

STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 19-0855-RULE

Proposed Revisions to Vermont Public Utility
Commission Rule 5.100

SOLAFLECT ENERGY
RESPONSE TO PUBLIC UTILITY COMMISSION
INFORMATION REQUEST

Do you really want to be remembered as the Vermont Public Utilities Commission that buried its head in the sand, that fiddled while the planet burned?*

** Paraphrasing United Nations Secretary-General António Guterres' remarks on Dec. 1, 2019, "Do we really want to be remembered as the generation that buried its head in the sand, that fiddled while the planet burned?"*

With all due respect, Solaflect Energy challenges the base premises of the Public Utilities Commission's Request for Additional Information.

(1) The climate crisis should be the major organizing framework for the future development of the energy sector and renewable energy in Vermont.

While Hydro-Quebec is a valuable asset in a transition to a cleaner future, a 20 to 50 year old infrastructure does nothing to solve the climate crisis. It is deplorable that the State and some of its utilities are greenwashing the electric sector in Vermont by hiding behind 50 year old facilities.

(2) The "cost shifting" argument comes directly from the Koch Brothers-funded American Legislative Exchange (ALEC) website.

It is designed to create divisive politics that support and maintain the status quo utility monopolies and indirectly fossil generation of electricity. It has been utilized in many locations including Nevada, Michigan and Florida, but consumers have revolted. It creates faux economic analyses that largely support the status quo due to the fact that the pricing signals within the

electric sector are highly distorted, economic externalities are ignored, and in no way do price signals account for the environmental, climate and health damage created by the current system.

(3) The requests are premised on a 20th century grid rather than a 21st century grid.

The underlying premise of the PUC Requests for Additional Information and the responses provided by the VT Department of Public Service and the utilities assumes a monopolistic centralized command-and-control utility system. All thoughtful projections of any future grid that solves our climate crisis include distributed ownership of generation and storage assets, highly varied and controlled demand response, and a multitude of market signals. Fundamentally, the 20th century grid (and the current analyses presented) is producer-centric. However, in economics, the consumer is king. For the first time in a century, electricity consumers are starting to have choices in the production and utilization of electricity. The energy transformation can be slowed by the utilities and their allies in the State Government, but it will ultimately happen despite all of the roadblocks created to slow it down. Unlike video stores and buggy whip manufacturers, electric utilities are fortunate that only 18% of Vermont's energy use is electric. The exciting challenge for utilities should be to INCENT the electrification of the remaining 82% of energy use at least as fast as the installation of distributed generation, efficiency improvements, and storage. THAT's the big market opportunity, after all. By doing so, they mitigate the so-called cost-shifting by replacing revenue lost from the early adopters of 21st century technology.

Each of these topics is addressed in more detail below.

(1) The climate crisis should be the major organizing framework for the future development of the energy sector and renewable energy in Vermont.

On December 1, United Nations Secretary-General, António Guterres said that “the point of no return is no longer over the horizon, it is in sight and hurtling toward us”. His remarks include:

Global average levels of carbon dioxide reached 407.8 parts per million in 2018.

And I remember, not long ago, 400 parts per million was seen as an unthinkable tipping point. We are well over it.

The last time there was a comparable concentration of CO₂ was between 3 and 5 million years ago, when the temperature was between 2 and 3 degrees Celsius warmer than now and sea levels were 10 to 20 metres higher than today.

The signs are unmissable.

The last five years have been the hottest ever recorded.

The consequences are already making themselves felt in the form of more extreme weather events and associated disasters, from hurricanes to drought to floods to wildfires.

Ice caps are melting. In Greenland alone, 179 billion tonnes of ice melted in July.

Permafrost in the Arctic is thawing 70 years ahead of projections.

Antarctica is melting three times as fast as a decade ago.

Ocean levels are rising quicker than expected, putting some of our biggest and most economically important cities at risk.

More than two-thirds of the world’s megacities are located by the sea.

And while the oceans are rising, they are also being poisoned.

Oceans absorb more than a quarter of all CO₂ in the atmosphere and generate more than half our oxygen.

Absorbing more and more carbon dioxide acidifies the oceans and threatens all life within them.

Three major reports from the Intergovernmental Panel on Climate Change – on land, on the oceans and cryosphere, and on the 1.5 degree Celsius climate goal – each confirm that we are knowingly destroying the very support systems keeping us alive.

<https://www.un.org/sg/en/content/sg/speeches/2019-12-02/remarks-opening-ceremony-of-cop25>

On November 5, 2019, we heard:

Scientists have a moral obligation to clearly warn humanity of any catastrophic threat and to “tell it like it is.” On the basis of this obligation and the graphical indicators presented below, we declare, with more than 11,000 scientist signatories from around the world, clearly and unequivocally that planet Earth is facing a climate emergency.

<https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biz088/5610806>

The purpose of 30 V.S.A. § 8005 is “To encourage the economic and environmental benefits of renewable energy, this subdivision establishes, for the RES, minimum total amounts of renewable energy within the supply portfolio of each retail electricity provider.” This was clearly legislated as a MINIMUM, yet the PUC, the utilities and the VT Department of Public Service all seem to treat it as a MAXIMUM. Vermont’s Climate Pollution is more than 50% above the stated goals of the State. Progress is not nearly fast enough and needs to be accelerated.

There is a serious case of greenwashing in Vermont that is a major impediment to adequately addressing the climate crisis.

GMP's Energy Supply is 90% Carbon Free

Company | December 13, 2018



We're proud that our power sources are 90% carbon free and 60% renewable!

Doesn't it look great that GMP has all that wind and solar to make up 60% of its electricity supply? The trouble is that GMP's own website states that the 2017 fuel mix was only 0.9% renewables OTHER THAN hydro (I suppose wind and solar make for a great photo shoot, albeit highly misleading; why not pictures of 50 year old dams?). Nearly ALL of the 90% carbon free and 60% renewable claim comes from decades old hydro (mainly Hydro Quebec) and nuclear (Millstone in CT and Seabrook in NH) facilities (<https://greenmountainpower.com/2018/12/13/fuel-mix/>). GMP (by far Vermont's largest utility at about 70% market share) actually does slightly better in generation, where 13% is from solar and wind. However, GMP and other VT utilities sell the renewable attributes (RECs) of this generation out-of-state, and in turn, purchase attributes from decades old hydro facilities. These hydro facilities cannot count towards renewable goals in most other states, so the purchase of these renewable attributes is inexpensive. These transactions are not transparent, and there is a dereliction of duty by the PUC and/or the Vermont Department of Public Service to not require transparency of the REC transactions. The State presents nearly the same data in their annual report.

It is pure fantasy to think that decades old infrastructure will solve our climate problem.

Hydro Quebec is a fantastic resource to aid the transition to a cleaner economy, but the DPS and the utilities should be investigating to what extent, given environmental, technical and transmission constraints, that these facilities can be used to help smooth the intermittency of renewables. To slow the construction of new renewables by relying on ancient dams is unconscionable, and is totally misleading to Vermont citizens.

GMP reports over 15,000 net metering customers, or about 6% of their customer base. If the grid is already renewable, why are so many Vermonters foregoing a new car, a remodeled kitchen, or the repayment of student loans in order to go solar? In our experience, nearly all of our customers are seeking to decarbonize their lifestyle for the sake of their children and grandchildren. We have a shocking number of 80+ year old customers who are unlikely to ever witness an economic payback from their investment in their lifetime. In addition, all customers like the concept of owning electric generation, and look forward to the resiliency and security benefits that will be increasingly available as battery prices decline.

Lower income Vermonters were also participating in this renewable revolution through community solar, but that option has been largely closed due to perverse state policy. Of course, the early adopters tend to be higher income (early adopters always are), but a large proportion of our customers have taken long term loans in order to purchase renewable energy, and many are on a fixed income. As costs continue to decline, a higher and higher proportion of Vermonters will make this choice if given the opportunity. This should be encouraged, not punished.

(2) The “cost shifting” argument comes directly from the Koch Brothers-funded Alec website.

This argument has been used in attempts to strangle the renewables industry in Nevada, Michigan and Florida, and in all cases it has infuriated consumers. It is a clever divide and conquer strategy, and has no place in Vermont. If anyone in the PUC or the DPS does not believe in science and climate change, they should be fired. Electricity is dangerous without science, alas.

The “cost shifting” calculation is producer-centric, based upon a monopolistic centralized utility model. However, economics is about consumer choice, and for the first time in a century, consumers are starting to have a choice. This is the discomfort that utilities are facing. From the consumer perspective, over 6% of GMP’s customers have already decided to go solar, despite the utility’s claims that they already have clean electricity. Using their own data from Table 1.1 (pg. 2) in the “Responses to PUC Information Request” , the total 2020 net metering will be 263,515 MWh, with an average retail value of \$170.15/MWh (17 cents/kWh). This is lost revenue of \$44.84 million. The data provided is a blended

average, but the actual out-of-pocket costs from RECs and adders paid is roughly equivalent to the value of RECs and Avoided Capacity/RNS payments.

If the PUC took the consumer's perspective, the question would be what is the minimum utility cost required to shift the consumer's production, either by a few hours, a few days, or seasonally. Vermont utilities are currently arguing that the only way to offer this service is to provide the traditional grid model, and to charge all of the grid fixed costs to a customer that wants to shift production. In the short term, utilities are still in a monopolistic position, but battery prices are declining by 21% per year. Consumer prices are about 10 cents/kWh, but volume battery prices are about 3.5 cents per kWh (assuming 5,000 cycle lifetime). Volume battery prices are projected at 1.2 cents per kWh by 2030. In a shorter timeframe, it is likely that many Vermont households will have 200 kWh or more of battery storage sitting in their driveway, or roughly a week of household energy use. Mitsubishi is already selling a bidirectional charging system (between houses and cars) in Japan. It does not make sense to create a pricing model that will eventually encourage grid defections even if it is a captive market today.



However, given that utilities have large fixed costs, a loss of revenue does create a serious problem for utilities. If they have no response, electricity will be more expensive for the remaining customers. There is one solution that continues to incent the rapid adoption and creation of NEW renewables and resolves the problem with fixed costs.

The solution entails the Department of Public Service and the Public Utilities Commission insisting that lost revenue from lost kWh sold be replaced by increases in demand from the electrification of the 82% of Vermont energy use that is not currently electric.

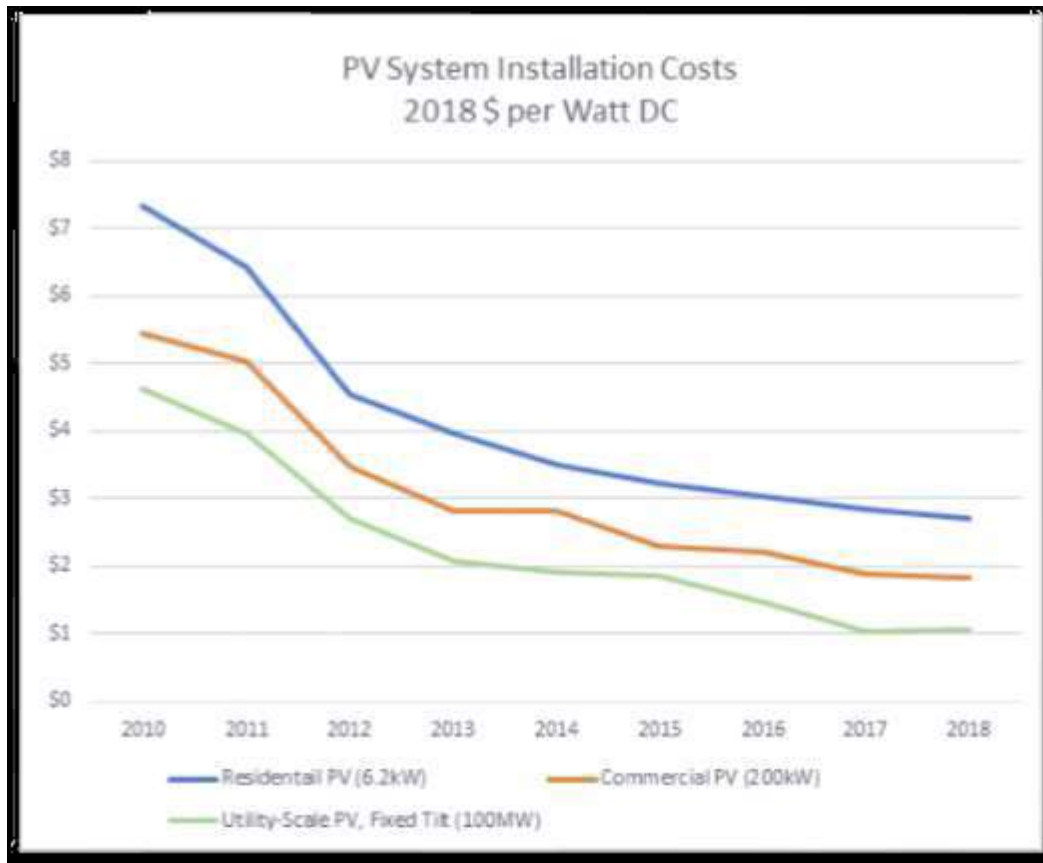
If rather than trying to destroy the solar industry, the State and the utilities join the solar and efficiency industries, this demand could be created at least as fast as demand is removed from net metering.

There is no such thing as decarbonizing the Vermont economy too fast.

The “cost shifting” argument is also based on current market prices. In economic theory, “externalities” are costs that should be included in a price, but are not. Electricity from fossil fuels, for example, do not reflect any of the actual costs from the destruction of the planet or the health impacts of particulate and other pollution.

JUST A FEW VT CLIMATE CHANGE AND FOSSIL FUEL COSTS (Disproportionately impacts low-income Vermonters and not reflected in electricity prices)	
Tick borne illness (Lyme Disease, Anaplasmosis, etc.)	Minimum of \$25 million per year (from near zero a decade ago)
VT share of military expenditures to protect oil	\$153.9 million per year
Hurricane (tropical storm in VT) Irene damage in Vermont	\$733 million (<i>what is the future frequency??</i>)

Nuclear power has also received a large Federal subsidy not reflected in prices. The Price-Anderson Act was passed in 1957 to cap the liability of nuclear power plants. Without this, the industry is unlikely to have developed, and the Federal Government is assuming all liability above a modest limit. Over 60 years, the insurance pool has expanded to \$13.5 billion. That sounds like a large amount, until compared to the cost from the Fukushima nuclear disaster in Japan, currently estimated to cost \$187 billion.



The Vermont Department of Public Service is also factually incorrect about the State of Vermont. They state, in reference to the above graph, that:

Compensation paid to net-metering resources has not seen a corresponding reduction of the same magnitude, which suggests a reassessment of the compensation structure is overdue.

Solaflect started selling commercially in 2013. Interpolating from the graph, the residential average installation cost was \$3.90 per watt in 2013, declining to \$2.80 per watt in 2019. During the same time period, the incentive went from 6 cents per kWh to 2 cents per kWh, but there was also a \$450/kW installation incentive in 2013 that has since been eliminated. Thus, the NREL price declined 28.2%, and the kWh retail value of net metering declined by 27.7%. Those seem pretty comparable. During the same timeframe, the real price per kWh delivered for Solaflect customers declined by over 20%. Furthermore, the Federal tax incentive is declining by 4% on January 1, 2020, a further 4% on January 1, 2021, and goes to zero in 2022. Thus, a 30% compensation reduction for net metering is already in place for the next two years.

(3) The requests are premised on a 20th century grid rather than a 21st century grid.

The traditional utility model is under threat, which has been predicted for a number of years (see graphic below from 2014).

FIGURE 6: PRESSURE ON TRADITIONAL UTILITY BUSINESS MODELS



Rocky Mountain Institute [2014], *The Economics of Grid Defection*. <https://rmi.org/insight/economics-grid-defection/>

This will only increase over time as solar and battery prices continue to decline. The same 2014 report predicted that the LCOE (levelized cost of energy) for solar plus battery systems would become less than utility prices in 2025 for commercial customers (in NY, the best proxy for VT in their study). For residential customers, this would happen between 2020 and 2049, depending upon various assumptions. The approach by the DPS and the utilities seems to be to put all possible roadblocks in the way of solar to slow this transition. This can absolutely delay the transition since given the current distorted price signals, electricity from natural gas and 50 year old hydro facilities appears less expensive than solar. Solaflect Energy gets asked about going off-grid frequently, and we discourage this as net metering makes much more societal sense. However, if the DPS and the utilities continue to operate in a 20th century mindset, the rate of grid defections will absolutely grow. It must be remembered that technology development in off-grid and micro-grid systems is developing incredibly fast, particularly due to developing countries that have large areas with no grid infrastructure. Just as these areas bypassed landline telephones and went to near universal cell phone adoption, many isolated communities are bypassing the grid infrastructure completely and developing micro-grids.

The transition to a 21st century grid can be delayed, but cannot be stopped.

No economic analysis suggests that monopolies are the preferred outcome. For a century, utilities have been natural monopolies due to the huge economies of scale of a grid infrastructure. This monopolistic structure will decay very rapidly as consumers increasingly have choice. Economic theory always suggests that consumer choice should be encouraged. There is also no economic analysis that suggests that zero-export solar systems should in any way be regulated by a utility commission.

Zero-export solar systems have no grid impact other than lost sales. They should be allowed for ALL Vermont customers, and should not be regulated by the Public Utility Commission in any way, shape or form.

It is incumbent upon the Public Utilities Commission and the Vermont Department of Public Service to start thinking creatively about a 21st century grid, rather than slowing the absolutely necessary transition to such a grid.

Fortunately, there is a huge opportunity for the utilities to prevent this “death spiral”, unlike many other transformed industries of the last two decades. 82% of Vermont’s energy use is non-electric, and nearly all of it needs to be electrified. The grid performs a critical and essential role, and there are plenty of opportunities for utilities to embrace the transition to a cleaner economy rather than trying to destroy Vermont’s nascent solar industry.