



**DRAFT ANNUAL REPORT
TO THE PUBLIC SERVICE BOARD &
PUBLIC SERVICE DEPARTMENT**

February __, 2016

INTRODUCTION

In accordance with the Memorandum of Understanding (MOU) approved by the Public Service Board in Docket 7081 as amended¹, this document comprises the annual report of the Vermont System Planning Committee (VSPC) detailing activities undertaken in 2015.

Among its provisions, the Docket 7081 MOU requires that the VSPC provide a report to the Public Service Board (PSB or Board) and Public Service Department (PSD) by February 15 of each year and post that report on the VSPC website. The report must consist of at least the following:

89. A report on each Reliability Deficiency identified to date in the [Long-Range Transmission] Plan or through the process described in Steps 1 through 6, above, including:
 - i. The status of NTA [Non-Transmission Alternative] Analysis for the Reliability Deficiency.
 - ii. The status of decision-making on the selection of alternative(s) to address the Reliability Deficiency.
 - iii. The status of decision-making on the allocation of costs of the alternative to address the Reliability Deficiency.
 - iv. The strategy chosen for implementing the alternative selected to address the Reliability Deficiency.

¹ Investigation into Least-Cost Integrated Resource Planning for Vermont Electric Power Company, Inc.'s Transmission System. Amended 1/30/2012, 8/1/2012 & 11/6/2013.

- v. The status of implementation of the alternative(s) to address the Reliability Deficiency.
 - vi. All documentation pursuant to paragraph 86, above, relating to advisory votes within the preceding calendar year.²
90. A statement of the dates and locations of all VSPC meetings held during the preceding year.³

This document represents the VSPC annual report on the status of transmission and non-transmission analysis, solution selection, cost allocation, and implementation planning of all identified reliability deficiencies as required by the MOU, as well as the meetings and organizational work of the VSPC during 2015.

VSPC ACCOMPLISHMENTS, MEETINGS AND PROCESS

The past year was the eighth full year of VSPC operation. During this year, the major activities and accomplishments of the Committee included:

- Received regular briefings each quarter from lead utilities on all reliability deficiencies identified in the Vermont Long-Range Transmission Plan (2012 plan in effect until June 25, 2015, when 2015 update was published).
- Provided extensive input to VELCO in its draft of the 2015 Vermont Long-Range Transmission Plan. Participated in a two-month VSPC review process on the plan prior to public draft release and supported the public outreach process leading up to the final draft.
- Developed, and filed on October 23, 2015, the annual geographic targeting recommendations to the Board. The development of the recommendations followed a full review by the Geographic Targeting Subcommittee of transmission and subtransmission issues, as established in Docket 7081, and distribution issues, as established in Docket 7874.
- Received regular briefings on a variety of current policy proceedings, such as the net metering rulemaking and the Renewable Energy Standard (RES) implementation process at the Board, and the interconnection rule revision working group led by the PSD.
- Heard presentations on a wide variety of energy-related initiatives, studies and reports including: Solar Siting Task Force, Energy Action Network, Vermont Energy & Climate Action Network, Vermont Weather Analytics Center, proposed merchant transmission projects, Northeast Energy Efficiency Partnership

² ¶ 86 requires the VSPC to take advisory votes to resolve disputes regarding determinations of affected utilities and cost allocation.

³ Docket 7081 MOU at 35-36.

geotargeting report, Vermont Comprehensive Energy Plan, and the Green Mountain Power (GMP) Solar Mapping Project.

- With regular participation by an ISO-New England (ISO-NE) representative, and briefings by VELCO, updated participants regularly on significant policy developments at ISO-NE, the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC). Topics of particular focus included: FERC Order 1000 implementation, the Distributed Generation Forecast Working Group, stakeholder input into the Regional System Plan, and FERC Order 745 (demand response) Supreme Court appeal.
- Organized a cross-stakeholder meeting with ISO-NE to improve understanding of ISO-NE tariffs and procedures for all generators and particularly those generators seeking to interconnect as Qualifying Facilities under PSB Rule 4.100.
- Successfully implemented a recently-revised meeting schedule designed to eliminate the need for special meetings to approve various products. For the first time, no special meetings were needed to complete regular VSPC business. A special meeting was held with ISO-New England on the topic of regional requirements regarding generation interconnection.
- Began discussion of what changes to the Docket 7081/VSPC process may be warranted by significant changes that have taken place in the planning process, electric grid and energy-related public policy since the process was established in 2007. These discussions will continue in 2016.

The VSPC held the following full committee meetings during 2014:

1/28/2015	Quarterly meeting, Randolph, VT
4/29/2015	Quarterly meeting, Middlebury, VT
7/22/2015	Quarterly meeting, Montpelier, VT
10/14/2015	Quarterly meeting, Rutland, VT
11/4/2015	Special meeting with ISO-NE, Montpelier, VT

The subcommittees of the VSPC met throughout the year as follows:

- Public Participation Subcommittee: The Public Participation Subcommittee met July 10 and December 8.
- Coordinating Subcommittee: The Coordinating Subcommittee met by phone January 9, April 16, July 8 and September 24 to plan the agendas for regular VSPC meetings.
- Forecasting Subcommittee: The Forecasting Subcommittee met on February 3, March 17, May 12, July 9, and November 3. The subcommittee provided extensive input on the Vermont load forecast to be used for

the 2015 Vermont Long-Range Transmission Plan, in addition to other ongoing committee work and current topics.

- **Geographic Targeting Subcommittee:** The Geographic Targeting Subcommittee met on January 20, March 18, June 23 and August 5 to carry out its responsibilities regarding geographic targeting recommendations to the full VSPC on energy efficiency and distributed generation.

The calendar of all VSPC meetings is posted on the VSPC website at:

<http://www.vermontspc.com/calendar>

Agendas and meeting minutes for the full VSPC meetings are posted on the VSPC website at:

<http://www.vermontspc.com/vspc-at-work/meetings>

Subcommittee agendas and meeting minutes are posted on the VSPC website at:

<http://www.vermontspc.com/vspc-at-work/subcommittees>

No advisory votes were taken in 2015.

REPORT ON IDENTIFIED RELIABILITY DEFICIENCIES

Paragraph 51 of the Docket 7081 MOU requires that the VSPC, VELCO and the distribution utilities report progress on identified reliability deficiencies at least annually to the Board. The following sections address all identified reliability issues as follows:

1. *Issues that screened in for full NTA analysis in the 2015 Vermont Long-Range Transmission Plan (the Plan)⁴ and are currently the subject of Project-Specific Action Plans/Reliability Plans.* The Rutland area is the only area identified in the plan that fits into this category. As previously reported to the Board and described below, GMP now projects that this reliability gap will not arise within the 10 to 20 year horizon.
2. *Transmission and subtransmission issues that screened out of full NTA analysis in the 2015 Plan and are the subject of brief updates.* These include: Connecticut River Valley and Central Vermont. The Northern Area is under analysis, and NTA screening remains to be completed. A brief update is provided.
3. *Distribution issues that are the focus of reliability plans as required by the Docket 7873 Screening Framework and Guidelines for Implementation of 30 V.S.A. § 8005a(d)(2).* The Hinesburg area is included in this section.

⁴ The 2015 Vermont Long-Range Transmission Plan, filed with the Board on 6/25/2015, serves as the basis for the current list of identified bulk system and subsystem reliability issues. The Plan is posted at <http://www.velco.com/longrangeplan2015>

GROUP 1—ISSUES THAT SCREENED IN FOR FULL NTA ANALYSIS IN THE 2015 PLAN AND ARE CURRENTLY THE SUBJECT OF PROJECT-SPECIFIC ACTION PLANS/RELIABILITY PLANS.

RUTLAND

GMP filed a reliability plan for the Rutland area on April 1, 2015.⁵ The plan indicates that various developments that have occurred or are projected have eliminated the projected reliability gap for the Rutland area within the next 10 to 20 years. In effect, the re-analysis has removed the Rutland area from the current list of issues requiring continued tracking through the Docket 7081 process since no reliability gap is now projected within the 10-year time frame. A brief update of status follows.

GMP's analysis of the Rutland area shows that the previously identified reliability gap is no longer likely to emerge as a result of developments in the Rutland area, particularly economic conditions and the influx of solar power. GMP's planned integration of former Vermont Marble Power Division into GMP's system, including its plans to permanently close the normally open 46 kV tie at West Rutland (2018); reconductor the Florence-West Rutland 46 kV line (2017), and permanently close and reconductor the normally-open (second) Rutland-West Rutland 46 kV line (2018), will widen the reliability margin for the area. GMP's plan further includes continued monitoring of area load growth to determine when the reliability margin is within three to four years of exhaustion; monitor load shapes and annual load duration curve; evaluate GMP energy initiatives, including Act 56 implementation, to determine impacts on reliability margins; update studies as needed; and deploy identified resource options if and when a reliability gap is again projected.

⁵ The Rutland Reliability Plan may be accessed on the VSPC website at: <http://www.vermontspc.com/gmp-rutland-reliability-plan>

GROUP 2—TRANSMISSION AND SUBTRANSMISSION ISSUES THAT SCREENED OUT OF FULL NTA ANALYSIS IN THE 2015 PLAN

<i>Status update: Connecticut River Valley</i>	
Lead utility	Green Mountain Power ⁶
Description	Bulk system deficiency (see page 24 of the 2015 Plan). Overloads on Coolidge to Ascutney, as well as subsystem overloads. Low and high voltages, as well as voltage collapse in a subarea bordered by the Middlebury, Granite, Bellows Falls, and Webster 115 kV substations. Line overloads and voltage concerns for a single contingency that may remove one or more elements from service (N-1 conditions) and two succeeding contingencies (N-1-1.) The transmission overload is largely affected by power transfers from generation in Massachusetts and Vermont supplying New Hampshire load.
NTA Screening	A detailed NTA screening for the Connecticut River Valley deficiency demonstrates that an NTA would not be a viable solution. See page 25 of the 2016 Plan.
Proposed alternative	Reconductoring and rebuilding the 115 kV line from Coolidge Substation to Ascutney Substation (K31 Line), adding a +50/-25MVAR reactive device adjacent to the Ascutney Substation, adding a new bay at Ascutney Substation to accommodate the reactive device, rebuilding the Chelsea Substation into a 115 kV ring bus configuration, and splitting the 25MVAR capacitor bank at Hartford Substation into two 12.5MVAR capacitor banks.
Status of decision-making on cost allocation	This alternative will be funded per ISO-NE planning procedure 4 regarding pool transmission facilities, where New England utilities fund projects per their load ratio share of the New England load. Upgrades to GMP facilities will be funded by GMP.
Status and timing of implementation	ISO-NE Needs Assessment and Solution Assessment have been completed. VELCO NTA screening analysis has been completed. VELCO applied to the Board for a Certificate of Public Good (CPG) on September 24, 2015. The Board is currently considering the application in Docket 8605.

⁶ The Docket 7081 MOU defines the lead utility as the distribution utility with the responsibility for leading the NTA analysis. Although GMP was designated as the lead, VELCO is the petitioner for the transmission upgrade to resolve this reliability issue.

<i>Status update: Central Vermont Area</i>	
Lead utility	Green Mountain Power ⁷
Description	Bulk system deficiency (see page 25-26 of the 2015 Plan). Coolidge to Cold River overload. No voltage concerns assuming the Connecticut River upgrades are completed. Line overloads when more than one element is out of service (N-1-1 condition). However, 1030 MW critical load level is not projected to be reached until 2028, barring the addition of new generation or an increase in imports of power through Vermont, which could hasten the need date for this project.
NTA Screening	Screens out due to a year of need beyond the 10-year horizon.
Preferred alternative	Rebuild 115 kV line.
Status and timing of implementation	This project is on hold and will be re-evaluated in the 2018 Plan update.

<i>Status update: Northern Area (Highgate, Jay, Newport, Irasburg, Burton Hill)</i>	
Lead utility	Vermont Electric Cooperative
Description	Predominantly bulk system deficiency (see page 28 of the 2015 Plan). Low voltages in the northern subarea that occur when one element is out of service (N-1) conditions. This is a predominantly bulk deficiency that affects the sub-transmission system.
NTA Screening	To be determined
Preferred alternative	Addition of 46 kV capacitor banks. Upgrade of Moshers Tap. These upgrades will be completed in stages as load grows.
Status and timing of implementation	The need date of this project is undetermined. The timing of need is highly dependent on the status and amount of a single large customer's load. Load levels elsewhere in the northern area, such as the Jay ski resort, may also affect the timing of need. Analyses will continue to be performed to take into account any changes in load predictions and other factors.

⁷ The Docket 7081 MOU defines the lead utility as the distribution utility with the responsibility for leading the NTA analysis. GMP is designated as the lead in terms of Docket 7081; however, VELCO would be the petitioner should a transmission solution be required.

GROUP 3—DISTRIBUTION ISSUES THAT ARE THE FOCUS OF RELIABILITY PLANS**HINESBURG**

GMP has identified a distribution system constraint in the Hinesburg area that is currently undergoing full NTA analysis. The Hinesburg load center of 3 MW is located more than eight miles from the Charlotte source. Additional load growth is expected in the Hinesburg area. The distance of the load center from the source results in system protection issues, however, GMP has been able to identify a solution to these issues using distance relaying. Remaining unresolved issues include potential for future area load growth, voltage constraints, high solar penetration, and motor starting limitations.

In 2015, GMP engaged RES Americas to analyze a non-traditional solution for the Hinesburg area that would include battery storage to address voltage issues, coupled with a hybrid reactive compensation system to address both voltage and flicker concerns associated with solar generation and motor starts. GMP is currently determining the cost of these hybrid alternatives. Once costs are known, GMP will prepare an economic analysis of the transmission and distribution solution as compared with the alternatives. The company will file a reliability plan for the Hinesburg area by April 1, 2016.

The traditional distribution upgrade to resolve the Hinesburg constraint, should alternatives not prove viable, would be to construct a 34.5/12.47 kV or 115/12.47 kV substation in Hinesburg to serve load currently fed off the Charlotte substation. The new substation would provide feeder backup to the Charlotte substation, increase available capacity in the area to serve new load, and provide backup for VEC area circuits.