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July 18, 2017

Ms. Judith C. Whitney, Clerk
Vermont Public Utility Commission
112 State Street
Montpelier, Vermont 05620-2701

RE: Case No. 17-3142-PET
Comments from Green Mountain Power in Response to Notice of Workshop Regarding Utility Rate Regulation

Dear Ms. Whitney,

Green Mountain Power respectfully submits these comments in response to the Commission's June 26, 2017 Order seeking potential topics for discussion at the August 8, 2017 initial workshop in the above-captioned proceeding.

I. Introduction

The energy sector is undergoing a profound transformation that is changing many of the fundamental assumptions underlying traditional regulation. This means that several of the underlying assumptions on which the traditional regulation framework was built have changed. We group these changing assumptions into the following four general categories:

1. How we obtain the power to serve our customers;
2. Our ability to "store" electricity;
3. Declining retail sales and increasing regional cost pressures; and
4. The need for innovation to avoid cost pressures and to respond to what customers want.

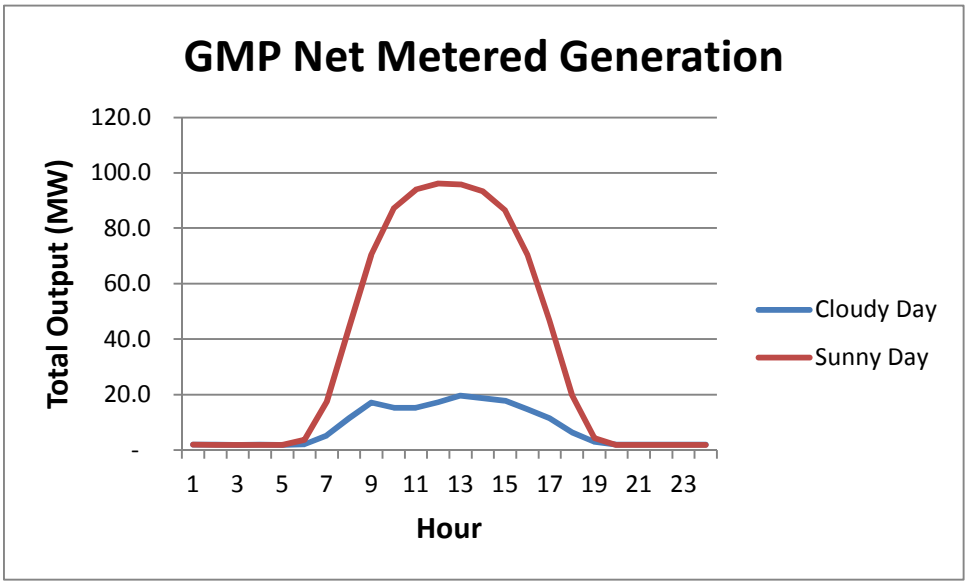
Each of these is addressed further below. We recommend them as potential topics for discussion at the August 8 workshop.

II. How We Obtain The Power To Serve Our Customers

For years, a relatively small number of power plants and power purchase agreements provided the clear majority of electricity we supplied to customers. The grid was built on this assumption—that power would be delivered in a centralized, top down process, moved out to customers from a few large sources.

The advent of distributed generation, which has been building slowly since the late 1970s and has exploded in the last few years, has disrupted this dynamic. Where we once had just a few principal sources of generation, we now have thousands smaller ones (over 8,000 net metered, standard offer, and larger scale solar, wind, and hydro), in addition to smaller shares of large sources that are more cost-competitive than the old contracts (the present purchases are from Hydro Quebec and Seabrook; Vermont Yankee, like many other U.S. nuclear plants, closed primarily because it could not stay competitive with the decline in natural gas prices). In short, we have gone from a centralized system to an increasingly diverse and more decentralized one.

This, in turn, causes significantly more volatility in our power supply portfolio on a short-term basis (i.e., over time frames from a day up to a year). What used to be a relatively small number of "round the clock resources" has now grown exponentially to encompass an increasing number of less predictable ones. A cloudy day, a windy day, or a shoulder month with a lot of rainfall can all have a significant impact on the power supply costs that our customers pay. Here's an example:



This chart above shows the hourly output of all net metered generation in GMP's territory (solar PV projects are the overwhelming majority) on two consecutive days in April 2017. The first day was cloudy, featuring one of the lowest net metered generation totals for the month. On this day, net metered output peaked between 15 and 20 MW during the middle of the day. The second day was very sunny, resulting in the highest net metered generation of any day in the

month, and total net metered output exceeded 90 MW during several mid-day hours. This means that from one day to the next, net metered output increased by about 75 MW during mid-day hours, and by a factor of more than four across the day as a whole. While this is a relatively extreme example of day-to-day output variance, and such fluctuations tend to average out over the long-term, they can contribute to significant short-term variances in GMP's net power costs.

The movement from a few big generators to thousands of smaller ones has also led us to reimagine our grid. Most of our existing grid infrastructure is more than 50 years old. It was designed to accommodate a few large generators (often located tens or hundreds of miles from load centers), not thousands of smaller, more local ones which are interconnected to the distribution or sub-transmission system. Future forms of regulation must support this changing reality.

We are leading the transition to a smarter, more dynamic system that can handle and balance multiple intermittent resources and seamlessly operate for customers, regardless of whether the sun goes behind a cloud or is shining bright.

And our commitment is that we do all this while maintaining incredibly reliable, cost-effective service that our customers expect of us. GMP's outage duration and frequency statistics are among the lowest of similarly situated utilities in the region and our rates are around the second or third lowest in New England (even with our most current rate filing). We have delivered multiple bill decreases to customers in the last several years. And, for the last two years, J.D. Power ranked us in the top two best mid-sized utilities in the East for customer service and our most recent customer service satisfaction survey came in at 94%. We believe that future forms of regulation should maintain and keep building on these outcomes for customers.

III. Our Ability To "Store Electricity"

We are in the midst of an historic break-through in energy storage technology. Electricity is unique as a commodity in that supply and demand must be in very close balance at all times. For decades, we had no meaningful ability to store electricity and use it later during "peak" periods when supply was scarce. The exceptions here were pumped-storage hydro plants designed in part to complement nuclear plants in the 1970s (these plants were never implemented in Vermont) and conventional hydro plants with limited ponding capacity.

In the last decade, research and development in battery storage technology has grown exponentially. This was driven by demand for hand held cameras and video camcorders, and then, more recently, cell phones and electric vehicles. All this development spurred material breakthroughs in larger scale batteries (especially lithium ion) that have the capacity to store large amounts of energy for several hours and then release it onto the grid instantaneously. We are seeing a sustained drop in the cost of these batteries as the industry gains scale along with improvements in their technology.

The ability to store electricity locally has the potential to be transformative for customers and for GMP's continuing ability to deliver energy that is clean, cost-effective, and reliable. Battery storage is a core part of our reimagined dynamic grid, helping to integrate renewables and smooth their uneven output, providing "islanding" ability that can serve as back-up power during outages, and also reducing costs for customers through peak shaving, energy arbitrage, and other ancillary services. For example, deployment of our 3.4 MWh of battery storage at the 2 MW Stafford Hill solar project in Rutland saved $200,000 in one hour alone this past summer. We are also integrating smaller, residential-scale batteries, like the Tesla Powerwall, which provide the same benefits and can also be used as a back-up power source for a home when the grid goes down. This past summer, GMP customers used the Tesla Powerwall paired with home solar arrays to power their homes for approximately 15 hours during a storm-related outage. This also happened during the most recent severe windstorm on May 5, 2017, where customers with the Powerwall did not experience any outages. At the same time, the participating customers also share access to the Powerwall batteries with GMP and we use them to shave peak and maintain grid reliability during non-storm times. This makes GMP's Powerwall pilot a very cost-competitive means of leveraging storage assets for the financial benefit of all our customers.

IV. Declining Electric Sales And Its Impact On Customers And Growing Regional Cost Pressures

Under traditional regulation, it was not uncommon for Vermont utilities' retail sales to grow at a clip of about 1 to several percentage points per year. For this reason, utilities would go years without rate cases because retail sales were growing and that growth more than made up for any new costs to operate the system.

This represents a fundamental design flaw in traditional regulation—where the utility is actually provided an incentive to encourage its customers to use as much electricity as possible and to over-report costs and under-report sales. Nearly a decade ago, Vermont had the foresight to address this problem by largely "decoupling" GMP's revenues from its sales under its regulation plan. This means that our earnings are substantially disconnected from how much energy we sell. Traditional regulation does not have this advantage.

Also, our retail sales are no longer growing. We have seen a significant decline in retail sales trajectory over the last decade, with GMP along with the other Vermont utilities now forecasting retail sales to stay flat or even modestly decline over the next ten years. GMP's retail sales are now lower than they were in 2005. This decline is largely due to a combination of net metering, efficiency efforts, and modest economic growth.

If we do nothing, customers will bear the impact of all this in the form of increased rates. This happens because when retail sales decline or stay flat, the utility has fewer kilowatt hours over which to spread fixed costs. That means that rates will go up, especially with other uncontrollable regional cost pressures like transmission and capacity increasing. In fact, we have forecasted that if current trends were to continue, GMP could see yearly double digit rate increases in a decade from largely uncontrollable rate pressures like declining sales, net metering, and regional cost pressures.

There are two drivers of increasing regional cost pressures that are largely out of GMP's control and that are impacting customers through higher rates. The first is transmission costs. These represent about $112 million or roughly 18 percent of GMP's overall cost to provide service to customers. These costs are what GMP must pay to use the regional transmission grid as well as the Vermont transmission infrastructure (through VELCO). They have been steadily increasing year over year. In fact, in the 2018 rate case GMP just filed, increasing transmission expense accounted for a majority of the requested rate increase. Indications are that these costs will continue to increase steadily.

The second driver is regional capacity costs. These represent about $42 million or roughly 7 percent of GMP's overall cost to provide service to customers. These costs include a reserve fee that all New England utilities must pay into ISO-New England to ensure that there will be enough generation to supply New England's peak demand at the highest hour of use of the year (an afternoon on a hot summer day). These costs, which are set through an auction process administered by ISO-New England, have increased significantly over the last few years. We hope and currently expect that capacity costs will come down somewhat from their recent high point, but nonetheless we do not anticipate them to go back to the lower levels we saw a few years ago.

V. The Need For Innovation To Avoid Cost Pressures And To Respond To What Customers Want

If the cost pressures described above were to continue unchecked, it would be harmful to customers. But our strategy is to look these external pressures directly in the eye and to innovate in how we manage our costs and provide service to customers to drive down costs. We are working to reduce our share of transmission and capacity costs via aggressive peak management that includes battery storage, demand response, and controlled shared access to end-use devices like heat pumps, EV chargers, batteries, and water heaters that can be turned down during peak times in a way that is imperceptible to customers. We are also focusing on innovative products and services that can be used to bring revenues back into the regulated business, flowing 100% to customers as rate reduction benefits and making up for the cost pressures that would otherwise befall customers due to declining retail sales.

These "shared" devices become as much grid assets as customer assets. Given that GMP's power supply will be 60% renewable and 90% carbon free in 2018, it makes sense to think more holistically about how we approach heating and transportation in this rural, cold climate state and to look for opportunities to stack benefits for customers – i.e., enhance grid reliability for customers while at the same reducing the carbon footprint around how we heat our homes and businesses and how we travel.

Through these strategies, we are shifting away from a traditional bulk energy system to one that is more home, business, and community based. Our goal is to reduce our dependence on the regional grid and move toward one that is more locally-based. Like any business, we want to reduce our dependence on costs over which we have little control, like regional transmission and capacity. So what used to be poles, wires, and meters will look more like a combination of

distributed generation, a battery, electric vehicle ("EV") with charging apparatus, and load-controlled efficient devices like heat pumps or heat pump water heaters to start. Providing customers the service and value they want in this new paradigm will require cost-effective innovation, such as the ability to control and dispatch distributed energy resources like heat pumps, EV chargers, distributed generation, and batteries instantaneously. In sum, we are shifting to a business that relies on data and technology as much or even more than poles, wires, and fossil fueled peaking plants. The Vermont Distribution Utilities are also mandated by Tier 3 of the Renewable Energy Standard law (Act 56) to move in this direction. All of this must be considered in future forms of regulation.

Now is the time to act. If we wait too long to actualize our vision of a reimagined grid, we will be beat off the block by other New England states like Massachusetts that have commercial scale storage statutory mandates. This would mean that those states would be ahead of Vermont in terms of peak management and realize transmission and capacity savings and revenues from participation in ancillary markets that could otherwise have been ours and flowed 100% to customers. Peak shaving is to some extent a zero sum game in this way.

Too much delay will also risk compromising seamless integration of renewables. We hear over and over from our customers that an energy system that is home, business, and community based is exactly what they want. If we wait too long to give them a seamless, low cost approach to managing their energy use, we increase the likelihood of significant grid defection (meaning that customers will choose to use a combination of storage and distributed generation to disconnect altogether from the grid), which will leave our remaining customers with crippling costs.

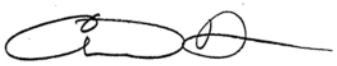
We believe that future forms of regulation must provide thoughtful support to help Vermont innovate on behalf of customers, avoiding significant future cost pressures and improving our customers' experience.

Finally, we believe it will be useful to hear about regulation design in other states and countries. We have been working with Mark Lowry, a highly acclaimed expert on this topic. Mr. Lowry has advised commissions, consumer advocates, environmental groups, and utilities on regulation design. We would be pleased to have him attend the upcoming August 8 workshop or a subsequent one to share on best practices and learnings from other jurisdictions.

VI. Conclusion

We look forward to joining in the dialogue that will consider these changing realities and evaluate what type of regulation Vermont needs going forward to ensure we plan wisely for our energy future from the perspectives of cost and state energy policy.

Regards



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