideration.
- b. See answer to subpart (a) above.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-93. Regarding the OCED program for the NOMAD, what is GMP's cost share of this program (Castonguay direct testimony page 15)?

- a. How of the much of this will be funded by the ZOI?; and**
- b. Please explain how GMP will fund this grant work.**

A.DPS.GMP.1-93.

The full project cost is \$19 million with a 50% cost share requirement. Of the \$9.5 million cost share, GMP's cost is approximately \$6 million, which is for the battery equipment and installation which will be owned by GMP to benefit customers.

- a. See responses to Q.DPS.GMP.1-79, 1.104, and 1.122. GMP may use a portion of the \$30M ZOI funding to support Resiliency Zones with the NOMAD equipment. Given the timing of finalizing this grant with the DOE and then constructing and deploying the NOMAD units, we anticipate the funding for these in the first few years to be low, if any. However, if the opportunity arises where a NOMAD unit would provide support to our ZOI in a resiliency zone, we would leverage a portion of the \$30M to cover the share of cost. We do not expect this to exceed \$1M of ZOI funding.
- b. If not funded through ZOI, please refer to Mike Burke's prefiled direct testimony at 12 and Josh Castonguay's prefiled direct testimony at 23, which explain how Resiliency Zone projects are enabled through the Climate Plan and IRP and are planned under MYRP capital investments.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-94. Regarding the OCED program in partnership with the Town of Guilford, what is GMP's cost share of this program (Castonguay direct testimony page 15)?

- a. How much of this will be funded by the ZOI?; and**
- b. Please explain how GMP will fund this grant work.**

A.DPS.GMP.1-94.

Since this testimony was filed, GMP's pre-application for the OCED Energy Improvements in Rural Areas program was not selected to move forward with a full application.

- a. See above.
- b. See above.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-95. Regarding the State's Energy Storage Access Program, what is GMP's cost share of this program (Castonguay direct testimony page 16)?

- a. How of the much of this will be funded by the ZOI?; and**
- b. Explain how GMP will fund this grant work.**

A.DPS.GMP.1-95.

With the Energy Storage Access Program (ESAP), GMP will use the grant funding to cover the \$5,500 upfront lease associated with the existing ESS tariff for all eligible low- and moderate-income customers. ESAP grant funding will also cover up to \$6,000 per customer for non-standard installation costs. GMP's cost, as with the existing ESS tariff, is the standard per installation fee that is paid to installers directly.

- a. GMP will fund ESAP installations through the MYRP New Initiatives capital budget as with the ESS tariff. If the timing of ESAP and ZOI align, any customers who meet ESAP eligibility guidelines and live in Zone 4 would have home battery storage installation costs covered by ZOI instead. This will allow ESAP funds to reach more customers outside of Zone 4.
- b. See above.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager

Date: January 5, 2024

Q.DPS.GMP.1-96. Regarding the DOE Grid Resilience State and Tribal Formula Grants, what is GMP's cost share of this program (Castonguay direct testimony page 16)?

- a. How of the much of this will be funded by the ZOI?; and**
- b. Please explain how GMP will fund this grant work.**

A.DPS.GMP.1-96.

Since the filing of this testimony, DPS has not released any additional information about the timing or programmatic details of the \$6M Grid Resilience State and Tribal Formula Grants and GMP has not been able to apply for this funding.

- a. See above.
- b. See above.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-97. Many of the grant applications are preliminary in nature and have not been awarded.

- a. Will the funding sought through the grant applications be removed from the ZOI budgets if the grant is not awarded?;**
- b. If the funding is not removed from the ZOI budget, what will GMP propose to use the funding for?; and**
- c. Does Mr. Castonguay believe that GMP will need specific authorization to re-allocate this funding from the grants to other GMP programs?**

A.DPS.GMP.1-97.

- a. If GMP is successful and receives grant funding for any ZOI projects, it will defray the costs for the specific projects and further allow us to accelerate additional projects. The accounting treatment will still require us to submit projects in rate filings only after they are completed and providing benefits to customers.
- b. See subpart (a) above.
- c. No.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-98. Regarding the Panton microgrid and Stafford Hill microgrid mentioned in Mr. Castonguay's direct testimony on page 17:

- a. Please provide after-action reports for the automatic operation of each of these microgrids;**
- b. Please provide all annual costs necessary to maintain these microgrids; and**
- c. Please provide all repairs including firm-ware upgrades to these microgrids, descriptions, and costs incurred since the installation of the microgrids.**

A.DPS.GMP.1-98.

- a. There are no after action reports specific to the operation of the microgrids. There are various reports that discuss the overall operation of the storage system including peak shaving to benefit customers.
- b. The cost to maintain the actual microgrid portion of the project is minimal. The underlying solar and storage project requires typical maintenance such as mowing, plowing, and annual testing of the solar output and inverter equipment, which is standard for any solar and storage facility whether supporting a microgrid or not.
- c. As to the specific components related to the microgrid there have not yet been any measurable repairs to the Panton microgrid. We are reviewing the Stafford Hill system to prepare for inverter upgrades and replacements in the coming few years.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-99. Regarding the Resiliency Zones:

- a. Please provide one-line diagrams depicting how these microgrids would interconnect into GMP's system;**
- b. If a Zone 3 or 4 section fails during a storm, will the Resiliency Zone provide continued power to the homes on these sections?;**
- c. Are the Resiliency Zones designed to provide back energy in the event of a transmission line failure?;**
- d. Are the Resiliency Zones designed to provide back energy in the event of a distribution line failure?;**
- e. Will the Resiliency Zone isolate the zone and engage the microgrid autonomously or must GMP personnel be present to initial the microgrid operation; and**
- f. What safety features are in place to prevent re-energizing power lines that may have fallen prior to the initial microgrid operation?**

A.DPS.GMP.1-99.

- a. Please see Attachment GMP.DPS1.Q99a (Panton One-Line Diagram) for an example of interconnection. All of the microgrids referenced in testimony are still in the design phase.
- b. Ultimately this depends on the location of the microgrid – we are expecting that Zone 4 will mostly be individual home battery systems and the microgrids will be located in other zones. The microgrid will maintain the customers located within the microgrid.
- c. Yes.
- d. Yes, as long as the failure does not occur inside the microgrid.
- e. Yes, they are being designed to be automatic – similar to Panton.
- f. The system protection in place is designed to not attempt to energize the microgrid if the fault has occurred inside the microgrid. This is handled through microprocessor based relays, like those used on our transmission and distribution system today.

Person/s Responsible for Response: Josh Castonguay, Kamran Hassan
Title of Person/s: VP, Chief Innovation and Engineering Executive; Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-100. Regarding equity of electric service discussed in Mr. Castonguay's direct testimony on page 19:

- a. Is GMP proposing any ZOI adjustments for economically disadvantaged ratepayers, specifically?;**
- b. Is GMP proposing any ZOI adjustments for locations known for second homeownership, specifically?; and**
- c. Does the ZOI create a cost shift to economically disadvantaged ratepayers from second-home homeowners?**

A.DPS.GMP.1-100.

- a. No, as noted in response to Q.DPS.GMP.1-65, the ZOI is about ensuring all customers have access to reliable, resilient service no matter their location.
- b. No.
- c. No. The ZOI is designed to benefit all customers on the system by lowering costs and improving reliability and resiliency in the face of extreme weather.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-101. Mr. Castonguay states on page 19 of his direct testimony that some community centers may be far enough outside of the mainline locations that they will not fully be covered by Zone 1 and Zone 2 of the zero-outage zone:

- a. Is it Mr. Castonguay's belief that the work proposed in Zone 1 and Zone 2 will lead to zero outages for the next 20 to 30 years?;**
- b. Will GMP bury the overhead services to the community centers near Zone 1 and Zone 2 to help prevent all outages?; and**
- c. If the overhead services to these community centers are not buried, please explain how a microgrid will power these centers if the overhead service line fails.**

A.DPS.GMP.1-101.

- a. Yes, subject to completion of the Zero Outages Initiative.
- b. **Objection 5.** The question as phrased is vague and would require speculation to answer as written. Without waiving or otherwise limiting this objection, GMP responds as follows:

The referenced testimony described a potential scenario where targeted microgrids would complement other ZOI infrastructure and bring priority resiliency to critical areas such as emergency infrastructure and community centers that are far from mainlines.

- c. **Objection 5.** The question as phrased is vague and would require speculation to answer as written. Without waiving or otherwise limiting this objection, GMP responds as follows:

Assuming this question refers to community centers near Zone 1 or 2, a microgrid may not be a chosen solution as described above in part b. Regardless, a microgrid is able to power the area within its limits. A microgrid may be sized down to a single critical building in the appropriate circumstances. GMP would evaluate, with the customer, the best possible solution to stay powered up and safe.

Person/s Responsible for Response: Josh Castonguay, Mike Burke
Title of Person/s: VP, Chief Innovation and Engineering Executive; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-102. Regarding social vulnerability in the Resiliency Zone screening criteria (Mr. Castonguay's direct testimony at page 20):

- a. Please provide all work papers and reference materials beyond the limited information in Exhibit GMP-JC-1 used by GMP to address the social vulnerability of communities; specifically, the scoring sheets developed for communities;**
- b. Did this analysis include urban communities or only rural communities?; and**
- c. How was it determined which communities to access?**

A.DPS.GMP.1-102.

- a. Please refer to Exhibit GMP-JC-1 under the "Social Vulnerability" section for the reference materials. See attachment GMP.DPS1.Q102a for scoring sheets for the social vulnerability criteria of the Resiliency Zone screening criteria.
- b. Please refer to Exhibit GMP-JC-1 under the "Reliability" section for reference to which communities were included in the Resiliency Zone screening.
- c. Please refer to Exhibit GMP-JC-1 under the "Reliability" section for reference to which communities were included in the Resiliency Zone screening.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-103. Please identify each Resiliency Zone that will be funded or has been funded by the MYRP along with the budgeted/actual cost for the microgrid work.

A.DPS.GMP.1-103.

Please refer to Josh Castonguay's prefiled direct testimony at 21, which identifies the six Resiliency Zones that are being planned or are in progress and supported by the MYRP. For an example of actual costs, please see Attachment GMP.DPS1.Q44b for the Grafton Resiliency Zone Pilot 6-month report, noting that the Grafton project is a Resiliency Zone but is not a microgrid because it was determined that residential storage was the preferred solution for that area. Budget information for the other Resiliency Zones is not available because these budgets have not been developed or finalized.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-104. Please identify each Resiliency Zone that will be funded by ZOI along with the budgeted cost for the microgrid work.

- a. Please provide any total cap within the ZOI for Resiliency Zone funding proposed by GMP; and**
- b. Are any of the towns/cities contributing to the deployment and/or maintenance of these microgrids? If so, please explain the cost sharing proposed by GMP.**

A.DPS.GMP.1-104.

- a. See responses to Q.DPS.GMP.1-79 and Q.DPS.GMP.1-122. As noted, the first few years of our ZOI will be focused on specific circuits, which includes \$30M for battery storage system deployment. GMP anticipates the majority of that investment will be on home batteries; however, if grant opportunities arise, GMP may pursue microgrid resiliency zones using a portion of the \$30M for battery storage systems.
- b. No.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-105. Mr. Castonguay explains the advantages of energy storage (frequency control, voltage control, peak demand reduction, power factor correction, energy time shifting) in his testimony on pages 24 and 25.

- a. If all the storage units are deployed in the rural parts of GMP's system, what storage capacity will be used for voltage/frequency/power factor support in urban areas?;**
- b. Please identify all substations and transmission lines that are within 95% of their capacity rating or 95% of their capacity rating during single contingency outages; and**
- c. Please identify if these nearly overloaded facilities are in urban areas or rural areas.**

A.DPS.GMP.1-105.

- a. Voltage and Power Factor do not require the use of any stored energy; this relies on the inverter itself to adjust reactive power which in turn will adjust power factor and voltage. Frequency regulation does require stored energy both discharging and charging. When operating in frequency regulation mode we tend to operate the battery in between 50-70% state of charge. However, we will only utilize voltage and power factor correction if the local electric system calls for it. Frequency regulation will be an option that a customer can participate in but will not be deployed on every system.
- b. GMP does not have any substations that are within 95% of their capacity for serving load; however, we do have substations that are approaching nameplate capacity for reverse flow due to distributed generation saturation. Based on recent data from VELCO's upcoming long range plan the following transmission lines are at least 95% overloaded after the first contingency in their 2033 case:
 - i. VELCO Windsor – GMP Windsor
 - ii. Highbridge - Ascutney
 - iii. Maple Ave – Claremont Solid Waste Tap
 - iv. Wyeth Tap - Ballard Road
 - v. Marshfield – WEC Danville
 - vi. WEC Danville – GMP Danville
 - vii. Gorge 46Y1– McNeil 46Y1
 - viii. McNeil 46Y1 – McNeil Tap
 - ix. E. Pittsford – Pittsford Village
 - x. Georgia Tap – Ben & Jerry's Tap

- c. All of these potentially overloaded facilities are in rural areas except for a portion of the 46Y1 line which runs through Winooski, VT.

Person/s Responsible for Response: Josh Castonguay, Kamran Hassan
Title of Person/s: VP, Chief Innovation and Engineering Executive; Leader of Engineering
Date: January 5, 2024

Q.DPS.GMP.1-106. Regarding the screening criteria in Exhibit GMP-JC-1:

- a. Please explain why GMP does not use more current data than 2018 for the resiliency screening; and**
- b. Please explain how service reliability from extreme storms like the ones experienced since 2021 are used in the screening process.**

A.DPS.GMP.1-106.

- a. Please refer to Josh Castonguay's prefiled direct testimony at 20, which describes the use of the screening criteria agreed upon by the Department of Public Service in GMP's Climate Plan proceeding. The selected projects are the first Resiliency Zones to be selected under those criteria.
- b. Please refer to Josh Castonguay's prefiled direct testimony at 20, which describes the re-evaluation of the screening criteria in GMP's 2024 IRP.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager
Date: January 5, 2024

Q.DPS.GMP.1-107. How will GMP take equity and/or energy burden into account when prioritizing projects for the ZOI?

A.DPS.GMP.1-107.

See response to Q.DPS.GMP.1-65. Our Zero Outages Initiative is about equity and every customer having resiliency no matter their location or income. For our Resiliency Zones, we already use CDC's Social Vulnerability data.

Person/s Responsible for Response: Josh Castonguay, Mike Burke
Title of Person/s: VP, Chief Innovation and Engineering Executive; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-108. Please provide the following information regarding second and seasonal homes served by GMP:

- a. The total number served by GMP by rate, town, and circuit;**
- b. The total number in each of Zones 1 through 4 as indicated in Exhibit GMP-MB-7 (Rev); and**
- c. The percentage of all homes that are second/seasonal in each of the Zones 1 through 4 in Exhibit GMP-MB-7 (Rev)."**

A.DPS.GMP.1-108.

- a. GMP does not have data on second homes. For seasonal accounts, we have 1,876. See Attachment GMP.DPS1.Q108a.
- b. GMP has not done research on where seasonal homes are as the ZOI is meant to address all parts of the electrical circuit and would not decide to not upgrade a line based on a small percentage of seasonal customers on a given line.
- c. See response to subpart (b) above.

Person/s Responsible for Response: Mike Burke, Liz Hart
Title of Person/s: VP, Field Operations; Customer Care Supervisor
Date: January 5, 2024

Q.DPS.GMP.1-109. Please refer to the direct testimony of Mr. Castonguay, page 7 lines 9-12. Please explain how spending up to \$30 million over two years lowers overall costs for GMP's customers. In particular, please provide any cost/benefit analyses to support this claim.

A.DPS.GMP.1-109.

Objection 3 and 8. GMP objects to this request insofar as it calls for analysis performed in support of previously approved cases before the Commission that are equally available to the Department. Without waiving or otherwise limiting the objection, GMP responds as follows:

There are two important factors that lower what customers otherwise would have to pay for increased reliability in Zone 4. First, the storage systems are able to cover most, if not all, of their cost through dispatching for peak reduction and other power supply cost reductions. See Case Nos. 19-3537-TF & 19-3167-TF and analysis provided regarding cost/benefit. Second, to achieve a similar level of reliability, the distribution system in Zone 4 would likely need to be undergrounded which would have a cost that is not covered by the type of future power supply savings generated by storage solutions. This combined results in a lower cost for customers. See Attachment GMP.DPS1.Q109 (Grafton Pilot Filing), which shows an example of how residential storage in a similar area compares to the cost of a poles and wires alternative.

Person/s Responsible for Response: Josh Castonguay, Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-110. How will GMP assure that rate impacts on lower-income households and small businesses will be equitable with the impacts on its other customers with the implementation of ZOI?

A.DPS.GMP.1-110.

Our Zero Outages Initiative is about equity and every customer having resiliency no matter their location or income. This program will benefit everyone, including households who are income challenged and small businesses, and will protect them from otherwise rising storm costs that are happening now.

Person/s Responsible for Response: Josh Castonguay, Mike Burke
Title of Person/s: VP, Chief Innovation and Engineering Executive; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-111. Will ZOI impact AMI customers differently than analog-meter customers? If so, how, and how will those differences be mitigated (if needed)?

A.DPS.GMP.1-111.

Nearly all GMP customers have AMI; opt-out as prescribed by state law only accounts for 3% of meters. All customers both with and without AMI will benefit from the system investments in their community. For analog metering customers whose locations are Zone 4 where installation of individual battery storage systems would make sense, they can opt into AMI metering to participate. A number of customers who opted out in the past have later requested AMI when they join an innovative program.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-112. Under the ZOI, will individual storage systems be deployed by circuit, by Zone, or by some other determination?

A.DPS.GMP.1-112.

In the first phase of the ZOI, we will prioritize by circuit first, and then identify appropriate customers in Zone 4 of that circuit for deployment of the storage system.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-113. Page 6 of Mr. Castonguay's testimony states "[w]e will invest these resources for customers to continue to build out storage through the ESS & BYOD programs, which remain popular, along with the types of additional Zero Outage storage projects described in my testimony below, which would be subject to PUC review and regulatory approval as appropriate." Please clarify for which customers GMP is requesting up to \$30 million to invest in storage solutions, and whether they will include customers who would otherwise apply for GMP's BYOD program, which requires customers to purchase their own storage equipment. If so, please explain which costs associated with the BYOD program would the requested up to \$30M be used to cover.

A.DPS.GMP.1-113.

As noted in responses to Q.DPS.GMP.1-80, Q.DPS.GMP.1-104, and Q.DPS.GMP.1-112 above, GMP is seeking up to \$30M over two years to invest in storage solutions under ZOI in eligible areas of our service territory. We will proceed with this work by circuit (prioritizing the least reliable circuits first), and on each circuit will identify the individual customer locations that can be more cost-effectively served by batteries instead of other ZOI measures. Depending on implementation this may include customers who otherwise would be eligible to participate in GMP's BYOD program. If located in an area eligible for a battery under ZOI, those customers could receive it under the ZOI program. GMP's existing BYOD program will continue and customers who are not otherwise eligible for batteries under the ZOI program, or who do not choose to install a battery under that program, will be able to participate in the tariffed BYOD program under the same existing terms.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-114. Page 12 of Mr. Castonguay's testimony states "[a]s noted, V2X is one ongoing focus we are excited about that will expand with the adoption of EVs."

- a. Does GMP anticipate that the EV adoption rate over the next two years will be consistent with its modeling for the availability of V2X storage over that period?; and**
- b. Will GMP be able to avoid drawing down power during an outage from individual storage systems at residences where a household member requires electricity for a life-saving medical device?**

A.DPS.GMP.1-114.

- a. See Attachment GMP.DPS1.Q40e.
- b. As discussed previously, we are excited about the opportunity that V2X will bring to customers who purchase EVs. During the next two years, we do not anticipate widespread availability of V2X, but we are hopeful to begin testing this technology for deployment in the next phase of ZOI. Vermont has seen an increase in EV ownership and is focused on EV infrastructure deployment. With new and more affordable models coming out every year, we anticipate that to continue.
- c. When the battery is operating in outage mode, GMP is not managing the dispatch of the battery; it will automatically feed the load that the home requires at that time. Prior to a storm event, as we do today, GMP does not utilize the battery for other power supply benefits and assures it is charged up and available for the customer. See responses to Q.DPS.GMP.1-38, Q.DPS.GMP.1-86 and Q.DPS.GMP.1-88 above.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-115.

- a. What are the towns in Vermont where GMP customers are experiencing the highest number of customer outages by year for each of the past five years?**
- b. Please identify any of these towns where customers experienced more than two outages per year lasting more than 24 hours.**

A.DPS.GMP.1-115.

- a. Please see Attachment GMP.DPS1.Q115a for a summary of SAIFI by town for the time from 2018 to 2022.
- b. **Objection 8.** GMP objects to the request insofar as it requires substantial additional analysis of the data as requested. Without waiving or otherwise limiting this objection GMP response as follows:

GMP's outage reporting is prepared by circuit, not town. For available outage data please see response to Q.DPS.GMP.1-4. In the event the Department is interested in seeing subsets of this information for specific locations, GMP will work with the Department on a narrower request or arrange review of the data with GMP.

Person/s Responsible for Response: Ken Couture

Title of Person/s: Leader of Grid Resiliency

Date: January 5, 2024

Q.DPS.GMP.1-116. What community impact metrics has GMP used in its analysis of need for proposing its ZOI initiative? Please describe and discuss. Provide any notes, research, or relevant work papers.

A.DPS.GMP.1-116.

GMP looked at data including reliability metrics which pointed to frequency of severe weather events in specific areas, along with data on storm hardened versus not yet storm hardened distribution lines in those areas, and social vulnerability data considered as part of our Resiliency Zone work. This aligns with criteria adopted in our Climate Plan, which we have proposed to carry forward into our ZOI work.

Person/s Responsible for Response: Josh Castonguay, Mike Burke
Title of Person/s: VP, Chief Innovation and Engineering Executive; VP, Field Operations
January 5, 2024

Q.DPS.GMP.1-117. What is the energy burden estimated by GMP for its residential customers expressed as a percentage of total housing costs and expressed as a percentage of income?

A.DPS.GMP.1-117.

GMP does not collect customer income-specific information and therefore does not have the requested data. Please see, e.g. Vermont's 2023 Energy Burden Report (available at: <https://www.encyvermont.com/news-blog/whitepapers/vermonts-2023-energy-burden-report>)

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-118. What affordability concerns has GMP reviewed and discussed as it prepared the ZOI filing and request for approval of resources? Please describe and discuss. Provide any notes, research, or relevant work papers.

A.DPS.GMP.1-118.

As discussed throughout testimony and in these discovery responses, affordability is at the core of why we are proposing ZOI. Vermonters rely on electricity more than they ever have and it is increasing as other industries are making the important shift to electrification, such as transportation and heating. We are proposing ZOI to ensure we address the rising costs of a climate-changed Vermont and we must transform the grid to one that is sustainable, resilient and affordable. Climate change costs are here right now in Vermont and on the rise. Vegetation management and trimming costs are and have been on the rise. Extreme unpredictable storms are and have been on the rise. Growing seasons are longer. Vermont's forests and tree density are much different now than it was when the grid was designed. To ensure affordability, we must rapidly transform the grid by strengthening reliability and resilience and by delivering a clean, connected and dynamic energy future. No matter who you are or where you live in our service territory, you will be a part of a reliable, resilient energy system that is there when you need it most. Storms over the past year have been the most costly and impactful in GMP's history, amounting to 7% rate impact for repairs for major storms if recovered in one year. Our climate experts and weather forecasts are not calling for a reduction in severe weather; in fact, they are pointing to a continued increase. Even just last month alone, Vermonters have experienced a series of wet-heavy snow and water events, with some of the worst flooding in Vermont's history happening in December 2023. See Exhibit GMP-MB-4 for total 10-year storm costs for customers.

For a summary of the impacts of climate change on Vermont, please see: <https://climatechange.vermont.gov/vermont-today>. Additionally, please see <https://legislature.vermont.gov/Documents/2024/WorkGroups/House%20Environment/Climate%20Action/Flood%20Resiliency/W~Lesley-Ann%20L.%20Dupigny-Giroux~Testimony%20-%20State%20Climatologist~1-3-2024.pdf>

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-119. What resiliency metrics does GMP propose for tracking the success of the ZOI investment? Please describe and discuss. Provide any notes, research, or relevant work papers.

A.DPS.GMP.1-119.

GMP tracks many metrics for our MYRP and for SQRP and 4.900 reports and will continue all of those, along with filing Integrated Resource Plans every three years, and are confident that all of those provide ample opportunity for the DPS and PUC to measure our success over time for ZOI and other work. See response to Q.DPS.GMP.1-74.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-120. What number of critical services (e.g. hospitals, fire stations, clinics) were without power each year for the past five (5) years for outages lasting more than 2 hours?

A.DPS.GMP.1-120.

Objection 8. GMP objects to the request insofar as it requires data either not available or substantial additional analysis of data not held in the form requested. Without waiving or otherwise limiting this objection GMP response as follows:

GMP does not explicitly track which customers are considered to deliver “critical services.” GMP is able to provide this information for the 14 hospitals that we serve. Please see Attachment GMP.DPS1.Q120.

Person/s Responsible for Response: Ken Couture, Mike Burke
Title of Person/s: Leader of Grid Resiliency; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-121. Has GMP done any community engagement specific to the design and development of this ZOI? If so, please describe, including which communities and/or community-based organizations were engaged and how. Please describe any plans to involve customers/communities/community-based organizations in additional design details/implementation.

A.DPS.GMP.1-121.

Storm restoration at GMP includes proactive and frequent outreach to town officials, emergency managers, and customers who may require electricity for life saving medical equipment. During outreach over the storms in late 2022 and early 2023, it became clear that customers and communities were unprepared for the impacts of climate change driven storms particularly with road blockages and other access challenges that came with these weather events. It is imperative to help these customers better understand how weather patterns are changing, how our restoration efforts work, and our plan to address the impacts of climate change from these storms.

GMP began a series of meetings focused on the hardest-hit areas from those storms, targeting town selectboards, regional planning commissions, town energy committees, and presenting at conferences focused on emergency preparedness. For examples of presentations at these meetings see Attachments GMP.DPS1.Q121(a)-(c).

We went to speak in-person whenever possible, and these meetings included our operations lead, the local district operations supervisor (OS), and the person who leads information to towns during storms.

These 30+ meetings enabled us to hear from leaders in towns and their constituents, and strengthened our resolve that the plan for our Zero Outages Initiative is not only prudent but critical to keep Vermonters safe in increasingly more severe and damaging storms. While towns are unique both geographically and infrastructure-wise, the zone approach of the ZOI applies equitably across all communities and can be tailored to individual town needs, i.e. critical infrastructure that could be included in a microgrid and serve as a warming shelter during emergencies.

The list below represents the community engagement that informed the ZOI design and plan:

- Windham Region Resiliency Project Meeting January 24, 2023

- Addison County Emergency Managers Meeting February 8, 2023
- Bethel Selectboard March 27th
- Bethel Energy Committee March 28th
- Wardsboro Community Meeting April 3rd
- Newfane Selectboard Meeting, April 3rd
- Brattleboro Emergency Managers, April 10th
- Chester Selectboard Meeting, April 17th
- Grafton Selectboard Meeting, April 17th
- Windsor Resiliency Zone Meeting, April 19th
- Dummerston Selectboard Meeting, April 19th
- Townshend Selectboard Meeting, April 25th
- Vermont Emergency Management, May 4th
- Jamaica Selectboard Meeting, May 8th
- VT Warn Conference, May 11th
- Chittenden Regional Planning Commission, May 17th
- Guilford Selectboard Meeting, May 22nd
- Mt Ascutney Regional Planning Commission, June 6th
- Rockingham/Bellows Falls/WRC Meeting on Resiliency Zones, June 19th
- Rutland Regional Planning Commission, June 28th
- Guilford meeting with school, Town officials on Resiliency Work and potential microgrid
- Vermont Emergency Preparedness Conference, September 21st
- Presentation to Vermont League of Cities and Towns Town Fair, September 26-27
- Groton Town Selectboard, September 27th
- Franklin County Regional Emergency Managers Commission, September 28th
- Woodstock Town Manager meeting on ZOI, October 16th
- Wells Town Manager meeting on ZOI, October 18th
- Brandon Town officials meeting on RZ, October 23rd
- Brandon Energy Committee, November 2nd
- US EPA Vermont Power Resiliency Workshop for Vermont Water Utilities, November 7th
- Halifax Community Meeting, December 14th
- Whitingham Senior Meal, December 14th
- Upcoming: Town of Guilford

Person/s Responsible for Response: Josh Castonguay, Tiana Smith

Title of Person/s: VP, Chief Innovation and Engineering Executive; Leader of Electrification and Sustainability

Date: January 5, 2024

Q.DPS.GMP.1-122. Mr. Castonguay states on page 18 of his direct testimony “[o]ur Zero Outages Initiative will continue to expand these Resiliency Zones, recognizing that reliable service is a critical element in community resilience, equity, and safety across the state.”

- a. How much of the \$30 million proposed for energy storage systems in the ZOI would go to community resilience (Resilience Zones) vs. residential storage?; and**
- b. How many MW/MWh of community vs. residential storage is the \$30 million expected to support?**

A.DPS.GMP.1-122.

- a. We anticipate in the first few years the vast majority of the \$30M will go towards residential storage. In addition to determining the best location for microgrid deployment, there will be additional permitting requirements associated with these systems which will add to the development timeline.
- b. If the full \$30M is used for residential storage it will provide about 14MW/38MWH of additional storage capacity.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-123. Mr. Castonguay states on page 25 of his direct testimony “[a]s Mr. Burke notes, as we analyze our distribution circuits and look at the best resiliency measures for each zone in our system, there will be a portion of customers where individual storage is the optimal solution to achieve zero outages. This typically will be in the part of the circuit we are calling Zone 4, focused on the rural, remote ends of the circuit.”

- a. How many GMP customers are in so-called “Zone 4” and how many is the \$30 million expected to support?;**
- b. How will GMP prioritize which customers receive battery storage?; and**
- c. Please discuss any data sources and/or metrics GMP intends to utilize.**

A.DPS.GMP.1-123.

- a. Please see response to Q.DPS.GMP.1-56 above.
- b. Once the Zone 4 customers have been identified on a circuit, we will work to evaluate ZOI solutions in each circuit and deploy storage where it is the most cost-effective option for customers in Zone 4.
- c. We will build off our Resiliency Zone analysis work which incorporates outage data, the CDC’s Social Vulnerability Index, and the DPS’s communication data which includes access to fiber, cable and cellular availability.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-124. Mr. Castonguay states on page 29 of his direct testimony “[e]ven after taking the systems needed to clear the substantial wait list into account, this level of investment will allow us to develop additional community pilots now to deploy systems directly to customers at no additional cost to them in vulnerable rural areas – some of which are included in the federal government’s Justice 40 initiative—while learning how quickly we can provide these systems to more customers with similar needs throughout our territory. Meanwhile, we will continue to operate the voluntary ESS and BYOD programs in parallel with storage deployed as a part of the Zero Outages Initiative so that in the years ahead all customers will have access to storage.”

- a. Will all customers receiving storage systems receive them at no charge?; and**
- b. What impacts of the proposed ZOI does GMP foresee on either uptake of the ESS/BYOD tariffs or availability of batteries to tariff customers?**

A.DPS.GMP.1-124.

- a. Yes.
- b. See response to Q.DPS.GMP.1-82(c).

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-125. Mr. Castonguay states on page 28 of his direct testimony “[w]e will expect to broaden this type of storage deployment through additional resiliency pilots like the Grafton RZ—partnering with customers to offer an installed residential battery owned and operated by GMP as a grid asset with no lease payments and moving to a tariffed offering once we have reached scale.”

- a. Does this imply a customer will receive a free battery at first and then be asked to pay later?; and**
- b. Does this imply that some customers will receive a free battery, and some will not?**

A.DPS.GMP.1-125.

- a. No. Customers who are eligible for batteries under the ZOI program will not be required to pay for the battery provided under the program.
- b. As noted in response to Q.DPS.GMP.1-113, ZOI implementation will proceed in a phased manner and individual customer eligibility for batteries under the first phase of the ZOI program will depend on the circuit they are located on, as well as an evaluation of whether a battery solution is the most cost-effective manner of providing ZOI measures to that individual location.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-126. Mr. Castonguay states on page 9 of his direct testimony “[i]n addition, while the Zero Outages Initiative has a primary focus on reliability and resilience in the face of extreme events, all of these solutions ultimately feed into our broader distributed energy resource platforms providing a host of additional benefits day in and day out. This can include managing peak energy demands, increasing renewable generation hosting capacity as well as supporting the intermittency of these renewables, providing the regional grid operator with various services that lower costs for all customers, and much more.”

- a. Does GMP anticipate operating residential storage under the proposed ZOI any differently than it operates storage systems under its ESS tariff?;**
- b. What battery storage technologies is GMP proposing to deploy?;**
- c. If all Tesla Powerwalls, why?; and**
- d. Is GMP proposing to own these systems or would customers be able to own systems and enroll them in the ZOI Initiative for payment rather than employ a GMP-owned storage system?**

A.DPS.GMP.1-126.

- a. No.
- b. Currently lithium ion.
- c. No. While the Powerwall is currently the best solution on the market, we continue to test additional systems and will deploy systems that meet similar criteria of reliability, power, energy and cost.
- d. Currently, GMP is proposing to own these systems located in Zone 4.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-127. Mr. Castonguay states on page 29 of his direct testimony “[u]nlike the ESS or BYOD programs, however, which are customer driven and designed to have net positive rate impacts, Zero Outages storage installations would be deployed in areas that would otherwise require more expensive storm-hardening work to achieve zero outage resiliency, and therefore prioritize reliability benefits. When compared to the avoided investment expense of the alternative, this approach will save all customers money, while continuing to generate similar benefits as our other battery programs.”

- a. Please describe the basis for this conclusion and clarify whether the alternative is storm restoration and vegetation management (status quo) or a different solution proposed under the Initiative such as undergrounding; and**
- b. What is the cost to GMP ratepayers to subsidize the resilience for individual customer beneficiaries of the ZOI storage systems, in \$/customer/year?**

A.DPS.GMP.1-127.

- a. The alternative to deliver a similar reliability benefit to the customer would require the local distribution system to most likely be undergrounded out to the customer location. As described in the overall ZOI strategy, these ‘last mile’ locations are likely to be much more cost effectively handled through the deployment of storage versus the considerable amount of additional undergrounding that would be needed to reach every last customer. As discussed in response to Q.DPS.GMP.1-123, we will choose the most cost-effective option for these customers when reviewing each specific location.
- b. Ensuring the grid is reliable and resilient for all, and safe for all, is core to our work and does not reflect subsidies between customers in different areas. The ZOI will deliver these benefits for all customers, even in the most rural locations that have historically seen more weather challenges. That is true both for the T&D investments and for the storage investments. For T&D investments, by way of example, the ZOI work in rural areas is helping the overall system and lowering costs similar to storm hardening work already completed in more urban parts of the state. And for storage, all customers will also benefit from these installations because they will be grid assets both for peak shaving/market participation (that helps pay for the system and potentially return even more over time, unlike other grid investments) and for load balancing, in addition to outage protection. This work strengthens the entire grid.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-128. Mr. Castonguay states on page 30 of his direct testimony “[w]ith this increased electrification comes the need for increased grid flexibility to assure that significant system upgrades are not needed while we make this transition. We have proven that we can avoid upgrades in some cases, thanks to our flexible load programs and the deployment of energy storage.” Will the addition of storage systems under the proposed ZOI enable electrification that might otherwise be limited by home electric system, distribution line, or distribution or substation transformer sizing?

A.DPS.GMP.1-128.

Yes, and this is another benefit at the core of why we are proposing the ZOI. The aggregation of energy storage resources provides us with a grid management tool that can reduce overloads caused either by loading or by saturation of distributed generation at the local level. This is the grid transformation needed to accommodate Vermont’s electrification and decarbonization goals.

Person/s Responsible for Response: Josh Castonguay
Title of Person/s: VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-129. What fire codes, safety standards, installation practices, and decommissioning plans does GMP follow for residential battery storage systems, and how are these enforced?

A.DPS.GMP.1-129.

Please see Attachment GMP.DPS1.Q129 for the GMP ESS Installer Agreement.

GMP works with a network of installers who have completed manufacturer certifications to install the residential storage systems. All installers must comply with GMP's ESS Installer Agreement that requires site evaluations of customers' homes, and compliance with all manufacturer installation best practices and GMP standard safety policies and procedures. GMP maintains close communication with installers and receives customer feedback about installation experiences and satisfaction. GMP would terminate an ESS Installer Agreement if there were any breaches to the agreement made by an installer.

For public buildings, installers follow applicable local or state fire codes.

GMP currently works directly with battery manufacturers for decommissioning storage systems. We will expand decommissioning plans to work directly with battery decommissioning organizations as the first tranche of installed batteries needs to be decommissioned.

Person/s Responsible for Response: Josh Castonguay, Maddy Murray-Clasen, Craig Ferreira
Title of Person/s: VP, Chief Innovation and Engineering Executive; Innovation Project Manager; Innovation Champion
Date: January 5, 2024

Q.DPS.GMP.1-130. In reference to GMP's computation of property taxes on ZOI capital projects, please provide the Excel model and discuss the process to compute property taxes to be recorded to the regulatory asset.

A.DPS.GMP.1-130.

Please see Attachment GMP.DPS1.Q130 Property Tax Model

The attachment shows an example of how GMP values our distribution line assets each year. GMP will first determine if a ZOI project will be in service and assessed for the current tax year, then each ZOI project will need to be analyzed with this model to determine what the current year's value would have been prior to the ZOI work and what it will be after the ZOI work. Only the incremental change in assessment will be recorded to the regulatory asset.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-131. Please clarify whether all capital projects under the ZOI will result in an incremental increase in GMP's property tax liability. For example, does a line relocation through undergrounding result in an increase in property tax assessment?

A.DPS.GMP.1-131.

A capital project under the ZOI will not necessarily result in an incremental increase in GMP's property tax liability. The property tax assessment could change if the line changed from overhead to underground or if the number of phases increased.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-132. Please explain the frequency by which the valuation of GMP's assets is reassessed for property tax assessment purposes.

A.DPS.GMP.1-132.

GMP's utility assets are reassessed for property tax assessment every year. GMP files updated inventory values by March 31st of each year, reflecting any changes in asset ages or value from the prior calendar year.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-133. Please explain the criteria measure by which GMP's assets are valued for property tax assessment purposes, e.g., the net book value of plant in service or gross plant in service.

A.DPS.GMP.1-133.

GMP uses the methodology recommended by the State of Vermont Department of Property Valuation and Review for valuing distribution line assets. Each year, the state provides a value per mile for lines based on the number of phases and if the line is overhead or underground. These values are applied to the number of miles in each town, then a 30% depreciation rate is applied to the total calculated value for each town.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-134. Please explain how the GMP proposes to determine property tax impacts of ZOI capital projects that reflects the incremental property tax liability of GMP.

A.DPS.GMP.1-134.

See response to Q.DPS.GMP.1-130.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-135. Please explain how GMP's property tax costs reflected in the ZOI capital project regulatory asset will reflect the potential reduction in property taxes for any assets removed from service.

A.DPS.GMP.1-135.

Each year, property tax values will be analyzed as shown in response to Q.DPS.GMP.1-130. This will capture any changes in assessments, increase or decrease.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-136. In reference to GMP's inclusion of incremental capital costs in the regulatory asset for ZOI Capital Projects, please provide GMP's criteria and approach to determine whether a cost is an "incremental O&M expense" eligible to be deferred to the regulatory asset.

A.DPS.GMP.1-136.

Specific O&M expense resulting from a ZOI capital project will be captured, as required by FERC rules, namely in accounts 580 to 598. With respect to property taxes, see response to Q.DPS.GMP.1-130. See also response to Q.DPS.GMP.1-138 below.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-137. Please confirm whether the “incremental O&M expense” that is eligible to be deferred to the regulatory asset for ZOI Capital Projects are limited to costs properly includable in FERC Accounts 580-598 that are directly associated with ZOI projects. If it cannot be confirmed, please provide a detailed justification.

A.DPS.GMP.1-137.

That is correct. An example would be the cost of transformer removal and re-install which cannot be capitalized as per FERC accounting rules. As correctly stated in the question, O&M expenses from ZOI projects and captured on FERC Accounts 580-598 are the ones expected to be eligible to be deferred.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-138. In reference to the Prefiled Direct Testimony of Laura Doane, page 6:1-2, Ms. Doane states that it will record to a regulatory asset the incurred Zero Outages O&M expenses that have not been included in the COS of a base rate filing. Please:

- a. Provide the criteria and approach to determine whether a cost has not been included in the cost of service of a base rate filing;**
- b. In determining the costs to include in the regulatory asset, will GMP also consider any cost savings achieved by the ZOI projects that were included in the COS of a base rate filing? If so, please explain how this will be accomplished. If not, please justify; and**
- c. Will the “O&M expenses” included in the regulatory asset include any costs includable in FERC Accounts 920 – 935?**

A.DPS.GMP.1-138.

- a. See responses to Q.DPS.GMP.1-136 and Q.DPS.GMP.1-137.
- b. Costs are contemporary to the investments while savings will develop over time. As part of future COS, GMP will determine the appropriate COS to serve its customers, including the impact of savings developing based on investments, and submit it to the DPS and PUC for review and approval. Meanwhile, savings from storage investments that produce immediate customer value are reflected in the quarterly power supply adjustors and annual power supply updates.
- c. GMP is not expecting incremental costs to hit FERC Accounts 920 – 935 during Phase 1 of ZOI. If there were any incremental identifiable costs associated with a ZOI project in FERC Accounts 920 - 935, it would be captured in the regulatory asset during Phase 1 as we do not intend to use a specific A&G capitalization rate during this phase as stated in response to Q.DPS.GMP.1-145.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-139. In reference to Prefiled Direct Testimony of Laura Doane, page 8:2-5, GMP states that it “will accrue the cost of capital on the regulatory assets, excluding the deferred debt and equity components of the regulatory asset.” Please confirm whether GMP’s intent in this statement is to not compound the cost of capital included in the regulatory asset, i.e., committing not to compound interest or carrying costs. If not, please provide a detailed explanation of GMP’s intent in the statement.

A.DPS.GMP.1-139.

GMP is committed not to compound interest and carrying costs and will use the same treatment authorized in the Climate Plan and the Broadband Tariff Rider. When the asset is put in service, the carrying cost of capital stays in a regulatory asset, stops accruing cost of capital and is amortized over a 2-year period, which will commence when the regulatory asset is included in rate base.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-140. For GMP's accrual of cost of capital on ZOI capital projects, please explain whether the cost of capital rate will be applied to the original cost, less accumulated depreciation and deferred income taxes. If not, please provide a detailed computation and justification.

A.DPS.GMP.1-140.

Consistent with the approach undertaken with Climate Plan and Broadband, the cost of capital will be applied to the original cost, less accumulated depreciation and deferred income taxes. Additionally, the accrual of capital costs will also apply to the depreciation and ZOI-related O&M expenses, if applicable, in the regulatory asset. This calculation will be done on a 13-month average basis.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-141. Regarding GMP's ZOI, please identify any additional full-time equivalent positions GMP has or intends to hire specifically to support ZOI projects and provide a detailed description of the duties and responsibilities of each position.

A.DPS.GMP.1-141.

We are currently in discussions with external project management firms for project management services in support of the ZOI. Additionally, we are in the planning stages to identify any additional internal full-time resources necessary to cost effectively and efficiently oversee and manage the work, including the potential addition of an internal resource responsible for ZOI in each region of the state.

Person/s Responsible for Response: Mathieu Lepage, Mike Burke
Title of Person/s: VP, Chief Financial Officer; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-142. Regarding GMP's undergrounding project, please explain whether the construction activities will be primarily done by contractor or GMP employees.

A.DPS.GMP.1-142.

The work of getting the cable in conduit in the ground will be completely done by trenching equipment companies together with local excavation crews. The termination of the electrical cable along with the installation of pad mounted electrical equipment will be done by either external or internal line crews

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-143. In reference to GMP's ZOI, please identify any modifications or changes to financial accounting or income tax accounting practices or procedures directly or indirectly associated with the initiative.

A.DPS.GMP.1-143.

None. GMP is and will continue to follow GAAP accounting for capital investments made through the ZOI. As for income tax practices and procedures, the answer is the same; ZOI will be treated the same for income tax reporting.

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-144. Has GMP pursued any funding for its ZOI projects under the Infrastructure Investments and Jobs Act of 2021 or other sources of government funding? Please provide a detailed discussion of funding GMP has sought out or intends to apply for.

A.DPS.GMP.1-144.

Please refer to Josh Castonguay's prefiled direct testimony at 14, which describes the four grants GMP has pursued and the one grant GMP will pursue under the Infrastructure Investments and Jobs Act of 2021 (Bipartisan Infrastructure Law). These are also referenced in response to Q.DPS.GMP.1-48, Q.DPS.GMP.1-91, Q.DPS.GMP.1-92, Q.DPS.GMP.1-93, Q.DPS.GMP.1-94, and Q.DPS.GMP.1-96. GMP may pursue these grants again in additional funding rounds.

GMP utilizes the Investment Tax Credit for Energy Property under the Inflation Reduction Act for battery storage.

Person/s Responsible for Response: Mike Burke, Josh Castonguay
Title of Person/s: VP, Field Operations; VP, Chief Innovation and Engineering Executive
Date: January 5, 2024

Q.DPS.GMP.1-145. Please confirm whether GMP's overhead capitalization rate will increase above the level used to establish base rates as a result of the increased capital spend associated with the ZOI capital projects.

A.DPS.GMP.1-145.

GMP is not proposing to increase the overhead capitalization rate that is currently in effect and in base rate and applied to MYRP investments. During this Phase 1, GMP will assess and analyze the change in overhead costs and propose an overhead capitalization rate to be applied to ZOI projects in subsequent phases. For Phase 1, additional, incremental overhead costs, if any, would be captured as incremental O&M costs.

Person/s Responsible for Response: Laura Doane; Mathieu Lepage
Title of Person/s: Manager of Operational Finance; VP, Chief Financial Officer
Date: January 5, 2024

Q.DPS.GMP.1-146. To the extent GMP's overhead capitalization rate will increase to reflect increased capital spend associated with the ZOI capital projects, please discuss how the associated cost savings achieved to costs included in base rates will be reflected in the ZOI regulatory assets.

A.DPS.GMP.1-146.

See response to Q.DPS.GMP-138b.

Person/s Responsible for Response: Laura Doane; Mathieu Lepage
Title of Person/s: Manager of Operational Finance; VP, Chief Financial Officer
Date: January 5, 2024

Q.DPS.GMP.1-147. Please provide any analyses GMP has prepared that demonstrate the impact on GMP rates associated with the ZOI.

A.DPS.GMP.1-147.

See Attachment GMP.DPS1.Q54.

Person/s Responsible for Response: Mathieu Lepage; Mike Burke
Title of Person/s: VP, Chief Financial Officer; VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-148. Please provide any research or supporting information that indicates how much GMP customers are willing to have their rates increased in order to achieve zero outages.

A.DPS.GMP.1-148.

We speak regularly with our customers every day, and during both minor and major storm events and know the impact each outage has on our customers is significant. Storm outages are routinely recognized as the number one concern of customers, including most recently in the survey conducted by the Department. The cost to customers of repairing our system after storm events is significant (\$45M in the past twelve months) and is increasing with our changing climate. The proposed ZOI work will help reduce these costs for customers, while at the same time addressing their primary concern. Our regulation plan has been successful in helping manage and smooth costs for customers and the ZOI is intended, in the long run, to save customers money. In fact, without it, ever-increasing severe storms will drive the system to unaffordable levels for customers.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-149. Is the framework for how projects from the ZOI will be reflected in GMP's rates the same framework that is currently used to account for GMP's Climate Action Plan projects? If so, please provide an example of the reporting of a Climate Action Plan project that has been approved for inclusion in rates including all documentation developed to support the accounting treatment of the regulatory asset and information shared with the Commission to seek approval of including the project in rates.

A.DPS.GMP.1-149.

Yes. Please see Attachment GMP.DPS1.Q149 for an example of Climate Plan Report (supporting documentation previously provided in prior rate case).

Person/s Responsible for Response: Laura Doane
Title of Person/s: Manager of Operational Finance
Date: January 5, 2024

Q.DPS.GMP.1-150. Given that GMP's justification for the ZOI is based largely on the impact of major storms to the system, why is GMP not seeking to use the already approved Climate Action Plan as the means to pursue some or all of the projects described in this Petition?

A.DPS.GMP.1-150.

GMP's Climate Plan was incorporated into GMP's IRP in 2021 and in the existing MYRP. The approach proposed in the ZOI uses the same methodology previously approved in the Climate Plan and therefore is continuing that same framework for this work for customers. The amount of investment currently allowed in the MYRP does not meet the urgency needed to address how fast the climate is changing. Please see Burke testimony at 9, 12; Petition at 7.

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Q.DPS.GMP.1-151.

- a. What valuation did GMP consider for the avoided costs of an outage when contemplating and planning the ZOI initiative?**
- b. Did these costs attempt to quantify non-utility costs such as direct or indirect costs incurred by customers, including damages to personal property, business interruption costs, etc.? Please describe and discuss. Provide any notes, research, or relevant work papers.**

A.DPS.GMP.1-151.

- a. Health and safety are at the core of our work every day, for customers and our teammates. As such, health and safety are primary drivers of the Zero Outages Initiative. As discussed in Q.DPS.GMP.1-23 above, our society has seen major advancements in medical technology over the last several years and many Vermonters rely on such technology in their homes. For them, a prolonged outage during a major storm can be a matter of safety and life. Additionally, our relationship to technology and connected devices has increased over the last several years and is often the source of communication to family and loved ones during an extreme weather event. These technologies require electricity over the long term. Putting a formal cost value on the ability for someone to use their life-saving medical equipment during a major storm or to communicate with a loved one is not something we undertook because we know it is invaluable. The same is true for businesses. The vast majority of Vermont businesses are small, and minimizing interruptions in their ability to provide service and products in the face of climate change and extreme weather conditions is invaluable. We know these are of the utmost importance. Reports and published papers discussing the type of valuation in this question are inadequate in addressing the value to our customers of a highly reliable, resilient, two-way distributed electric grid, both for their lives and livelihoods and for the community at large. Also, please see the response to Q.DPS.GMP.1-23 above relative to our teammates and creating a better, more efficient, and safer way to respond to outages. Again, we know it is of the upmost importance and placing a formal cost value on these items is simply insufficient.

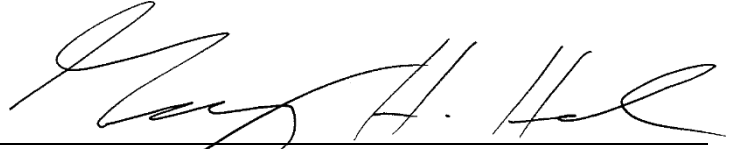
Additionally, ZOI is designed to deliver a more cost-effective system for all compared to the status quo in the face of the cost challenges outlined in response to Q.DPS.GMP.1-118 above.

- b. Please see Subpart (a).

Person/s Responsible for Response: Mike Burke
Title of Person/s: VP, Field Operations
Date: January 5, 2024

Dated at Burlington, Vermont this 5th day of January, 2024.

As to Objections:



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Dated at Colchester, Vermont this 5th day of January, 2024.

Respondent Signature

By: Michael Burke
Michael Burke
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Dated at Colchester, Vermont this 4th day of January, 2024.

Respondent Signature

By: 
Josh Castonguay
Green Mountain Power

Dated at Colchester, Vermont this 4th day of January, 2024.

Respondent Signature

By:


Rob Bingel
Green Mountain Power

Dated at Rutland, Vermont this 4th day of January, 2024.

Respondent Signature

By: 

Mathieu Lepage
Green Mountain Power

Dated at COLCHESTER, Vermont this 4th day of January, 2024.

Respondent Signature

By:

A handwritten signature in black ink, appearing to read 'Ken Couture', written over a horizontal line.

Ken Couture
Green Mountain Power

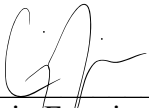
Dated at Colchester, Vermont this 4th day of January, 2024.

Respondent Signature

By: 
Kamran Hassan
Green Mountain Power

Dated at Rutland , Vermont this 4 th day of January, 2024.


Respondent Signature

By: 

Craig Ferreira
Green Mountain Power


Dated at MONTPELIER, Vermont this 4th day of January, 2024.

Respondent Signature

By: 
Tim Jones
Green Mountain Power

163 Acorn Lane, Colchester VT
Dated at _____, Vermont this 4th day of January, 2024.

Respondent Signature

By: 

Tiana Smith
Green Mountain Power

Dated at Colchester, Vermont this 4th day of January, 2024.

Respondent Signature

By: Madeline Murray-Clasen
Madeline Murray-Clasen
Green Mountain Power

Digitally signed by Madeline Murray-Clasen
DN: cn=Madeline Murray-Clasen, o, ou,
email=madeline.murray@greenmountainpower.com, c=US
Date: 2024.01.04 13:01:02 -05'00'


Dated at Colchester, Vermont this 4th day of January, 2024.

Respondent Signature

By: Thomas E. Williams
Tom Williams
Green Mountain Power

Dated at Rutland, Vermont this 5th day of January, 2024.

Respondent Signature

By: 
Matthew Haley
Green Mountain Power

Dated at Rutland, Vermont this 5th day of January, 2024.

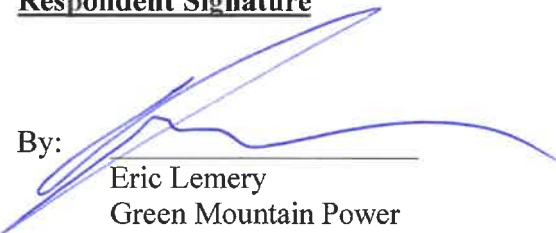
Respondent Signature

By: *Laura Doane*
Laura Doane
Green Mountain Power

Dated at Colchester, Vermont this 5th day of January, 2024.

Respondent Signature


By:



Eric Lemery
Green Mountain Power

Dated at Colchester, Vermont this 5th day of January, 2024.

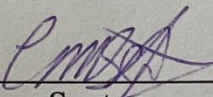
Respondent Signature

By: 

Liz Hart
Green Mountain Power

Dated at Jencho, Vermont this 5th day of January, 2024.

Respondent Signature

By: 
Gary Sexton
Green Mountain Power