VERMONT
DEPARTMENT OF PUBLIC SERVICE

MEMORANDUM

To: Chair Sheldon, Vice Chair Sibilia, and the House Environment and Energy Committee
Fr: TJ Poor, Public Service Department
Re: Follow up from January 30 Testimony regarding costs of Renewable Energy Standard proposals.

Chair Sheldon, Vice Chair Sibilia, and the House Environment and Energy Committee:

This memo is intended to be responsive to the request received January 30 during my testimony seeking additional information related to the costs of Renewable Energy Standard (RES) proposals. Part 1A and 1B of this memo explains the estimate provided for H.289 to cost Vermont ratepayers approximately **$1 billion** more than (the current RES) over the next 10 years (relative to business as usual). Part 2 explains why the Public Service Department's proposal is estimated to be only a fraction of those costs, at **$164 million** over 10 years (relative to business as usual). The PSD's proposal remains the only proposal that is based on Vermonters' input, and is intended to reflect the priorities heard during the stakeholder engagement process. As a reminder, each proposal produces the *exact same* emissions reductions toward Global Warming Solutions Act requirements, according to Vermont's Greenhouse Gas Inventory, while the PSD's proposal supports access to renewables for communities and is much more affordable.

Part 1: What drives the incremental cost of the H.289 proposal?

Incremental cost estimates for H.289 are driven by increased power supply costs, and increased transmission investment caused by Vermont based generation. The PSD roughly estimates these two areas to cost **$1 billion** to Vermont ratepayers.

Part 1A: Increased cost of power supply costs: PSD estimate of H.289: $500 million over 10 years.

The PSD's technical analysis, informed by a stakeholder advisory group that intentionally included a wide range of perspectives including Renewable Energy Vermont and other developers, estimated the net costs to ratepayers (and society) of several RES scenarios. On January 11, 2024, Renewable Energy Vermont testified that Scenario 2 was most like the proposal offered by H.289. As noted in testimony of the PSD, the publicly vetted and available model[1] showed that Scenario 2 has **$800 million** of net costs to Vermonters (while providing a benefit to global society), equating to an over 5% rate impact over 10 years. The PSD noted that H.289 had some significant exemptions and carve outs that reduced costs, but these costs have not been specifically included in the model by the PSD, REV, or others. The PSD roughly estimated that these changes could result in mitigation of these power supply costs by as much as $300 million, resulting in a net cost to ratepayers of $500 million over 10 years. Assuming about 2/3 of the modeled power supply cost is a reasonable estimate of the impact of H.289.

[1] Model is available at https://publicservice.vermont.gov/renewables#Technical%20Analysis

Isn't there uncertainty in these numbers?

Of course. Indeed, the uncertainty goes in both directions. For example, it is possible that the PSD has not properly accounted for all of the exemptions contained in H.289 – which would have a downward pressure on costs. On the other hand, the model assumes costs for new solar that are equivalent to prices seen for the last offers into the standard offer program; more recent power purchase agreements that have been filed with the Commission have significantly higher prices. There is significant uncertainty in projecting the future, and the PSD's model and estimates are reasonable middle estimate.

Part 2: H.289 Estimated increased cost of transmission infrastructure: $500 million.

VELCO's draft Long Range Transmission Plan, as presented to the Vermont System Planning Committee[2] and to the House Environment and Energy Committee (HEE)[3] shows that a 20% Tier II of the RES by 2032 reaches over 1300 MW of distributed solar PV installed in Vermont by 2032, with penetration continuing to increase in subsequent years. [REV estimates that GMP alone will have 72 MW per year of new distributed generation under H.289.][4] This amount is over double the amount of distributed solar installed in Vermont today. To accommodate that level of distributed generation, VELCO estimates transmission upgrades to avoid overloaded facilities and associated reliability issues are **$1.4 billion.** As noted in testimony, the PSD does not expect this worst-case scenario to occur – other non-wires solutions are likely to mitigate these costs. **However, these non-wires solutions are not free**. The PSD conservatively estimates that only about 36% of the worst-case costs would occur - $500 million.

> *Note: Transmission costs are expressed as upfront cost incurring in the year of construction. Financing costs will cause the costs to increase significantly – just like taking out a mortgage for your home, ratepayers are responsible for principal plus interest payments (and taxes). Power supply modeled costs are already expressed as "net present value", discounted for the time value of money.*

Aren't these transmission investments needed anyway to accommodate expected load growth?

It is possible that some of these transmission investments will be needed to meet load growth. Even in the case where the same transmission line is expected to be upgraded under both load and generation constraints, perfect alignment is unlikely because investment to meet load growth and investment to create headroom for distributed generation are likely solving different problems; mitigation options are likely to differ. For example, a different investment may be needed to meet winter peak load of a 3-hour duration than to meet a spring overload caused by distributed generation that has a 8- hour duration. Assuming incremental costs are zero for overlapping constraints ignores these differences.

Estimating additional costs to the distribution system for accommodating additional distributed generation requires additional utility input; indicators to date are that these costs could also be significant. Green Mountain Power's solar map, for example, shows that currently 20% of distribution

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[2] https://www.vermontspc.com/sites/default/files/2024-01/2024%20LRP_results_VSPC_rev1.pdf See slides 18 and 19. The actual draft of the Long-Range Transmission Plan will be distributed in early February.

[3] https://www.youtube.com/watch?v=JniBJCQPQRw January 26, 2024

[4] https://legislature.vermont.gov/Documents/2024/WorkGroups/House%20Environment/Bills/H.289/Witness%20Testimony/H.289~Peter%20Sterling~Updating%20Vermont's%20Renewable%20Energy%20Standard%20-%20Slides~1-24-2024.pdf January 24, 2024, Slide 4.

substations have less than 20% headroom remaining for additional solar. Distribution system costs are not estimated in neither H.289 nor the PSD proposal.[5]

Why doesn't the PSD's proposal – which also increases Vermont based distributed generation - cause these same transmission costs?

VELCO's presentation about its draft Long Range Transmission Plan made clear that *optimally sited* solar will not cause reliability concerns under 1052 MW. The PSD's proposal calls for a more gradual rate of growth, with approximately 1039 MW to be sited in the state by 2035.[6] If optimally sited, the PSD's proposal does not cause the same transmission costs. Market forces *should* drive developers to site distributed generation where it is less costly. Otherwise, projects will cost more to develop (those costs are initially borne by Developers, but then passed through to ratepayers in the form of higher contract rates. The LRTP underscores the need to better align siting of distributed renewable energy with the areas of the grid that can support it. If not, then the PSD's proposal could also incur some transmission costs, albeit at a significantly lower magnitude.

Can't we assume load or generation flexibility, including battery storage, will help smooth transmission costs?

Investments in non-transmission solutions can mitigate costs – but these investments are not free. The PSD has accounted for the non-wires solutions by removing all but 36% of the forecasted transmission cost solution. Notably, if used for reliability reasons, a mitigation option must be available when needed, to a similar level of certainty as a transmission line. Thus, the business case for those investments changes – the solution may no longer be available to provide other utility services that currently provide value and thereby offset costs. The PSD does assume that load and generation flexibility will help mitigate costs – however a cost must be assigned to these investments as well.

How can we get better certainty around these costs and potential solutions to mitigate?

The PSD has proposed further study (and funding) to further examine where and when both distribution and transmission upgrades might be necessary, and what mitigation solutions are possible (and their cost/benefit). It would not be responsible to pursue greater investments in renewable energy without further understanding of the implications.

Part 1B: <u>The PSD's proposal costs significantly less.</u> PSD estimate: ~$165 million over 10 years.

The PSD's proposal costs a fraction of H.289, while improving access to distributed generation for communities far more than H.289. The average rate impact of the proposal is ~1% over 10 years. The Department's estimate is based on the following modifications to the Sustainable Energy Advantage model to reflect its proposal. PSD starts with Scenario 4, variant 5 of the model, which models 20% regional and 20% Tier II by 2035. Most importantly, an exogenous adjustment to the model was made to

[5] The distribution generally refers to the infrastructure managed by the distribution utilities that directly connects consumers to the higher voltage transmission system. This distribution infrastructure carries electricity at a lower voltage than the bulk transmission system operated by VELCO.

[6] 1039 MW of solar PV, reflecting the PSD's proposal, was estimated as follows: 1) Currently, 10% by 2032 requires approximately 25-30MW of new distributed generation annually. 2) 15% by 2035 requires approximately 35-45MW (assuming some load growth and accounting for losses) per year. 3) Vermont currently has 514MW of solar PV. 4) 30MW in 2024, with 45MW annually starting in 2025 results in a total of 1039MW.

reduce requirements to align with PSD's actual proposal – 15% regional and 15% Tier II.[7] This is where the largest savings occur. Other adjustments that were made within the model include:

- Reduction in Net Metering deployment and above market cost, reflecting PSD's proposal for compensating "excess generation" (that which is exported to the grid) at "avoided cost" (what utilities could otherwise purchase power for). Net metering deployment should be expected to slow more under this compensation rubric than under H.289.
- Increase in small, distributed generation (coming at a higher cost than what utilities could otherwise purchase *solar* for to meet its requirements), consistent with the "Renewable Energy for Communities" program proposed by PSD.
- Reduction in Alternative Compliance Payment to be fixed at $60, without inflation. In all scenarios of the model, the ACP is expected to be reached in later years. This limits upside cost risk to ratepayers to a greater extent than H.289.

Other exogenous adjustments include:

- Assuming that Self-Managed Utilities will be able to meet the regional Tier and incremental Tier II at cost (given proposed contracts for power, and the need to not purchase land). This adjustment would be applicable to H.289 as well.
- Exemptions related to small hydro and landfill gas projects for small utilities to qualify for Tier II. Hydro exemptions would be applicable to H.289, landfill gas exemptions are not.

Conclusion

While estimates of costs of H.289 and the PSD's proposal are just that – estimates, they are informed by substantial work of the Stakeholder Advisory Group for the PSD's technical analysis, and VELCO in development of their Long Range Transmission Plan. Directionally the differences between the two proposals are clear. The PSD's proposal comes at an estimated cost above business-as-usual of $165 million, while H.289's cost could easily exceed $1 billion. The two proposals are exactly the same when it comes to Global Warming Solutions Act-required emissions reductions. Only the PSD's proposal and estimates come following substantial public engagement, consistent with the spirit of Act 154. Passing H.289 adds cost, complexity, and risk with little additional benefit to Vermonters. The PSD's proposal offers a path toward achieving 100% clean energy, with straightforward acknowledgment of utility power supply resources and investments, manageable increases to rates that won't thwart electrification, and a structure to embrace community benefits and needs. It will also build significant and necessary in-state renewables when and where they are needed to optimize the significant grid investment Vermonters have already made – while leaving resources to support other resilience and decarbonization initiatives and the extensive orchestration needs of the emerging modern grid.

[7] Structurally, the model was not built to accommodate these specific percentages of renewables. The model relies on Sustainable Energy Advantage's proprietary estimates of the regional market, including scenarios of Vermont's requirements. Thus, adjustments to account for the specific recommendation were made exogenously, or outside of, the model (for example, a 15% Tier II requirement had half of the incremental impact of a 20% requirement). This is a reasonable extrapolation because the actual modeled scenarios, ranging from above and below 15%, did not change the regional market price of renewable energy substantially, likely due to Vermont's small size. T&D impacts were not estimated in the model.