



October 18, 2019

Mr. Josh Castonguay
Chief Innovation Executive
Green Mountain Power
163 Acorn Lane
Colchester, VT 05446

Re: SHEI export benefit associated with upgrading the B20 Lowell-Johnson 34.5 kV line, Lowell transformer, and the B22 Johnson-Morrisville 34.5 kV line

Dear Mr. Castonguay:

This letter summarizes the assessment by Vermont Electric Power Co., Inc. ("VELCO") of the Sheffield Highgate Export Interface ("SHEI") constraints and the related findings that are reflected in VELCO's Northern Vermont Export Study ("NVES"). As explained further, we can confirm that Green Mountain Power's ("GMP") proposed upgrade to the B20 Lowell-Johnson 34.5 kV line, Lowell transformer, and the B22 Johnson-Morrisville 34.5 kV line (the "Project") is expected to result in increases to the SHEI export that are consistent with the NVES study results.

In December 2017, VELCO issued the NVES after extensive collaboration with Vermont Distribution Utilities ("VDUs") and VELCO's consultant, Energy Initiatives Group ("EIG"). VELCO contracted with EIG to perform power flow simulation studies on the northern Vermont transmission system to assess the ability to reduce curtailment of wind generation by increasing the ability to transfer power across the SHEI for all lines in ("ALI") conditions and facility-out conditions. The resulting NVES discusses the 45 alternative combinations of upgrade elements studied, including reactive support, bulk-transmission, subtransmission, and battery storage options. The NVES was performed based on appropriate electric system analysis methods, informed by the extensive experience of VELCO and EIG with transmission system analysis and interface limits. Although ISO-NE will ultimately establish the new system capacity limits associated with the implementation

of solution alternatives, the NVES utilized appropriate analytical tools, methods and case studies to approximate ISO-NE updates to the export limits once solutions are completed. Therefore, it is reasonable to expect that most or all of the potential benefits associated with various solutions identified in the NVES will be recognized by ISO-NE if some combination of those solutions are implemented.

This conclusion is also supported by our experience since the NVES was developed, performing analysis in collaboration with ISO-NE of updating the modeling of northern Vermont and defining SHEI limit increases resulting from the Sheldon Springs AVR project. This partnership allowed VELCO to self-verify the EIG study results, as well as verify and validate the analysis results with ISO-NE staff. We have found the work originally performed by EIG to be an accurate representation of the interface and how the limits may change due to the implementation of various upgrades.

The Project entails several upgrades identified in the NVES, including upgrading the B20 line with the installation of 795 ACSR conductors, replacing the Lowell 46/34.5 kV transformer with a 50 MVA nameplate transformer, and installing 477 ACSR conductors on the B22 line. These are the same potential solutions studied in the NVES. I have reviewed GMP's use of the NVES to develop its analysis of the Project's benefits and agree with GMP's overall approach, which was developed in consultation with VELCO through the SHEI working group. First, I agree that GMP has translated and applied the NVES results in a reasonable manner that should accurately reflect the benefits of this Project. In particular, the NVES results show that the combination of steps this Project represents will allow the thermal line rating increases that VELCO has implemented on its K-42 line to yield increases in the SHEI export limit. This export limit increase would not be possible without the Project. Second, GMP's use of the K-19 outage case to evaluate Project benefits is reasonable because the K-19 outage condition serves as an appropriate proxy for estimating the effect of potential solutions during a range of outage conditions, which is one of the reasons the NVES studied that outage condition in detail.

Additionally, GMP's assessment reasonably forecasts the Project's benefits during ALI and outage conditions, the anticipated benefits to voltage and thermal limits, as well as the benefits of this Project when implemented in combination with several AVR solutions. Finally, I also agree with GMP's decision to adjust its benefits analysis to remove the effects of the Essex Statcom outage during Spring 2017. Because the Essex Statcom facility will rarely require the type of extended outage experienced during the test period GMP used in its analysis and VELCO has agreed to schedule routine maintenance during times that should limit further curtailment, it was reasonable to make appropriate adjustments to the results to eliminate the impact of that outage.

In summary, I agree that this Project is an important step required to realize higher SHEI exports. Without the Project as proposed, the thermal capacity of the transmission system cannot be fully utilized because the system operator will set conservative transmission limits that will undoubtedly be limited by the current capacity of the B20 line and adjacent system elements. Additionally, the Project does not preclude other SHEI

solutions. Future systems upgrades such as energy storage or load management solutions will be more feasible once this Project has been implemented. Accordingly, in addition to the benefits quantified by GMP over the life of the Project, I also expect this Project will open the door to other reasonable steps that could be deployed in the SHEI area to further support the state's renewable energy goals.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read "Hantz A. Présumé".

Hantz A. Présumé
System Planning Manager

Cc: Christopher Root
Colin Owyang
Brian Connaughton

Chief Operating Officer, VELCO
Senior VP and General Counsel, VELCO
Director of Transmission Services, VELCO