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Ms. Judith Whitney, Clerk
Vermont Public Utilities Commission
112 State Street
Montpelier, Vermont 05620-2601

Re: Proposed Revisions to Net Metering Rule 5.100 Case No. 19-0855-RULE

Dear Ms. Whitney:

Green Mountain Power appreciates the effort that the parties have spent preparing responses and comments related to this case. Here are our further comments in response to the filings of other parties participating in this case.

Vermont Public Service Department (“Department”)

The Department observes that the current compensation structure for net metered generation (“NM”) significantly increases the cost of electricity to non-participant customers. As indicated in GMP’s initial responses to the Commission’s first and second questions, we agree with the Department’s conclusion and the reasons behind this cost shift – particularly that the value of additional solar generation has declined substantially in recent years for a number of reasons (including moderating wholesale power market prices, and the successful deployment of solar PV generation in Vermont and New England) that are very likely to persist over time. GMP agrees with the Department’s reasons for suggesting that the Commission should revise and reduce the compensation for new net metering projects¹:

- Vermont already has the highest amount of installed distributed solar in the region (as a fraction of load). (page 1)
- Successful deployment of distributed solar, along with other regional changes both in Vermont and across New England, fundamentally reduces the value of additional solar power. (page 2)

¹ References are to the Department of Public Service (“DPS”) Report on Public Utility Commission Net Metering Information Requests filed with the Commission on November 1, 2019.

- Increased cost pressure from NM makes it difficult to further the transition of transportation and thermal sectors to a lower-carbon future through electrification, since price advantage and affordability are important factors for customers. (page 30)
- New solar projects via long-term PPAs would likely be a much more cost-effective RES Tier II source than net metering under the current compensation structure. (page 29)
- From a societal perspective, the same carbon reduction benefits as net metered solar power are currently being achieved at significantly lower cost through development of larger-scale solar, meaning more carbon reduction benefits can be achieved more cost-effectively through these larger projects. (page 2)

Based upon these observations, the Department's core recommendation is that the compensation structure for NM should reflect the system value actually being provided; GMP agrees. We recognize that the Commission should accomplish this goal consistent with 30 V.S.A. § 8010.

Consistent with these points, the Department recommends that the Commission conduct a stakeholder process to develop a net metering compensation structure that minimizes cost shifts between participating and non-participating customers. GMP agrees with this recommendation, and recognizes that this goal could be accomplished in multiple ways. Thoughtful proposals of how to refine the net metering program to make it financially sustainable are likely to entail a number of design choices that warrant stakeholder comment so that the proposals (along with their potential consequences) are understood. Examples of these design choices include whether, and if so, how, to change the compensation rates, compensation structure and/or other program features.

The Department has put forward a "straw" proposal for how the compensation structure for net metered projects could be changed to limit the shift of costs from participating customers to non-participants. The central feature of the Department's straw proposal is that excess generation² would be compensated based on its value to the system, rather than a retail electric rate. The Department recognizes that this proposal would reduce the effective compensation rates received by net metering projects, and recommends that the PUC process should consider whether to phase in the changes over time. GMP appreciates that the Department has taken the initiative to develop a thoughtful straw proposal. The Department's straw proposal approach of compensating excess generation at rate lower than the retail rate (e.g., more reflective of wholesale power value) is one of the approaches being pursued in other states to manage cost of net metering. This approach appears to address to a significant degree some of GMP's key concerns with the current net metering program design – including the magnitude of cost shift to

² Under the Department's proposal, it appears that excess generation would be defined as net metered generation that flows to the grid at any time (as opposed to a netting of a net metering customer's generation and consumption on a monthly basis).

non-participating customers (and thus, the program's sustainability over time), and the current prevalence of projects that are relatively large and located remotely from customer load.

GMP believes that the Department's straw proposal is a reasonable place to begin the stakeholder discussion of potential program refinements. We recommend that the Commission's review of the straw proposal should consider the extent to which the proposal would mitigate the cross subsidy for representative types and sizes of net metered projects, along with the incentives that the proposal would create with respect to the sizing and location of future net metered projects and the pairing of battery storage with those projects.

While GMP is generally supportive of the Department's comments, we would like to note a couple of concerns.

First, in its response to the Commission's Question 15, the Department comments that if the compensation for NM is structured appropriately to minimize cost shifts, it is unlikely that a limit on the size of new net metered projects would be necessary. GMP disagrees with this proposition. While setting the price in this manner may also be a proxy for pacing NM development, it is not a substitute for project size limitations or an overall cap. Removal of the 500 kW maximum project size for net metered projects could adversely affect our customers significantly. A net metering program that allows projects sized up to 5 MW (and/or lacks a cap on annual deployments) could result in GMP and other distribution utilities being forced to absorb large volumes of net metered projects, with no control over the timing or location of those volumes, in a manner that would erode the utilities' ability to cost-effectively manage their supply portfolios of energy, capacity and renewable attributes to meet their customers' needs. In addition, because GMP's energy need on an hourly, daily, and seasonal basis already depends greatly on the output of the strong base of solar PV capacity that operates in our territory,³ large additional volumes of solar power will tend to be less effective at offsetting our exposure to wholesale market purchases (and therefore less effective at stabilizing the cost of those purchases). Finally, the lack of a size limit for net metered projects (or an overall cap) could result in net metered generation "crowding out" GMP's ability to acquire some solar PV power that is available at prices lower than that set for NM.

Second, the Department appears to characterize the cost shift associated with the current net metering compensation structure as being limited to the portion of net metered generation that is excess to the participating customer's needs and flows to the grid – and to not include net

³ GMP's need to purchase energy from the ISO-NE market depends on our customers' consumption, less the output of distributed generation (mostly solar PV, including net metering) that operates as load reducers. With over 250 MW of solar PV capacity already operating in GMP's territory, our needs for market energy tend to be the least (or GMP is a net seller of energy) during days and hours when solar PV output is strong, and much larger during days/hours when solar PV output is low. Thus, large additions of solar PV generation will tend to provide energy when GMP's market energy needs are the least.

metered generation volumes that are consumed onsite (see page 3). The estimated value of additional solar generation (about 9.2 cents/kWh, in the Department's estimate⁴) is presently far below the residential electricity rate that many customers will offset with, it appears to GMP that the current cost shift associated with net metering is associated with all volumes of net metered generation - not only those that are excess for the participating customer. As a result, GMP's understanding is that implementation of the Department's straw proposal would substantially reduce the net metering cost shift, but not eliminate it.

The Department is also looking at the interconnection process and ways to streamline it. GMP agrees that the Rule 5.500 updating process can be used to define needs and determine changes that may be beneficial.

Renewable Energy Vermont ("REV")

Pace of Net Metered Generation

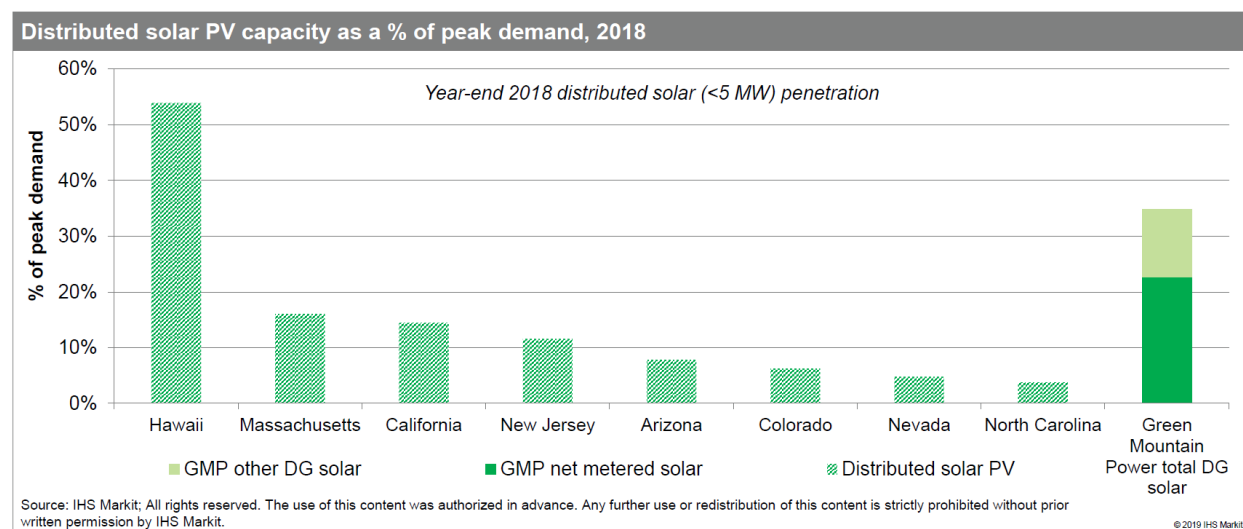
Page one of REV's filing provides a graph showing installations of solar PV declining over the last two years; the Commission should not view this as a reason to defer consideration of how best to limit the substantial cost shift that is inherent in the current design of Vermont's net metering program. First, when considering the pace of growth for net metering in Vermont, it is important to keep in mind that the early pace of net metering installations was very robust and therefore the base of existing distributed solar PV capacity in Vermont is already industry-leading. As shown in Figure 1 below,⁵ the amount of distributed solar PV capacity in GMP's territory (as a fraction of the peak load) is estimated to be well above other leading solar states, and second only to Hawaii.

⁴ We note that the Department's analysis yields an estimated ten year value of new solar output that is more than a cent higher per kWh than GMP's twenty-five year levelized value of solar. The difference appears to be attributable to a few factors including a lower assumed capacity factor (e.g. a lower denominator), higher assumed capacity reserve margin, higher initial coincidence factors for capacity and transmission benefits, and a somewhat higher outlook for the market price of regional Class 1 RECs.

⁵ This chart was developed by the consulting firm IHS Markit. In this context, distributed solar projects are defined as those sized 5 MW or smaller. The "Other DG Solar" category includes Standard Offer projects, other power purchase agreements, and GMP-sponsored solar projects.

Figure 1: Comparison of Distributed Solar PV Capacity in Selected States

Status of distributed solar as percent of peak load (2018)



Second, as discussed in GMP's direct comments, the pace of net metering applications in GMP's territory remains robust. Over the last several years the majority of solar PV capacity has been driven by Net Metering projects with a nameplate capacity of 150 kW to 500 kW. These projects typically take significantly longer to develop than small rooftop installations, and in fact GMP's queue of Net Metering projects that have filed for interconnection remains at historically high levels with a relatively low attrition rate as can be seen in the Figure 2 below.

Figure 2: GMP Interconnection Queue

GMP Net Metering as of 11/30/2019												
Size	Status	Solar NM 1.0		Solar NM 2.0		Solar NM 2.1		Solar NM 2.2		Non Solar NM		NM Total
		Count	AC Capacity (MW)	Count	AC Capacity (MW)	Count	AC Capacity (MW)	Count	AC Capacity (MW)	Count	AC Capacity (MW)	
<= 15 kW	Active	6381	39.3	2034	13.5	1235	9.1	147	1.1	82	0.5	9879
	Proposed	2	0	219	1.8	354	3.1	241	1.8	1	0	817
> 15 kW, <= 150 kW	Active	423	32.4	119	8.8	62	3.2	2	0	17	1.6	623
	Proposed	1	0.1	63	5.9	100	7.9	18	1.2	1	0.1	183
> 150 kW	Active	123	67.3	27	13	2	0.5	0	0	14	4.9	166
	Proposed	3	1.5	31	14.5	27	12.3	8	4	0	0	69
Total Active		6927	139	2180	35.3	1299	12.8	149	1.1	113	7	10668
Total Proposed		6	1.6	313	22.2	481	23.3	267	7	2	0.1	1069
Combined Total		6933	140.6	2493	57.5	1780	36.1	416	8.1	115	7.1	11737

In the 12 months ending June 30, 2019, GMP received applications for almost 40 MW of new net metered projects. In the subsequent months, after an Adjustor reduction effective July 1, the pace of new applications has remained substantial, amounting to a total of over 8 MW through the end of November.

Third, the volume of net metered generation applications in recent years has greatly exceeded the pace of growth in GMP's RES Tier II requirements. For example, the 40 MW of applications in the year ending June 30, 2019 would (if all projects were completed) provide energy and renewable attributes sufficient to meet about twice the growth in GMP's entire Tier II requirement.

Distribution Upgrades

On page three REV states "[P]articipants in the net metering program finance utility distribution grid upgrades and modernization, pay interconnection costs, and drive energy system innovation." We agree that net metered generators pay costs that are required to interconnect their proposed projects, but for circuits that are not already constrained, the vast majority of these projects, such as rooftop PV, are built without the need for any system upgrades. On occasion a distribution transformer feeding the home or business must be changed out to accommodate the size of the PV system. A substantial fraction of the upgrade costs for larger scale projects, such as 500kW systems, tends to be associated with an increased level of required system protection (e.g., a local recloser) to ensure that the injection of new generation does not adversely impact system safety or reliability to surrounding customers. These types of upgrades are needed solely because the generation project is being added to the grid at a specific location, and they do not otherwise improve distribution system reliability or defer/reduce capital costs or operating expenses that would otherwise have been required.

We also note that GMP has worked hard to provide NM developers with actionable information such as the GMP Solar Map that provides guidance through daily updates allowing NM developers to avoid locations that are already near capacity or are likely to have high interconnection costs, and to put in place through our TGFOV tariff a method to socialize among PV installations the costs of the most common barrier to interconnection. GMP does not believe it is appropriate or necessary to have its other customers pay for these interconnection upgrades. It is important to note that while developers pay for the interconnections for their projects, once these upgrades are built they become an ongoing part of GMP's operations and, like the rest of our system, any future maintenance, repairs, or replacements are paid for by all customers as part of GMP's ongoing O&M expenses.

Other Benefits

REV states on page three of its filing that "[D]eployment of distributed generation through net metering generally enables utilities to limit their and ratepayer costs associated with forward capacity markets, increasing grid resilience, and reducing reliance on foreign energy producers providing power from distant resources." It is true that to the extent that a solar PV project has

output during the coincident ISO-NE peak hour used to calculate a utility's capacity requirement, it will reduce the utility's capacity expense for the next capacity year. GMP has reflected this capacity benefit in its modeling of the future value of solar net metering generation within the analysis of the cost shift provided in this proceeding. It is also important to note that the coincident peak hour has been moved to later hours by existing solar PV generation in New England, which has significantly reduced the value of new solar PV generation. We anticipate that as behind-the-meter solar PV development across New England continues, the capacity benefit associated with solar shaped generation will continue to erode over time, as reflected in GMP's model. This trend supports the need for resource diversity in GMP's portfolio as we seek to deliver cost-effective renewable energy to our customers, and highlights the importance of not paying more than necessary for in-state solar generation.

On page five, REV provides a breakdown of the direct economic investments and benefits associated with a "typical" 500 kW Net Metering project. It is important to recognize that the cited annual \$25,000 customer savings from self-generation appears to be a benefit only to the participating net metering customer. As discussed in the comments of GMP and other parties, additional NM generation does not now provide savings for all customers as a whole.

Compensation Changes

REV states on page seven of its filing that "[T]he 2019 net metering rule and rates for new projects reflect little cost shift or negative economic on utilities and overall electric bills, particularly when taken in full context of other electric utility rate drivers and costs." REV goes on to recommend that net metering program costs be reported in terms of rates and absolute dollar amounts, and that the cost of net metering needs to be considered in the light of GMP's annual total budget of about \$600 million. The context of REV's comments is misplaced. GMP's annual budget includes all of the costs associated with running a utility; the actual portion of the budget associated with purchasing energy, capacity, and other ancillary market products required for meeting customer demand is about one third of the total budget. As discussed in our initial comments, the total cost of Net Metering in 2020 (reflecting only the cost of Net Metered Excess including adders/adjustors, and not lost retail electric sales) is forecast to be over \$50 million on a gross basis or about \$33 million net of power supply benefits; this represents approximately sixteen percent of our total power supply budget for the year, for a volume of energy that is only about six percent of our annual energy requirements. Also, as GMP detailed in our initial round of comments, an illustrative single-year installation of 20 MW of additional NM generation installed under the current compensation structure and rates, accounting for the value of avoided costs and other benefits, would drive an estimated further cost shift of about \$45 million over twenty-five years.

REV's comments rely on REC market prices of between 4.4 and 4.6 cents/kWh, reflecting market supply/demand conditions on a given day, for RECs to be delivered in a single year (page 7). This is not the proper context in which to frame REC prices. In general, REC market prices can be highly sensitive to changes in supply due to new projects and changes in demand driven by legislative initiatives in the New England states; over the last year market prices for regional Class 1 RECs have ranged from less than one cent per kWh to over 4 cents/kWh. GMP's current base case assumption - which was developed based in part on our review of materials developed by consultants who examine in depth the supply and demand for RECs in New England - is that Class 1 REC prices will average around 3 cents/kWh for the next several years and then reach equilibrium at about 1.5 cents/kWh in the 2020s as several large renewable projects in New England reach commercial operation.

Finally, it is important to state clearly that while GMP does have a budget for REC sales built into its power supply expectations, the proceeds from these sales flow directly to our customers, not to GMP. The proceeds are used to reduce GMP's net power supply expenses (and therefore electric rates) for the benefit of all of GMP's customers.

Vermont Law School – Energy Clinic

GMP disagrees with some assertions related to NM compensation presented in the Vermont Law School's Energy Clinic's ("VLS") filing. On page 4, VLS asserts that "in many jurisdictions cost shifting and rate impacts associated with net metering have been grossly overstated." VLS references two studies, one by the Lawrence Berkley National Laboratory and another by the Pace Energy and Climate Center, which were both prepared in early 2017. Inspection of the studies shows that the research is reliant on the Department's Evaluation of Net Metering in Vermont Conducted Pursuant to Act 99 of 2014 dated October 1, 2014 and a Value of Distributed Generation report prepared by the Acadia Center in July 2015, respectively. Both of these are now outdated; there have been significant structural market changes over the last five years that have led to significantly lower market outlooks for energy and capacity prices over the next decade. We would note that based on its response to the Commission's questions in this rulemaking, the Department's current outlook for energy and capacity market prices is appropriately much lower than those depicted in the cited Department 2014 net metering evaluation. Please see Charts 1 and 2 below, which show energy market price expectations over the next decade declining by roughly \$20/MWh to \$30/MWh, and capacity market price expectations declining by half or more.

Chart 1

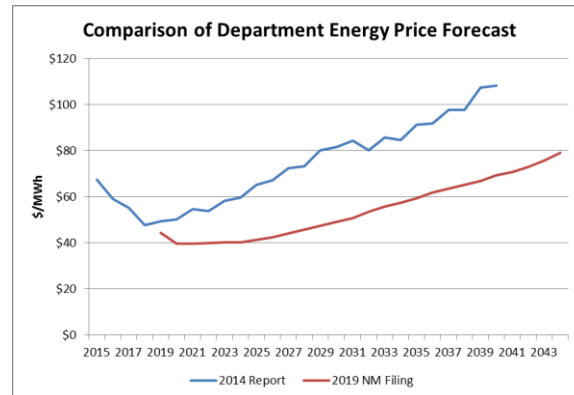
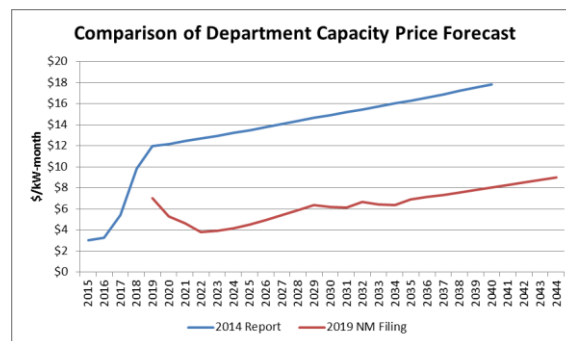


Chart 2



These significant changes in market price expectations and the rapid growth of behind-the-meter solar generation across New England (resulting in later system peaks and lower expected capacity value for new solar PV resources) have led to a significant diminution in the anticipated value of solar generation over the last few years. In short, the cited studies do not appear to be directly applicable to the Commission's current evaluation because they are based on wholesale power market price values that are stale and significantly overstated.

GMP agrees with VLS that there is urgent need for action to reduce GHG emissions in the country and in Vermont. GMP aims to achieve a power portfolio that is 100% carbon free in the near future and 100% renewable by 2030. The electric portfolios of the Vermont Distribution Utilities are relatively low contributors to the state's emissions, which are driven largely by emissions in the heating and transportation sectors. While VLS advocates against the structure of Vermont's RES and the utilization of RECs to lower costs for customers, GMP has found the state's policy helpful in driving meaningful growth of renewable generation, including deployed

in-state generation from renewable sources, while mitigating customer cost impacts. RECs are carefully tracked and accounted for through a well-established market mechanism. Any savings achieved through REC sales are passed onto customers, and do not flow to GMP. VLS's commentary regarding the treatment of NM solar also appears not to take into account the change in law regarding ownership and retirement of RECs that occurred for projects built after January 2017 versus prior.

We disagree with VLS's comments that would require utility customers broadly to compensate net metering participant customers for the RECs associated with their generation, even if those participants choose to retain those RECs. The decision on the part of a net metering participant to retain the RECs associated with their generation is a personal decision, and net metering customers who choose to do so may receive more value overall than those who do not. Conversely, net metering customers who elect to transfer the RECs associated with their generation to their utility are enabling their utility to meet some of the RES requirements for the benefit of all electric customers. As a matter of equity, it is appropriate for net metering customers who retain their attributes to receive lower compensation than net metering customers who transfer their RECs to the utility; the specific difference in compensation would be an appropriate matter for the Commission to consider.

All Earth Renewables

All Earth Renewables states on page 2 of its filing that "[T]he system upgrades often associated with interconnection of these facilities contributes to a more modern and robust grid." As we discussed in our comments above with respect to REV's filing, project interconnections frequently happen without system upgrades, and the system upgrades that do occur are typically required due to safety or reliability concerns associated with injecting the proposed generation into a specific location on the grid. A large fraction of these upgrades do not improve distribution system reliability or defer/reduce capital costs or operating expenses that would otherwise have been required.

On page 2 Question 7, All Earth Renewables proposes "bringing in an outside expert to offer a presentation on the subject....such a presentation should specifically include subjects such as recognizing the full value of carbon reduction". GMP notes that at least a portion of the societal value of carbon reduction has already been internalized into the energy market prices in New England through the price of allowances that fossil-fired generators pay under the Regional Greenhouse Gas Initiative, and into our forecasts of those prices. In considering potential carbon reduction value associated with net metering projects, it is also critical to keep in mind that NM generation is just one of many potential alternatives for carbon reduction, with many of the other

options offering lower priced renewable, non-emitting generation. The choice of the compensation structure for new net metering projects in Vermont should be informed by the relative cost of obtaining the various benefits of solar generation from net metered projects, compared to other ways to achieve them. That is because it is so critical to achieve the reductions we all seek.

On page 4 Question 9, All Earth Renewables recommends a paradigm shift of taking all fossil fuel generation out of the analysis of the value of renewable generation. While this is an interesting concept, it would tend to untether all analyses of NM generation from any objective measure of the market value of the power output and would leave the Commission with the need to develop a new framework that may or may not adequately reflect the value of the production. In any case, it appears to GMP that regional wholesale market prices (e.g., for energy and capacity) are relevant to the consideration of NM generation because as a practical matter these market prices (which depend in part on the cost of fossil fuel generation) directly determine the wholesale power costs that Vermont utilities will avoid in the near term as more renewable sources are procured.

Later on page 4 Question 11, All Earth Renewables suggests that the PUC should not “undertake an analysis under which net metering rates are contrasted with non-renewable, hypothetical power supply opportunities, and in which the costs of creating a more robust grid are laid at the doorstep of net metering or other renewable projects, rather than understood as also being essential components of evolving consumer needs, reliability of service, grid physical security and cyber security, and a variety of other factors.” There are two specific claims that need to be examined to understand this argument. First, the analysis of any project relative to avoided market costs is done to understand the value of the opportunity relative to the costs for buying the same set of benefits from another source. This is a process that attempts to ensure that a new power source is a reasonable commitment for our customers based on the then-current market expectations, and carbon emissions benefits or costs can be a part of that determination. This analysis does not constrain the portfolio choices that Vermont utilities or regulators make, but it does inform us as to the effective cost of hedging (stabilizing) the future expected portfolio costs for our customers using available alternative sources. Nonetheless, if one were to only compare Net Metering to other new distributed renewable options in Vermont, the results of the last Standard Offer RFP featured prices as low as 8.38 cents/kWh and other recent solar projects have been offered at prices of approximately 9 cents/kWh (fixed, not escalating) for terms up to twenty-five years. Second – as mentioned in our VLS comments above regarding grid expenses – the required interconnection expenses for net metered projects (particularly smaller ones) generally do not include upgrades to the distribution system. When grid upgrades are required, those upgrades are often to ensure that proposed generation can be safely and reliability

interconnected at a specific location on the grid - as opposed to upgrades that will also provide broader benefits or cost savings to the distribution system as a whole.

Norwich Solar Technologies

Finally, we would like to address an inaccuracy in the comments submitted by Norwich Solar Technologies (“Norwich”). On page six Norwich states that “current net-metering compensation has a de minimis impact on utility retail rates. The total of Green Mountain Power Corporation’s (“GMP”) power costs, including bill credits from power generated by GMP customers, were shown by the Department of Public Service in the most recent GMP rate case, to have gone down by more than \$33 million over the last five years”. First, this observation is not correct. While this misstatement continues to crop up, GMP did explain in response to REV’s First Set of Discovery Requests, Question 12 in Case No. 18-1633-PET that the cited comparison of purchased power costs between the two years was not apples-to-apples. The vast majority of the apparent decline in the power cost line item, about \$29 million, was due to a difference in how sales for resale were reported in the two source documents rather than a change in GMP’s net power costs. Additionally, other impacts that helped to lower GMP’s net power costs during this period included the addition of the Kingdom Community Wind project to GMP’s owned generation (i.e., a rate based project designed to reduce power costs) and a general decline in energy market prices that allowed GMP to enter a number of lower priced power purchase agreements. Second, GMP observes that even if factors other than net metering had actually caused net power costs in total to decline significantly during the period in question, this would not be an appropriate basis for concluding that net metering compensation has a de minimis impact on retail rates. The comments of GMP, other utilities, and the Department in the current proceeding demonstrate clearly that net metering under the current compensation structure does entail a significant cost shift and is putting upward pressure on retail rates.

Thank you for this opportunity to comment. If you have any questions, please feel free to reach out.

Sincerely,



Douglas C. Smith
Director, Power Supply
cc: ePUC Service List