Green Mountain Power
Interim and Rate Year Capital Projects
New Initiatives

Project Number and Title	Additional Information	Project Description	Project Justification
New Initiatives - Interim Year (Oct. 1, 2021 - Sept. 30, 2022) Total = $ 9,624,241			
170785: ESS Tariff (Powerwall Lease)	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2022 Fiscal Year: FY2022 Primary Purpose: Innovation Secondary Purpose: Reliability Total Project Spending: $7,364,242	The ESS tariff is a tariffed program available to all qualifying GMP customers. The tariff offers customers the option to have two Powerwall 2.0s installed in their home to provide a whole-home backup solution when needed during a grid outage. The systems are installed for a one-time, upfront charge of $5,500 or $55/month for ten years. GMP utilizes the Powerwalls to reduce peak costs during our monthly transmission peak and our annual capacity peak. This is done by using Tesla's GridLogic aggregation software platform, and allows GMP the ability to control the charging and discharging of each unit individually, and in aggregated groups. The program is open to 5MW of storage per year, which equates to 500 customers annually. GMP expects to install 500 systems in FY22. The Powerwalls provide the customer with significantly improved reliability and peace of mind, while not requiring any maintenance or producing any emissions compared to a fossil fired generator. GMP's FY22 Annual Base Rate filing included capital costs of $8.7M for this project. The variance between this number and the $7.36M capital spend included is the result of a delay in invoicing from Tesla. Tesla invoices are generally sent 1 to 2 months after installs are complete leading to this difference in capital expenditure in the FY22 period.	This project is necessary at this time, first and foremost because customers want this type of offering from GMP. The ESS tariff experienced full enrollment of 500 customers in the first year, and has already subscribed 500 customers for the second year, and produced a waitlist which we are now beginning to enroll for 2022. The feedback has been resoundingly positive, and GMP continues to see customers saving a spot in the queue when more program spots become available. Additionally, it remains important to reduce overall system costs for all GMP customers by utilizing these resources to reduce our system peaks. It also remains important to utilize these new tools and resources to drive down power supply expenses and create new, 'non-traditional' revenues, that flow back to non-participating customers. This project provides both while giving the host customer an alternative to a fossil-fuel-fired generator for backup power. As we move to a more distributed, de-centralized grid, flexible resources like battery storage will play a very important role in balancing the system, and managing system dynamics such as intermittency of distributed generation.
176805: V2G Chargers	Project Type: New Initiatives In-Service Month: 9 In-Service Year: Jun 2022 Fiscal Year: FY2022 Primary Purpose: Innovation Secondary Purpose: Reliability Total Project Spending: $109,672	GMP is working with several manufacturers of Vehicle to Grid ("V2G") EV Chargers and is in the process of testing or planning to test a few in the coming months for different uses cases. Vehicle to grid chargers allow energy in a vehicle's onboard battery to flow out of the vehicle and back onto the grid for the purposes of demand response. This is all managed via software included with each system we are planning to test. GMP currently has both a Fermata V2G station installed at our Colchester office, which is currently being operated with one of GMP's fleet vehicles, and a Wallbox Quasar. This is a system designed for residential use, similar to the Level 2 chargers we are currently deploying as part of our incentives for purchasing an EV. Finally, we have a V2G charger made by Lion Energy that will be used with a new electric bucket truck, on a larger scale than the other two systems installed in early 2022, pushing this project into FY22 rather than FY21 as originally planned. This larger scale unit will provide both fast charging to these large electric vehicles and also serve as a V2G option when the vehicles are not in operation. The cost of the Lion Energy charger and the installation were estimated at a total of $89,000 ($71,000 unit cost plus $18,000 installation estimate) as shown in attachments 176805 - Lion Energy Quote.pdf and 176805 - Lion Installation Estimate.pdf. The cost of the Wallbox Quasar unit was $6,250 as shown in attachment 176805 - Wallbox Invoice.pdf.	Electric vehicles are becoming more mainstream and will eventually become the norm for new vehicles purchases. The batteries in each vehicle represent a resource that may prove extremely valuable for demand response and the management of a highly distributed grid. It is important that GMP begins familiarizing ourselves with the available equipment and the functionality they provide, so that we can properly determine whether or not using vehicle to grid chargers will be viable for use in our territory. Similarly, it is also important to test systems from multiple vendors in order to understand the difference in approach between them, and properly evaluate what is and isn't useful to GMP and its customers. We may see V2G become popular or potentially even simple Vehicle too home such as what Ford has announced with the Lightning and we want to be prepared to leverage this benefit for our customers. The systems we are testing are the only V2G systems that we are aware of in this nascent market, and we want to ensure that we are on the leading edge of utilizing these systems in the future should we determine that they provide value to our customers. To not begin testing would mean that our customers may miss out on installing one of these systems in favor of a traditional EVSE, and the additional value that they may create could be lost.

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177042: SPAN (Smart Electrical Panel)	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2022 Fiscal Year: FY2022 Primary Purpose: Innovation Secondary Purpose: Operational Efficiency Total Project Spending: $521,715	This Pilot will work with a small set of customers to provide and install the Span Smart Panel ("Span panel") at no cost to the customer, and then test load management and metering capabilities, as well as integrating the Span panel with distributed resources like storage, EV chargers, and solar panels. Customers will benefit from information garnered by circuit-level data that will empower them to make smart energy choices in the home, while GMP and all customers will benefit by having additional resources available for grid needs, as well as by learning about how this new technology can be successfully leveraged in the utility space. As described in our recently concluded Resilient Home pilot that tested an alternative metering option using energy storage system data, GMP believes it is beneficial to continue testing alternative devices that could serve as the next-generation metering solution for customers. The Span panel provides all the safety features of a standard electrical panel with added functionality for the homeowner and GMP. The Span panel integrates various types of devices that GMP has deployed in partnership with customers over the past several years, such as energy storage, water heaters, heat pumps and EV Chargers. Importantly, the Span panel also allows for whole-home metering and load management by individual circuit in the home. When paired with storage for backup, the SPAN panel can be used to limit which loads are being served in the home and extend the backup duration of the battery system. We will work with 100 customers to install the panel in their home in FY22.	GMP is coming due to replace our AMI meters in the not so distant future. We believe that there is an opportunity to make use of an alternative device that not only accomplishes metering, but much more. Our Resilient Home pilot focused on using data from a Tesla Powerwall system to perform billing, and while we experienced high levels of success, we believe there is room for improvement. The Span panel provides whole home metering functionality as well as circuit level metering, which may unlock other types of billing mechanisms. It is important that GMP continue testing various types of technology that may help meet our goal of performing billing functions with an alternative device that provides additional benefits as an innate part of the product. We believe Span may be able to accomplish this. Secondly, GMP is managing a wide variety of distributed resources that each require their own device within the home (heat pumps, EVSE, water heaters etc.). The Span panel gives the ability to manage individual loads through the panel itself, which could potentially eliminate the need for multiple devices in a customer's home. This will provide efficiency, and potentially cost savings over time. As new technology enables additional types of resources in each home, it will become increasingly important that GMP has the ability to manage these loads as an integral part of our distributed grid.
177043: Enphase Battery Pilot	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2022 Fiscal Year: FY2022 Primary Purpose: Innovation Secondary Purpose: Reliability Total Project Spending: $1,069,246	GMP is rolling out a new pilot similar to that of our ESS tariff, but with an alternative battery. We are partnering with Enphase to offer a lease of two Enphase Encharge 10 batteries for $65 per month for ten years. The fully integrated System consists of two Encharge 10, 10kWh batteries, an Enpower Smart Switch which acts as the transfer switch during grid outages, and a communications kit that includes a cell modem and the Envoy that serves as the communication gateway between the System and Enphase/GMP. The 20kWh system will provide backup energy to the whole home and is warrantied for 10 years. Although the Pilot is available for up to 100 customers, GMP is anticipating that 70 customers will take part in this pilot and have budgeted as such. Pilot to be filed January 2022.	GMP recognizes the benefit of diversifying the types of systems that are being deployed. With this in mind, GMP is looking to gain real world experience with the Enphase Encharge 10 systems, by deploying a limited number of systems in a pilot similarly structured to the ESS Tariff in order to ensure that these systems work well for GMP and our customers. The end goal for this pilot will be to determine if the systems are robust enough to include as an option in the ESS Tariff. We have employed this diversification strategy with other device types like EVSEs and water heater retrofit controls by making use of multiple vendors. This has afforded GMP the ability to determine which systems work best and fit the needs of our customers, while also determining what components of a product or vendor need to be improved upon or avoided altogether. Expanding the vendors for energy storage is no different in that respect.
177045: DCFC Replacement	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2022 Fiscal Year: FY2022 Primary Purpose: Innovation Secondary Purpose: State Energy Policy Total Project Spending: $559,364	This project involves installing new, higher powered Level 3 DC Fast Charging (DCFC) charging stations (EVgo) at locations with existing electrical infrastructure, that will more appropriately meet the needs of the increasing number of electric vehicles in GMP territory. The scope of work involves selecting sites for new equipment according to historical usage patterns of the existing fast charger, purchasing new, higher powered stations through EVgo, and coordinating installation with local contractors. We will undertake this project in phases, with the aim of replacing 5 stations in FY22 replacing existing GMP DC Fast Charger stations. At an expected cost of $100,000 per unit as shown on page 1 of Attachment 177045 - EVgo Quote.pdf, GMP expects to spend $560,000 in capital for this project in FY23.	From 2014-2015, GMP deployed 14 fast charging stations around the state to help accelerate electric vehicle adoption. At the time of deployment, commercially available EVs were only capable of receiving a charge up to 50 kW, which is the maximum output of all deployed stations. Today, these stations are reaching the end of their useful lives. With vehicles capable of charging at much higher power ratings, 50 kW is no longer sufficient to deliver a positive customer experience and ensure EVs can become mainstream, which is critical both for helping GMP achieve its Tier III targets under the Renewable Energy Standard and the state of Vermont meet its goals under the Comprehensive Energy Plan, which calls for 60,000 EVs by 2025.

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New Initiatives - Rate Year (Oct. 1, 2022 - Sept. 30, 2023) Total = $9,969,366			
178046: North Troy Battery System	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2023 Fiscal Year: FY2023 Primary Purpose: Operational Efficiency Secondary Purpose: Innovation Total Project Spending: $1,544,593	Purchase and installation of a 5MW / 12 MWh battery energy storage system in Troy, Vermont. The battery system will be installed inside Vermont Electric Cooperative's (VEC) distribution system and the project will be joint owned (50%/50%) by GMP and VEC. The battery will be primarily used for peak/load management and also for absorbing energy from the Kingdom Wind project during hours when ISO-NE orders the wind project to curtail output due to transmission constraints. The battery system is designed to reduce curtailments by creating load at key times in the Northern Vermont area known as the SHEI. The Department of Energy and Sandia National Laboratories awarded $2M of grant funding for the project due to the innovative use case for using the battery to absorb wind energy during wind curtailment periods. Observing how this use case will work is the basis for awarding the grant. Additionally, VEC will pay for 50% of all costs, further lowering the cost to GMP customers.	The battery will serve as a component of GMP's overall peak/load management strategy to reduce costs for customers via lower transmission and regional network service costs. The cost/benefit analysis GMP performed demonstrates that there is significant value achieved for customers over the life of the project. The need is immediate because the significant grant award is specifically for this project and cannot be applied to a different project. The grant represents approximately 2/5 of the project cost so represents a significant lowering of the overall project cost and also boosts the benefits to customers.
179498: ESS Tariff (Powerwall Lease)	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2023 Fiscal Year: FY2023 Primary Purpose: Innovation Secondary Purpose: Reliability Total Project Spending: $6,247,856	The ESS tariff is a tariffed program available to all qualifying GMP customers. The tariff offers customers the option to have two Powerwall 2.0s installed in their home to provide a whole-home backup solution when needed during a grid outage. The systems are installed for a one-time, upfront charge of $5,500 or $55/month for ten years. GMP utilizes the Powerwalls to reduce peak costs during our monthly transmission peak and our annual capacity peak. This is done by using Tesla's GridLogic aggregation software platform, and allows GMP the ability to control the charging and discharging of each unit individually, and in aggregated groups. The program is open to 5MW of storage per year, which equates to 500 customers annually. GMP expects to install and close to plant 350 systems in FY23. Although we continue to expect full enrollment of 500 ESS customers in this program, actual closed installations trail behind enrollments as invoicing and financial processes take place only after installations have been completed. We do anticipate an increase in installation pace compared to the previous two years as supply chain constraints ease up.	This project is necessary at this time, first and foremost because customers want this type of offering from GMP. The ESS tariff experienced full enrollment of 500 customers in the first and second years, with a waitlist that is just starting to get enrolled in 2022. The feedback has been resoundingly positive, and GMP continues to see customers signing up to reserve a spot when they become available. Additionally, it remains important to reduce overall system costs for all GMP customers by utilizing these resources to reduce our system peaks. It also remains important to utilize these new tools and resources to drive down power supply expenses and create new, 'non-traditional' revenues, that flow back to non-participating customers. This project provides both while giving the host customer an alternative to a fossil-fuel-fired generator for backup power. One that has no maintenance, emissions or noise.
179499: DCFC Replacement	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2023 Fiscal Year: FY2023 Primary Purpose: Innovation Secondary Purpose: State Energy Policy Total Project Spending: $1,104,064	This project involves installing new, higher powered Level 3 fast charging stations (EVgo) at locations that meet the needs of the increasing number of electric vehicles in GMP territory. The scope of work involves selecting sites for new equipment, purchasing new, higher powered stations through EVgo, and coordinating installation with local contractors. We will undertake this project in phases, with the aim of installing 10 new stations in FY23. GMP will focus on locations that are less likely to see fast charger development through other funding sources such as infrastructure budget opportunities. These less traveled locations throughout Vermont will still be important spots for EV Fast Charging – both for customers that are passing through and need to charge and for GMP's own fleet to assure that as we transition to electric we have ubiquitous fast charging for our day to day work as well as storm response. We will look at some of our own properties as potential sites. In 2022, we were upgrading existing Fast Charger locations, while in 2023 we will be deploying new locations. At an expected cost of $100,000 per unit as shown on page 1 in Attachment 179499 - EVgo Quote.pdf, GMP expects to spend $1.1M in capital for this project in FY23.	From 2014-2015, GMP deployed 14 fast charging stations around the state to help accelerate electric vehicle adoption. At the time of deployment, commercially available EVs were only capable of receiving a charge up to 50 kW, which is the maximum output of all deployed stations. With vehicles capable of charging at much higher power ratings, 50 kW is no longer sufficient to deliver a positive customer experience and ensure EVs can become mainstream. This is critical both for helping GMP achieve its Tier III targets under the Renewable Energy Standard and the state of Vermont meet its goals under the Comprehensive Energy Plan, which calls for 60,000 EVs by 2025.

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180000: Grafton Resiliency Program	Project Type: New Initiatives In-Service Month: 12 In-Service Year: Sep 2023 Fiscal Year: FY2023 Primary Purpose: Innovation Secondary Purpose: Reliability Total Project Spending: $1,072,853	Climate change has already led to an increase in the frequency and severity of storms in GMP's service territory, and those impacts are only expected to intensify in the future, leading to increased costs and decreased reliability for customers if not addressed. Building on our experience implementing a cutting-edge microgrid in Panton, Vermont, GMP will pilot Resiliency Zones in the Vermont Towns that need it most. What's a Resiliency Zone? •Community hub that stays connected even when the lights go out •Leverage renewable generation, battery storage, and other innovations to prevent outages help communities bounce back more quickly if outages do occur •Custom plan in partnership with community •Focused resiliency improvement for vulnerable customers in challenging reliability areas that overlap with other challenges such as lack of communications. Using a multivariate analysis of outage, connectivity, and social vulnerability indicators, our team has identified fifteen high priority towns in which to target for a Resiliency Zone. We will begin with Grafton, which will entail providing home battery systems to 62 eligible customers who have experienced over 20 outages between 2018 and 2020. The batteries will be offered to these customers at no cost. These participants will benefit from backup power that is needed in order to maintain phone communications during power outages due to the fact that they are utilizing fiber to home and will lose phone when the power is out. As with all our storage programs, the storage will also be used to lower power supply costs during peak energy times. In late 2021, GMP issued an RFP which can include rooftop generation as well to further support the customer during an outage event however the solar will be owned and paid for by the customer or a third party. A pilot filing for this project is expected to be filed in FY22 in advance of the FY23 rate period.	This project is necessary at this time because of the increasing frequency in severe storms that threaten the reliability of GMP's grid in specific areas such as the town of Grafton. The customers in this area rely on a fiber to the home network for telephone communications, they can lose all connectivity with the outside world once the fiber modems lose their grid connectivity. With no cellular connectivity, this can create a dangerous situation for customers in this area during a major event. Reliability becomes a matter of safety. Customers in the proposed location each experienced over 20 outages between 2018 and 2020. This project will improve upon GMP's SAIFI, CAIDI, and SAIDI reliability metrics specifically as it relates to these customers. Discovering new solutions for customers beyond the traditional poles and wires is a must to keep up with the ever changing, ever worsening weather impacts driven by climate change. As you will see, we estimated what it would take to strengthen the distribution system and attempt to provide a similar level of improved reliability to these customers, however because it is still a poles and wires solution it will not be as reliable as storage directly in the home.