March 15, 2017

Mrs. Judith Whitney, Clerk
Vermont Public Utility Commission
112 State Street, 4th Floor
Montpelier, VT 05620

Re: Case No. 18-0086-INV Biennial Update of Net Metering

Dear Commissioners,

Renewable Energy Vermont (REV) greatly appreciates the opportunity to submit comments to inform the Public Utility Commission's first biennial update of net metering.

In Vermont we have a twenty year history of supporting the ability of Vermonters to produce their own clean energy. State incentives and compensation for new renewable energy in Vermont has declined, and thousands of homeowners and businesses have used their own money to build out the foundation of our new clean, distributed, and more efficient energy infrastructure. These homeowners, businesses, schools, and towns are leading our State from behind and directly doing their part to support Vermont's local economy and act on climate change. These are also the same Vermonters who will take the additional and next steps such as weatherization, installing energy storage, buying electric vehicles, installing efficient cold climate heat pumps, and advanced wood boilers, all of which benefit our local economy and environment. We need these Vermonters and hundreds of thousands more of our neighbors to join them if we are going to be successful in a full and timely transition to clean energy.

From a societal benefit perspective upon which energy policy decisions should be based, these Vermonters are providing a net benefit to their neighbors who have not yet participated in the clean energy transformation. Our local communities and economy has benefited significantly thanks to net metering, young people have stayed and new families have come to Vermont due to meaningful work in the trades, and there is hope that Vermont can show there is a positive path to addressing climate change through local action.

Despite our progress to date we have a long way to go and change is difficult, and necessary. Just over 5% of Vermont's electricity comes from local solar generation. We are still sending the majority of our energy dollars out of state and or out of country. A narrow focus on a limited cost shift analysis that ignores the societal benefits of net metered solar in Vermont sells us short. With all of the headwinds at the federal level now is not the time to hit the brakes or slow solar adoption in Vermont, rather we should be looking to take a more bold leadership position.

Vermont's net metering program is widely considered a model due to its original simplicity, accessibility to all customers, and success catalyzing local, customer-based renewable electricity. A keystone to long term energy resilience and distributed clean energy grid transformation, net metering must continue to enable all Vermonters equitable access to

local renewable energy choices and direct, meaningful contribution towards achieving the State's renewable energy and climate commitments. Through numerous public comments to the Commission, continuous support and legislation of the General Assembly, personal investments, and local town meeting votes, Vermonters have clearly stated they want more local renewable energy.

Vermonters are highly engaged and involved in moving our energy economy towards clean, local energy sources. At the highest level REV's comments support the following recommendations:

- Make no downward adjustments to the current siting and REC adjustors
- Creating two new criteria for new projects applicable for positive siting adjustors if at least the majority of net metering credits are for low or moderate income customers or residential accounts
- Due to low or no permit volume the Commission should reduce the permitting burden and review process for projects on previously developed / impaired properties
- Simplify the net metering credit calculations for customers in utility territories where electricity rates are higher than the statewide blended average to effectively reduce the bill credit for net metering customers in those service areas

REV's introductory comments below outline the benefits of net metering, highlight findings of an independent analysis completed by Synapse Economics (full report attached), summarize overall recommendations for future net metering customers, and discuss headwinds facing future solar installations.

I. Value & Benefits of Net Metering

Net metered projects in Vermont have provided substantial growth to the State's economy and benefits to participants and non-participants alike. There are more than 82 solar businesses offering services related to the development, design, construction, installation and maintenance of net metered solar projects in Vermont. According to the 2017 Vermont Clean Energy Jobs report, undertaken annually by the Vermont Department of Public Service, about 87% of businesses in the clean energy sector are small, with fewer than 24 employees, which means that changes to the net metering program resulting in job losses have tremendous effect on Vermont communities through lost local economic potential. The 2017 National Solar Jobs Census showed that Vermont lost 232 full-time solar jobs in 2017, reducing direct full time solar employment in Vermont by 13% to 1,535.[1]

Assets totaling over $400 million have been built and brought online under net metering2.0.[2] The full economic value that these systems have brought to the State can be seen by considering the impacts of just net metering 2.0 systems installed in 2017, which

[1] https://www.thesolarfoundation.org/national/

[2] Based on small, medium, and larger systems, respectively, of (38.6 MW, 32.2 MW, 58.4 MW) for NEM 1.0 and (6.4 MW, 2.75 MW, 1.95 MW) for NEM 2.0. The installation prices where taken from the Department of Public Service Cost Assumptions (2-8-2018) using 2014 costs as an average estimate for NEM 1.0 and 2016 costs for NEM 2.0.

Synapse Economics estimates at over $22 million. Additionally, the 2017 net metering 2.0 projects provide over $1 million in annual environmental benefits.

As these numbers demonstrate, the extensive economic benefits, including jobs and tax revenue, resulting from Vermont's net metering program and local solar energy are positive and impactful. Net metering improves the efficiency and resilience of Vermont's electric system by producing power closer to load and reducing transmission costs. Net metering attracts and enables private investment in Vermont, and keeps our money in Vermont, while successfully building a sustainable and clean energy system. In evaluating net metering's value to Vermonters, *all* economic and environmental benefits must be considered. Looking to the future, the Vermont Solar Pathways study, funded by the U.S. Department of Energy, found that if Vermont generated 30% of our electricity from solar, installing 1,000 MW by 2030, we would create $8 billion in net benefits for Vermonters.[3] Continuing stable net metered solar deployment is important to realizing those economic, public health, and environmental benefits.

It is important to note that due to Vermont's status as a vertically integrated, regulated utility state where only electric distribution utilities have the ability to sell electricity to customers, net metering is the only means available to businesses, schools and communities for having a choice in selecting the source of energy generated to meet customers' and community electric energy needs. This runs counter to many other states in the northeast and throughout the country, where virtual power purchase agreements, direct PPAs and green tariffs have allowed businesses and institutions the opportunity to procure clean renewable sources of electricity.

II. Synapse Economics Report Highlights

Synapse Economics recently completed an empirical analysis of net metering in Vermont. Their independent comments show that:

1) Up to 30 MW of new renewable energy generation installed annually in Vermont is necessary to achieve the State's minimal Renewable Energy Standard Tier II requirements
2) Net metering offers significant positive overall benefits to Vermonters
3) Over $23,000,000 - total inputs to Vermont's economy from just NEM 2.0 in 2017
    - $22,000,000 - estimated total economic impact based on wages of at least $6,365,000
    - Over $1,000,000 for carbon, NO_X, and SO_X emissions reductions
4) $1,720,000 - estimated annual state and local tax payments for all NEM in just GMP territory
5) "Cost shifting" of the new net metering regime is negligible in Green Mountain Power's territory, equating to less than $0.50/year for the impact of 2017 NEM 2.0

[3] D. Hill, D. Lane, K. Desrochers, F. Huessy, and R.Vandergon, Vermont Solar Market Pathways - Becoming an Advanced Solar Economy by 2025 (2017).

and far outweighed by the many benefits that net metering produces for the State and its residents.

- $0.48/year - averaged residential bill impact for 2017 NEM 2.0
- $5.52/year - averaged residential bill impact for all NEM 1.0 and 2.0

III. General Recommendations

REV supports the recommendations made by state agencies to minimize changes to the siting and REC adjustors during the 2018 biennial review. The very recently revised net metering rule is still in its infancy, and holding an overall steady course will create necessary regulatory certainty for Vermonters participating in net metering and near-term local economic investments. Maintaining a steady course will also aid utility planners, and will enable regulators to collect additional information from which to assess how the program has impacted siting decisions and overall pace of net-metering deployment. In the instances where states have made frequent or startling changes to net metering, the results have been devastating for the local solar market, causing massive job losses and drastically slowing progress toward distributed renewable energy deployment.

The Department of Public Service recommends minimal changes on the sound bases that (1) the new net-metering rule has been in effect for only a short period of time – having taken effect less than a year ago on July 1, 2017 – and therefore the impact from the siting adjustors is not yet known;[4] and (2) recent changes to the federal tax laws and the imposition of a tariff on imported solar modules have led to uncertainty that Vermont should not compound with adjustments resulting in an appreciable change to the net-metering program (e.g. with respect to REC adjustors, siting adjustors, the blended residential retail rate, or category eligibility).[5] In the same vein, the Agency of Natural Resources (ANR) does not recommend any modifications to REC adjustors or siting adjustors at this time, noting simply that "it *may be appropriate, in future biennial updates*, to evaluate whether particular preferred site types merit differential siting adjustors to further incent their development."[6] These are important points and REV agrees that the Commission should give them substantial weight during its 2018 biennial review.

Further, creating the net-metering 2.0 program took longer than anyone involved anticipated. The multi-year process, delay, and numerous shifts and changes proposed by the Commission introduced significant uncertainties that early program data reflects. Allowing additional time to transparently collect and track accurate data will inform the program in the next review. The need for accurate, uniform, and publically available data related to the net-metering program is discussed further in Section VIII, below.

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[4] See also Department of Public Service comments at page 18: "Ultimately, it is difficult to render any meaningful judgment about pace or changes in pace looking at discrete data points (such as interconnections) over discrete time periods (calendar years), and will likely prove more useful to examine trends over a longer period of time, particularly after NM 2.0 has more history to review."

[5] Department of Public Service comments dated March 1, 2018 at pages 1, 22-23, 25.

[6] Agency of Natural Resource comments dated March 1, 2018 at page at 1, *emphasis added*.

REV's comments below focus on the issues and criteria outlined in Rule 5.128 (A), (B), & (C) for the biennial update.[7]

IV. Pace of Net Metering

As of December 2017, only 8.6 MW of capacity was commissioned under the new net metering rule. Vermont's Comprehensive Energy Plan of 2016 (CEP) , the U.S. Department of Energy funded Solar Pathways Report, Department of Public Service comments, and Synapse Economics report provide generally consistent guidance related to the necessary pace of new renewable energy installations to achieve the State's renewable energy and climate commitments. The CEP explicitly states that net metering is ***the*** appropriate tool to provide a significant portion of the generation necessary to meet Vermont's Renewable Energy Standard, Tier II statutory requirements.

The Renewable Energy Standard Tier II requirement adopted by the legislature is not a ceiling regarding the amount and pace of in state renewable energy generation, but a minimum floor.

The CEP establishes a statewide renewable energy and climate goal of achieving 90% of Vermont's total energy needs, virtually eliminating reliance on oil.[8] The CEP "also establishes two goals for reduction in greenhouse gas (GHG) emissions from Vermont's energy use, both of which are consistent with the renewable energy and energy use goals: 40% reduction below 1990 levels by 2030; and 80% to 95% reduction below 1990 levels by 2050.[9] In setting these goals, the CEP emphasizes the imperative involved for all Vermonters:

> We have a moral and economic imperative to take substantial and consistent action to reduce greenhouse gas emissions to mitigate global climate disruption, while also preparing Vermont for its impacts.[10]

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[7] Rule 5.128 (A)-(C) states:

> (A) The Commission must conduct a biennial update in 2018 and every two years thereafter to update the following: (1) REC adjustors; (2) siting adjustors; (3) the statewide blended residential rate; and (4) the eligibility criteria applicable to Categories I, II, III, and IV net-metering systems.
>
> (B) In updating the REC adjustors, the Commission must consider: (1) the pace of renewable energy deployment necessary to be consistent with the Renewable Energy Standard program, the Comprehensive Energy Plan, and any other relevant State program; (2) the total amount of renewable energy capacity commissioned in Vermont in the most recent two years; (3) the disposition of RECs generated by net-metering systems commissioned in the past two years; and (4) any other information deemed appropriate by the Commission.
>
> (C) In updating the siting adjustors, the Commission must consider: (1) the number and capacity of net-metering systems receiving CPGs in the most recent two years; (2) the extent to which the current siting adjustors are affecting siting decisions; (3) whether changes to the qualifying criteria of the categories are necessary; (4) the overall pace of net-metering deployment; and (5) any other information deemed appropriate by the Commission.

[8] CEP, Executive Summary at 2.

[9] *Id.* at 4.

[10] *Id.*

Importantly, the CEP also emphasizes the importance of moving to a more distributed grid as we implement the actions to achieve these critical goals:

> Our legacy fossil-fuel-based energy system is also a centralized system. Large central electric generators produce power that flows great distances along power lines to consumers; fossil fuels are produced in a few locations around the world, then shipped or piped to wholesalers and then to consumers. This CEP embraces a different vision: a distributed energy future in which a significant portion of Vermont's energy is produced near where it is consumed, and which is shaped by many coordinated actions by distributed energy users, rather than through singular central control. This alternate vision is possible thanks to the increasing availability of cost-effective distributed electric generation technology, such as solar PV, along with the increasing opportunity to store electric and thermal energy, and the communications overlay that comes from near-universal broadband and smart grid deployment combined with "smart" appliances and other end-use energy control technologies.[11]

Specifically regarding net metering, the CEP emphasizes:

> Over the coming years, ***net metering has great potential to be a primary method for the development*** of small scale renewable electric generators in Vermont. Tier 2 of the Renewable Energy Standard requires development of new distributed generation at a sustained pace, likely to exceed 20 MW per year for the next 15 years. Because ***net metering provides an appropriate tool to develop a significant portion of this generation***, it is critical that the state implement a program that is financially sustainable over the long term and avoids boom and bust cycles. This requires allowing participation from a wide range of possible customers, in each utility service territory, while being financially sustainable for both participating and non-participating customers, as well as for the firms that develop and install generators.[12]

Vermonters strongly reaffirmed their support for implementing Vermont's CEP and achieving 90% total renewable energy during the last town meetings in March of 2018.[13] The 35 towns that considered resolutions adopted them overwhelmingly.

REV respectfully urges the Commission to prioritize implementation of the CEP as it reviews how Vermont's net-metering program can facilitate a path forward to a clean, local, and distributed energy climate for Vermonters.

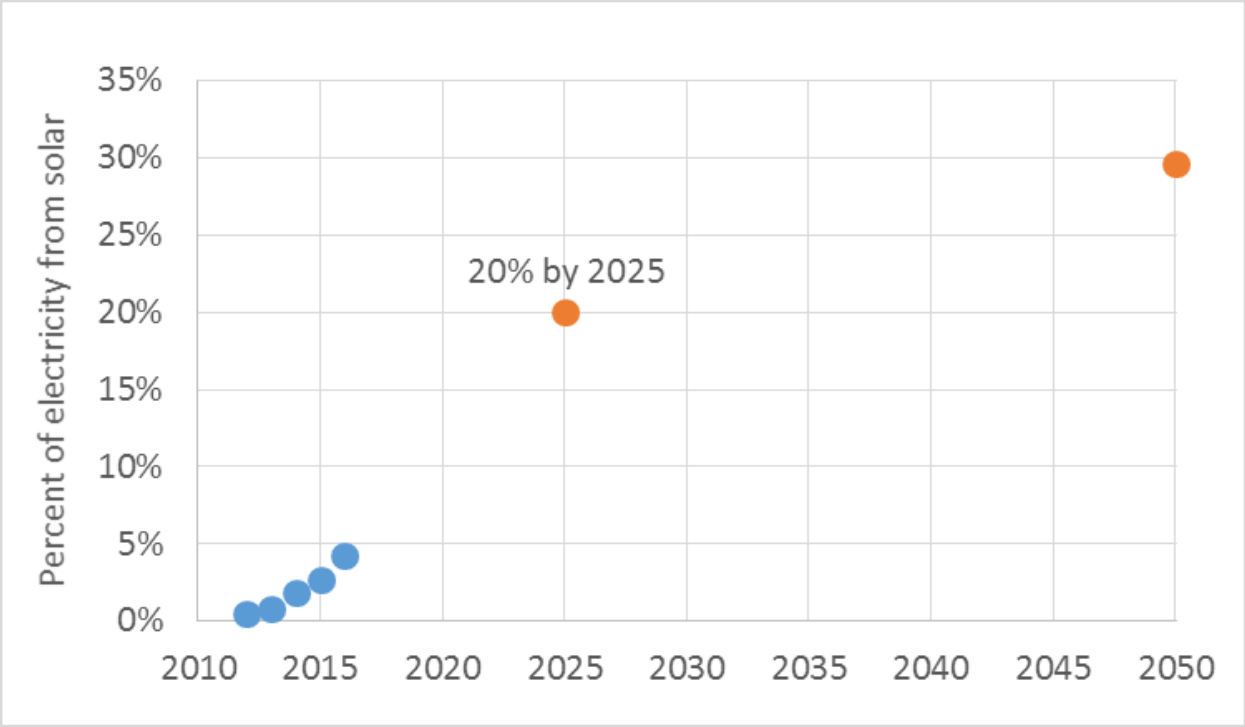
Funded by an award from the U.S. Department of Energy to the Vermont Energy Investment Corporation, Regulatory Assistance Project, and the Vermont Department of Public Service, the Vermont Solar Market Pathways project began in late 2014 and continued through

[11] *Id.* at 4-5.

[12] *Id.* at 257.

[13] http://digital.vpr.net/post/climate-change-resolution-adopted-35-communities#stream/0

2017. The project sought to determine the possibility, costs and benefits, and policy considerations necessary to meet 20 percent of the State's 90 percent renewable energy commitment with solar generation. The Solar Pathways Report concludes that "[g]enerating 20 percent of the projected electricity consumption in Vermont by 2025 will require an estimated 1,000 MW (1 gigawatt) of installed solar capacity."[14] This is more than 5 times the amount of solar installed in Vermont at the end of 2016.



Importantly, this extensive report, supported by empirical data, concluded that significant investment in Vermont distributed solar generation will not result in adverse economic impacts. Instead, the report concludes that "[t]he net costs for the advanced solar scenarios are only a small fraction of the state's annual energy expenditures and investments."[15] Regarding the value of a more significant solar distributed generation footprint in Vermont, the report concludes:

> The research results indicate that investments that support high amounts of solar energy generation in Vermont promise significant future economic return. Extending the analysis through 2050, the investments in solar and efficiency result in almost **$8 billion of net savings** to Vermont consumers. The SDP scenario also reduces greenhouse gas and other emissions, while securing energy resources with less volatile prices, resulting in a more robust and reliable energy system.[16]

[14] D. Hill, D. Lane, K. Desrochers, F. Huessy, and R.Vandergon, Vermont Solar Market Pathways - Becoming an Advanced Solar Economy by 2025 (2017).

[15] *Id*, Exec. Summary at page 3.

[16] *Id.* (emphasis added).

The chart below from Green Mountain Power's testimony before the legislature in February of 2018 shows how changes to the net metering rule in 2017 have slowed net metering applications and installations. It is important to notes that systems sized 150 to 500 kW have seen the most dramatic reduction in installed systems. Much uncertainty remains as to the pace with these systems as the difference between proposed and active applications is unknown and may be attributable to more stringent permitting requirements leading to delayed or rejected applications and/or the increased sensitivity of larger systems to price increases. It is also likely that the number of applications filed in 2017 was disproportionately high on an annual basis as it included projects pending from 2016 when the net metering program was closed. These systems should be strongly supported because many of them directly benefit schools, towns and non-profits and are important opportunities in times of tight budgets and an important step that schools and municipalities can take in expressing their commitments to clean energy.

		GMP Net Metering as of 2/9/2018							
		Solar NM 1.0		Solar NM 2.0		Non Solar NM		NM Total	
Size	Status	Count	AC Capacity (MW)	Count	AC Capacity (MW)	Count	AC Capacity (MW)	Count	AC Capacity (MW)
Small	Active	6356	38.6	1025	6.4	86	0.5	7467	45.5
	Proposed	606	4.9	360	2.6	4	0	970	7.5
Medium	Active	413	32.2	33	2	16	1.5	462	35.7
	Proposed	10	0.9	50	4.6	1	0.1	61	5.6
Large	Active	113	58.4	2	1	11	3.7	126	63.1
	Proposed	14	10.8	32	15.6	0	0	46	26.4
Total Active		6882	129.2	1060	9.4	113	5.7	8055	144.3
Total Proposed		630	16.6	442	22.8	5	0.1	1077	39.5
Combined Total		7512	145.8	1502	32.2	118	5.8	9132	183.8

It has been stated that the Standard Offer Program will provide a significant portion of the renewable energy Vermont needs to keep pace with its commitments. First, it should be noted that while the Standard Offer Program is authorized to accept proposals for 7.5 to 10 MW annually, only 4.38 MW were installed in 2017. Further, REV appreciates that under the new net metering rule, utilities are required to retire RECs received from net metering customers.[17] The Standard Offer Program does not impose a similar obligation to retire RECs.[18] Therefore, it is not guaranteed that Standard Offer projects can be counted toward the CEP and RES commitments because utilities may (and do) sell the RECs from those projects.

[17] *See* 30 V.S.A. 8010 (c)(1)(H) and PUC Rule 5.127(B)(1).

[18] *See* 30 V.S.A. 8005a(k)(3).

It has also been stated that individual customers seeking renewable energy could simply purchase RECs rather than generate their own electricity. This approach of buying RECs simply goes against Vermont's Comprehensive Energy Plan and passes on our collective obligations to others while sending financial resources out of state. In addition buying REC's provides a financial disincentive to clean energy adoption due the increase in power cost. This is in direct contradiction to the CEP's practical encouragement of clean energy adoption using financial incentives. The lack of an overarching federal energy policy with respect to REC's only reinforces the importance of supporting Vermont's Comprehensive Energy Plan. Further purchasing RECs is not feasible for all customers nor is it a viable solution. The extensive economic benefits of local net metered renewable energy are not realized by either the customer or Vermont as a whole through REC-only purchases that will send money and jobs out of the state.

As the Commission considers the pace of net metering, it should focus on permits issued, permit applications, and commissioned installations. After reviewing the disparate data only recently publicly available, general trends reflect fewer annual applications both in capacity and number of projects, fewer issued permits, and even fewer commissioned installations after the 2017 net metering rule overhaul. REV estimates that at least 10 to 15 percent of net metered projects previously permitted under net metering 1.0 in 2016 were never and will not be installed and commissioned. Some comments referenced interconnection requests, however these numbers are not reflective of actual anticipated development for a wide variety of reasons[19]

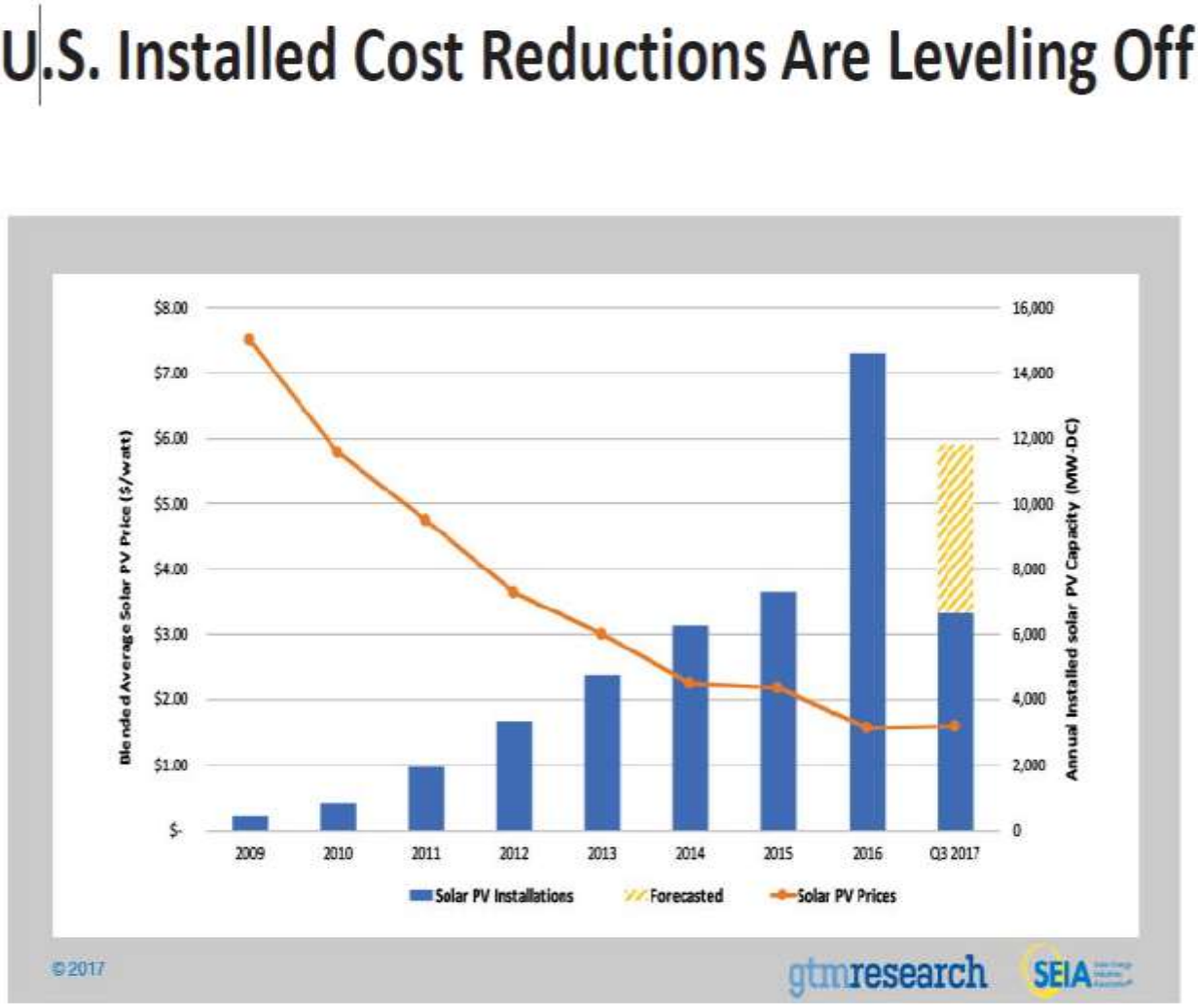
Numerous recent headwinds impacting future net metering project deployment must be considered as future pace is contemplated. The comments below as well as REV's February 19, 2018 comments in this proceeding, highlight some of these notable challenges creating customer uncertainty, limitations, and increasing all new solar generation (both net metered and utility scale) project costs including: changes in federal tax law; installation costs; federal tariffs on solar panels, aluminum, and steel; siting restrictions; customer caps; and grid constraints. Considered cumulatively, these headwinds will increase project costs and further dampen the pace of net metering.

Solar projects installed before 2020 qualify for a federal investment tax credit of 30% of the eligible basis of a project's cost and accelerated depreciation. Federal law limits who has the ability to access and monetize these benefits. Recent changes to the federal tax code include complicated factors affecting how much a tax investor may invest in a given year. The effect is a reduction in the value of accelerated depreciation, and the number of investors in the market. The effect of decreasing the corporate tax rate from 35% to 21% is a 40% reduction in the value of accelerated depreciation. Given the lower value of depreciation, investor requirements have changed. This change negatively affects the direct financial value of a solar project to an investor, making financing and securing capital for certain projects very difficult. To maintain a consistent stream of financing relative to pre-tax law changes, the credit for net metering kWhs would need to be 2 to 3 cents per kWh higher in 2018.

[19] The interconnection review process (not the initial que) is a gatekeeping issue for permitting because Rule 5.111 applies the system stability and reliability criterion, 30 V.S.A. § 248(b)(3), to all projects.

The federal Investment Tax Credit reduction in 2020 is anticipated to reduce the amount of new solar projects that year and in future years as it continues to step down. This will negatively affect the financing and potentially increase the cost of both net metered and utility scale solar projects. The opportunity to maximize private local investment in energy infrastructure should be utilized to the greatest extent possible in 2018 and 2019.

The following figures from ISO-NE's most recent 2018 PV forecast document a number of trends that caution that the recent trend in reduced costs for solar PV installations are not only leveling off but face increases.[20]



Source: https://www.seia.org/sites/default/files/inline-images/growth-falling-prices_q42017.png

[20] https://www.iso-ne.com/static-assets/documents/2018/02/dgfwg_2018feb12_draft2018forecast_final.pdf at 14-16.

Other Federal Policies Impacting PV Development

- Anticipated impacts of final federal tax bill are mixed and uncertain, with major features including:
  - Maintain current phase-down schedule for ITC
  - Lower corporate tax rate could decrease tax "appetite" of investors, potentially limiting their ability to monetize the ITC, while also increasing the value of operating projects due to increased after-tax revenue
  - New base erosion anti-abuse tax (BEAT) could reduce amount of tax equity used for investment in many PV projects
- U.S. tariff on imported PV cells and modules
  - Modules represent roughly 10-25% of total installed PV costs
  - Tariff is 30% in year 1, stepping down to 15% by the fourth year
  - Annually allows 2.5 GW of unassembled imported solar cells tariff-free
  - Effect will offset some of the decreasing trend in installed PV costs in past years
- The overall result of these federal policy changes, when considered in tandem with the approaching ITC phase-down and continued decreases in state policy support, is increased near-term uncertainty in the region's PV outlook

The recent Trump Administration solar panel tariff adds approximately 10-15 cents per watt to the price of solar panels, or 5 to 7% (depending on project size) to the cost of a solar project. Vermont began experiencing increased panel prices in 2017. According to GTM Research, the tariff will result in an 11 percent net reduction in U.S. solar installations from 2018 to 2022.[21] A January 22, 2018 memo prepared by Sustainable Energy Advantage at the request of Rhode Island Office of Energy Resources provides early information about federal tax reform and the Trump trade tariff decision. See http://www.ripuc.org/eventsactions/docket/4774-DGBoard-DR-PUC1-14-Exhibit2.pdf. In response to changes arising from the Trump tariff and corporate tax reform, GTM Research reduced its total U.S. solar PV forecasts by 13% for 2018 to 2022.

The recent Trump Administration aluminum and steel tariffs are also expected to increase renewable energy project costs and slow deployment. GTM Research indicates that these tariffs could cause an additional 2 to 4 cents per watt increase in the price of solar racking.[22]

[21] https://www.greentechmedia.com/articles/read/tariffs-to-curb-solar-installations-by-11-through-2022#gs.6Bzd0Fk

[22] https://www.greentechmedia.com/articles/read/steel-aluminum-tariffs-renewables-elon-musk#gs.xoQrils

https://www.greentechmedia.com/articles/read/steel-aluminum-tariffs-could-add-2-cents-per-watt-to-utility-scale-solar

Changes to the net metering rule effective in 2017 limited the number of locations for 150kW to 500kW projects, imposed customer caps, and increased the costs and time necessary to plan and develop non-rooftop projects. The significant decrease in the quantity of sites where these projects may occur combined with increases in permitting costs and development times have made potential community net-metered and privately financed solar projects not economically viable. Data on permit applications, permits issued, and projects installed confirms that the slowed pace of these project sizes, which is anticipated to further exponentially slow in future years.

The new "preferred locations" policy is well-intentioned because it aims to drive more solar generation toward land that has few or no other economically viable uses, such as capped landfills, reclaimed gravel pits, brownfields, and Superfund sites. However, the policy and its implementation have led to several unintended, or at least unconsidered, consequences in terms of complexity, costs, cost recovery, and time.

"Preferred sites" in most cases are already under local state, or federal jurisdiction above and beyond the more routine types of land classification and permitting (such as current use, conservation easements, and Act 250), and this multi-tiered permitting greatly complicates the work and communication involved in solar development compared to conventional sites. For example, landfill closures are certified by the Department of Environmental Conservation, so any structures on top of the cap require landfill re-certification, along with verification that a solar array conforms to the ANR/DEC Solar Landfill Policy of 2014, and - in many cases – an amendment to the host town's custodial care agreement with the State. Similar parallel approval processes exist for gravel pits and brownfields, and for Superfund sites as well, with the addition of EPA approval requirements in the latter. As a result, the emphasis on "preferred sites" has led to significantly higher costs associated with feasibility studies and permitting paperwork. Solar arrays on or near landfills in multiple Vermont towns required engineering and technical outlays alone increase by as much as 5-10% of the total cost of the project.

There is not much elasticity in the costs associated with feasibility studies and permitting between non-rooftop projects larger than 50kW and up to 500kW under the new net metering rule permitting and review process. The economies of scale between 150kW projects and 500kW projects further do not warrant the siting adjustor difference allotted in the net metering rule. In other words, many such costs (e.g., environmental studies, civil engineering, surveys, aesthetic studies, legal costs) are the same for 150kW and 500kW arrays. The shift toward fewer 500kW projects is having a downward impact on cumulative project viability and overall net metering pace because it is becoming less common to be able to spread relatively fixed feasibility and permitting costs across larger projects.

Under the new net metering rule, the impact of 5.129(D) which limits the cumulative capacity of net-metering systems allocated to a single customer to 500 kW has had a negative impact in the pace, potential, and cost of developing net-metering systems. The 500kW per-customer limit places an arbitrary constraint on the freedom of large electricity consumers to engage in local, distributed solar power generation, not only limiting future

growth in renewable energy capacity, but also creating undue barriers for municipalities, schools, and other public-sector institutions.

The impact of the 5.129 (D) customer cap on net-metering pace has also been amplified by the recent effort to consolidate schools into unified districts. Historically, schools have been well represented in net-metering, and in fact reflect the majority of 500 and 150 kW project generation utilization. With multiple schools now coming under one "owner" through district consolidations and thus being considered a single customer, the customer caps have reduced the net metering opportunities and benefits being delivered to schools. The impacts of the customer cap are even more limiting for public-sector and nonprofit entities because they cannot utilize tax credits, have limited budgets and access to capital, and therefore have as their only option the (curtailed) ability to participate in investor-financed net-metered projects.

To further illustrate the point, the largest 300 users of electrical energy in Vermont comprise a significant portion of the total electrical usage in Vermont. Prior to the customer cap outlined in 5.129 (D), this market represented thousands of potential net metering 500kW systems to offset their energy use. With the cap of 500kW per customer now in place, the potential for these customers to help Vermont reach its renewable energy goals has been significantly reduced to a maximum of 300 systems.

The 500kW customer cap has also negatively impacted solar installation costs. All businesses rely on the value of repeat customers as a key component to lowering the cost of acquiring customers. With the customer cap in place under the new rules, each system is a new customer. The time and cost required to find and negotiate projects has increased as a result of the cap, which in turn has slowed the pace of installations and increased the cost to install systems.

V. Eligibility criteria applicable to Categories I, II, III, and IV net-metering systems

REV recommends creating two new criteria for projects based on the offtaker / customer of the net metered generation, one for low and moderate income Vermonters and one for residential community solar.

Much has been discussed leading into this review surrounding the economic impact net-metering may, or may not, have on the ratepayers of Vermont. While other sections of this document address those claims, it is apparent that making Vermont a more affordable place to live, for all, is within the public good. Energy costs are a disproportionately high percentage of low-income Vermonters monthly budgets.[23] Many low-income Vermonters or renters do not usually have access to capital, ample credit score/history, and/or lack the home to purchase a renewable energy system themselves. Group net-metering is a grossly underutilized tool for allowing our low and moderate income neighbors to equitably participate and benefit from local renewable

[23] https://www.efficiencyvermont.com/Media/Default/docs/white-papers/efficiency-vermont-mapping-energy-burden-vermont-white-paper.pdf

energy. Low income Vermonters' participation within net metering has been limited largely in part due to the financial risk, aggregation expenses, and lack of incentive. In short, it is more financeable to seek a large institutional offtaker for a project than to seek many offtakers with a variety of credit risk.

In order to ensure that all Vermonters, regardless of income status, home ownership status, or background have the ability to receive the benefits of net-metering, REV proposes the following new adjustors.

"Preferred Site" Low & Moderate Income Projects:

- Project Definition: A net-metering project that is located on one of the previously identified "Preferred Sites" (landfills, gravel pits, etc.) in place at the time of the biennial review, up to 500kW and has 40 percent of the net-metering system's electrical output allocated to customers who are 150 percent of the median income for Vermont.
- Applicable Adjuster: Projects that meet the above criteria shall receive an additional $.01 per kWh siting adjuster in addition to any other siting adjusters applicable to the project for a period of 10-years.

Other Low & Moderate Income Projects:

- Project Definition: A net-metering project that is up to 150kW in size and has 60 percent of the net-metering system's electrical output allocated to customers who are 150 percent of the median income for Vermont and whose limits of disturbance of the proposed net-metering system do not include any headwaters , streams, shorelines, floodways, rare and irreplaceable natural areas, necessary wildlife habitat, wetlands, endangered species, productive forestlands, or primary agricultural soils, all of which are as defined in 10 VSA chapter 151.
- Applicable Adjuster: Projects that meet the above criteria shall receive an additional $.005 per kWh siting adjuster for a period of 10-years.

The state of Mississippi offers a specific low income customer adjustor.

In addition to enabling greater low and moderate income participation in the net metering, REV again strongly encourages the Commission to ensure that traditional community solar becomes viable in Vermont once again. Prior to 2017, Vermont had one of the most dynamic virtual net-metering policies in the region, widely recognized as a model for energy democracy and local renewable generation deployment. Since implementation of the most recent 2017 net metering rule, residential community solar participation and development in Vermont has come to a virtual standstill. After surveying local solar businesses, REV is aware of only 3 who directly offer new residential community solar projects. While the majority of Category II, III, and IV projects are group net metering, the customers are not residential customers.

Community solar and virtual group net metering enables all electricity customers to access and choose to directly participate in and benefit from local renewable energy generation, especially those unable to host on-site generation. Residential group net metered projects – referred to as

community solar in these comments should be prioritized for revitalization rather than targeted for curtailment.

A community solar-specific adjuster should be considered.

"Preferred Site" Community Solar Projects:

- Project Definition: A net-metering project that is located on one of the previously identified "Preferred Sites" (landfills, gravel pits, etc.) in place at the time of the biennial review, up to 500kW and has 50 percent of the net-metering system's electrical output allocated to residential customers.
- Applicable Adjuster: Projects that meet the above criteria shall receive a $.01 per kWh siting adjuster in addition to any other siting adjusters applicable to the project for a period of 10-years.

Other Community Solar Projects:

- Project Definition: A net-metering project that is up to 150kW in size and has 50 percent of the net-metering system's electrical output allocated to residential customers.
- Applicable Adjuster: Projects that meet the above criteria shall receive a $.005 per kWh siting adjuster for a period of 10-years.

REV welcomes the opportunity to discuss these criterion in specific detail with the Commission in order to ensure that, if adopted, these below criteria are properly enforced, regulated, and structured correctly within the program.

VI. Siting adjustors affecting siting decisions

REV reviewed the CPG permits issued in 2017 and found that siting adjustors are generally effectively driving new projects to "preferred sites".

Preferred Site Type	Category 2 Number of Projects	Capacity (kW)	Category 3 Number of Projects	Capacity (kW)	Total Number	Total Capacity
Rooftop	86	5387	7	2766	93	8153
Gravel pit	2	346	6	3000	8	3346
Town/RPC	4	524	2	1000	6	1524.8
50% onsite	2	66	2	1000	4	1066
Parking lot canopy	0	0	0	0	0	0
Pre-developed impervious surface	1	150	0	0	1	150
Brownfield	0	0	0	0	0	0
Landfill	1	150	0	0	1	150
NPL	0	0	0	0	0	0
				Totals:	113	14390

Given this data, REV urges the Commission to not lower the existing siting adjustors for Category II and III projects. Noting that few to no projects have been permitted on parking lot canopies, brownfields, and NPL sites, the Commission should consider reducing the permitting burden and process for projects on these sites that are previously developed / impaired properties as the addition of solar to these properties would not create new negative environmental impacts. There are many proposed Category II and III projects, but have not been permitted that are highly likely to be withdrawn due to not being economically viable under the revised net metering rule.

VII. Statewide blended rate – credit application

Individual utility's may have different circumstances that may require different approaches, at times, which is why in 2016, REV proposed that new net metering customers receive bill credits based on the statewide blended rate. The statewide blended rate is generally lower than most co-op and municipal utility rates. Net metering bill credits should be completely "transparent" to the rate design under which net metering customers take service. By "transparent," we mean that a residential customer who has installed net metered generation continues to see exactly the same rate design, and same resulting price signals that the customer faced before installing solar or elects from their utility. We believe that the newly revised net metering rule did not intend to change this.

The new method utilized to calculate the net metering bill credits under utilities with rates that exceed the statewide blended retail rate is unnecessarily cumbersome and delivers a higher net metering value than is needed for a reasonable pace of deployment. For example, a residential customer in Washington Electric Coop's (WEC) service territory is effectively able to offset a two tiered energy rate of 23.2 cents per kWh for use above 200 kWh and 10.4 cents for energy use below 200 kWh. Production above what is used at the home (net excess production) is then compensated at a rate of 14.9 cents which is the blended statewide rate. WEC net metering customers consequentially receive significantly higher incentives than the statewide blended rate which creates unnecessary compensation for those installing net metered systems in WEC's territory. In the end, the rate that WEC pays is a mix between the statewide blended average and the composite of the two-tiered energy rate which is significantly higher than the 14.9 statewide blended rate.

REV recommends, for customers who file permits after June 30, 2018, a change to simplify the process and reduce the compensation paid by WEC and other utilities in a similar situation. All net metered projects currently being installed in the net metering program have separate production meters that track how much solar has been generated in any given billing period. Allowing utilities to simply multiply this gross production (rather than just the net) by the statewide blended rate to calculate the billing period solar credit will simplify the process and lower the compensation due for that solar production. This solar credit would still be netted against the customer bill and the customer would still have to pay the monthly customer charge and other non-bypassable charges.

VIII. Other issues

a. Data consistency & transparency

REV urges the Commission to require more transparency, uniformity, and timeliness in reporting data on net-metering installations in Vermont. Current data is not reliable when figures for non-net metered solar are co-mingled with net metering, and when data used for pace or potential cost analysis includes net metering systems that were never installed or commissioned. Until a facility is operating, it does not have the potential to impact utility costs borne by all ratepayers and it should be excluded from analysis.

All stakeholders would benefit from a single source of data that is tracked and made available in regular time intervals by the Commission as part of any future policy discussion and biennial update process.[24] The data set should include the number of applications filed with the Commission,[25] number of applications withdrawn before final order,[26] number of CPGs issued, number CPG applications denied, and total capacity of net metering systems commissioned.[27] Collecting and tracking this information by technology, Category, and site type (especially each different preferred location) would also usefully inform the future program, as would tracking the number of projects that were not built and commissioned before their CPGs expired.[28]

b. Grid Modernization

REV appreciates the Department's thoughtful discussion on the need to be proactive and modernize the electrical grid, both to sustain the net metering program and to meet the State's renewable energy commitments. The Department's comments echo a similar observation from the CEP that "[p]roactive grid design and planning can address integration concerns before they serve to limit generation interconnection."[29] REV's members are committed to doing their part to achieve these goals. In fact, an unsung success of the net metering program has been the substantial number of grid upgrades financed by installers and customers. Investments in net metered generation are directly responsible for grid upgrades across the state, such as enabling substations to accept two-way flows of electricity and information. These are meaningful benefits that advance the State's goals to transform Vermont's electrical network into a smart grid.

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[24] "An accurate and universally agreed upon foundation of data is necessary for all stakeholders to properly understand and opine on the pace of deployment, the effect of adjustors and other trends at the heart [that] process." ANR Comments at 5.

[25] An "application filed" would be one for which the Commission issued a completeness determination or was deemed complete by operation of law. See Rules 5.105(C), 5.106(E), 5.107(D).

[26] An "application withdrawn before final order" is one for which a completeness determination was issued butthe Applicant later withdrew the application from the Commission.

[27] "Commissioned" has the same meaning as provided in Rule 5.103. The data could come from the utilities in a uniform format, which can be accomplished by including it as part of the annual report filed with the Department per 30 V.S.A. § 22(a).

[28] The Commission has newly been consistently denying requests to extend the expiration date of net-metering CPGs.

[29] Comprehensive Energy Plan at 243.

REV also agrees with the Department that investigating and implementing rate design and technology solutions to address potential grid constraints are beyond the scope of this biennial review.[30] Notably, the Commission is already investigating these issues in a separate proceeding on the Sheffield-Highgate Export Interface ("SHEI"), an area of the electrical grid in Northern Vermont.[31] It is important to address this complex issue in a way that allows comprehensive and broad stakeholder involvement to guide solutions focused on strengthening the grid while honoring the CEP's goal of avoiding limits to generation interconnection.

REV does, however, respectfully disagree with the Department's suggestion that each incremental addition of new generation displaces existing generation in the SHEI (or other constrained areas of the grid).[32] As the Commission is aware, VELCO and others have reported that congestion is not an issue during most hours of the year as it is concentrated within certain hours and seasons.[33] Thus new generation will only displace existing generation to the extent its output coincides with output from existing generators during the limited hours of congestion. Studies from a number of institutions, including the Lawrence Berkeley National Laboratory, have found that low levels of hourly and seasonal correlation between solar and wind, for example, limit conflicts resulting in congestion.[34] These studies highlight the "complementary profiles" of wind and solar with respect to grid integration. For these reasons, REV disagrees with the Department's suggestion that a negative siting adjuster should be imposed if a project is on a "saturated" distribution circuit.[35] Such a negative adjuster would be a blunt tool that lacks the precision needed to address the complexities of these issues and will likely negatively impact customers' access to local renewable energy for a long period of time. A negative adjuster could also be overbroad insofar as it would limit project opportunities in large areas of the State and impede Vermont's progress to meeting its renewable energy commitments. In any event, REV agrees with the Department that more stakeholder input and analysis is needed before any rate design and technology solutions are implemented.

c. Neighboring States

As part of an evaluation of Vermont's Net Metering program it can be instructive to consider how the States program compares with its neighbors and others across the country. This

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[30] DPS Comments at 11-12.

[31] *See Public Forum on the Sheffield-Highgate Expot Interface*, Case No. 17-5219-INV.

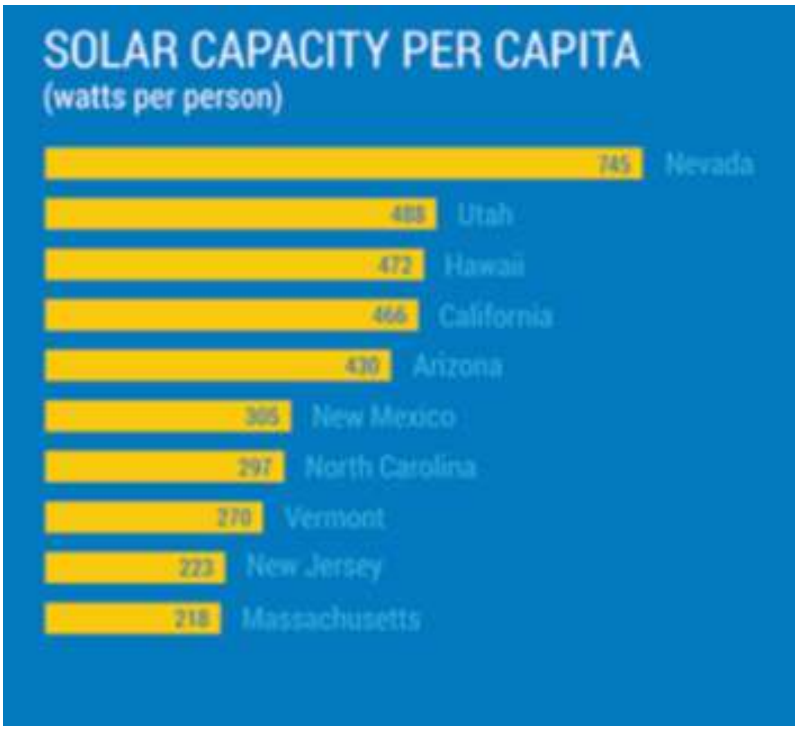
[32] *See* DPS Comments at 11.

[33] *See, e.g.*, *Northern Vermont Export Study* at 2 (2017); GMP 1/11/18 Presentation, Case No. 17-5219-INV. https://www.vermontspc.com/library/document/download/5894/SHEI%20Study%20SeptemberUpdate.pdf.

[34] *See* Andrew Mills and Ryan Wiser, Lawrence Berkeley National Laboratory, *Strategies for Mitigating the Reduction in Economic Value of Variable Generation with Increasing Penetration Levels* (2014), https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwij8qiZ_-nZAhXCrFkKHU-SCq4QFggsMAA&url=https%3A%2F%2Femp.lbl.gov%2Fsites%2Fall%2Ffiles%2Flbnl-6590e.pdf&usg=AOvVaw1FHhrzRibdZA8o6yo_Nnj5.

[35] DPS Comments at 23.

consideration includes how much solar Vermont has adopted and the net metering rates. The figure below is from SEIA and shows a ranking of Vermont relative to states in terms of solar adopted on a per capita basis.[36]



In terms of net metering rates, the Massachusetts SMART program is instructive. This program seeks to double the amount of solar in MA to 3.2 GW in the next several years. As an example of the incentives, the base rates for the SMART program in Nation Grid territory are:[37]

- < 25 kW Low Income: $0.33/kWh (10 years)
- < 25 kW: $0.31/kWh (10 years)
- 25 - 250 kW: $0.23/kWh (20 years)
- 250 - 500 kW: $0.19/kWh (20 years)
- 500 - 1,000 kW: $0.16/kWh (20 years)
- 1,000 - 5,000 kW: $0.14/kWh (20 years)

On top of these base rates are adders of $0.02 to $0.06/kWh for incentivized types of installations including public entities.

VIII. Response to ANR's Comments

REV supports ANR's comments related to parking lot solar canopies. Deploying renewable energy our built environment has numerous land use and electrical grid benefits. Unfortunately, extremely few solar canopies have even entered the permitting process, let

[36] https://www.seia.org/research-resources/top-10-solar-states

[37] https://news.energysage.com/solar-massachusetts-renewable-target-smart-massachusetts-srec-replacement-program/

alone been built. This is because solar canopy construction requires a relatively expensive structure, which increases the cost of project to a point where there is no financial case for the installation.

Further, the current permit process for a solar canopy greater than 50 kW requires legal testimony on a number of issues that do not apply to existing parking areas (prime ag soils, wetlands, etc.). REV requests that the Commission permit canopies through a registration type process, with the exception that the notice period is 45 days, to allow for adequate local input on aesthetics.

REV urges the Commission to reject any changes to the net metering rule that would in any way narrow the area on "preferred location" parcels.

X. Closing

Largely thanks to net metering, Vermont has a vibrant, active renewable energy sector working as an engine of economic growth and producing significant benefits to all Vermonters. Vermont and REV's members are true trailblazers in our commitment to progress transition to a total renewable energy system and a modern electricity system. We also have enormous understanding and respect for the difficult balancing act that implementing such a transition entails. REV's members and Vermont's citizens stand ready and willing to invest private capital to help build a 21st century clean energy infrastructure in which all consumers have the opportunity to directly participate and benefit. We look forward to the Commission's continued leadership in creating equitable access to renewable energy.

Again, REV sincerely appreciates the opportunity to weigh in on these important issues.

Respectfully submitted,

Olivia Campbell Andersen
Executive Director
Renewable Energy Vermont

Attachments:

1. Synapse Comments

Renewable Energy Vermont's members work to eliminate reliance on dirty fossil fuels by increasing clean, renewable energy and energy efficiency in Vermont. Vermont's clean energy economy directly enables at least 19,080 jobs at 3,751 businesses, representing approximately 6% of Vermont's workforce. Together, we will achieve 90% total renewable energy (electric, thermal, transportation) before 2050. Learn more at [www.revermont.org.](http://www.revermont.org)