STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 23-_____

Petition of Vermont Transco LLC and Vermont Electric Power Company, Inc. (collectively, "VELCO"), for a Certificate of Public Good pursuant to 30 V.S.A. § 248 authorizing construction of the "Franklin County Line Upgrade Project" consisting of upgrades to VELCO's existing K42 transmission line in Georgia, St. Albans, Swanton, and Highgate, Vermont	

PREFILED TESTIMONY OF HANTZ A. PRÉSUMÉ ON BEHALF OF VERMONT ELECTRIC POWER COMPANY, INC. AND VERMONT TRANSCO LLC

October 26, 2023

Mr. Présumé discusses the benefits of the second conductor proposed as part of this Project, including expected improvement to the congestion of the Sheffield-Highgate Export Interface. He also explains how the Project conforms with the State of Vermont's 20-year Electric Energy Plan, improves system stability and reliability, and aligns with principles for resource selection.

EXHIBITS

Exhibit Petitioner HAP-1	**Résumé of Hantz Présumé**
Exhibit Petitioner HAP-2	**ISO-NE Approval Letter**

PREFILED TESTIMONY OF HANTZ A. PRÉSUMÉ

Q1. Please state your name, current employer, business address, and position.

A1. My name is Hantz A. Présumé. I am currently employed by Vermont Electric Power Company Inc. and Vermont Transco LLC (collectively referred to as "VELCO" or the "Petitioner") with a business address of 366 Pinnacle Ridge Road, Rutland, VT 05701. I am an electrical engineer employed as a director of system planning at VELCO. I have special training and experience in the area of transmission system planning including the modeling and simulation of electric power systems.

Q2. Please describe your education and employment background.

A2. My résumé is included with this filing as **Exhibit Petitioner HAP-1**.

Q3. Have you previously provided testimony before the Vermont Public Utility Commission ("the Commission")?

A3. Yes. I have provided testimony on behalf of VELCO in: Docket No. 6860 for the Northwest Vermont Reliability Project; Docket No. 7314 for the East Avenue Loop Project; Docket No. 7751 for the Ascutney Substation Project; Docket 8604 for the PV20 Cable Replacement Project; Docket No. 8605 for the Connecticut River Valley Project; and Docket No. 8847 for the Vermont Green Line Transmission Project.

Q4. What is the purpose of your testimony?

A4. My testimony addresses certain aspects of VELCO's proposal for the Franklin County Line Upgrade Project, as described in Mr. Mallory's testimony (the "Project"). Specifically, I discuss the benefits of the second conductor that VELCO proposes to add as part of this Project, including benefits relating to the Sheffield-Highgate Export Interface. I also address how the Project meets several Section 248 criteria: conforming with the State of Vermont's 20-year Electric Energy Plan, improving system stability and reliability, and aligning with principles for resource selection.

Q5. Please provide an overview of the proposed Project.

A5. As further detailed in the Prefiled Testimony of Scott Mallory and William McNamara, the Project involves the rebuild of the K42 transmission line and is primarily designed to address deficiencies of the K42 Line concerning asset condition and aged structures. The existing two-pole, H-frame with single conductor configuration will be replaced with a single-pole, double conductor configuration. The existing line will remain in-service during the line rebuild activities, which will minimize negative impacts to local consumers, generators, and the overall system as discussed by Mr. Mallory.

In my testimony, I provide additional detail about the benefits of adding a second conductor to the K42 Line and discuss how that part of this Project will reduce congestion in the SHEI area, resulting in both regional and local benefits. Specifically, I discuss loading on the existing K42 Line, the benefits of reduced line losses, improved system strength and reactive margin, and increased export limitation on the SHEI.

Q6. What is the Shefield-Highgate Export Interface ("SHEI")?

A6. The Commission, the Department of Public Service, and others are familiar with the SHEI from other Commission proceedings. As discussed in the Commission's Final Order in Case No. 19-4464-PET approving Green Mountain Power's upgrade of the B20 line, "The SHEI refers to an export constraint on the electric transmission system that occurs in northern Vermont. It currently extends from approximately the Vermont/New Hampshire border in northeastern Vermont to Alburgh in northwestern Vermont." *Petition of Green Mountain Power*, Case No. 19-4464-PET (Vt. Pub. Util. Comm'n, May 21, 2020) at ¶ 26 (hereinafter "B20 Order"). The Commission's findings in the B20 Order, at paragraphs 26 through 33, provide a good explanation of the SHEI constraint.

In summary, the SHEI is export-constrained, which means the energy generating resources exceed the electric demand in the area, and the transmission lines leading out of the area are not sufficient to transport out the excess energy without jeopardizing the reliable operation of the grid. *Id.* at ¶ 27. ISO-NE established and manages SHEI export limitations to ensure grid stability and reliability. When export limitations are reached, generation resources in areas of northern Vermont that sell power in the ISO-NE market are required to not exceed a secure output level due to the lack of transmission system capacity needed to export power. *Id*. at ¶ 28. These occurrences reduce the net energy revenue that generators receive. *Id*. at ¶ 30.

Q7. How does SHEI congestion impact Vermont utilities and customers?

A7. As the Commission found in Case No. 19-4464-PET, "[Vermont Electric Cooperative ("VEC")], the City of Burlington Electric Department ("BED"), GMP, and Washington Electric Cooperative, Inc. ("WEC") all own or purchase the output of generation

that operates in the SHEI. The energy output of each of these sources is sold in the ISO New England energy markets, with the associated revenues reflected in the power supply costs of the purchasing/owning utility. Transmission constraints in the SHEI cause the output of local generation sources to be reduced or lower the locational marginal price revenues that these sources receive." *Id*. at ¶ 59. While not all Vermont customers are adversely affected by these congestion costs—either because their distribution utility does not have resources in the SHEI or they actually benefit from lower locational marginal prices—the SHEI congestion causes increased power costs for the overwhelming majority of Vermont customers.

Q8. How does the Project improve system stability and reliability and improve congestion in the SHEI?

A8. In addition to improving stability and reliability by addressing the deficient asset condition of the existing K42 Line, the addition of the second conductor discussed above reduces line energy losses, improves system strength and reactive margin, and increases the export capacity of the SHEI by approximately 20 MW. For context, a review of historical loading shows that the existing line is loaded heavily and at a nearly constant level. These flows create significant losses and contribute to the voltage and stability concerns that inform the ISO-NE's establishment of a SHEI limitation. The addition of a second conductor achieves several results:

Reduced line energy losses by 50%: Current flow on a line and other current-carrying equipment generates heat, which is characterized as energy loss because it requires generators to produce more energy than the energy that is ultimately used by customers. Therefore, line loss reduction is one of the critical objectives of utilities. The second conductor reduces the

resistance of the line by a half, which directly results in a 50% reduction in line losses and the associated cost and greenhouse gas emissions of producing this unused energy.

Improved system strength: The second conductor together with the configuration of the conductors on the structures will not only reduce the line resistance, as noted above, but also what is called the line reactance. The value of lowering these line attributes is a more resilient electric grid, which makes it less likely for generators, particularly inverter-based resources, such as the Highgate import facility and the inverter-based renewable resources, to trip or temporarily cease to operate. The grid itself is also better positioned to respond to and recover from disturbances.

Improved reactive margin: A lower reactance also reduces inductive line losses, which do not have to be supplied by generators and other voltage control equipment. Further, the rebuilt line will increase the capacitive nature of the line, which has the opposite effect of the inductive nature discussed above. In a sense, for the same system condition, the inductive needs are less, which in turn results in more reserve capability that can be utilized to respond to low voltage events.

Resolution of current export constraints: The export limitations ISO-NE established in the SHEI are affected by current carrying capacity, which is increased by the line rebuild. With two conductors, the line will be able to carry more power out of this constrained export area. Export limits are also affected by voltage and stability capacities, which are increased by the additional system strength and reactive margin discussed above. Although ISO-NE is ultimately responsible for establishing the SHEI limits, VELCO's analysis of the Project indicates that the SHEI limits will likely increase by 20 MW or more. This is a conservative number, recognizing that ISO-NE is responsible for setting the export limit.

Enabling of renewable energy growth: With the expected increase in export limits, additional renewable generation will be able to run without negatively affecting existing resources under prevailing conditions.

Ensuring equitable access to renewables: Requests for generation certificates of public good have been denied or withdrawn to prevent aggravating negative impacts to Vermont distribution utilities that own or have purchase contracts with generators inside the export constrained area. As a result, communities inside the export constrained area do not have the same access to renewable energy as those outside the area. By increasing export limits, the Project will create additional space that will allow local communities to install renewable generation whose size is greater than the threshold allowed.

Q9. Please describe the analysis VELCO performed to determine the expected 20 MW increase in the SHEI export resulting from this Project.

A9. VELCO is familiar with the analysis methodology that ISO-NE utilizes to determine the export limits as a result of coordination efforts needed to ensure that both VELCO and ISO-NE operators understand, monitor, and manage SHEI exports. At a high level, ISO-NE determines SHEI export levels just short of levels that would cause equipment capacity (thermal) overloads, low voltages or stability concerns. The voltage and stability limits are the more serious limits and are typically those that result in operator action. VELCO utilized a similar analysis approach to determine thermal, voltage, and stability limits with the as-is system. The same analysis was conducted with the Project modeled in service. The difference between the limits with and without the Project was found to be at least 20 MW. Because ISO-NE is

responsible for establishing system limits, these expected improvements will need to be confirmed by ISO-NE at the appropriate time.

Q10. Is the expected 20 MW increase in the SHEI limit from this Project incremental to the SHEI benefits discussed regarding the B20 Project in Case No. 19-4464-PET?

A10. Yes. The expected 20 MW increase in the SHEI limit from this Project is incremental to the SHEI benefits that were planned within Green Mountain Power's B20 and B22 line upgrades. The B20 and B22 line upgrades were expected to relieve the vast majority of current SHEI congestion conditions.

Q11. Please discuss VELCO's coordination with ISO-NE on this Project.

A11. Consistent with ISO-NE tariff and planning procedures, VELCO presented the Project to ISO-NE and the Planning Advisory Committee ("PAC") to seek input and address any concerns. VELCO discussed the need for the Project and its benefits with ISO-NE starting in July 2021 before presenting the Project to the PAC. The discussions with ISO-NE were reflected in the PAC presentation in September. The discussions continued until the final presentation in January 2022. VELCO also provided a project update to ISO-NE and the PAC in October 2023.

The nature of discussions revolved around the concept of holistic planning as recommended by the Federal Energy Regulatory Commission ("FERC"). In essence, the FERC recommends that transmission planners consider several system concerns at the same time instead of the silo approach addressing only one concern, such as asset condition, congestion, energy efficiency, generation interconnection, renewable energy, reliability, resilience, and so on.

At its core, the Project addresses asset condition concerns. Due to the number of structures needing replacement, and reliability concerns associated with taking the line out service for repairs, the preferred solution is to construct a new line while keeping the existing line in service. The existing line will be removed following energization of the line.

The Project as proposed also addresses several of the issues noted by the FERC. ISO-NE agreed with the asset condition remediation approach, but requested additional information regarding the second conductor. VELCO demonstrated that loss reduction achieved by the second conductor exceeded a benefit to cost ratio of 1.0 by utilizing the energy efficiency valuation method adopted by New England states. With support from stakeholders at the PAC, ISO-NE formally supported the mitigation approach and requested that the PAC develop a process for evaluating similar future holistic right-sizing projects. While discussions with ISO-NE focused primarily on loss benefits, the Project also addresses renewable generation congestion, which will enable New England renewable energy growth in Vermont.

Q12. Please describe the reliability criteria applicable to this Project.

A12. The need to repair or replace equipment is based on good utility practice. Some of the considerations for replacing structures include end of life, woodpecker holes, rot, and cracks. There does not exist a specific transmission line maintenance criteria document issued by NERC, NPCC or ISO-NE that outlines maintenance requirements that utilities need to meet, except with regard to vegetation management. The K42 line rebuild follows good utility maintenance practices designed to maintain facilities in acceptable condition in order to maintain reliable service and public safety.

Q13. Will the Project adversely affect system stability and reliability (30 V.S.A. § 248(b)(3))?

A13. No. As discussed above, the Project improves system stability and reliability.

Q14. Has the regional system operator, ISO-NE, reviewed this Project and if so, what has it determined?

A14. Yes, ISO-NE reviewed the Project and determined that the Project can proceed as proposed. The ISO-NE letter indicating support is included with this filing as **Exhibit Petitioner HAP-2.**

Q15. Is the Project consistent with the Integrated Resource Plan (30 V.S.A. § 248(b)(6))?

A15. VELCO does not have an integrated resource plan. As a transmission-only company VELCO periodically performs transmission studies to determine whether reinforcements to the transmission system are necessary, and whether system constraints can be mitigated by non-transmission solutions. VELCO also produces a long-range transmission plan at least every three years. Specifically, VELCO recently published the 2021 Vermont Long-Range Transmission Plan. This Project was described and identified as a necessary asset condition mitigation solution in the Long-Range Plan. Pursuant to the Docket 7081 MOU, the Long-Range Plan ("LRP") is a document that informs the state of future transmission system reliability concerns and gives an initial indication of whether these concerns may be able to be addressed by demand-side measures or local generation. Nonetheless, VELCO includes additional information that might be of interest, such as concerns unrelated to load serving

capability. We have noted possible asset condition projects even when these future projects are not fully scoped out or have not yet received ISO-NE approval to proceed. The K42 line rebuild falls in that category. Both the asset condition of the K42 line and other aspects related to enabling renewable energy growth and mitigation of the SHEI issue were discussed in the LRP. This line rebuild is on the list of possible upgrades to address thermal impacts of generation in section 6.2 of the LRP. The K42 line is also noted as one of the transmission facilities limiting renewable generation growth in the northern portion of the state in section 6.2.1 of the LRP.

Q16. Is this Project consistent with the 2022 Vermont Comprehensive Energy Plan which also serves as the Vermont Electric Plan (30 V.S.A. § 248(b)(7))?

A16. The Vermont Comprehensive Energy Plan ("CEP") articulates strategies to meet the renewable energy targets in the transportation, thermal and electric sectors. The CEP notes that these targets will not be easy to reach. The Project facilitates renewable energy growth in these three sectors by improving the efficiency of the line, and by addressing capacity limitations, which currently hinder the production of existing renewable generation and the addition of new renewable generation. The Project better positions the system to meet future renewable load growth.

The CEP notes that the electric grid must be optimized to ensure resilience and responsiveness, and to benefit all electric customers. The Project mitigates the identified structure degradation concerns, and the new structures are expected to perform better under the increasingly severe weather conditions. Consistent with the CEP's focus on energy equity, the Project increases hosting capacity, which allows equitable access to renewable energy in local communities currently negatively affected by transmission constraints.

Q17. Does this conclude your testimony at this time?

A17. Yes.

DECLARATION OF HANTZ A. PRÉSUMÉ

I declare that the above statements are true and accurate to the best of my knowledge and belief. I understand that if the above statements are false, I may be subject to sanctions by the Commission pursuant to 30 V.S.A. § 30.

10/26/23
Date

/s/ Hantz A. Présumé
Hantz A. Présumé