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January 31, 2025

Holly R. Anderson, Clerk
Vermont Public Utility Commission
112 State Street
Montpelier, VT 05620

RE: Case No. 24-3351-INV – 2024 Vermont Long-Range Transmission Plan – Frequency and Duration Analysis Update

Dear Ms. Andersen,

Following the presentation delivered to the Vermont System Planning Committee (VSPC) at the January 22, 2025 quarterly meeting, VELCO is formally submitting the attached document titled “2024 VT Long-Range Transmission Plan – Frequency and Duration Analysis Update” as requested by the Hearing Officer in Case No. 24-3351-INV.

This presentation provides an overview of the in-depth analysis underway to identify the reliability exposure of transmission deficiencies identified in the 2024 Vermont Long-Range Transmission Plan. As requested by the distribution utilities, this analysis expands upon the initial plan’s findings by examining the frequency and duration of these deficiencies throughout the year, with a particular focus on the Northern area.

This expanded analysis seeks to inform the Non-Transmission Alternative (NTA) study group’s efforts in early 2025 by providing a comprehensive understanding of:

- **Critical Load Periods:** Identifying peak demand beyond which system constraints occur, in both summer and winter.
- **Daily Peak Load Conditions:** Analyzing daily peak load patterns.
- **Hourly Load Conditions:** Developing study scenarios for each hour of the day.
- **Contingency Analyses:** Evaluating system performance under various contingency scenarios.
- **Overload Durations:** Determining the duration of transmission overload conditions.

By identifying how often and for how long non-transmission alternatives may be required to address reliability concerns, this analysis will enable the NTA study group to develop effective and targeted solutions.

Please do not hesitate to contact us if you have any questions or require further information.

Respectfully submitted,

A handwritten signature in cursive script that reads "Shana Louiselle".

Shana Louiselle,
Communications Manager, VELCO
Facilitator, Vermont System Planning Committee

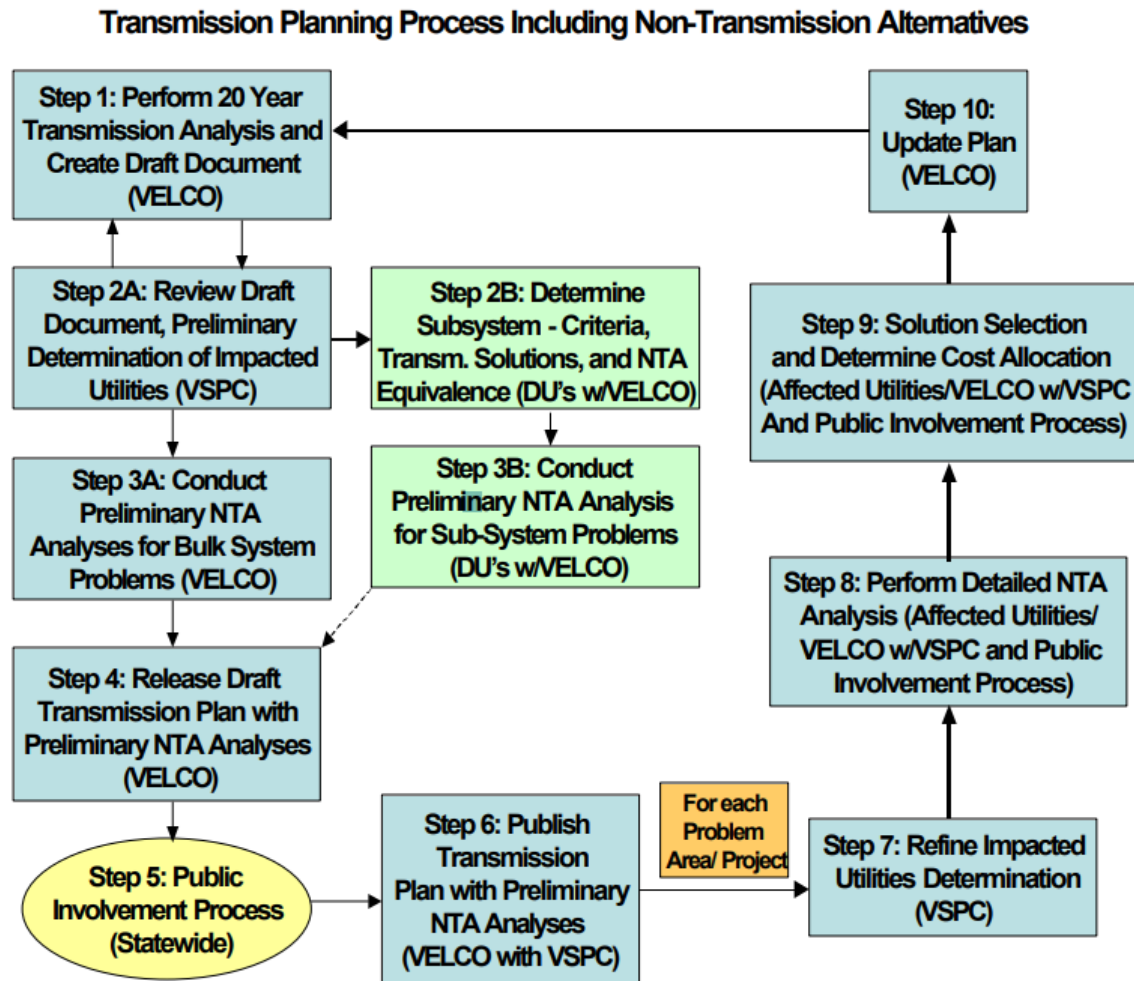
NTA ANALYSIS

2024 Vermont Long-Range Transmission Plan –
Frequency and Duration Analysis Update



VSPC Meeting
January, 2025

Background



<https://puc.vermont.gov/sites/psbnew/files/orders/2007/7081mouwithattachments.pdf>

2024 LRP Result Summary

SUMMARY OF BULK SYSTEM REGIONAL GROUPING & TRANSMISSION SOLUTIONS	ESTIMATED TRANSMISSION PROJECT COST	LEAD & AFFECTED DISTRIBUTION UTILITIES	SCREENED IN OR OUT OF FULL NTA ANALYSIS
Northern area - N-1-1 contingencies causing overload & voltage collapse exposure - Install a new 115 kV line between Essex and Williston - Affected transformers: Queen City, Tafts Corner, Barre - Need date is 2032 based on winter expected forecast	\$120M Three X \$11M	<i>Lead:</i> GMP <i>Affected:</i> All VT	In 75 MW of load reduction in northern area by 2033 Grows over time
Northwest area – includes northern area - N-1-1 contingencies causing thermal overload - Rebuild West Rutland to Middlebury 115 kV line - Affected transformer: Middlebury - Need date is 2029 based on summer expected forecast	\$215M \$13M	<i>Lead:</i> GMP <i>Affected:</i> All VT	In 80 MW of load reduction in northwest area by 2033 Grows over time
Central area – includes northwest area - N-1-1 contingencies causing thermal overload - Rebuild Coolidge - Cold River - North Rutland 115 kV line - Affected transformers: North Rutland, Cold River, Windsor - Need date is 2034 based on summer expected forecast	\$185M Three X \$13M	<i>Lead:</i> GMP <i>Affected:</i> All VT	In Keep load below 2033 load level in central area Grows over time
Southern area – includes central area - Rebuild NGRID Bellows Falls-Ascutney Tap 115 kV line and GMP Vernon Road to Newfane 46 kV - N-1-1 contingency causing thermal overload - Affected transformer: GMP Vernon Road 115/46 kV - Need date is 2034 based on summer expected forecast	No VELCO estimate	<i>Lead:</i> GMP <i>Affected:</i> All VT, NGRID	In Keep load below 2033 load level in southern area Grows over time
State of Vermont - N-1-1 contingency causing thermal overload - Install new 345 kV line between Vernon & Eversource Northfield, MA - Affected transformers: Bennington - Need date is 2034 based on summer expected forecast	\$5M for VELCO portion \$13M	<i>Lead:</i> GMP <i>Affected:</i> All VT, Eversource	In Keep load below 2033 load level in Vermont Grows over time

Step 8: NTA Analysis

- Reliability Exposure:
 - How often will the NTA be needed and for how long
 - Area focused: Northern area, Northeast etc
 - Identify the frequency and duration of the issues identified in the LRP
 - Identify the critical load for summer and winter
 - Use sectionalizing of the subtransmission system

Step 8: NTA Analysis

- Frequency

- How many days of the year will show an overload at the peak hour

Velco Load	Date
1388.95	1/18/33 6:00 PM
1365.73	1/19/33 6:00 PM
1344.83	1/12/33 6:00 PM
1337.73	1/20/33 6:00 PM
1327.33	1/13/33 6:00 PM
1316.82	1/14/33 6:00 PM
1304.44	1/21/33 6:00 PM
1302.55	1/24/33 6:00 PM
1294.45	1/28/33 6:00 PM
1293.33	1/17/33 6:00 PM
1291.74	1/25/33 6:00 PM

- Re-run the LRP simulations until finding the critical load

Step 8: NTA Analysis

- Duration

Case Scenario	Monitored facility	Maximum Load %
Jan 18 2033 00:00	QUEEN CITY 115/34.5kV Trsf	109.33
Jan 18 2033 01:00	QUEEN CITY 115/34.5kV Trsf	116.88
Jan 18 2033 02:00	QUEEN CITY 115/34.5kV Trsf	109.75
Jan 18 2033 03:00	QUEEN CITY 115/34.5kV Trsf	106.18
Jan 18 2033 04:00	QUEEN CITY 115/34.5kV Trsf	108.25
Jan 18 2033 05:00	QUEEN CITY 115/34.5kV Trsf	113.56
Jan 18 2033 06:00	QUEEN CITY 115/34.5kV Trsf	107.59
Jan 18 2033 07:00	QUEEN CITY 115/34.5kV Trsf	117.01
Jan 18 2033 08:00	QUEEN CITY 115/34.5kV Trsf	119.12
Jan 18 2033 09:00	QUEEN CITY 115/34.5kV Trsf	121.45
Jan 18 2033 10:00	QUEEN CITY 115/34.5kV Trsf	118.15
Jan 18 2033 11:00	QUEEN CITY 115/34.5kV Trsf	112.06
Jan 18 2033 12:00	QUEEN CITY 115/34.5kV Trsf	108.34
Jan 18 2033 13:00	QUEEN CITY 115/34.5kV Trsf	104.66
Jan 18 2033 14:00	QUEEN CITY 115/34.5kV Trsf	116.49
Jan 18 2033 15:00	QUEEN CITY 115/34.5kV Trsf	105.43
Jan 18 2033 16:00	QUEEN CITY 115/34.5kV Trsf	114.74
Jan 18 2033 17:00	QUEEN CITY 115/34.5kV Trsf	121.94
Jan 18 2033 18:00	QUEEN CITY 115/34.5kV Trsf	127.8
Jan 18 2033 19:00	QUEEN CITY 115/34.5kV Trsf	122.19
Jan 18 2033 20:00	QUEEN CITY 115/34.5kV Trsf	118.29
Jan 18 2033 21:00	QUEEN CITY 115/34.5kV Trsf	119.29
Jan 18 2033 22:00	QUEEN CITY 115/34.5kV Trsf	116.57
Jan 18 2033 23:00	QUEEN CITY 115/34.5kV Trsf	118.3

- For the summer and winter peak days used in the LRP, how many additional hours of the day continue to show the overload
- Build additional cases to look at the remaining 23 hours for the summer and winter days studies in the LRP