

**STATE OF VERMONT
PUBLIC UTILITY COMMISSION**

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Proposed Revisions to Vermont Public Utility	)	
Commission Rule 5.100	)	19-0855-RULE

**RESPONSE OF NORWICH SOLAR TECHNOLOGIES
TO THE VERMONT PUBLIC UTILITY COMMISSION'S
REQUEST FOR ADDITIONAL INFORMATION RELEVANT
TO THE REVIEW OF RULE 5.100**

November 1, 2019

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I. INTRODUCTION

NOW COMES Norwich Solar Technologies and responds to the Vermont Public Utility Commission’s (“Commission”) August 22, 2019 Request for Additional Information and Discussion of Next Steps (“Request for Information”).

Net-metering has brought significant value to the state of Vermont and collectively, we should be proud of what has been achieved to date. Looking forward, we welcome a thorough review of the costs and benefits of net-metering. We strongly believe and can demonstrate that net-metering projects of all sizes are critical in addressing the energy, environmental, social, and economic issues Vermont faces.

Norwich Solar Technologies is a small, thirty employee business in White River Junction that provides net-metering services to numerous Vermont businesses, schools, and communities each year. From the unique perspective of providing services to dozens of Vermont ratepayers each year, from working with hundreds of other Vermont businesses, and from applying Vermont’s environmental regulations and collaborating with regulators, Norwich Solar

Technologies has responded to the questions and comments proposed in this investigation from four primary investigatory perspectives:

1. Are the proposals put forth the most effective in achieving the stated policy and statute objectives?
2. Will any community, group, or ratepayer class be disenfranchised with what is proposed?
3. Can Norwich Solar Technologies provide real and complete information from our role serving Vermonters that uniquely advances the discussion?
4. Is there additional information or context required in order to properly evaluate the cost and benefits of net-metering as outlined in statute and as general good practice?

Norwich Solar Technologies' response to the Commission's Request for Information utilizes an unaltered complete dataset based on over thirty non-residential net-metered projects we have or plan to install in 2019. This anonymized dataset provides a solid basis to directly evaluate the total costs and benefits associated with the net-metering program at large. Again, we thank the Commission for the opportunity to comment on the proposed rule changes.

II. RESPONSES TO COMMISSION QUESTIONS

Q1. 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.

A1. The net-metering compensation system does not unfairly shift costs to non-participating customers. Vermont's net-metering statute states that the net-metering rules shall establish and maintain a net-metering program that "to the extent feasible, ensures that net-metering does not shift costs included in each retail electricity provider's revenue

requirement between net metering customers and other customers.”¹ The current net-metering program complies with this requirement. The issue of whether net-metering causes a cost shift has been extensively studied in the past, and the overwhelming conclusion is that there is a net *benefit* to everyone, including non-participating customers. The Vermont Department of Public Service (the “Department”), who is charged with representing the *public* interest, has consistently concluded that this is the case. In 2014, the Department released an *Evaluation of Net Metering in Vermont Conducted Pursuant to Act 99 of 2014* (the “Evaluation”) in which it concluded that “the aggregate net cost over 20 years to non-participating ratepayers due to net metering under the current policy framework is close to zero, and there may be a net benefit.”² The Evaluation noted that a degree of cost shifting (or “cross-subsidization” as the Department defines it) is present in all utility ratemaking and that attempting to eliminate cost shifting in the net-metering context would unfairly hold net-metering policies to a higher standard.³

The Evaluation explains that cost-shifting is common in utility ratemaking and gave the example of rural electrification. The Department explains that while “rural ratepayers have caused the construction of an extensive distribution system, from which the urban customers do not directly benefit, yet all pay equally for distribution network

¹ 30 V.S.A. § 8010(c)(C).

² Public Service Department, *Evaluation of Net Metering in Vermont Conducted Pursuant to Act 99 of 2014* 28 (2014).

³ *Id* at 28.

costs...[s]ociety as a whole has benefited from universal electrification, and concern about this cross-subsidy has generally faded.”⁴

Net-metering does not shift utility costs unfairly onto non-participating customers. Net-metering generates value for all customers well in excess of their costs. For example, the Maine Public Utilities Commission’s *Maine Distributed Solar Valuation Study* (the “Study”), found that the 25-year value of each kilowatt-hour of distributed solar is worth more than double the retail rate of electricity.⁵ The Study concluded that any cost shifting analysis must take into account all of the benefits associated with solar, not just the value of solar compared to the wholesale cost of fossil fueled sources of energy.

Norwich Solar Technologies respectfully requests the analysis of any cost shifting in Vermont to be completed in a comprehensive manner that allows for transparent and fact-based decision making. At a minimum, the following factors should be considered when completing a cost shifting analysis. First, each net-metering size class (less than 50 kW; 50 kW to 150 kW; and greater than 150 kW) should be analyzed separately. It is important to analyze the different net-metering size classes separately because the price paid per kilowatt hour generated is significantly different between the different size classes, the recent changes in the compensation for larger systems have dramatically reduced the overall participation of these types of systems, and the prices for Renewable Energy Credits (“RECs”) should not be a part of any analysis unless other sources of

⁴ Public Service Department, *Evaluation of Net Metering in Vermont Conducted Pursuant to Act 99 of 2014* 28 (2014).

⁵ Maine Public Utilities Commission, *Maine Distributed Solar Valuation Study* 6 (2015).

generation include an equivalent cost for RECs. Second, current net-metering pricing should be distinguished from older net-metering pricing. Although older net-metering pricing mechanisms are still in effect, they are not connected to the performance or costs incurred under the current net-metering pricing mechanisms. In addition, net-metering rates have decreased significantly in recent years (especially for systems greater than 150 kW) and including past net-metering rates does not accurately reflect changes already made. Third, *all* of the benefits associated with net-metering need to be considered, including: significant state and local taxes paid by taxpayers at rates significantly higher than other generation types (especially net-metering systems greater than 150 kW in size); direct energy savings public institutions experience, which in turn lower Vermont's tax burden; benefits generated from transmission upgrades and tariffs enabling grid modernization; direct value to the utilities from net-metering upgrades; and the value of any RECs from net-metering projects that might be sold by the utilities.

Q2. Please quantify the effect of current net-metering compensation on your retail rates.

Please provide all calculations and information supporting your response.

A2. Respectfully, the Commission's singular focus on electric rates is mis-placed. First, current net-metering compensation has a *de minimis* impact on utility retail rates. The total of Green Mountain Power Corporation's ("GMP") power costs, including bill credits from power generated by GMP customers, were shown by the Department of Public Service in the most recent GMP rate case, to have *gone down* by more than \$33

million over the last five years.⁶ The fact is that overall power costs have decreased significantly, and customer self-supply has not caused rate increases.⁷

Comparison of Changes to GMP Cost of Service - 2013 Recorded to 2018 Settlement
In \$1,000s

	2013 Test Year Actual	2018 Settlement	Dollar Change	Percent Change*
Purchased Power and Production	\$322,603	\$289,154	(\$33,449)	-10.37%
Net Transmission	\$31,676	\$28,878	(\$2,798)	-8.83%
O&M Platform, Other O&M and Savings	\$117,541	\$104,571	(\$12,970)	-11.03%
Rate Base Related Costs				
Depreciation & Amortization & Other	\$45,611	\$53,270	\$7,659	16.79%
Taxes - Federal, State & Municipal	\$46,809	\$67,487	\$20,678	44.18%
Return on Utility Rate Base	\$66,673	\$98,535	\$31,862	47.79%
Less Affiliate & Other Operating Revenue	(\$33,282)	(\$21,583)	\$11,699	-35.15%
Gross Revenue & Fuel Gross Receipts Taxes	\$6,094	\$6,266	\$172	2.82%
Cost to Ultimate Consumers	\$603,724	\$626,580	\$22,854	3.79%

Table – Comparison of Changes to GMP Cost of Service – 2013 Recorded to 2018 Settlement In \$1,000s⁸

In its 2019 Base Rate Case, GMP reported that “total [customer self-supply] production (the vast majority of which is solar PV)” was 125,000 MWh for the test year, compared to its total load of 4,400,000 MWh.⁹ Thus, customer self-supply through net-metering represented only three percent of the total GMP electric load. Given that overall power costs decreased by more than \$33 million over the last five years, and given the small fraction that customer self-supply with renewable energy actually represents in terms of

⁶ Tariff filing of Green Mountain Power Corporation Requesting a 5.45% Increase in its Base Rates Effective with Bills Rendered January 1, 2019, to be Fully Offset by Bill Credits Through September 30, 2019, Case No. 18-0974-TF, Prefiled Direct Testimony of Brian Winn, Vermont Department of Public Service, August 10, 2018, at 11.

⁷ Petition of Green Mountain Power for Approval of a Multi-Year Regulation Plan Pursuant to 30 V.S.A. §§ 209, 218, and 218d, Case No. 18-1633-PET, Prefiled Direct Testimony of Mary Powell, Green Mountain Power, June 4, 2018 at 17.

⁸ Case No. 18-0974-TF at 11 (Winn Direct).

⁹ Case No. 18-0974-TF, Prefiled Direct Testimony of Douglas Smith, Green Mountain Power, April 13, 2018, at 7, 18.

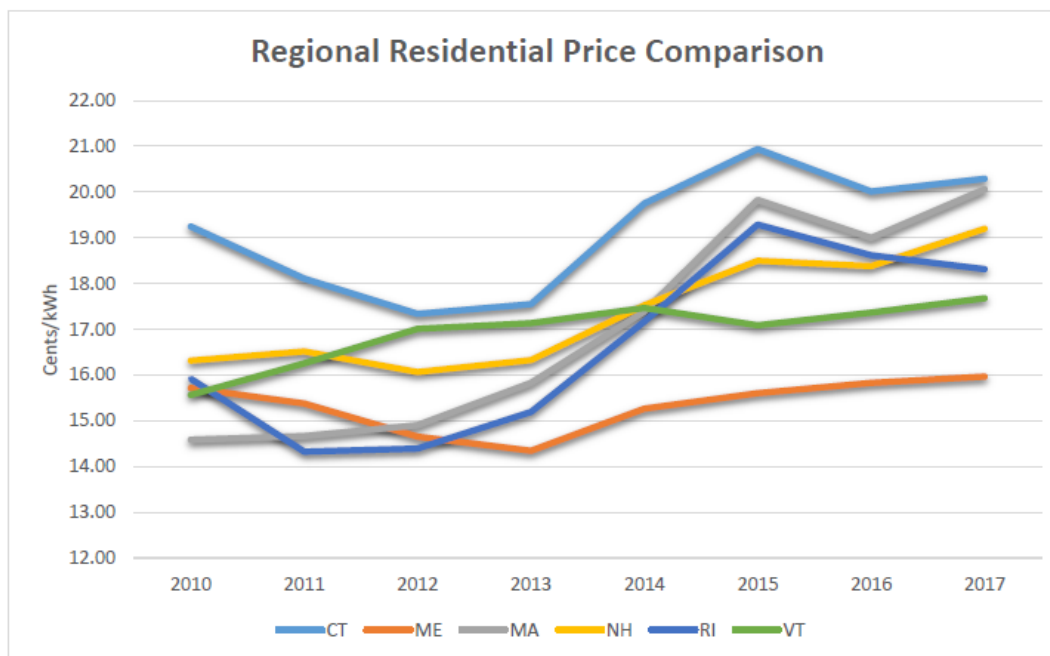
GMP's total electric load, it is clear that customers who have invested their own capital in grid-connected generation have not made a material impact on overall rates.

Equally important, the Commission has made it clear that under 30 V.S.A. § 218(c), “[t]he societal test should remain the principal touchstone” in power resource evaluation and selection.¹⁰ That is, GMP and this Commission must evaluate all societal costs and benefits of various power supply alternatives before making commitments. Any discussion of the value of customer self-generation in meeting our energy transformation challenges must be undertaken in this context. Moreover, even without consideration of societal costs and benefits, Vermont's electric rates are among the lowest in New England, as illustrated in the Department's 2019 Annual Energy Report¹¹ (see Table – Regional Residential Price Comparison below).

¹⁰ *Investigation into Least-Cost Integrated Resource Planning for Vermont Electric Power Company, Inc.'s Transmission System*, Docket No. 7081, Order at 21-22 (June 20, 2007).

¹¹ Vermont Department of Public Service, *2019 Annual Energy Report* 12 (2019)

Figure 5: Residential Electric Price Comparison¹⁰



Vermont's average residential retail rate is the second lowest in the New England region. Additionally, as can be seen in the chart above, it has been more stable than the other New England states.

Table – Regional Residential Price Comparison¹²

Reductions in the compensation for net-metering caused a noticeable slowdown in clean energy jobs between 2017-2018 according to the *Vermont Clean Energy Industry Report* (2018):

For the first time since the Vermont Clean Energy Industry Report's inception in 2013, the state's clean energy economy exhibited a decline in employment, driven largely by losses in the solar industry. Job declines in the solar industry were also a first-time national phenomenon since The Solar Foundation began tracking employment in 2010. In Vermont, the shedding of solar jobs came alongside a decline in solar installations over the same period of about 9%. More importantly, however, these shifts follow significant policy reforms to the state's net metering program, which made the siting of new renewable energy projects—especially

¹² Vermont Department of Public Service, 2019 Annual Energy Report 12 fig.5 (2019).

larger installations—more difficult, leading to an almost 20 percent decline in applications.¹³

The renewable energy jobs sector in Vermont is a significant economic engine that provides vast economic opportunities not considered by the Commission’s narrower electric rate impact focus. Renewable energy jobs offer premium wages and in 2019 represented a workforce of nearly 18,900 (see [Table – Vermont Median Hourly Wages](#) below).

Table 2. Vermont Median Hourly Wages²⁹

	RENEWABLE ENERGY			ENERGY EFFICIENCY		
	Entry	Mid	High	Entry	Mid	High
Electricians	\$13.57	\$19.43	\$28.89	\$18.91	\$25.47	\$32.95
HVAC Workers	\$13.10	\$20.77	\$32.66	\$18.43	\$25.15	\$35.05
Installation, Maintenance, and Repair Occupations	\$13.10	\$20.77	\$32.66	\$14.84	\$20.72	\$30.23
Sales Representatives	\$17.60	\$28.71	\$56.74	\$30.55	\$39.57	\$68.70
Engineers	\$24.99	\$37.21	\$56.61	\$23.78	\$39.38	\$57.98

Wages for clean energy occupations in Vermont are often at a premium compared to the typical worker. For example, an electrician working in energy efficiency industry sector in Vermont making mid-level pay makes on average about \$5.38/hour (28%) more than the average electrician in Vermont. These premiums are even higher for entry level positions.

Table – Vermont Median Hourly Wages¹⁴

¹³ BW Research Partnership, *Vermont Clean Energy Industry Report 3* (2018).

¹⁴ BW Research Partnership, *Vermont Clean Energy Industry Report 18 tbl.2* (2019).

Independent data from the PUC also reflects that reductions to net-metering credits have significantly slowed the number of net-metering applications submitted. [Table A](#) below shows the changes to the quantity of applications for net-metering CPGs listed on the ePUC portal that are affected, in part, by the changes in compensation.

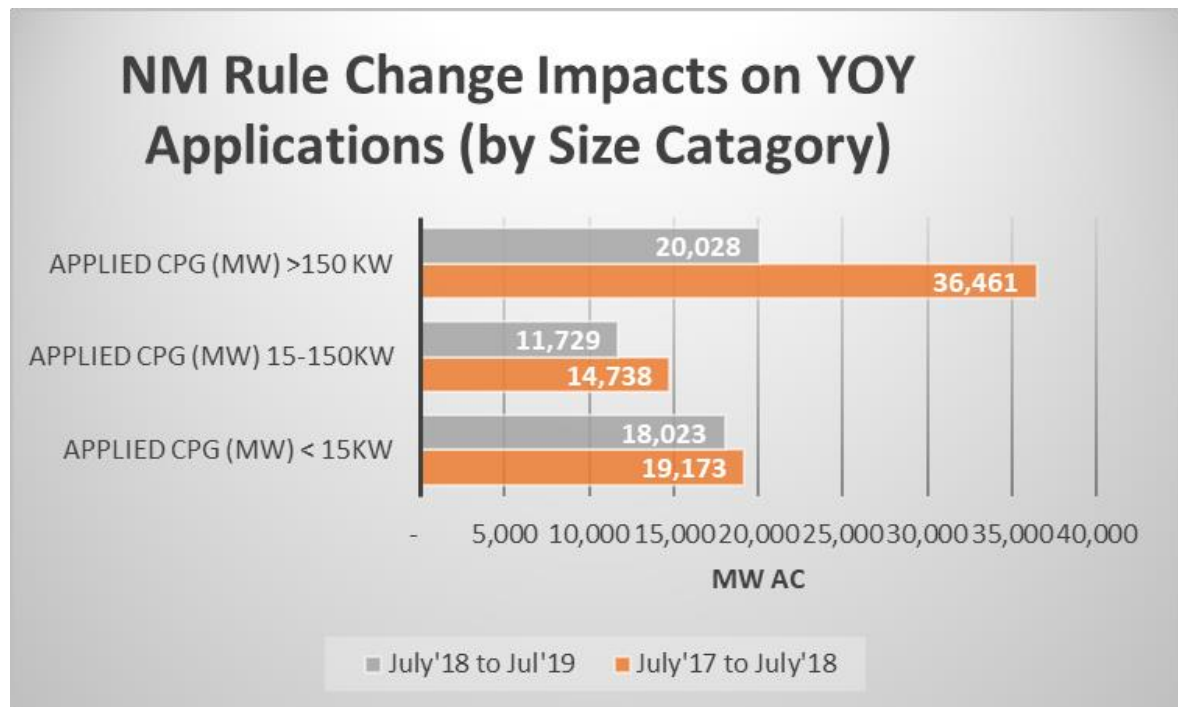


Table A. Net-Metering Rule Change Impacts on Year-Over-Year Applications

As the results demonstrate, every net-metering size class has experienced reductions in the number of net-metering applications submitted. Net-metering systems greater than 150 kW have suffered the most, with a **45% decrease** in applications submitted between the two-year time period noted in [Table A](#). Additional reductions in compensation in July 2019 and a reduction in the federal ITC in January 2020 will likely lower the adoption further.

One method to understanding the impact of net-metering compensation on utilities, ratepayers, and all Vermonters can be determined by applying the current net-metering compensation against the number of net-metering applications submitted last year. Note that this is a very conservative approach and the costs detailed below are likely overstated as this approach assumes every net-metering application becomes a net-metered project (highly unlikely); that no additional fall-off in applications will occur due to further compensation changes that took effect July of 2019 (highly unlikely); that a reduction in the federal Investment Tax Credit on January 1, 2020 will not further reduce net-metering applications (highly unlikely); and that the increased costs and obstacles associated with stricter regulatory review will not further reduce net-metering CPG applications (highly unlikely). Table B (below) demonstrates the cost of net-metering to utilities (excluding all economic, customer, environmental, and societal benefits), by including: 1) the current net-metering rates (without the REC pricing included); 2) the quantity of net-metering applications submitted between July 2018 and July 2019 (separated by system size); and 3) the avoided cost and avoided transmission and distribution (“T&D”) benefits to calculate the cost of net-metering to utilities.¹⁵

¹⁵ Avoided cost and avoided transmission and distribution benefits data taken from Synapse Energy Economics, Inc., *Avoided Energy Supply Components in New England: 2018 Report* (2018).

	SYSTEM SIZE		
	< 15 kW AC	15-150 kW AC	> 150 kW AC
July '18 to Jul'19 CPG Applications in kW ¹	18,023	11,729	20,028
Current NM Rate (without REC) \$/kwh	0.164	0.164	0.134
kwh Generated annually by Size (Assuming July '18 to July '19 adoption levels)	18,923,982	12,902,109	22,030,910
Net-metering Credits Generated Annually by Size	\$3,103,533	\$2,115,946	\$2,952,142
Avoided Energy and Avoided T&D Offsets	\$1,676,665	\$1,143,127	\$1,951,939
Cost of Net-metering including Avoided Generation and T&D Offsets (Assuming July '18 to July '19 adoption levels) by System Size	\$1,426,868	\$972,819	\$1,000,203

¹ Data derived from ePUC

Table B. Net-Metering Costs Excluding Economic, Customer, Environmental, and Societal Benefits

Comparing the costs of net-metering detailed in Table B with the annual retail electric sales of Vermont utilities clearly demonstrates that even without the additional benefits of net-metering included, the cost of net-metering has a de minimis impact on Vermont utilities. As demonstrated in Table C (below), when comparing the net-metering costs to the utilities with the electric retail sales of the utilities for the same time period, the costs of net-metering have minimal to no impact on utility retail rates. The total electric retail sales for Vermont utilities during this same time period was approximately \$833,500,000.¹⁶ In comparison, the annual costs for net-metering systems less than 15 kW in size was \$1,426,868, the annual costs for net-metering systems between 15 kW and 150 kW in size was approximately \$972,819, and the annual costs for net-metering

¹⁶ U.S. Energy Information Administration. Forms EIA-861, Schedules 4A & 4D & EIA-861S (2018). Available at <https://www.eia.gov/>.

systems greater than 150 kW in size was approximately \$1,000,203. As [Table C](#) clearly demonstrates, these net-metering costs when compared to the total electric retail sales for Vermont utilities are negligible.

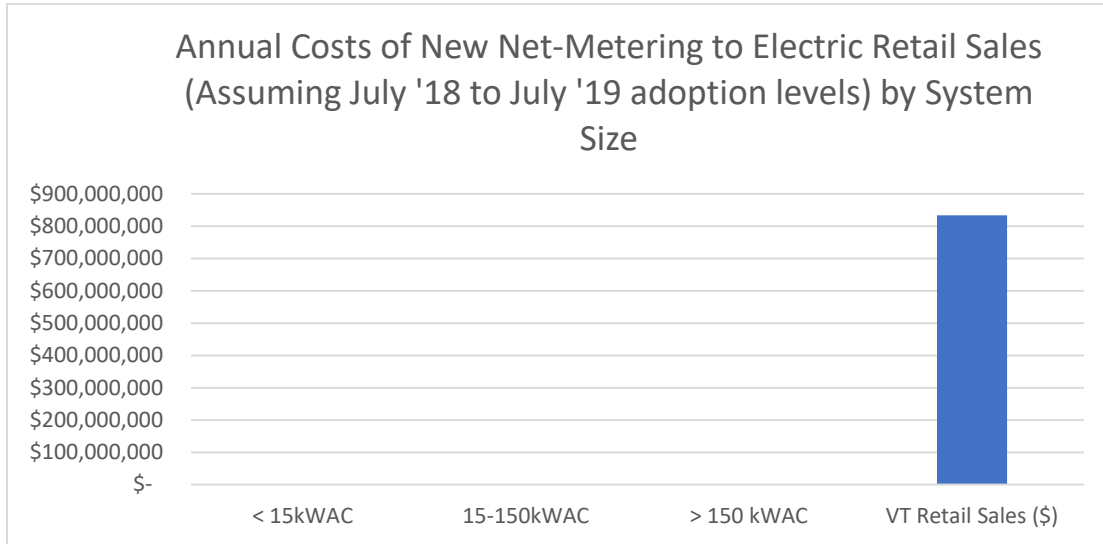


Table C. 2019 Annual Net-Metering Costs compared to the Annual Electric Sales

Q3. 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.

A3. Current net-metering compensation is not having a significant effect on retail rates. At a minimum, no changes to net-metering compensation should take effect. The reduction in net-metering compensation during the past few years has already had a significant adverse impact on the net-metering program. As shown in [Table A](#) (above), the Commission's two-year phased reduction in net-metering compensation significantly contributed to the reduced number of net-metering applications, especially for net-metering systems greater than 150 kW in size. Given these facts, Norwich Solar Technologies recommends that no changes be made to net-metering compensation.

While Norwich Solar Technologies appreciates and understands the necessity of ensuring net-metering costs are as low as possible and equitable, the underlying questions incorrectly imply that net-metering should only be valued from a narrow avoided energy cost only perspective. The analysis should be broadened to include the parameters set forth in the enabling statute, 30 V.S.A. § 8010, and in standard least cost planning.

If lowest cost generation is the primary objective for the net-metering program, then mechanisms to lower the costs to net-meter should be a component of this investigation. Significant savings could be achieved (while preserving the only “Customer Choice” generation option) in reducing the extraneous permitting costs associated with net-metering. Cost reductions could be achieved by:

1. standardizing net-metering regulations to match existing forestry rules;
2. Standardizing net-metering regulations to match existing agricultural rules;
3. Streamlining and shortening the regulatory approval process for net-metering systems;
4. Standardizing net-metering regulations to match existing Natural Heritage Program invasive species eradication rules at solar sites; and
5. Adopting consistent policies across state agencies to allow for predictable, repeatable, lower cost processes.

Q4. 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.

A4. Vermont needs more net-metering than what the Renewable Energy Standard requires in order to meet Vermont's statutory goal of 25% renewable by 2025.¹⁷ This question is incomplete in that it implies that Vermont only needs enough net-metering for the utilities to be able to meet Vermont's Renewable Energy Standard. Vermont law requires the Department of Public Service to produce a Comprehensive Energy Plan for the State covering at least a 20-year period.¹⁸ Vermont law also requires the net-metering rules to establish and maintain a net metering program that "achieves a level of deployment that is consistent with the recommendations of the Electrical Energy and Comprehensive Energy Plans."¹⁹

The current estimate is that approximately 30 MW per year is required to meet Tier II Distributed Generation under the Renewable Energy Standard. While this level is enough to meet Tier II RES requirements, it will not meet Vermont's Comprehensive Energy Goals or greenhouse gas reduction goals unless there is significantly more additional distributed generation development.

¹⁷ 10 V.S.A. § 580(a) "It is a goal of the State, by the year 2025, to produce 25 percent of the energy consumed within the State through the use of renewable energy sources, particularly from Vermont's farms and forests."

¹⁸ 30 V.S.A. § 202(b).

¹⁹ 30 V.S.A § 8010(c)(1)(B).

Q5. Please identify all the benefits that net-metering provides (for example, energy, capacity, reduced regional network service charges, etc.).

A5. The benefits and impacts of net-metering extend far beyond the framework of the questions in this investigation and those limited to utilities and ratepayers. These benefits are significant and include the following:

1. Significant Tax Benefits (especially for net-metering systems over 150 kW)
 - a. Contributions from Vermont's clean energy jobs economy of payroll tax revenue from each net-metering system;
 - b. Contributions to Vermont's income tax revenue on generated power;
 - c. Direct tax payments to municipalities from net-metering systems;
 - d. Vermont education tax from net-metering systems; and
 - e. Annualized Vermont payroll tax.
2. Direct Ratepayer Savings
 - a. Direct reduction of operational costs of those municipalities, schools, farms, residents, non-profits, and businesses that net-meter their electric accounts; and
 - b. Direct energy savings of public institutions through net-metering lower Vermont's tax burden.
3. Transmission & Distribution Benefits
 - a. Net-metering payments for transmission ground fault overvoltage fees fund improvements to the grid;
 - b. Net-metering systems greater than 150 kW to 500 kW in size modernize the grid for storage;

- c. Net-metering pays for transmission and distribution upgrades and modernization;
- d. Asset-based compensation net-metering upgrades provide to utilities;
- e. Higher utilization and response times caused by net-metering systems are savings to utilities;
- f. REC values from net-metering systems transferred to utilities;
- g. Local generation make the Vermont transmission and distribution system more resilient;
- h. Net-metering policies drive solar adoption, and solar adoption drives resiliency storage adoption;

4. Site Remediation

- a. Net-metering drives the remediation and repurposing of extraction sites, landfills, brownfields, and other previously contaminated or developed sites.

5. Economic Stimulus

- a. Net-metering systems pay land use lease payments to Vermont property owners;
- b. Net-metering customers experience electric bill reductions;
- c. Net-metering spurs clean energy job creation;
- d. Net-metering requires significant engineering, environmental, and archaeological assessments, studies, surveys, monitoring, etc., which increase economic growth across Vermont professional service industries;

- e. Direct employment of professionals in the design, permitting, construction, and operation of net-metered systems.

Q6. 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.

A6. See answer to Question 5.

Q7. 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.

A7. The benefits of net-metering are extensive and broad. Norwich Solar Technologies is answering Question 7 from the perspective of the benefits that directly and verifiably accrue to the public. Please keep in mind, however, that many other benefits not discussed below can also be attributed to net-metering. For the purposes of this answer however, we have focused on the direct and verifiable response.

The results of our analysis easily demonstrate that when factoring the direct benefits net-metering provides to the State and its local communities, the cost of net-metered systems greater than 150 kW in size is less than \$0.01 per kWh (even without factoring all of the other numerous indirect benefits net-metering provides).

For determining the total **DIRECT** economic benefits each net-metering system delivered to taxpayers and ratepayers, Norwich Solar Technologies utilized its 2019 portfolio of non-residential net-metered projects. These benefits include:

1. Annual payments of \$4/kW AC to the Vermont Education Fund that all net-metered systems above 50 kW AC are required to annually pay;
2. Annual property tax payments to municipalities based on anticipated revenues from the array that systems above 50 kW AC pay. These property tax payments uniquely support all Vermont ratepayers in ways out-of-state resources do not;
3. Discounts on power costs provided to towns and schools also uniquely support all Vermont taxpayers as well as payroll and income tax revenues that are uniquely created by in-state generation. Seventy-five percent of these schools and towns served, are in communities that have average incomes below Vermont's median income;
4. Annual savings on the electric bills of participating municipalities in our portfolio;
5. Annual savings on the electric bills of participating schools in our portfolio that support the Vermont Education Tax;
6. Vermont income tax payments from the revenue generated on solar arrays;
7. The annualized payroll tax revenue installation and maintenance activities generate for the State of Vermont (first year costs/ divided by 20 years);
8. The annualized benefit of utility upgrades that extend beyond project specific costs (beneficial portion of first year costs divided by 20 years); and

9. The annualized public good benefits that are requirements of obtaining a Certificate of Public Good (first year costs divided by 20 years). These benefits include site remediation, archeological studies, invasive species eradication, etc. that benefit the public.

Table D (below) summarizes the impact of the annual direct economic benefits of Norwich Solar Technologies portfolio against the calculated cost of net-metering credits outlined in Question 2. The direct benefits net-metered systems provide taxpayers (and by logical extension ratepayers) are significant and should require a broader analysis.

	Value	Percentage of Total	Impact \$/kWh
Total Cost of Net-metering Credits Generated NST 2019 Portfolio(no REC)	\$ 1,379,747	100%	\$ 0.134
Avoided Purchase and T&D Cost Savings	\$ 861,217	62.4%	\$ (0.089)
Direct Muni Savings /kWh	\$ 36,344	2.6%	\$ (0.004)
Direct School Savings /kWh	\$ 45,253	3.3%	\$ (0.004)
Muni Tax Revenue /kWh	\$ 63,925	4.6%	\$ (0.006)
Vt Ed Tax Revenue /kWh	\$ 22,533	1.6%	\$ (0.002)
Annualized Utility Benefits /kWh	\$ 56,333	4.1%	\$ (0.005)
Annualized Mandated Public Good Benefits /kWh	\$ 17,164	1.2%	\$ (0.002)
Annualized VT Payroll Tax Benefits /kWh	\$ 32,110	2.3%	\$ (0.003)
VT Income Tax on Solar Generation Revenue /kWh	\$ 103,481	7.5%	\$ (0.010)
Actual Cost of NM after Direct Benefits Added/kWh	\$ 141,386		\$ 0.009

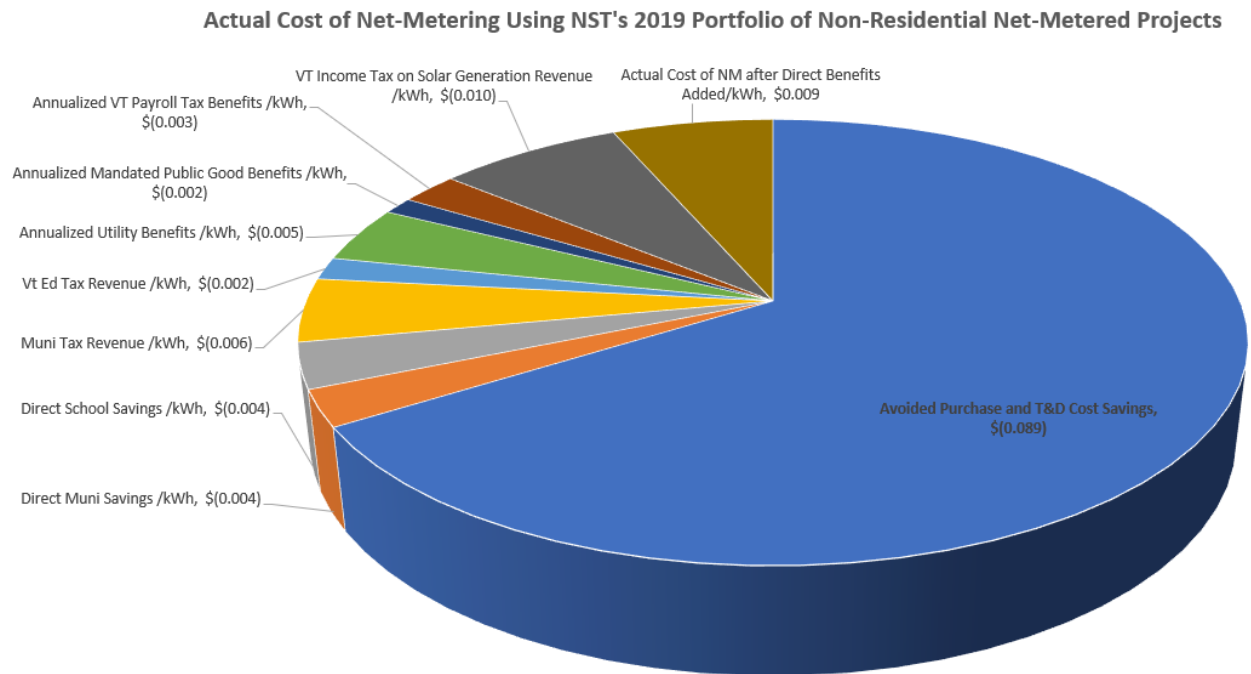


Table D. Actual Cost of Net-Metering Using Norwich Solar Technologies 2019 Portfolio of Non-Residential Net-Metered Projects

As shown in [Table D](#), the total cost of net-metering credits generated in Norwich Solar Technologies 2019 portfolio (not including RECs) is approximately \$1,379,747. However, when factoring in the direct benefits provided, the cost of net-metering drastically reduces to approximately \$141,386 (or \$0.009 per kWh). And if the delta paid between the current Market Value of Renewable Energy Credits (RECs) and the price paid for RECs under the current net-metering pricing is included (see [Table E](#) below),

another \$145,804 of DIRECT savings is provided to ratepayers which exceeds the “cost” of net-metering outlined in Table D.

Factoring in Renewable Energy Credits (REC) on Portfolio	
MARKET VALUE of REC at 2.5c/kWh	\$ 243,007
VALUE Paid for RECs under Current NM Rules at 1.0c/kWh	\$ 97,203
Additional DIRECT VALUE Created by RECs	\$ 145,804

Table E. Additional Direct Value Created by Renewable Energy Credits

Net-metering provides additional direct benefits to farms, low income Vermonters, and Vermont businesses (that all strengthen the Vermont economy and help taxpayers and ratepayers). As shown in Table F (below), the total additional direct savings to Vermont taxpayers is approximately \$261,515, or \$0.03/kWh.

Additional VALUE to VERMONT RATEPAYERS			
DIRECT Annual Farm Benefits	\$ 74,061	5.4%	\$ (0.007)
DIRECT Low Income Savings	\$ 24,668	1.8%	\$ (0.002)
DIRECT VT Business Savings	\$ 162,786	11.8%	\$ (0.016)
Total Additional DIRECT Savings to VT Taxpayers	\$ 261,515		\$ (0.03)

Table F. Additional Value to Vermont Ratepayers

Q8. When estimating the value of the benefits of net-metering, what time horizon should the Commission consider? Why?

A8. The values of the benefits of net-metering should be considered by the Commission on the time horizon that matches the life of the assets because the benefits continue to accrue over the lifetime of the asset and the societal benefits increase over time.

Q9. 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.

A9. Norwich Solar Technologies respectfully requests any analysis of net-metering costs use shared, consistent terms and include all parties involved, such as solar developers and solar system owners. Costs are incurred by all stakeholders involved and without inclusion will lead to a flawed analysis of which future decisions are made from. Any analysis should not look at just the price of net-metering credits, but should also include cost drivers associated with building in-state renewable generation, including the following at a minimum:

1. Costs of each net-metering size class must be evaluated separately (i.e. less than 50 kW, 50 kW to 150 kW, and greater than 150 kW), as costs vary significantly based upon system size;
2. Costs incurred by solar developers and solar system owners such as regulatory delays, site assessments, legal fees, interconnection upgrades, and special site remediation, and state and local taxes. For example, CPGs delayed more than one year at this point will not be able to meet the January 2020 Investment Tax Credit (ITC) deadline as originally anticipated. The resulting impact of each project missing the ITC is greater than \$100,000 for *each* 500 kW net-metering project which is a significant cost on a project that no entity benefits from, but needs to.
3. Costs incurred by small business customers as they wait to begin receiving their net-metering credits. Unknown regulatory timelines impact the economic benefit of group net-metering customers who want to plan, budget, and rely on the commencement of receiving their net-metering credits.

Q10. For each cost, please identify who pays the cost (ratepayers, the utility, society).

A10. Below is a breakdown of who pays the costs outlined in Question 9.

1. Local municipal taxes are paid by the system owner;
2. State Education tax is paid by the system owner;
3. Payroll tax for engineering, construction, and legal services is paid by the system owner;
4. Utilities pay net-meter customers for the power customers generate (with a significant portion offset by avoided energy costs and avoided T&D costs);
5. Interconnection costs are paid by the owner of the net-metering system;
6. Grid upgrades are paid by the owner of the net-metering system;
7. Regulatory delays are paid by all parties involved, including owners, the Commission, municipal authorities, other state and federal agencies involved in the review process of net-metering systems, and society in general; and
8. Site remediation is paid by the owner of the net-metering system.

Q11. Please compare the benefits of net-metering to the cost of net-metering under the current net-metering rule.

A11. As clearly stated in Vermont's net-metering statute, the Commission must implement a net-metering program that accounts for *all* costs and benefits of net-metering.²⁰ The

²⁰ 30 V.S.A. § 8010(c)(1)(D). The Commission must implement a net-metering system that "accounts for all costs and benefits of net metering, including the potential for net metering to contribute toward relieving supply constraints in the transmission and distribution systems and to reduce consumption of fossil fuels for heating and transportation."

majority of the Commission's questions are tailored towards utility and ratepayer values. However, the Commission's investigation must go beyond this narrow cost/benefit analysis and extend to all costs and benefits of net-metering, including the significant list of benefits listed Norwich Solar Technologies answer to Question 5. Norwich Solar Technologies analysis clearly demonstrates that the far-reaching direct benefits of net-metering far outweigh its costs.

Q12. 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.

A12. Norwich Solar Technologies believes an explicit connection to statute or stated policy direction would best frame responses for implementation. If lowest cost generation is the primary objective for the net-metering program, then mechanisms to lower the costs to net-meter should be our collective focus. Significant savings could be achieved (while preserving the only "Customer Choice" generation option) in reducing the extraneous costs of net-metering. If job creation, economic development, environmental benefits, and modernizing the grid are primary factors, then the resulting cost/benefit analysis will need to be very different from a lowest-rate analysis.

Q13. 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?

A13. Norwich Solar Technologies respectfully asks the Commission to seek and provide additional information regarding the proposal to move towards time-of-use (“TOU”) retail rates for net-metering customers. The impacts to net-metering customers should be evaluated in order to ensure a thoughtful and fair policy is implemented and that participation in the net-metering program does not come to a halt. Some initial concerns that should be discussed include:

- 1) How will TOU impact ratepayers? Are low income customers more likely to have their energy burden reduced? Will ratepayers be able to understand the rate structure? Will commercial customers that incur debt in order to finance solar arrays be able to demonstrate that Debt Service Coverage Ratios can be adequately maintained over the course of the loan with potentially different TOU rates?
- 2) What Policy objectives are being achieved? If customers are entering TOU programs, what is the underlying policy (i.e. peak reduction, greenhouse gas reduction, valuing solar at the marginal generation rate, etc.)? Are there safeguards to ensuring no rate class or customer segment is unduly disenfranchised in fulfilling the underlying policy?
- 3) What other parties need guidance and input on the implementation? For example, how will tax liabilities be easily accessed by the hundreds of listers

across Vermont, and what guidance will the Vermont Department of Taxes provide?

Q14. 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?

A14. Alternative tariffs should only be contemplated if out-of-state generation is not being used to offset local renewable sources. In-state renewable sources should be promoted over out-of-state sources and used to offset fossil fueled generation in the region. The current mix of ISO-NE generation is 73%²¹ fossil-fuel based, and while Vermont may be able to point to the purchase of RECs as a measure of “cleanness,” we need to take regional considerations into account as well.

Q15. Should the Commission adopt a limit on the amount of new net-metering resources? If so, how should the Commission determine the amount?

A15. No, the Commission should not adopt a limit on the amount of new net-metering resources. Vermont is already lagging far behind its renewable energy and greenhouse gas reduction goals and net-metering has been shown to provide significant direct economic benefits to Vermonters. Further, a significant increase in all local renewable projects is needed in order to meet Vermont’s renewable energy generation and greenhouse gas reduction outlined in the Comprehensive Energy Plan. Coupling the

²¹ ISO New England Inc., Real-Time Data, <https://www.iso-ne.com/> (last visited November 1, 2019).

strong environmental and economic benefits of net metering with the only viable approach for individual customer choice, it is important that net-metering be a major component of local generation.

Q16. What standards or criteria should regional and local bodies apply to determine whether a site should be designated as “preferred”?

A16. Although not explicitly stated, this Question 16 is most likely referring to Preferred Site #7, “a specific location that is identified in a joint letter of support from the municipal legislative body and municipal and regional planning commissions in the community where the net-metering system will be located.”²² Accordingly, the response below only address this preferred site.

Regional and local bodies do not need additional standards or criteria in order to determine whether a site should be designated as “preferred.” Each regional or local body has their own set of concerns and can request information from the applicant as needed.

Norwich Solar Technologies suggests that the term “preferred” be changed to “locally compliant.” We commonly find that local municipal bodies are not necessarily comfortable stating that a proposed location is “preferred.” Municipalities are likely more comfortable stating that the project proposal is “locally compliant” and that it wishes for it to move ahead through the Commission’s extensive review process.

²² Vermont Public Utility Commission Rule 5.103.

Q17. Which entity should be responsible for making a determination that a preferred site meets the applicable standards and criteria? Should it be the local planning body, the regional planning body, or the local legislative body? Or all three?

A17. As explained in Answer #16, regional and local bodies do not need additional standards or criteria in order to determine whether a site should be designated as “preferred.” The current system of trusting local communities is working, which requires approval from the municipal legislative body and municipal and regional planning commissions.

Q18. What procedures should regional and local bodies follow before designating a site as preferred? Should notice be provided to adjoining landowners and the public before this decision is rendered?

A18. The current system of allowing municipal legislative bodies and municipal and regional planning commissions to designate sites as preferred is currently working. Each entity has their own well-established procedures for reviewing potential preferred sites. The review process is required to be open to the public pursuant to Vermont’s Open Meeting Law, which clearly emphasizes that “all meetings of a public body are declared to be open to the public at all times.”²³ The public is given notice of requests for preferred siting via the Open Meeting Law’s agenda posting requirements.²⁴

²³ 1 V.S.A. § 312(a)(1).

²⁴ 1 V.S.A. § 312(d)(1) “At least 48 hours prior to a regular meeting, and at least 24 hours prior to a special meeting, a meeting agenda shall be: (A) posted to a website, if one exists, that the public body maintains or designates as the official website of the body; and (B) in the case of a municipal public body, posted in or near the municipal office and in at least two other designated public places in the municipality.”

Q19. What information should applicants be required to provide to regional and local bodies before a site is designated as preferred?

A19. Applicants should not be required to provide a certain set of information (predetermined by the Commission) to regional and local bodies before a site is designated as preferred. Each body has their own method for approving preferred siting status. The review process is not instantaneous and can take weeks of information sharing and public meetings before any decision is made.

Q20. Should a local determination that a site is or is not a preferred site be subject to review by the Commission? If so, what procedures should the Commission use to review such determinations?

A20. No, a local determination that a site is or is not a preferred site should not be subject to Commission review. Local determination of preferred siting should rest with the local legislative body. The Vermont Legislature intended for decisions regarding energy siting to be carried out in the most local level. Title 24, Section 4302 clearly states that “[i]t is the intent and purpose of this chapter to encourage the appropriate development of all lands in this State by the action of its constituent municipalities and regions...to encourage the development of renewable resources...(b) it is also the intent of the Legislature that municipalities, regional planning commissions, and State agencies shall engage in a continuing planning process that will further the following goals...to encourage citizen participation at all levels of the planning process, and to assure that

decisions shall be made at the most local level possible commensurate with their impact.”²⁵

Accordingly, local municipalities should have a degree of control over whether a proposed net-metering system is considered a preferred site. The current net-metering program allows this to happen. If the municipal legislative body and municipal and regional planning commissions in the community where the net-metering system will be located all agree that the site is appropriate for a net-metering system, the Commission should give substantial deference to this decision.

²⁵ 24 V.S.A. § 4302.