



BURLINGTON
ELECTRIC
DEPARTMENT

November 1, 2019

Judith Whitney, Clerk
Vermont Public Utility Commission
112 State Street, Montpelier, VT

Re: Case No. 19-0855-RULE - Proposed revisions to Vermont Public Utility Commission Rule 5.100

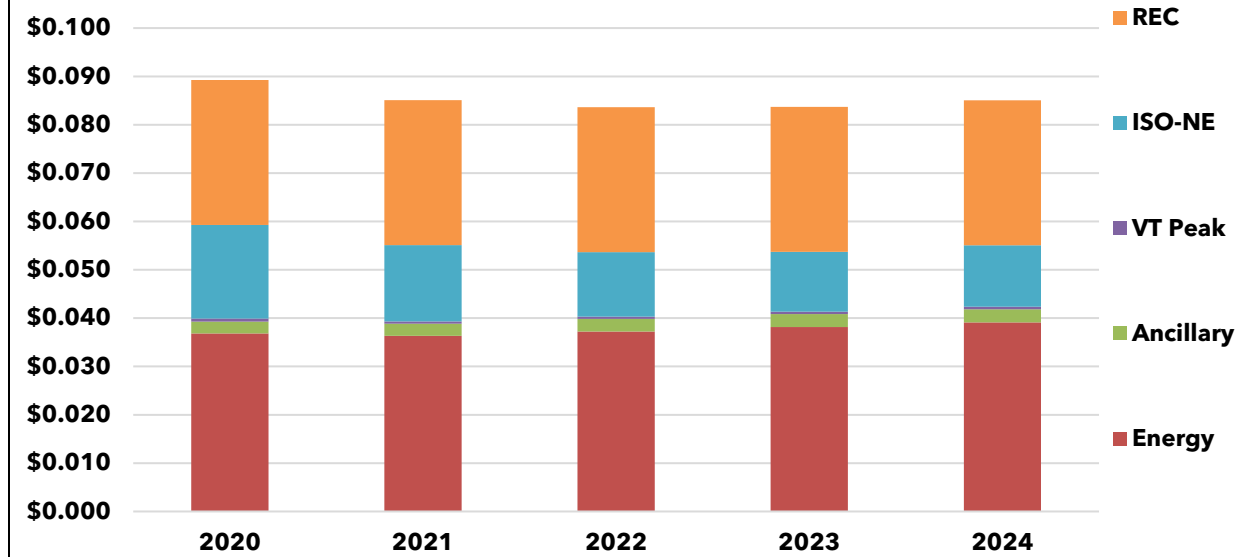
Dear Ms. Whitney:

In an Order dated August 22, 2019, the Public Utility Commission (Commission) requested that Vermont's electric distribution utilities provide additional information related to net metering compensation. The Commission further requested comments on the costs and benefits of Vermont's net metering program. Vermont in Vermont Public Power Supply Authority (VPPSA) and Burlington Electric Department (BED) submit the following responses to the topics covered in the Commission's Order.

1. Is the current net-metering compensation system causing a cost shift between customers who net-meter and those who do not? Please quantify this cost shift and provide all calculations supporting your response.

Yes. The benefits of solar range from 8 - 9 cents/kWh (Figure 1.1) while the costs of the program range from 8 - 17 cents/kWh (see Table 2.1). Please see additional text included in Appendix 1 for a description of the methodology of calculating the values provided in response to Questions 1 and 2.

**Figure 1.1
Unitized Solar Valuation
BED October 2019**



- Please quantify the effect of current net-metering compensation on your retail rates. Please provide all calculations and information supporting your response.

The estimated impact on retail rates of the existing program ranges from -0.1% to 1.0% as shown in Table 2.1. Supporting calculations are included in the Appendix 3. For the purpose of this response, we have assumed that, at least with regard to small net metering systems for on-site consumption, distribution losses will be saved. The assumption is that any net metering system will reduce upstream losses (sub-transmission if applicable and VELCO transmission).

Table 2.1

Net Metering Capacity Solar Only After 7/1/2017			Net Metering Compensation (\$/Yr)		Net-Metering Avoided Costs & Cross Subsidy		Net Metering Rate Impact		Net Metering Penetration	
Utility	kW Installed	kWh/Yr	NM Compensation	Ave \$/kWh	Value of Avoided Costs	Cross Subsidy	2018 Total Retail Sales	Rate Impact	NM Energy (kWh/Yr)	NM Peak (kW)
A	B	C	D	E / D	F = C * \$0.091/kWh	G = D - F	H	G / H		
Burlington	1,348	1,836,972	\$280,213	\$0.153	\$167,164	\$113,048	\$47,232,455	0.2%	0.5%	6.2%
Barton	75	94,398	\$16,441	\$0.174	\$8,590	\$7,851	\$2,746,877	0.3%	0.7%	2.6%
Enosburg	604	926,673	\$110,377	\$0.119	\$84,327	\$26,050	\$4,133,234	0.6%	3.5%	12.8%
Hardwick	604	769,216	\$131,248	\$0.171	\$69,999	\$61,249	\$5,882,109	1.0%	2.3%	8.4%
Jacksonville	39	47,339	\$8,110	\$0.171	\$4,308	\$3,802	\$856,822	0.4%	0.9%	3.4%
Johnson	318	442,065	\$59,064	\$0.134	\$40,228	\$18,836	\$2,141,035	0.9%	3.5%	13.4%
Ludlow	5	6,439	\$520	\$0.081	\$586	-\$66	\$8,078,204	0.0%	0.0%	0.0%
Lyndonville	652	914,173	\$114,326	\$0.125	\$83,190	\$31,136	\$9,207,999	0.3%	1.6%	5.5%
Morrisville	442	566,507	\$81,747	\$0.144	\$51,552	\$30,195	\$7,081,487	0.4%	1.2%	5.4%
Northfield	550	848,846	\$74,312	\$0.088	\$77,245	-\$2,933	\$3,769,912	-0.1%	3.0%	10.4%
Orleans	14	17,170	\$2,270	\$0.132	\$1,562	\$707	\$1,936,891	0.0%	0.1%	0.4%
Swanton	1,095	1,695,510	\$144,351	\$0.085	\$154,291	-\$9,940	\$7,043,131	-0.1%	3.1%	10.7%

3. If current net-metering compensation is having a significant effect on retail rates, please describe how compensation should be changed so that the net-metering program does not have a significant effect on retail rates.

BED and VPPSA support net metering as a means of helping customers who want to install self-generation such as solar. Vermont public policy has likewise supported net metering for a variety of reasons, including adding new renewable generation to Vermont's supply mix, supporting local jobs in renewable energy, and for the additional benefits net metering can provide including some peak demand reductions. With that said, BED and VPPSA acknowledge that net metering can cause a cost shift among customers if the compensation rate exceeds the economic value (this is not entirely unique to net metering), and in that case can add some upward pressure on rates.

The most straightforward manner in which to affect the rate pressure caused by net metering would be to improve the alignment of the compensation paid to customers with the value received by the utility. Compensating net metering customers at a rate closer to the economic value of the electricity they generate would reduce the cost-shift that is currently taking place between net metered and non-net metered customers. Under value-driven net metering compensation, utilities - and through them their customers - would pay an amount closer to the value received from net metering generation. To the extent that the state creates structures that monetize societal benefits (such as the RES), then those benefits should be included in the valuation.

4. Please state the amount of new net-metering capacity the utility will need to meet Vermont's Renewable Energy Standard in total and on average per year.

Tier 2 of Vermont's Renewable Energy Standard requires utilities to purchase electricity equivalent to a specified portion of their retail sales from in-state renewable generators that are smaller than 5 MW and came online after June 30, 2015. New net metering generation where customers transfer the RECs to their utility counts towards the utility's Tier 2 requirement; however, there is no goal or specific requirement for the amount of net metering generation that should be purchased by each utility. At a basic level, the RES requirements could be met without new net metering capacity. If no additional net metering projects came online, utilities could simply procure generation from other Tier 2 eligible resources.

In fact, net metering is, in all probability, the highest cost resource available to comply with Tier 2 of the RES due to the difference between the net metering compensation rates and the prices at which utilities can develop projects, purchase Standard Offer output, or execute PPAs. The Department clearly acknowledged this reality in its 2019 report to the legislature, which found that, "Although net-metering meets many of the

goals laid out in 30 V.S.A. § 8001, it is currently the most expensive type of renewable energy available to fulfill the RES requirements, in addition to being highly unpredictable and uncontrollable by utilities, which are the obligated parties to purchase the generation under RES.¹”

As the Commission is aware, BED and Swanton have modified Tier 2 requirements under 30 V.S.A. § 8005 due to its attainment of 100% renewability, which they intend to maintain. DUs that meet the statutory threshold for being 100% renewable must accept new net metering systems and retire any associated RECs. Accordingly, the above discussion is most relevant to VPPSA members (excluding Swanton.)

5. Please identify all the benefits that net-metering provides (for example, energy, capacity, reduced regional network service charges, etc.).

See below for response to Questions #5 and #6

¹ *Report on Vermont Renewable Energy Programs, A Biennial Report to the Vermont General Assembly Prepared by the Department of Public Service.* March 1, 2019.

6. For each benefit identified, please state whether the value of the benefit accrues to the net-metering customer, ratepayers, the utility, or society in general.

The following table summarizes the material benefits (including non-economic benefits) from net metering systems, notes regarding the benefit in question, and an identification of who receives the benefit. Also included is a comment on whether the benefit in question is the result of a reduction in costs or a reallocation of costs to others. For municipal utilities, benefits that accrue to the "utility" effectively accrue to all ratepayers.

Some financial benefits of net metering accrue to the participating customers and the developers that install and/or own the net metering systems. This financial benefit or "profit" is the difference between the compensation received for net metering and the cost to install a net metering system. BED and VPPSA do not have transparency into the magnitude of this financial benefit or how the benefit is being apportioned between customers and developers. Information on those arrangements may be difficult to acquire but could be very informative in setting the appropriate compensation rates, but would require installers to disclose their cost information.

Possible Benefit	Note/Comment	Reduction or Reallocation	Contingent On	Primary Beneficiary
Energy	Through ISO-NE energy market revenues or reduced costs	Avoid		Utility
Capacity	Either through ISO-NE FCM asset treatment or load reductions	Avoid	ISO-NE Rules	Utility
Distribution Losses	Loss savings (most likely in non-exporting arrays at load location)	Avoid	Size/Location/Exporting	Utility
GMP Trans	Re-allocation of costs that have generally already been incurred	Re-allocate	Tariff terms	Utility
VELCO Trans	Re-allocation of costs that have generally already been incurred	Re-allocate	Tariff terms	Utility
ISO-NE Trans (RNS)	Re-allocation of costs that have generally already been incurred	Re-allocate	Tariff terms	Utility

Possible Benefit	Note/Comment	Reduction or Reallocation	Contingent On	Primary Beneficiary
ISO-NE Ancillary Markets	Smaller markets with both credit and charge components	Avoid?	ISO-NE Rules	Utility
Environmental	Currently valued through RECs / RGGI	Avoid		Holder of Attributes
Environmental (Non REC)	Any assumed environmental benefits not monetized in RPS/RGGI	Avoid	Non-monetary valuation	Society
Resiliency - Grid	More a possible future benefit than current			Utility/Society
Resiliency - Customer	Not generally achievable without local storage		Additional Investment	Customer
Local Generation	Potential congestion protection			Society (regional)
Economic Benefits/Profit	Job creation and Return on Investment	Re-allocate		Participants, Local Economy, Developers

7. For each benefit, please describe how the Commission should estimate the value of that benefit. Please identify what data sources the Commission should use to make such estimates. If you have an estimate of the value of a particular benefit, please provide the estimate, along with supporting documentation showing how the estimate was derived.

See below for response to Questions #7 and #8. For a numeric quantification of the primary utility benefits, see the answer 1.

8. When estimating the value of the benefits of net-metering, what time horizon should the Commission consider? Why?

Possible Benefit	Valuation	Time Horizon	Notes
Energy	ISO-NE energy values	Long	Changing load shape will result in changing energy values over time
Capacity	ISO-NE capacity values	Long	Changing load shape will result in changing capacity values over time
Distribution Losses	If demonstrable by engineering estimate	Medium	Changing load shape will result in changing transmission values over time. System topology may change over time.
GMP Trans*	Tariff rates & projections	Shorter	Changing load shape will result in changing transmission values over time
VELCO Trans*	Tariff rates & projections	Shorter	Changing load shape will result in changing transmission values over time
ISO-NE Trans (RNS)*	Tariff rates & projections	Shorter	Changing load shape will result in changing transmission values over time
ISO-NE Ancillary Markets	Historical values and trends	Long	Not large and offsetting (i.e. can reduce both charges and credits)

Possible Benefit	Valuation	Time Horizon	Notes
Environmental	Mid to long term market prices	Long	Should recognize potential risks of extremes
Environmental (Non-REC)		Long	Hard to quantify monetarily
Resiliency - Grid		Long	Hard to quantify monetarily. Not commencing immediately.
Resiliency - Customer		Medium	Hard to quantify monetarily. Potential equipment life concerns
Local Generation		Long	Local economic benefit versus alternatives

*Not these are cost shifts, not reductions in cost.

9. Please identify all costs of net-metering. Please describe how the Commission should account for these costs so that they can be compared to the benefits of net metering.

As a general matter, the direct utility costs of net metering are the costs to the utility of net metering compensation rates. In addition, net metering systems that can export power to the grid, especially larger projects and those located far from the load they are intended to serve, can actually impose additional costs on the distribution grid.

Vermont's net metering structure is removed from traditional net metering in that it allows generation to potentially be located far from the load it ostensibly serves (the "group" net metering structure). Some consideration of the potential for future upgrades to the distribution system are attributable to new (non-group) net metering projects should be considered, along with how those costs should be recovered (all customers, all net metering customers, net metering customers from the point of upgrade on etc.). VPPSA and BED are not advocating one of these treatments at this time but do want to note the issue. Costs associated with new group net metering systems should be borne by those group net metering systems, and the members in those groups.

The existing distribution system was designed for a one-way flow of power from large generators to the end-use customers. Reductions in load at the point of consumption should not stress the system, but the present mechanics that allow for producing energy sufficient to offset annual consumption can result in systems that, at times, inject significant power to the grid ("reverse flows"). Grid impacts are most pronounced during times when net metering generation is high in comparison with system load and perhaps more so with solar due to its natural coincidentization (there are times when all solar projects, especially in a smaller utility, are generating significant output at the same time).

There are also non-monetary costs that are more difficult to quantify, such as aesthetics and land use impacts which some have raised, particularly in the context of the larger group net metered systems on green fields. To the extent that there might be non-monetary costs of this type, these costs and concerns are minimized or removed with smaller, typically rooftop, arrays or arrays on "preferred sites".

10. For each cost, please identify who pays the cost (ratepayers, the utility, society).

Cost	Who Pays
Net Metering Compensation	Ratepayers (Through their utilities)
Aesthetics	Society
Land Use	Society
Grid Impacts - Upgrades	Net Metering Customers and All Ratepayers
Grid Maintenance/Support	Customers, but falls more heavily on non-net metered customers under VT's net metering implementation absent utility filings for non-by passable charges

11. Please compare the benefits of net-metering to the cost of net-metering under the current net-metering rule.

BED and VPPSA provided a quantification of the economic costs and benefits of net metering in response to question #1. There are, in all probability, non-economic benefits to net metered generation, such as environmental benefits that are not valued, as well as facilitating future resiliency of the grid (see response to #6). It is important to note, that most, if not all, of the benefits delivered by net metering can also delivered by other distributed generation resources and thus are not unique *benefits of net metering*. The unique benefit of net metering is the ability of customers to "self-generate" some or all of their electricity.

BED and VPPSA recognize a customer engagement benefit that can be present with net metering, where net metering customers may be more likely to participate in other utility programs such as EV incentives through Tier III. BED offers a Solar Shopper program with participating solar installers to help encourage its customers to evaluate the opportunity for individual residential (not group) net metering projects.

From a benefit point of view there is no practical difference (added benefit) between utility (and community) projects and individual net metering projects in terms of the wholesale market and transmission value streams (for a given resource type and location). These value streams are governed by the generation characteristics of the resource, and the interplay between those characteristics and the applicable market rules or tariffs. Thus in the conversation regarding the costs and benefits of net metering, it is important to acknowledge that *alternatives* to net metering (e.g. utility community solar programs) can deliver the same wholesale market benefits (though perhaps not some of the non-economic benefits) at a significantly lower cost than the cost of Vermont's current net metering structure.

12. If the current net-metering compensation system does not balance the costs and benefits of net-metering, please describe how the compensation system could be changed to better balance costs and benefits.

Simply put, from a utility revenue/rate perspective, the costs and benefits of net metering would be in balance if the amount paid in compensation was equal to the economic values derived from the generation. Setting net metering compensation rates equivalent to the expected value provided by net metering generation over the life of the systems would eliminate or significantly reduce rate pressure due to net metering deployment and alleviate equity concerns around the cross-subsidy paid by non-net metering customers to those customers that net meter. Though even in the case of setting resource values equal to the long-term benefit, there can be differing rate pressures at different points in the asset life (for example levelized costs can yield up front rate pressure). This is not unique to net metering and this issue can exist in utility PPA's as well.

To the extent that non-economic values derived by non-net metering are monetized in net metering rates, electric ratepayers will bear those costs without commensurate economic benefit (i.e. those non-economic values will be monetarized in the utility rates). With regard to environmental/carbon benefits, it is important to note that at least a portion of these benefits are currently captured through RGGI and REC prices, which monetize environmental benefits. BED and VPPSA also note that while net metering systems may have lifetimes of 25 years or longer, the current compensation rates for RECs only provide a value for 10 years which improves the utility economics.

Another method for mitigating cross-subsidy concerns would be for utilities to implement of increase distribution access fees to reflect the true costs of utilizing the distribution system infrastructure. This would require taking fixed costs out of the retail rate and result in significantly higher fixed, non-bypassable monthly charges for all customers. While this approach is permissible under the current Rule 5.100, it has not been fully implemented by any distribution utility.

13. Would using time-of-use retail rates to set net-metering compensation better align the costs and benefits of net-metering? Should the Commission require net-metering customers to be on time-of-use rates?

Time of use retail rates could better align the costs and benefits off net metering, if lower rates were paid at times when the generation was less valuable to the utility and higher prices during peak times (both in terms of energy costs and in terms of cost that affect utility capacity charges). Other states, such as California, have taken this approach. There

are several drawbacks to this approach. The value of energy by time period is very dynamic (especially as utilities attempt to manage shifting peaks) and may need to be adjusted more often to reflect changes on the system than is reasonable under Vermont's structure for reviewing and approving rate design changes. This approach would significantly increase the complexity for both utilities and net metering customers and could potentially require additional investments by the utilities related to billing of net metering.

14. Should the Commission allow utilities that provide their customers 100% renewable energy to propose alternative net-metering tariffs? If so, what minimum requirements should the Commission adopt for such tariffs?

Yes, it would be appropriate for the Commission to allow utilities that provide 100% renewable electricity to propose alternative net metering tariffs, as those utilities have already taken significant action to advance Vermont's climate goals.

In general, the Commission should review tariffs as they come in on their merits. It is not clear why a utility that is not 100% renewable would not be permitted to propose an alternative net metering tariff (though the burden of proof might be higher). The statewide oversight would provide for a sufficiently robust review process in which stakeholders could comment at that time. Proposing rates that accomplish the utilities' goals and Vermont's goals while respecting system capability and constraints is appropriately the role of the distribution utilities. Setting general goals and reviewing the proposals for attaining those goals is the purview of the legislature and regulatory bodies.

15. Should the Commission adopt a limit on the amount of new net-metering resources? If so, how should the Commission determine the amount?

No. Limiting the amount of net metering resources to be deployed in Vermont is not the solution to the problem of net metering costs exceeding their benefits. In fact, better alignment of costs and benefits is the path to making sure that net metering is, in fact, sustainable and available to all Vermont customers, not just the early adopters. Under a structure where utilities (and through them their ratepayers) received value that is in line with the price paid for the generation and costs were allocated fairly, utilities would be indifferent to the amount of net metering deployed on their systems. The Commission should endeavor to better align these costs and benefits rather than restrict the amount of new net metering resources and thus limit the number of Vermonters that are permitted to participate in net metering.

Returning to a cap would not be desirable for small residential systems and would only be needed for larger/group systems if compensation is allowed to significantly exceed value, or if material non-economic benefits are monetized, in net metering compensation. The closer the alignment of economic value and cost, the less relevant a cap is.

Thank you for your consideration of these comments. Please contact me (mbailey@vppsa.com or 802-882-8509) with any questions you may have.

Sincerely,

Melissa Bailey
Legislative and Regulatory Affairs Representative
Vermont Public Power Supply Authority