



April 25<sup>th</sup>, 2022

Ms. Holly Anderson, Clerk

Vermont Public Utilities Commission  
112 State Street, 4<sup>th</sup> Floor  
Montpelier, VT 05602

RE: 22-0334-INV Biennial update of the net-metering program

Dear Clerk Anderson,

Renewable Energy Vermont ("REV") submits this comment in response to the Department of Public Service's comments and recommendations in the Biennial Update of the Net-Metering Program (Case # 22-0334-INV) dated April 8th, 2022. 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 recommendation to reduce compensation rates rests on two assertions that we believe are faulty and poorly supported: that net-metering imposes a net cost rather than a net benefit for Vermont ratepayers and that rate of renewable deployment is sufficient to ensure that the state reaches its climate and energy goals. As we will describe below, we believe that there are several shortcomings to the Department's assessment. In short, the Department is recommending cutting net-metering compensation while:

1. net-metering interconnections have been declining steadily since 2016,
2. the Federal Investment Tax Credit (ITC) is scheduled to drop in both 2023 and 2024,
3. development costs are rising,
4. supply chain disruptions, inflation, and interest rate increases are occurring,
5. the Department itself is unsure of the impact of NM 2.3 and 2.4 on interconnection and CPG application trends, and
6. complying with the GWSA will require significant growth in new renewable energy capacity.

Reducing net-metering compensation, and therefore slowing rates of renewable deployment, would be contrary to the public interest and would perpetuate the massive and ongoing cost-shift to ratepayers of the future. Instead, we urge the Commission to use this investigation to update the statewide blended residential rate to \$0.17141/kWh, as recommended by the Department, and additionally to increase the REC adjustor by \$0.015/kWh - \$0.03 kWh to offset the adverse impacts of the decline in the Federal ITC.

Our response is organized as follows. Section 1 and 2 provide the background and context for our response. In Section 1, we lay out the principles that we believe must guide this biennial update process. These are: Vermonters' right to a meaningful opportunity to participate in net-metering, the imperative to expand renewable energy generation in order 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) and GWSA. In Section 2, we described the level of renewable energy deployment that will be necessary to achieve the GWSA mandates and the likely inadequacy of the RES in achieving the goals.

Sections 3 through 6 respond directly to the Departments' April 8th filing. Section 3 provides an overview of the shortcomings that we observe in the Department's filing - that is too narrow in its focus and that it lacks the methodological rigor to adequately support the conclusions that the Department reaches. Section 4 goes into more detail on why we believe that net-metering continues to provide a net benefit for Vermonters and highlights

the Department's failure to analyze this comprehensively. Sections 5 and 6 look at historical net-metering deployment trends and future net-metering prospects. A careful examination of the historical data shows that the Department's characterization misrepresents several of the most pertinent trends, which show declining participation in the net-metering program. Payback modeling, undertaken by REV to assess the impact of the proposed changes in conjunction with the broader environment for solar development, highlights why further cuts to the net-metering compensation would be particularly harmful at this time. 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." 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. 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.

**Complying with the GWSA Requires Massive New Renewable Deployment:** Additionally, the success of the net-metering program must be evaluated in the context of the GWSA, the most recent and overarching statutory directive on clean energy and climate change in Vermont. 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 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 in excess of the RES minimums accelerates greenhouse gas emissions reductions and provides broad societal benefits.

## 2. GWSA Implications for Renewables

The GWSA created binding, statutory requirements for greenhouse gas reductions in Vermont that open the state to legal liability if these requirements are not met. As detailed in the Climate Action Plan, the path for achieving these emissions reductions hinges on the electrification of the transportation and heating sectors and the state's ability to meet this new demand with clean, renewable energy while simultaneously reducing our existing reliance on ISO-NE grid mix, which is heavily dependent on fossil fuel generation.

Modeling conducted by the Cadmus Group and Energy Futures Group for the Vermont Agency of Natural Resources in support of the Vermont Climate Council indicates that electricity demand will need to increase by 16% by 2025 and 43% by 2030, a growth of 900,000 MWh and 2.4 TWh respectively, to achieve these ends.<sup>1</sup> New electricity demand, as projected by the Pathways Report is shown in Figure 1. Renewable energy growth will have to be even more rapid than demand growth to meet this new demand and displace existing fossil fuel usage. This implies that Vermont will need over 900,000 MWh of *additional* renewable electricity by 2025.

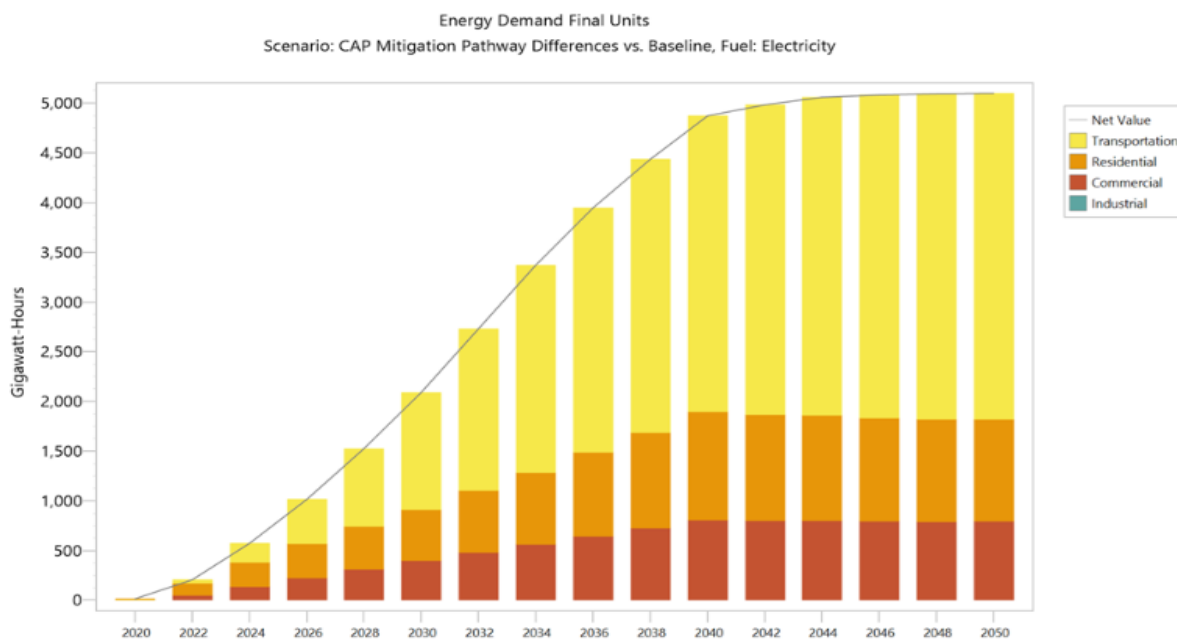


Figure 1. Projected demand growth required to meet GWSA mandates from the Vermont Pathways Analysis Report

While renewable energy can be acquired from a variety of sources, including out-of-state resources like offshore wind, as other states in the region ramp up their own climate commitments, there will be significant competition for these resources. (The Department acknowledged the impact of this competition in the context of REC prices in the 2022 RES report and the same logic applies to renewable energy prices.<sup>2</sup>) Assuming that these resources will

<sup>1</sup> Cadmus Group and Energy Futures Group (2021). *Vermont Pathways Analysis Report*  
<https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/Vermont%20Pathways%20Analysis%20Report.pdf>

<sup>2</sup> Department of Public Services (2022). *2022 Annual Report on the Renewable Energy Standard*, page 23.  
<https://publicservice.vermont.gov/content/2022-annual-report-renewable-energy-standard>

be available for purchase by Vermont utilities on the scale required to meet this additional demand is a significant risk to assume, especially for offshore wind, which has proved to be very difficult to develop and deliver. To mitigate this risk, the state and the Commission should be focused on expanding in-state renewable generation as rapidly as possible, recognizing that that state will likely require a significantly higher share of in-state renewable energy than mandated by the RES.

Despite the electrification imperatives imposed by the GWSA and Climate Action Plan, the Department's assessment of the state's renewable energy needs is based on a VELCO load forecast that is essentially flat. The disparity in these estimates is shown in Figure 2. The Department's assertion that Vermont needs only 25-30 MW/year of new renewables for Tier II RES compliance should therefore be viewed with extreme skepticism over any but the shortest time horizons. Targeting this level of renewable deployment would mean planning for Vermont to fail to achieve its GWSA requirements or to fail to meet its RES requirements if our GWSA requirements were achieved.

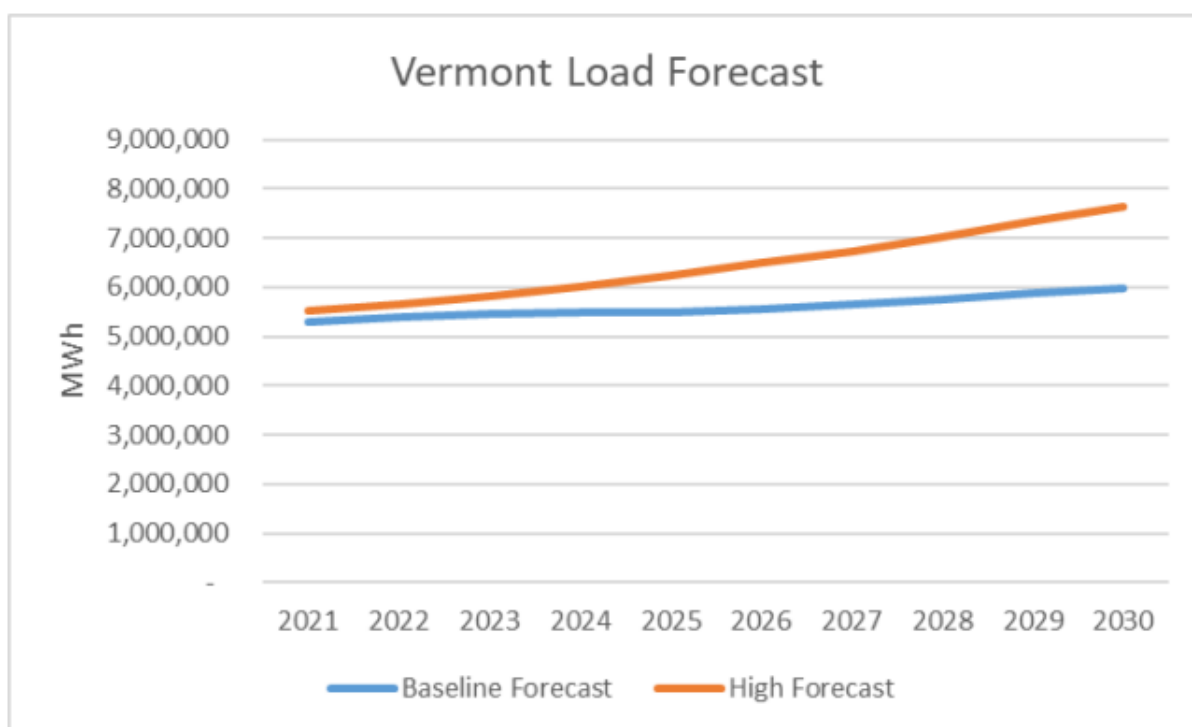


Figure 2. Baseline and GWSA compliant load forecasts from the 2022 RES Report<sup>3</sup>

### 3. Overview of DPS Filing

At the highest level, REV believes that the Department's filing is too narrow in its focus and that its analysis is flawed and fails to adequately support the conclusions that they reach. The Department's sole focus on RES compliance and rate impacts fails both to take into account the mandate to provide all Vermonters with an opportunity to participate in net-metering as well as with the imperative to cut greenhouse gas emissions set forth in the GWSA. The Department's net-metering cost and climate impact estimates are improperly limited to a comparison between the cost of net-metered solar and other renewables rather than an analysis of the net

<sup>3</sup> Department of Public Services (2022). *2022 Annual Report on the Renewable Energy Standard*, page 11. <https://publicservice.vermont.gov/content/2022-annual-report-renewable-energy-standard>

societal benefits (or costs) that net-metering provides. Its assessment of interconnection and CPG application rates as well as the relationship between solar installation costs and NM compensation rates all fail to accurately convey the trends in these areas since the transition from NM 1.0 to NM 2.0 through NM 2.4 and fails to address the shifting economic environment for renewable installation in a meaningful way. Moreover, the Department's own filing suggests that it is premature to make changes to the REC adjustor.<sup>4</sup> Overall, the Department's filing provides neither the methodological rigor nor accuracy to justify cutting NM compensation rates at the same time that the state is pushing for accelerated electrification and greenhouse gas emissions reductions. For these reasons, REV urges the Commission to implement the Department's updated statewide blended residential of \$0.17141/kWh and additionally to increase the REC adjustor to \$0.015/kWh - \$0.03 kWh to offset the adverse impacts of the decline in the Federal ITC.

## 4. Societal Value and Rate Impacts of Net-Metering

Across the 2018 and 2020 Biennial Updates and the 19-0856 NM Rulemaking case, the Department has presented a variety of estimates of the relative benefits and cost of the net-metering program as well as estimates of a purported cost-shift to non-participating customers. These two issues, the net societal benefit provided by net-metering and the rate impacts of net-metering, are distinct and the analysis required to assess each varies significantly. The net-metering statute requires consideration of both the net societal benefits of net-metering (30 V.S.A. § 8010(c)(1)(D)) as well as any potential cost-shifts resulting from the program (30 V.S.A. § 8010(c)(1)(C)). In their April 8th filing for this case, the Department seems to conflate these two issues and to largely limit their assessment to the relative costs of net-metering and other sources of renewable energy such as Standard Offer projects. Demonstrating a cost difference between these programs (which have different objectives and different benefits), however, is not sufficient to demonstrate that net-metering has negative societal value nor even that it imposes an adverse cost-shift to non-participating ratepayers. Establishing that net-metering has a negative societal value would require a comprehensive analysis of the costs *and* benefits of net-metered projects, as required by 30 V.S.A. § 8010(c)(1)(D). Convincingly documenting the magnitude of a cost shift would similarly require a more detailed accounting of avoided costs than the Department has undertaken in this review.

The Department's emphasis on comparing the costs of the Net-Metering Program and Standard Offer Program elides the different purposes and benefits of these programs. The primary purpose of the Net-Metering Program is to provide Vermonter ratepayers with the opportunity to self-generate power. This purpose is not served by the Standard Offer Program. The purpose and regulatory structure established for net-metering (such as limitations on project size and siting) intrinsically raise the cost of these projects in service to this purpose. In contrast, the State of Vermont stands behind VEPPI in guaranteeing the payments over the life of the Standard Offer contracts. As a result of this guarantee and Vermont's AAA credit rating, developers or investors in net-metering projects are paying at least 2% more funds than an investor in a Standard Offer project. In addition, Standard Offer projects require larger tracts of land that are not necessarily located in places that would satisfy the "Quechee test" and may not provide the same benefits in terms of line losses as small arrays closer to the off taker. Again, the relative cost of net-metering and the standard offer projects is not a sufficient basis to suggest that the value provided by net-metering exceeds its costs and the requirement to limit cost-shift related to net-metering *to the extent feasible* must be balanced against the requirement to provide Vermonters with the opportunity to participate in self-generation, which cannot be achieved through standard offer projects.

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<sup>4</sup> *In re: biennial update of the net metering program*, Case No. 22-0334-INV, Department filing on 4/8/2022: "With just 11 months of history under Net-Metering 2.3 and 2.4, it is challenging to identify trends and make recommendations for REC adjustor levels."

Overall, the Department's evaluation of the value of net-metering is far too focused on the short-term and fails to capture the dynamics of the type of widespread electrification that will be required to comply with the GWSA and other regional efforts to combat climate change. The Department's estimates of the value of solar are made in the context of current load patterns but it is clear that both storage and demand response will play a significant role in meeting the GWSA goals, changing the relationship between existing load and generating capacity. The Department recognizes but dismisses this reality in a footnote by stating that net-metering rates do not "compensate or consider the value of load control itself." While it is true that the value of net-metering and load control are distinct, they are also synergistic - the value of load control is lower when the amount of renewable energy on the grid is lower. Lowering net-metering compensation now (and therefore net-metering deployment) will make it less attractive to invest in storage and demand response in the future, limiting the benefits of renewable energy and load control technologies expanding in tandem that would otherwise accrue to ratepayers. Continued expansion of the use of electric vehicles and heat pumps will necessitate investing in upgrades to utility infrastructure in many areas. Net-metering projects undertaken today, in many instances, cover the cost of these infrastructure improvements. Looking at the costs and benefits of net-metering with a longer time horizon and with a broader lens would better capture the value of the net-metering program.

## Societal Value

Several studies looking at net-metering programs have found that net-metering generates a positive societal benefit that exceeds the cost of those programs. These include two studies referenced previously by REV - a 2017 study by Lawrence Berkley National Labs and a 2018 study by Synergy Energy Economics - as well as a 2021 study by Daymark Energy Advisors evaluating Maine's net-metering program. While the Department has critiqued elements of these first two studies, they have declined to undertake or commission a similar analysis and seem to exclude the social cost of carbon from its assessment of the net-metering program. In the absence of such a study, broad assertions that the societal cost of net-metering exceeds its value remain unsupported.

The Department's continued practice of excluding the social cost of carbon from its assessment of the Net-Metering program is notable since this is one of the larger benefits of the program. This decision is also hard to understand since the societal harms of carbon emissions are incontrovertible and since the marginal generation displaced by net-metered solar is virtually always a fossil fuel power plant. Moreover, the Department has previously developed a social cost of carbon estimate in efficiency cases. The fact that solar power can be acquired from other sources such as the (now expiring) Standard Offer Program, does not mean that the Department can ignore the emissions saving that result from net-metering as it is entirely possible for both programs to provide a net societal benefit. If net-metering provides a net societal benefit, as the above studies conclude, reducing the rate of deployment will make the state worse off.

It should also be noted that in the context of analyzing the benefits and costs of net-metering, reduced sales are not a cost to the utility. While reduced sales, under some circumstances, can result in changes to a utility's rate structure, utilities are not entitled to a particular load from any ratepayer, and a reduction in load - whether from conservation, efficiency, or self-generation - does not add anything to the utility's expenses. Just as lost sales are not flagged as a cost imposed by Vermont's energy efficiency utilities, they should not be considered a cost of self-generation.

## Contextualizing Rate Impact Estimates

There are several reasons to believe that the Department's estimates of the rate impact attributable to net-metering are overstated. At a macro-level, there is little evidence that the program is causing significant upward rate pressure. The average price of electricity for Vermonters is 2 to 3 cents per kWh lower than most New England states and rate increases over the past ten years have averaged less than 3% and are lower than increases in surrounding areas. While this undoubtedly reflects the utilities' work to contain restrain rate growth, it is also indicative that any rate impacts resulting from net-metering are quite moderate.

The relatively small increase in rates may also reflect an incomplete accounting for the avoided costs that result from net-metering installation. The Department does not provide a valuation for reductions in "line losses" that results from distributed power generation. Electricity delivered from a central location loses power over the transmission lines and transmission and distribution losses are estimated at 6 to 10%. In a footnote to the 2022 RES Report, the Department acknowledges that these losses should be accounted for but does not provide any indication of their value. Additionally, several costs that are privatized and covered by net-metering participants provide value to the utility. Net-metering participants are required to pay for surveys, new poles, transformers, reclosers, etc. which all accrue to the benefit of the utility and improve the delivery system and all of which are offsets to the capital assets required of the utility for it to operate. If these costs were not absorbed by outside contractors all of such costs would go into the rate base but the Department provides no assessment of this value. There is no clear consideration for the operating expenses absorbed by privately owned solar installations, costs that would accrue to the utility were they to undertake utility-owned projects; such costs would include insurance, maintenance and repairs, and local and state taxes.

Additionally, the Department does not seem to place any value on avoided carbon emissions in this analysis. While the cost of these emissions is not included in current rates, continuing to externalize these costs perpetuates the fundamental economic problem that is driving climate change - failure to account for externalities - and is contrary to the spirit of the GWSA.

While we have significant reservations about the methodology and accuracy of the various rate impact estimates provided by the Department and the utilities, it is nonetheless informative to consider these estimates in the larger context of system costs and their impact on ratepayers. Despite the Department's repeated emphasis on the impact on ratepayers, it is notable that the Department provides only aggregate cost estimates but does not present data on how these costs impact individual ratepayers.

The Commission's 2020 Order cites a GMP estimate that 20 MW of new net-metered capacity creates a cost shift of \$47.4 million to non-participating customers over 25 years. This amounts to \$1.88 million per year spread across more than 4 million MWh of retail load. Assuming 7,000 kWh of consumptions, this equates to approximately \$0.26/month in ratepayer impacts. If the Department applied a social cost of carbon of \$0.04/kWh, the same 20 MW of net-metered capacity would produce over \$880,000 of avoided carbon benefits each year meaning the net cost to consumers would be only \$1 million/year or approximately \$0.14/month. For comparison's sake, the Department has asserted that a quarterly over-collection of \$361,631 (which would be \$1.45 million on an annual basis) by GMP would "result in a *de minimis* immediate rate impact."<sup>5</sup> While REV recognizes that the over-collection is temporary, it is interesting nonetheless that the rate impact of 20 MW of net-metered capacity is on par with these *de minimis* immediate rate impacts.

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<sup>5</sup> Order Approving Request to Carry Adjustors Balances Forward. 08/16/2021. Case No. 21-2809-PET.

In short, even if the net-metering cost estimates advanced by the utilities and Department were accurate, the magnitude of the costs would not justify continuing reductions to net-metering compensation that would shut Vermont ratepayers - and especially LMI ratepayers - out of the net-metering program.

Finally, the Department's filing does not address the direct benefits that LMI Vermonters get from participating in the net-metering program. When the cost to install solar was significantly higher it was difficult for LMI households to afford to purchase or finance systems, but as costs have declined over the last decade and states have made efforts to increase LMI access, national trends have shown a significant increase in LMI participation. According to data collected by Lawrence Berkeley National Labs, solar is increasingly benefiting lower-income households. They estimated that 41% of solar adopters in 2020 could be considered LMI.<sup>6</sup> Within Vermont, 13% of solar adopters had an income below \$50 thousand in 2020. To reduce compensation now in the name of supporting LMI Vermonters would perversely stall the progress that is being made to increase LMI access to clean, renewable energy. Rather than reducing compensation rates and excluding growth in the area, the PUC should consider targeted policies that help LMI Vermonters to participate in net-metering as is done in states like Massachusetts, Connecticut, Illinois, and New York among others. Specific incentives, financing tools, and outreach to LMI households have proven to be effective tools for increasing equitable access to net-metering.

## 5. Historical Net-Metering Deployment Trajectory

### Historical Trend in Interconnections and CPG Applications

The Department's recommendation to reduce net-metering compensation hinges on its interpretation of the trends in net-metered project development since 2016.<sup>7</sup> Unfortunately, we believe that the Department misinterprets the trends in both the interconnection and CPG application data. A more careful examination of these data demonstrates the declining participation in the net-metering program.

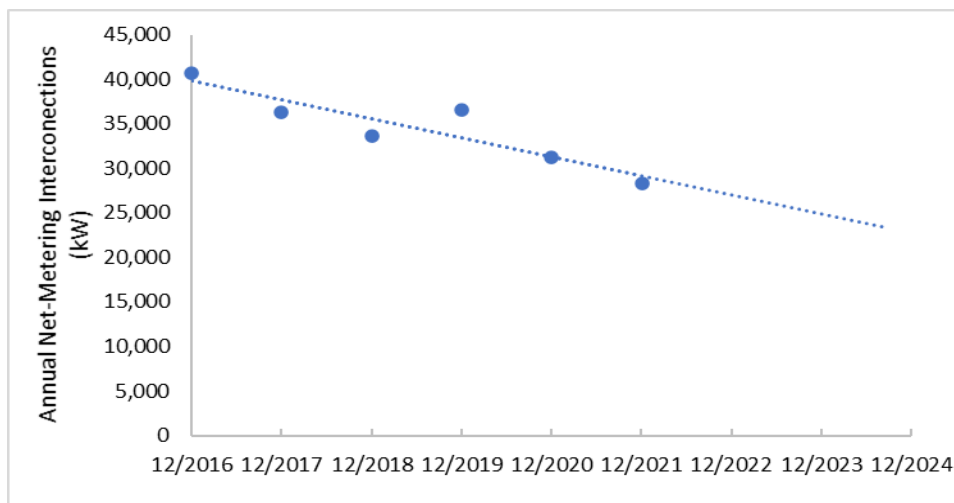
Contrary to the Department's assertion that net-metering deployment over the 2020-2021 biennial period occurred "at a pace roughly in line with previous years", interconnection data show a steady and inexorable decline from 2016 (the last year that NM 1.0 was in effect) through the 2020-2021 biennial period. As shown in Figure 3, net-metering interconnections show an undeniable and material decline across this period. The sole deviation in the year-over-year decline in net-metering interconnections occurred in 2019, the last year that solar projects were eligible for the 30% ITC and the year that the net-metering cap was removed, allowing a temporary surge in installation in some of the smaller utility services territories. Annual interconnections are already below 30 MW/year and a linear forecast based on this trend shows net-metering interconnections dropping below the 25 MW/year that is the Department's lower bound estimate for the level of Tier II resources needs by the end of 2023.

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<sup>6</sup> Berkley Lab (2022). *Residential Solar-Adopter Income and Demographic Trends: 2022 Update* <https://emp.lbl.gov/solar-demographics-tool>

<sup>7</sup> *In re: biennial update of the net metering program*, Case No. 22-0334-INV, Department filing on 4/8/2022 on page 9.





*Figure 3. Total capacity of annual net-metered interconnections*

While the interconnection data show a clear decline in net-metering deployment as net-metering rates have declined, REV has argued that CPG applications provide more insight into the impacts of changes in NM rates than interconnection data. Interconnections in a given year include installations from previous NM compensation regimes that provide little relevant information for adjusting the current NM regime. Category III systems, for instance, can take over two years to install from the time of the CPG application (accounting for the permitting process, site restrictions, and actual construction) in which case current interconnection data is reflective of the viability earlier rather than current NM compensation rates. It is notable, therefore, that the Department's own assessment is that there is not yet sufficient data to evaluate the impact of NM 2.3 and 2.4 on CPG applications stating, "With just 11 months of history under Net-Metering 2.3 and 2.4, it is challenging to identify trends and make recommendations for REC adjustor levels."

While REV agrees with the Department's assessment that it is likely too early to draw definitive conclusions about the impact of NM 2.4 on CPG applications, comparing applications for the September to December period of 2021, when NM 2.4 first went into effect, with the September to December period in prior years, shows that the cumulative capacity of CPG applications is also in decline. Limiting this analysis to the September to December period controls for seasonal variability in CPG applications and provides a consistent duration. Figure 4 shows the CPG applications for this period from 2017 to 2021. In addition, the Figure shows two trend lines - one fit using all data points and a second that excludes data from 2020. Since applications are known to spike immediately before a rate decrease, the spike in the 2020 data is likely skewed by the imminent change from NM 2.2 to NM 2.3 rather than being indicative of the baseline CPG applications rate for that time of year.

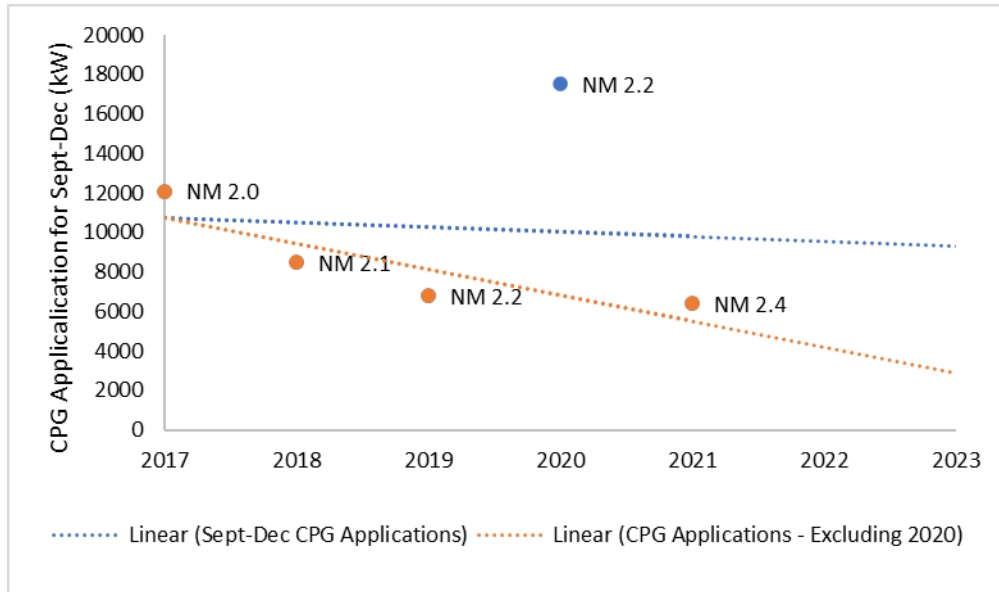


Figure 4. Total capacity of CPG applications for Sept. to Dec. under various net-metering regimes

As the Department discussed in their filing, much of the decline in overall application capacity is attributable to a decline in applications by larger, Category III systems. Figure 5 shows a dramatic decline in Category III applications from NM 2.0 to NM 2.4. In this Figure, application rates for Category III CPGs were annualized to account for the different duration of these NM regimes. This decline is likely explained by the lengthening payback period resulting from reductions in net-metering compensation and the ITC.<sup>8</sup>

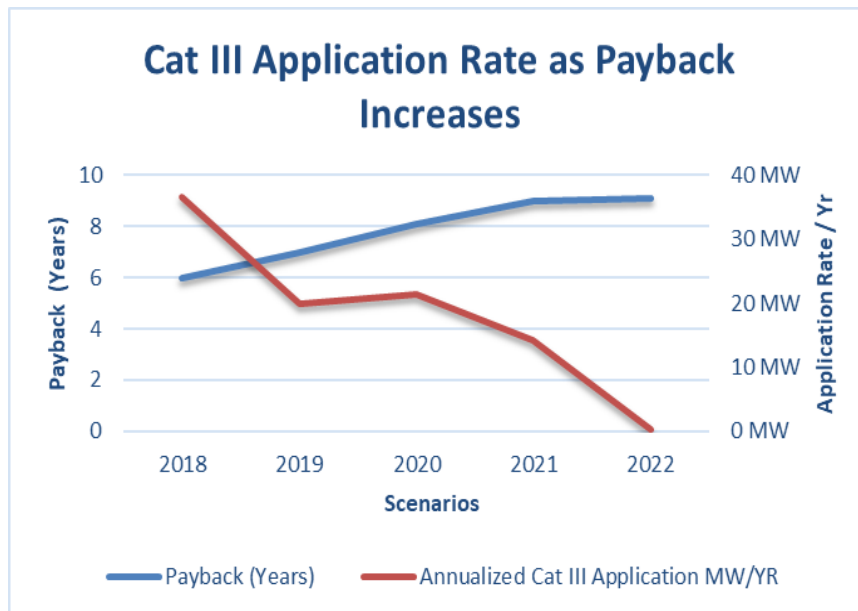


Figure 5. Annualized Category III net-metering applications versus system payback period

<sup>8</sup> The payback model used to create this figure is described in Section 6.

This figure is indicative of the importance of threshold effects in net-metering compensation. Once payback periods exceed acceptable levels, participation free falls. The net-metering program may have exceeded that threshold for larger commercial systems since these systems compete for dollars with a wide range of other investment opportunities. While applications for smaller residential systems have remained more stable so far, there are limits to the payback period that is acceptable to Vermont families as well and at a certain point deployment of these systems will also diminish rapidly, as evidenced by Nevada's experience cutting net-metering compensation in 2016 and the resulting decline in solar deployment. As noted previously, lengthening payback periods harm LMI Vermonters first, and perpetuate disparities in access to renewable energy. The Department's recommendation to further reduce net-metering compensation by decreasing the REC value by an additional cent seems to ignore the data and the Department's own, stated, uncertainty about the advisability of reducing the REC adjustor.

## Historical Trends in Solar Costs and NM Compensation

Citing Lawrence Berkley's cost data, the Department asserts that net-metering compensation has not declined at a comparable rate to solar costs.<sup>9</sup> For the period from 2014 (when net-metering interconnections in Vermont first exceeded 20,000 kW/year) through 2020, net-metering rates have fallen by a substantially larger percentage than installation costs, as shown in Figure 6. Note that the net-metering compensation rates used here assume that the ratepayer retains their RECs since this provides the apple-to-apples comparison to the value that the ratepayer received under the NM 1.0 system. Even comparing the decline in cost and net-metering compensation dating to 2011, when NM 1.0 went into effect and when solar prices were declining most rapidly, yields an essential equivalent decline. REV is unsure on what basis the Department makes the assertion.

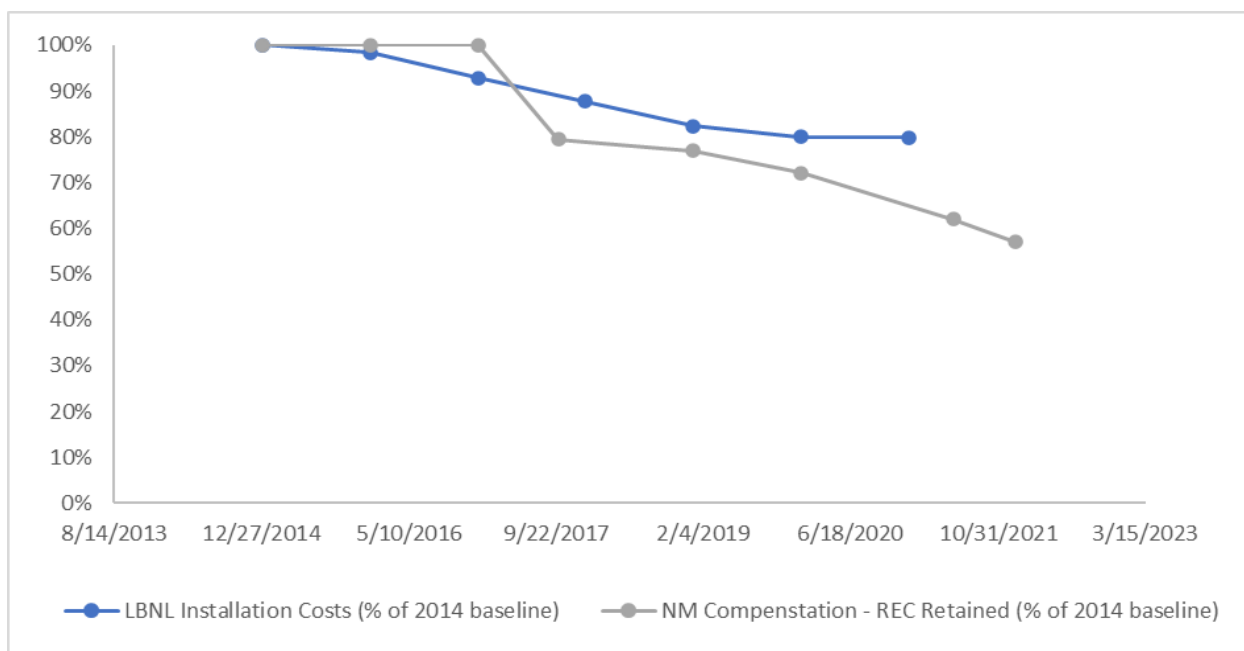


Figure 6. Relative decline in solar prices and net-metering compensation

<sup>9</sup> *In re: biennial update of the net metering program*, Case No. 22-0334-INV, Department filing on 4/8/2022 on page 35: "Exhibit 13 depicts the declining costs of solar over the past several years.<sup>49</sup> The compensation paid to net-metering resources has not seen a corresponding reduction in magnitude over time."

## 6. Future Net-Metering Deployment

In addition to misinterpreting historical trends, the Department fails to adequately account for changes in the broader economic environment that could signal a significant divergence from these historical trends. Contrary to prior review periods, the economic environment for solar projects is becoming significantly more challenging and many costs are increasing. Solar price declines have offset the impact of declining net-metering compensation rates in the past but solar developers in Vermont and across the country are currently facing rising costs for solar modules, racking, and other components such as production meter sockets. Ongoing supply chain issues, inflation, rising interest rates, looming changes to the federal ITC, and now a Department of Commerce anti-circumvention investigation are all factors making solar projects more costly than in prior years.

### Simple Payback Model

To more rigorously understand the cumulative effects of changes in net-metering compensation, the ITC, and inflation, REV created simple payback models for Category I and III systems. These models estimate a ratepayer's payback period based on the blended rate, site adder, REC adjuster, and the federal ITC that their system receives as well as two scenarios that explore the impact of inflation. The working models for each system are included with REV's filing. The payback results are quite alarming. Beyond question, the combination of the changes proposed by the Department and pending ITC changes will push paybacks beyond acceptable lengths for Vermont ratepayers.

The payback models were applied to eleven scenarios covering 2018 to 2024, the end of the next biennial review. Scenarios 1-5 provide a historical baseline by showing the payback from 2018-2022 under NM 2.0-2.4 and the appropriate federal ITC. Scenarios 6-10 reflect the Department's suggested changes to the net-metering program, designated NM-PSD (blended residential rate of \$0.1714/kWh and a -\$0.01/kWh REC adjuster applied for 25 years), and illustrate the impact of this compensation change in combination with different assumptions about the ITC and inflation. Scenario 11 uses a \$0.164 residential rate to show the impact of the change in utility territories that do not apply the statewide blended residential rate. Category I system prices are set at \$3.0/WDC and Category 2 system prices are set at \$2.20/WDC. Where noted (scenarios 8, 10, and 11) a 10% inflation increase is applied to these base system prices. All scenarios utilize an expected 2.5% annual growth in the blended residential rate. These models are not intended to replicate real-world payback periods precisely but rather to provide a consistent basis for comparing the magnitude of past and pending changes in the overall economic environment for solar deployment on the financial viability and attractiveness of these systems. Modeling assumptions are generally conservative as they do not include any price impacts from supply chain issues or the U.S. Department of Commerce's tariff circumvention investigation. As such these models are likely to *underestimate* the rate at which payback periods are increasing.

Results for Category I systems are shown in Figure 7 while the details of each scenario are presented in Table 1. These results show that the changes to net-metering implemented in the 2020 biennial update increased the payback period by approximately 7.8% (NM 2.4 shown in scenario 5 vs NM 2.2 shown in scenario 3) and that Department's proposed changes in combination with the scheduled reduction in the ITC would result in a 17% increase in the payback period relative to NM 2.2 (scenario 7 vs scenario 3). When considering the expiration of the ITC in 2024 in combination with the proposed cut to NM compensation, payback for these systems reaches 18-20 years (scenarios 9-11), essentially double the payback period that ratepayers could anticipate in 2018. Once the ITC is eliminated in 2024, maintaining the payback period that is available under NM 2.4 (14 years which is already pushing the boundaries of ratepayer acceptance), the REC adjuster would need to be set to a positive \$0.03/kWh.

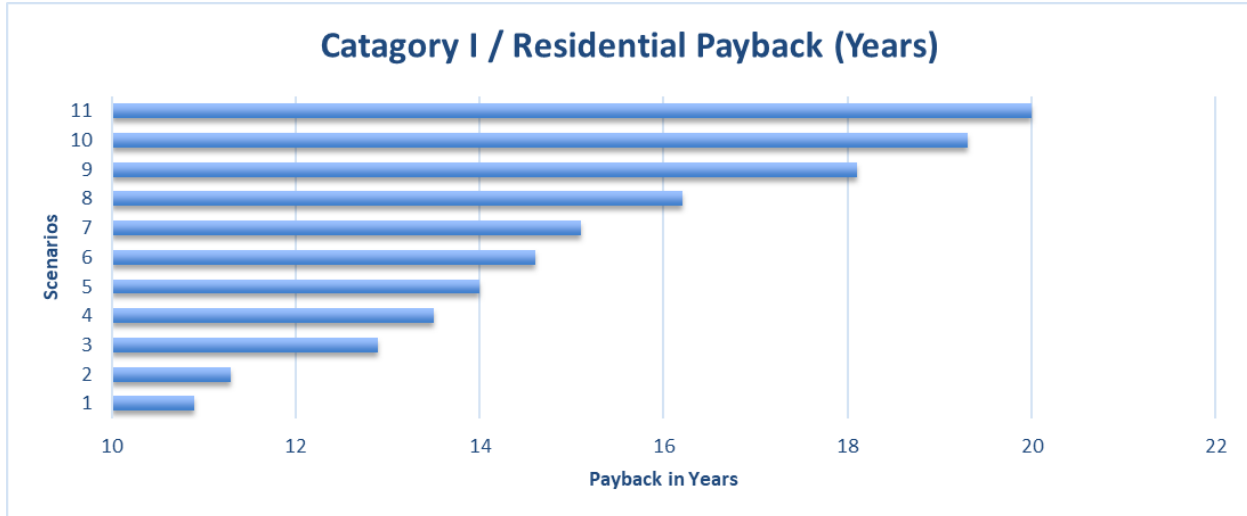


Figure 7. Payback model results for Category I systems

Table 1. Payback Model Scenarios and Results for Category I Systems

Year	Scenarios	NM Regime And ITC	Residential Payback (Years)	Notes
2018	1	NM 2.0 @30% ITC	10.9	(\$3.00/WDC)
2019	2	NM2.1 @30% ITC	11.3	(\$3.00/WDC)
2020	3	NM2.2 @26% ITC	12.9	(\$3.00/WDC)
2021	4	NM2.3 @26% ITC	13.5	(\$3.00/WDC)
2022	5	NM2.4 @26% ITC	14	(\$3.00/WDC)
2023	6	NM-PSD @26% ITC	14.6	PROPOSED BY PSD Base (-.01) REC (\$3.00/WDC)
2023	7	NM-PSD @22% ITC	15.1	PSD Base Jan 1,2023 ITC Change
2023	8	NM-PSD @22% ITC	16.2	PSD Base w/ 10% inflation (3.30/WDC)
2024	9	NM-PSD @no-ITC	18.1	PSD Base Jan 1, 2024 ITC Change
2024	10	NM-PSD @no-ITC	19.3	PSD Base w/ 10% inflation (3.30/WDC)
2024	11	NM-PSD @no-ITC	20	PSD Base w/ 10% inflation and 16.4c residential rate

Results for Category III systems are shown in Figure 8 while the details of each scenario are presented in Table 2. The results are even more alarming than the Category I results as the data suggests acceptable customer payback periods have already been exceeded. Even if a modest amount of applications come in before the next net-metering regime begins, it is clear from the application data that Category III is not being utilized. This loss jeopardizes the ability of non-profits, housing agencies, businesses, municipalities, and schools to participate and which violates the principles of the net-metering statute. Simply maintaining the current Category III paybacks (that has minimal adoption) once the ITC drops to 10% in this biennial review period would require the REC adjuster to be set to +\$0.015/kWh.



Figure 8. Payback model results for Category III systems

Table 2. Payback Model Scenarios and Results for Category III Systems

Year	NM Regime and ITC%	Scenario	Payback (Years)	Annualized Cat III Application MW/YR	Notes on Variations
2018	NM 2.0 @30% ITC	1	6.0	36.5	(\$2.2/WDC)
2019	NM2.1 @30% ITC	2	7.0	20.0	(\$2.2/WDC)
2020	NM2.2 @26% ITC	3	8.1	21.4	(\$2.2/WDC)
2021	NM2.3 @26% ITC	4	9.0	14.2	(\$2.2/WDC)
2022	NM2.4 @26% ITC	5	9.1	0.4	(\$2.2/WDC)
2023	NM-PSD @26% ITC	6	10.0		PROPOSED BY PSD Base (-.01) REC
2023	NM-PSD @22% ITC	7	10.1		PSD Base Jan 1, 2023 ITC Change
2023	NM-PSD @22% ITC	8	11.0		PSD Base w/ 10% inflation (2.42/WDC)
2024	NM-PSD @10% ITC	9	11.5		PSD Base Jan 1, 2024 ITC Change
2024	NM-PSD @10% ITC	10	12.2		PSD Base w/ 10% inflation (2.42/WDC)
2024	NM-PSD @10% ITC	11	12.8		PSD Base w/ 10% inflation and 16.4c residential rate

Again, this analysis is a conservative estimate of the impacts on payback periods as it does not take into account the fact that interest rates are rising, and inflation is running at rates higher than 10% for the solar industry. The cost of capital and inflation are not variables that will be receding in the next few years and only make the analysis tip more conservative in terms of payback period impacts. The Department notes that they have previously attempted payback modeling but failed to replicate real-world results and opted not to continue that effort for this biennial update. Without some kind of model of the impact that changes to the net-metering compensation will have on the financial viability of the program, it is unclear how the Department arrived at the specific rate adjustment that they did. In the context of the GWSA, some form of rigorous analysis should be required to justify the specific cuts that the Department is proposing.

## 7. Conclusions

Given the Department's misinterpretation of the trends in both net-metering interconnections and CPG applications and the differences in the prevailing economic conditions from renewables between the 2010s and today, we believe that reducing net-metering compensation at this time would be a grave mistake and contrary to the legislative intent of the GWSA and 30 V.S.A. § 8010. The Department is recommending cutting net-metering compensation while:

1. net-metering interconnections have been declining steadily since 2016,
2. the Federal ITC is scheduled to drop in both 2023 and 2024,
3. development costs are rising,
4. supply chain disruptions, inflation, and interest rate increases are occurring,
5. the Department itself is unsure of the impact of NM 2.3 and 2.4 on interconnection and application trends, and
6. complying with the GWSA will require significant growth in new renewable energy capacity.

Reducing net-metering compensation, and therefore slowing rates of renewable deployment, would be contrary to the public interest and would perpetuate the massive and ongoing cost-shift to ratepayers of the future. Consequently, REV recommends that the Commission adopt the Department's updated residential rate of \$0.17141/kWh and additionally that the Commission increase the REC adjustor to +\$0.015/kWh to +\$0.03 kWh to offset the adverse impacts of the decline in the Federal ITC.

In addition, REV requests that the PUC consider adding additional preferred site types to promote solar development at parking locations (which have a lower environmental impact but higher cost than some other locations), at low-income housing, and for schools, municipalities, and other tax-exempt entities. REV requests that the PUC consider opening an investigation to determine the appropriate site adjusters for these new preferred site types.

Finally, REV would like to raise the possibility of eliminating the requirement for a production meter on net-metered systems, recognizing that this will need to be addressed outside of the scope of this investigation. Production meters add additional cost to net-metered systems, are increasingly difficult to procure given global supply chain issues, and can make it more difficult to install solar plus storage systems.