May 1st, 2024



Ms. Holly Anderson, Clerk

Vermont Public Utilities Commission 112 State Street, 4th Floor Montpelier, VT 05602

RE: 24-0248-INV Biennial update of the net-metering program

Dear Clerk Anderson,

Renewable Energy Vermont ("REV") submits this comment in response to the Public Service Department's ("PSD") recommendations in the Biennial Update of the Net-Metering Program (Case # 24-0248-INV) dated April 1st, 2024. We appreciate the opportunity to present our perspective on the net-metering program, which has been and will continue to be critical to the state's efforts to advance renewable energy development and meet the state's climate goals.

The Department's proposal to reduce the adjustor for NM 2.6 systems by 2 cents/kWh would have little impact on Vermont rates but would make net metering substantially less accessible for Vermonters. The net cut in compensation that the Department is proposing is nearly three times larger than the cut enacted in 2022 – a cut that corresponded to a 37% drop in annual net-metering CPG applications. In the context of a worsening climate crisis, reducing Vermonter's ability to participate in net metering is not in the public interest.

Consequently, we urge the Commission to update the statewide blended residential rate to \$0.18398/kWh, as calculated by the Department, but to reject the Department's recommendation to reduce either the REC or siting adjustors.

The Department's argument for further cuts to net metering compensation relies on four fundamental errors:

- 1. It continues to underestimate the value of net-metered generation,
- 2. It misrepresents the trends in net-metering applications and installations,
- 3. It mischaracterizes the trend in net-metering affordability, and
- 4. It underestimates the amount of Tier II capacity that the state needs to be building

Our response is organized as follows. Section 1 outlines the principles that underlie our response. These are Vermonters' right to a meaningful opportunity to participate in netmetering, the imperative to expand renewable energy generation to reduce greenhouse gas emissions as mandated in the Global Warming Solutions Act (GWSA), and the asymmetric consequences of deploying renewable resources more quickly versus more slowly than the minimum rates required to achieve compliance with the Renewable Energy Standard (RES).

Sections 2 through 4 respond directly to the Departments' April 1st filing. Section 2 provides an overview of the shortcomings that we observe in the Department's assessment of a purported cost shift attributable to net metering and several recent examples of studies (including one commissioned by the Department) that incorporate a more comprehensive set of values for distributed generation than simply energy and RECs. Section 3 calculates the actual, minimal impacts of the Department's proposed cuts on electric rate as well as the negative impact of the proposed cuts on Vermonters looking to net meter. Section 4 looks at the historical net-metering application and interconnection trends and shows that the Department's characterizations of the state of net metering misrepresents several of the most pertinent trends, which show declining participation in the net-metering program. Finally, Section 5 examines the implication of the likely passage on H.289 on our renewable energy needs. Our conclusions are presented in Section 7.

1. Principles

All Vermonters Should Be Able to Access Net-Metering: Net-metering was created as a mechanism to empower Vermont ratepayers to self-generate clean, renewable energy and increase consumer choice in the context of Vermont's vertically integrated utility environment. 30 V.S.A. § 8010(c)(1)(E) mandates that the net-metering rule must ensure "that all customers who want to participate in net-metering have the opportunity to do so." Net-metering rates that make self-generation financially inaccessible deprive Vermonters, and especially low- and moderate-income Vermonters, of a meaningful opportunity to participate in the net-metering program. While the statute also includes the provision to avoid cost shifts among ratepayers, this is a qualified requirement, 30 V.S.A. § 8010(c)(1)(C) "*to the extent feasible,*" and is subject to the broader mandate that all Vermonters have the opportunity to participate in the net-metering program. Access to net metering is meaningfully eroded by the Department's proposal.

The Climate Crisis Requires Massive New Renewable Deployment: Additionally, the success of the net-metering program must be evaluated in the context of the climate crises and the Global Warming Solutions Act (GWSA). The GWSA articulates the imperative to accelerate greenhouse gas emissions reductions and mandates that all State agencies consider "any increase or decrease in greenhouse gas emissions in their decision-making

procedures with respect to the planning, design, and operation of programs" such as the net-metering program. As described in the Climate Action Plan, achieving the GWSA target will require massive electrification of the transportation and heating sectors and this new electricity demand will need to be met with equally massive *new* renewable energy generation. As neighboring states also look to advance climate goals, creating a similar demand for *new* renewable energy resources and significant competition for the electricity generated by these resources. Promoting the development of in-state renewable energy is essential for ensuring that Vermont has access to the clean energy resources necessary to achieve the GWSA greenhouse gas reduction mandates. In this context, it is imperative that the Renewable Energy Standard (RES) mandates for in-state renewable energy generation are understood as floors for renewable generation and that more rapid deployment of renewable energy resources is recognized as highly desirable for advancing the state's climate objective.

An Insufficient Rate of Net-Metering Deployment Hurts Vermont and Vermonters:

Consequently, the downside risk of under-shooting the RES minimum generation thresholds is substantially greater than any risk associated with renewable development above the RES mandates. Setting net-metering rates that result in missing the RES mandates would exacerbate the climate stressors impacting Vermont (which disproportionately impact low-income Vermonters), undermine trust in climate mitigation efforts, and shrink the renewable sector in Vermont – weakening the state's capacity to achieve future renewable energy goals – and open the state up to legal jeopardy. Renewable development above the RES minimums accelerates greenhouse gas emissions reductions and provides broad societal benefits.

2. Value of Solar Net Metering

The Department's primary rationale for reducing net-metering compensation is that it believes that net-metering results in a cost shift that adversely impacts non-participating customers. However, the Department failed to conduct a comprehensive assessment of the benefits that ratepayers receive from net metering and, as a result, failed to substantiate its assertion that net metering results in a cost shift. The Department states that "the compensation currently paid to net-metering systems continues to significantly exceed the wholesale energy price and market-based Class I REC prices combined."¹ but net metering benefits are not limited to the energy and RECs that the systems provide.

REV members believe that fully accounting for the benefits of net metering would show that the program saves money for all ratepayers. *At a bare minimum*, the Department overstates the magnitude of any cost shift resulting from net metering by failing to account for the numerous benefits provided by net metering systems.

New Hampshire VDER Study

In 2022, the New Hampshire Department of Energy commissioned a study on the value of distributed energy resources that included a dozen benefit categories in its distributed generation value stack. The report determined that the value of residential and commercial solar was on the order of 13 to 17 cents/kWh through 2035 and that energy and RPS compliance benefits provided less than a third of this total value (see Figure 1).² Subsequently, the New Hampshire DOE released a 2023 addendum to this study to reflect the value of distributed energy resources in the context of surging natural gas prices and energy supply costs³. In this addendum, the near-term value of residential and commercial solar was 15-20% higher than the original study and still 5% higher than the 2022 study in 2035. While the differing levels of solar penetration in Vermont and New Hampshire mean that these numbers are not directly transferable from New Hampshire to Vermont, it does indicate that benefits other than energy and RECs cannot be ignored and can result in net metering systems providing a net benefit to ratepayers.

¹ In re: biennial update of the net-metering program, Case No. 24-0248-INV, Comments and Recommendations of the Department of Public Service RE: Biennial Update of the Net-Metering Program, 04/01/2024 at page 16.

² Dunsky Energy + Climate Advisors, *New Hampshire Value of Distributed Energy Resources Final Report* see Figures 11-13 available at <u>https://www.energy.nh.gov/sites/g/files/ehbemt551/files/inline-</u> <u>documents/sonh/nh-vder-report.pdf</u>

³ Dunsky Energy + Climate Advisors, *New Hampshire Value of Distributed Energy Resources Final Report: Addendum* available at <u>https://www.energy.nh.gov/sites/g/files/ehbemt551/files/inline-documents/sonh/nh-vder-rpt-addendum.pdf</u>

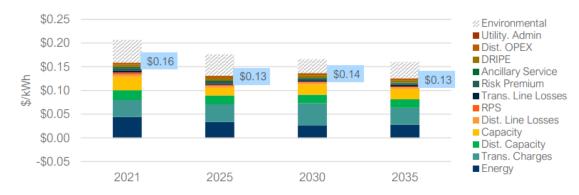


Figure 10. Average Annual Avoided Cost Value for Residential South-Facing Solar PV Array Installed in 2021 (2021\$)^a

Figure 1. Value of Residential Solar from 2022 New Hampshire VDER Study

PSD RES Technical Analysis

Modeling commissioned by the Department and conducted by Sustainable Energy Advantage (SEA) also included 12 additional categories of ratepayer benefits associated with Tier II generation above and beyond energy and RECs⁴. In the baseline "Business as Usual" scenario SEA assessed these benefits at \$15.96/MWh, 22% of the 2025 energy value alone. While the assumptions used by SEA (which REV has not vetted), do not result in a value of solar net metering that exceeds current net metering compensation it again demonstrates that the Department's limited efforts to quantify a cost shift are of questionable accuracy.

The twelve benefit categories considered by SEA but ignored by the Department in the Biennial update are:

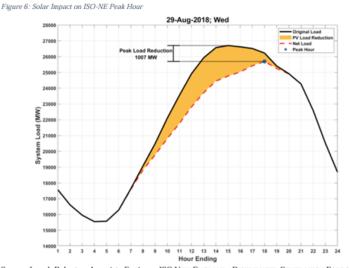
- 1. Interconnection upgrade benefits
- 2. Uncleared capacity value
- 3. Reduced share of capacity costs
- 4. Energy price suppression
- 5. Capacity price suppression
- 6. Electric-gas price suppression
- 7. Electric-gas-electric price suppression
- 8. Reduced transmission cost
- 9. Reduced share of transmission cost
- 10. Reduced distribution costs

⁴ Sustainable Energy Advantage. *Technical Analysis of a 100% Renewable or Clean Energy Standard* available at <u>https://publicservice.vermont.gov/sites/dps/files/documents/VT%20RES%20Technical%20Analysis%20Final%20Report</u> <u>%2011.27.23.pdf</u>

- 11. Reduced T&D losses capacity
- 12. Reduced T&D losses energy

Value of Historical Peak Shaving

The Department's assessment of the magnitude of the cost shift that it attributes to net metering also ignores the benefits that Vermont utilities have accrued as a result of peak shaving from behind-the-meter consumption from the deployment of earlier net metering systems. While the Department is correct that new net-metering systems provide reduced *but non-zero* value during the region's peak hour today, net-metering systems in aggregate have significantly reduced Vermont's peak demand. Though these peak shaving benefits are well established, the Department has chosen to ignore them.



Source: Joseph Roberts – Associate Engineer, ISO NEW ENGLAND, DISTRIBUTED GENERATION FORECAST WORKING GROUP, Update on Estimating Summer Peak Demand Impacts of BTM PV (Mar. 2, 2020), available at https://www.iso-ne.com/static-assets/documents/2020/03/3_peak_load_reductions_update.pdf.

The Department acknowledged that its analysis fails to account for the peak shaving benefits that early generations of net-metering projects provided in the Comprehensive Energy Plan stating:

This figure represents the costs and values of solar projects in 2021, treating generation from all netmetering projects equally. In recent years, the high adoption of solar in Vermont, and throughout New England, have effectively flattened loads and shifted peak hours. Therefore, projects that came online 10 years ago provided a greater value than projects that came online one year ago. This analysis does not assign a greater value to first generation projects.⁵

⁵ Vermont Department of Public Service, 2023 Vermont Comprehensive Energy Plan, Appendix C: Report on Vermont Net-Metering Program at C-10 (Jan. 15, 2023), available at . https://ljfo.vermont.gov/assets/Meetings/Renewable-Energy-Standard-Reform-Working-Group/2023-11-15/9e4269be00/2023-Net-Metering-Report-Appendix-C-of-Annual-Energy-Report.pdf

Given that the higher compensation provided to early-generation net-metering was based in part on the peak shaving benefits that these systems provided, it is highly problematic to include the full cost of these systems but ignore the benefits that they provide in a cost shift assessment.

3. Impact of PSD NM2.6 Proposed Adjustor Reductions

By focusing on what it asserts is the total cost shift attributable to all-metering systems, rather than the marginal impact of systems that might be installed under NM2.6, the Department creates a misleading impression of the impact of its proposed cut to net metering adjustors. While the Department acknowledges that the total cost shift it asserts "reflects the higher compensation that was paid in prior years" to earlier vintage net metering systems,⁶ it fails to illustrate the actual impact its recommended net metering adjustors reductions – which will only apply to future systems – will have on either Vermont ratepayers at large or on those ratepayers seeking access to the net metering program.

As described below, the Department's proposed reductions provide, in the best-case scenario, virtually no appreciable benefit in terms of rate impacts while making net metering significantly less affordable for Vermonters.

Minimal Impact of PSD NM 2.6 Reductions on Vermont Ratepayers

Since the reduction to the adjustors that the Department proposes would only impact the compensation received by net-metering systems that applied for a CPG between 7/1/2024 and 6/30/2026, the proposed change would provide minimal benefit to Vermont ratepayers at large. Assuming that 52 MW of NM 2.6 systems are ultimately installed (consistent with 2023 NM 2.5 CPG applications), these systems would generate approximately 68,400 kWh per year. Reducing the compensation provided for this power by 2 cents/kWh would save Vermonters just *23 thousandths* of a cent/kWh⁷ or less than \$2/year for a household with a 700 kWh/month usage.

If, as REV members believe and as the New Hampshire Department of Energy found for New Hampshire, the value of net metering exceeds the compensation paid to these systems then the Department's proposal would likely increase rates for Vermonters by unnecessarily reducing the rate of net metering.

⁶ In re: biennial update of the net-metering program, Case No. 24-0248-INV, Comments and Recommendations of the Department of Public Service RE: Biennial Update of the Net-Metering Program, 04/01/2024 at 8.

⁷ Assumed capacity factor of 0.14 and retail sales of 5,600,000 MWh: 52,000 kW * 8,760 hrs *0.14 *\$0.02/kWh /5,600,000,000 kWh = \$0.00023

Negative Impact of PSD NM2.6 on Vermonters Interested in Going Solar

While the Department's proposal would provide little tangible benefit to Vermont ratepayers at large, it would significantly harm Vermonters looking to join the net metering program. In its filing the Department asserted that "decreasing compensation rates from the REC and siting adjustors have been more than offset by the decreasing installation costs and higher retail rates, making net-metering increasingly profitable" but this statement is not accurate. Accounting for changes in installation cost, federal ITC rates, and interest rates, net metering has become less, *not more*, financially beneficial for net-metering customers.

As shown in Figure 2, interest rates are almost two and a half times higher than during the last Biennial Update. Given the upfront costs of renewables, financing costs are critical to their affordability. Financing costs are especially important for maintaining access to net metering for low and moderate-income Vermonters who rely on bill savings from net metering to exceed the loan payments on the system to participate in the program.





Here we use cost data from the Lawrence Berkely National Laboratory's (LBNL) *Tracking the Sun* project to illustrate the cost trend for an average 7 kW residential solar net metering system.⁸ Tracking the Sun data is consistently higher than other estimated solar costs and higher than REV members report in Vermont. We use this dataset because of its public availability and its consistent data collection methods. While we do not believe that the specific costs reported in Tracking the Sun are directly applicable to Vermont, we do believe that it accurately reflects the *trend* in solar installation costs over time. As shown in

⁸ LBNL *Tracking The Sun* available https://emp.lbl.gov/tracking-the-sun

Table 1, while solar costs have decreased slowly in recent years, these cost savings Have been largely negated by higher borrowing costs.

	NM 2.0	NM 2.1	NM 2.2	NM 2.3	NM 2.4	NM 2.5	NM 2.6
Build Date	1/1/17	1/1/19	1/1/20	1/1/21 ¹	1/1/22	1/1/23	1/1/25
Cost (\$/kW from LBNL) ²	\$4.60	\$4.30	\$4.40	\$4.30	\$4.20	\$4.12	\$4.04
Federal ITC	30%	30%	26%	26%	30%	30%	30%
Share Financed (after ITC)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Interest Rate	0.0375	0.055	0.0475	0.0325	0.0325	0.075	0.085
Loan Term (yrs.)	10	10	10	10	10	10	10
Total System Cost (with loan and ITC)	\$24,993	\$24,512	\$25,976	\$24,360	\$22,507	\$24,800	\$24,983
¹ NM 2.3 began in February 2021. January date used for maintaining consistency in calculations.							
² Cost data for NM 2.5 and NM 2.6 extrapolated from 2017 – 2022 data.							

Table 1. Illustrative calculations of the trend in system cost for a 7 kW system

In contrast to the relatively flat costs of these systems, the total compensation that netmetering systems receive has dropped significantly over time because the rate at which REC and sitting adjustors have fallen has consistently exceeded the rate at which the blended residential rate increases. As a result, the amount by which a system's 20-year revenue exceeds its cost has also decreased significantly over time. As shown in Figure 3 for a 7 kW system, a NM 2.5 system provides only 72% of the financial benefit of a NM 2.0 system. Under the Department's proposal, NM 2.6 systems would provide Vermont residents only 45% of the financial benefit of NM 2.0 systems.

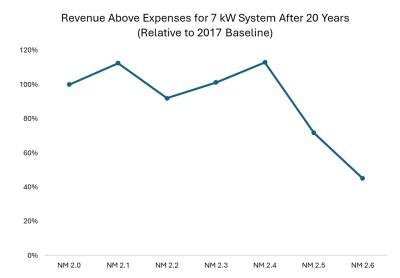


Figure 3. Illustration of the decline in financial benefits across net metering vintages⁹

⁹ System revenue was calculated using the blended residential rate (forecast to increase at the same rate as between 2017 and 2024 for future years) and applicable adjustor.

As an alternative illustration of the impact of the Department's proposal, reducing the value of every kWh generated by 2 cents would decrease the total compensation generated by a 7 kW system by \$4,292 over the life of the system. The net present value (NPV) of this lost compensation is \$2,870, more the 10% of the cost of the system using LBNL's cost data (and a larger percentage if costs are lower as REV members report).

System Size	7 kW
System Cost after 30% ITC ¹	24,983
Annual Generation ²	8,585 kWh
Annual Compensation Reduction	\$171.70
Total 25-Year Compensation Reduction	\$4,292.40
NPV of Total Compensation Reduction ³	\$2,419.87
NPV of Compensation Reduction/System Cost	11%
1. See Table 1	
2. Calculated using a capacity factor of 0.14	
3. Calculated using a 5% discount rate	

Table 2. Illustration of Loss of Net Metering Revenue Relative to System Cost

Taken together, it is clear that the financial benefit of net metering, contrary to the Department's assessment, is decreasing. Further cuts to net metering compensation threaten to make net metering financially inaccessible for most Vermonters.

Trends In Net-Metering Applications and Installations

Whether measured by the total capacity of net metering CPG applications each year or by net metering interconnection rates, it is clear that net metering has fallen steadily since 2017. In each of the last three Biennial Updates, however, the Department glossed over declines in net metering to characterize net-metering deployment as essential flat ("the capacity of installed net-metering over the previous three years has been relatively constant" in 2020¹⁰, "at a pace roughly in line with previous years" in 2022¹¹, and "steady compared to the prior biennial" in 2024). During the period which the Department characterized as "relatively constant", "in line with previous years" and "steady", the capacity of annual net metering CPG applications has fallen by 62% since its peak and annual installed net metering capacity has fallen by 39%.

¹⁰ In re: biennial update of the net metering program, Case No. 20-0097-INV, Comments of The Department of Public Service Re: Notice of Proceeding and Scheduling Order, 4/2/2020 on page 18.

¹¹ In re: biennial update of the net metering program, Case No. 22-0334-INV, Department filing on 4/8/2022 on page 9.

Net-Metering CPG Applications

Net-metering CPG applications are the best indicator of the impact of net-metering compensation changes on net-metering deployment. Because the interconnections in a given year included systems permitted under multiple net metering compensation regimes, the annual installation data report by the Department is a lagging indicator of the impact of compensation changes. CPG applications, in contrast, directly reflect the viability of a specific net-metering compensation regime for Vermonters interested in accessing the net-metering program. The Department's own CPG application data clearly shows that net-metering applications are declining rapidly.

In fact, as shown in Figure 4, the total capacity of net metering projects applying for a CPG each year has declined by more than 40 MW (62%) since 2017. This is consistent with a trend that would see net metering applications reduced to 0 by 2027.

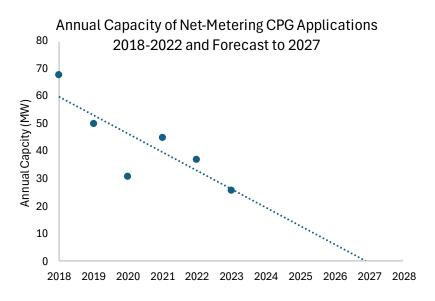


Figure 4. Trend in Net Metered Solar CPG Applications (Source: PSD

Looking more granularly at CPG applications by net-metering vintage instead of by year further reinforces this picture. While the total capacity of NM 2.6 applications exceeds the capacity applied for under NM 2.4 or 2.3, this masks the *declining application rate* since NM 2.6 has already been in place longer than NM 2.3 and NM 2.4 combined. Converted to an annualized application rate to account for these differing durations reveals a drop of 25% from NM 2.3 to 2.4 and 37% from N 2.4 to NM 2.5 or a staggering 53% decrease in application rates between NM 2.3 and NM 2.5.

Vintage	Date Range	Months	Capacity (MW)	Annual Capacity (MW/yr)
NM 2.3	2/2/21 - 8/31/21	7	29.2	50.1
NM 2.4	9/1/21 - 8/31/22	12	37.8	37.8
NM 2.5	9/1/22 - 4/30/24	20	39.6	23.7

Table 3. Total Capacity of Solar Net Metering CPG Applications by Net Metering Vintage

Net Metering Interconnections

Though net metering interconnections are a lagging indicator, interconnections demonstrate the same trends shown in the CPG application data, namely a steady decline in net metering. The Department stated that net-metering capacity "has held steady compared to the prior biennial" with an annual installation rate of between 28.3 and 3[3]¹² MW from 2020 through 2023. This characterization is misleading regarding the short-term and long-term installation trends. Total installation in 2020 and 2021 were 6 MW (10%) higher than in 2022 and 2023. If net-metering installation continued to drop by an average of 3 MW a year, new net-metered capacity would reach zero by 2033.

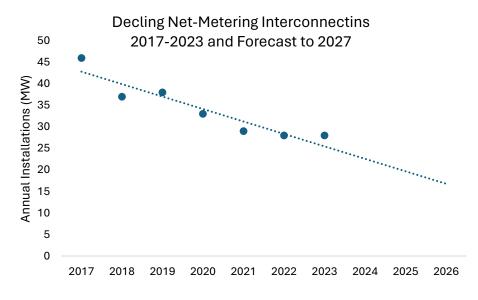


Figure 5. Trend in Net Metering Interconnections

¹² The Department's text reads "between 28.3 and 31 MW" but the actual installations shown in Figure 14 is 33 MW for 2021. *In re: biennial update of the net-metering program*, Case No. 24-0248-INV, Comments and Recommendations of the Department of Public Service RE: Biennial Update of the Net-Metering Program, 04/01/2024 at 37 and 40.

Tier II Capacity Requirements and H.289

The Department estimates that "Tier II of the RES requires approximately 25-30 MW per year" but does not discuss the implications of proposed changes to the RES in H.289 *An act relating to the Renewable Energy Standard*. H.289 increases the Tier II ramp rate significantly and shifts the baseline for RES compliance from retail sales to load. These changes would have the effect of increasing the rate at which Tier II resources must be built to an average of roughly 90 MW a year between 2025 and 2030 as shown in Table 4.

H.289 has passed the House, receiving more than two-thirds support among House members and is being voted on by the Senate this week. It is likely that the Commission will know whether or not H.289 has been enacted before the deadline for issuing a final order in this investigation.

Year	Tier II ¹	Load ²	Total Tier II (MWh)	New Tier II MWH	New Tier II Capacity ³ (MW)	
20244	4.8%	5,109,897	247,115			
2025	5.3%	5,464,657	290,935	43,821	33.6	
2026	7.1%	5,500,209	389,887	98,952	75.8	
2027	8.9%	5,586,498	494,586	104,699	80.2	
2028	10.6%	5,716,311	606,951	112,365	86.1	
2029	12.4%	5,868,632	726,685	119,734	91.7	
2030	14.1%	6,773,436	958,250	231,565	177.4	
1. Sales weighted average of utility-specific requirements in H.289 assuming equal load growth across Vermont utilities.						
2. Load from the PSD/SEA VT_RES_BCA_Final Excel model.						
3. Calculated using 0.149 capacity factor used in the PSD/SEA model. Does not account for allowance						
for some hydro facilities to count towards Tier II which will reduce the new solar capacity required						
4. 2024 Tier II % reduced by 7% to reflect exemptions for BED, Swanton, and WEC. PSD/SEA load was						
reduced by 5% to account for the difference between retail sales and energy purchases.						

Table 4. New Tier II Renewable Capacity Required Under H.289

Reducing the viability of net metering at the same time that the requirements for Tier II RECs are increasing significantly, would jeopardize utilities' ability to comply with the RES without paying an Alternative Compliance Payment. While there are other mechanisms through which utilities can procure Tier II-eligible power, most notably through PPAs or utility-owned projects, these larger-scale projects take longer to permit and build than most net metering projects and, especially in the period covered by this Biennial Update would be difficult to scale sufficiently to meet update RES targets. In addition, net metering projects rely on different sources of capital and are generally installed by different companies than utility-scale projects. As such, ensuring that both net metering is growing rather than shrinking provides the greatest assurance that utilities will be able to meet their Legislatively mandated Tier II requirement.

Conclusions

Net metering has been a vital tool for providing Vermonters with access to renewable energy and for meeting the requirements of our RES. The Department's proposal to reduce net metering adjustors by 2 cents/kWh fails to balance the mandate to provide universal access to net metering and consider all of the benefits of the program – including the greenhouse gas reduction benefits it provides – against its concern with a purported cost shift.

The Department's filing also mischaracterizes the current downward trend in net metering applications and interconnections and fails to consider the impact of proposed changes to the RES on the amount of Tier II renewable energy that is likely to be required over the next several years. Reducing the viability of net metering at the same time that the requirements for Tier II RECs are increasing significantly would be ill-advised.

Consequently, we urge the Commission to update the statewide blended residential rate to \$0.18398/kWh, as calculated by the Department, but to reject the Department's recommendation to reduce either the REC or siting adjustors. In the event that the Commission does adopt the Department's recommendation to reduce either the REC or siting adjustor by 2 cents/kWh, REV strongly urges the Commission to phase in the reduction with no more and a 1 cent/kWh decrease before July 1, 2025.