

1 Overview

Maintaining a reliable electric system involves careful long-range planning. Every three years VELCO, the owner and operator of Vermont’s **transmission**¹ system, performs a detailed analysis that identifies reliability concerns and the transmission alternatives to address those concerns. The purpose of this plan is to present the key findings from the most recent analysis and to put the findings in context.

VELCO’s planning must balance three fundamental tensions. The first is the tension between state and federal regulations that are not completely complementary. Federal policy sets explicit, mandatory reliability criteria for transmission system design, while state policy is much less explicit and more diverse in its criteria for evaluating transmission upgrades against other alternatives. Second, state standards favor transparency and full public disclosure about transmission planning while federal rules governing **Critical Energy Infrastructure Information** treat detailed transmission planning data as sensitive information that must be protected to guard homeland security. Third, while the playing field is more level than in the past, regional treatment of transmission solutions and their alternatives, energy efficiency and **generation**, do not enjoy the same levels of cost support. The balance among these factors is addressed in various places throughout the analysis.

Since 2006, the last time a transmission analysis was published, there have been significant changes to the planning process. In a regulatory proceeding called Docket 7081, VELCO and other parties developed a new approach to engaging the public and other representatives in the planning process. Other modifications were made in how the analysis itself is conducted, such as incorporating mandatory national standards that became effective in 2007 and extending the planning horizon to 20 years.

One key assumption in the transmission analysis is that Vermont’s peak electric **demand** will grow by 24 percent from 2008 to 2028, representing an annualized growth rate of 1.1 percent. Another major and perhaps more significant factor driving the need for new reinforcements to the transmission system are the mandatory national reliability standards imposed on the industry in 2007. These standards carry up to a \$1 million per day per violation fine for non-compliance. The standards require a transmission system capable of reliably transmitting **power** over a wide range of expected operating conditions, such as the loss of two major components of the system.

¹ Highlighted terms are included in the glossary at the back of the Plan. In the online version, these are hotlinks.

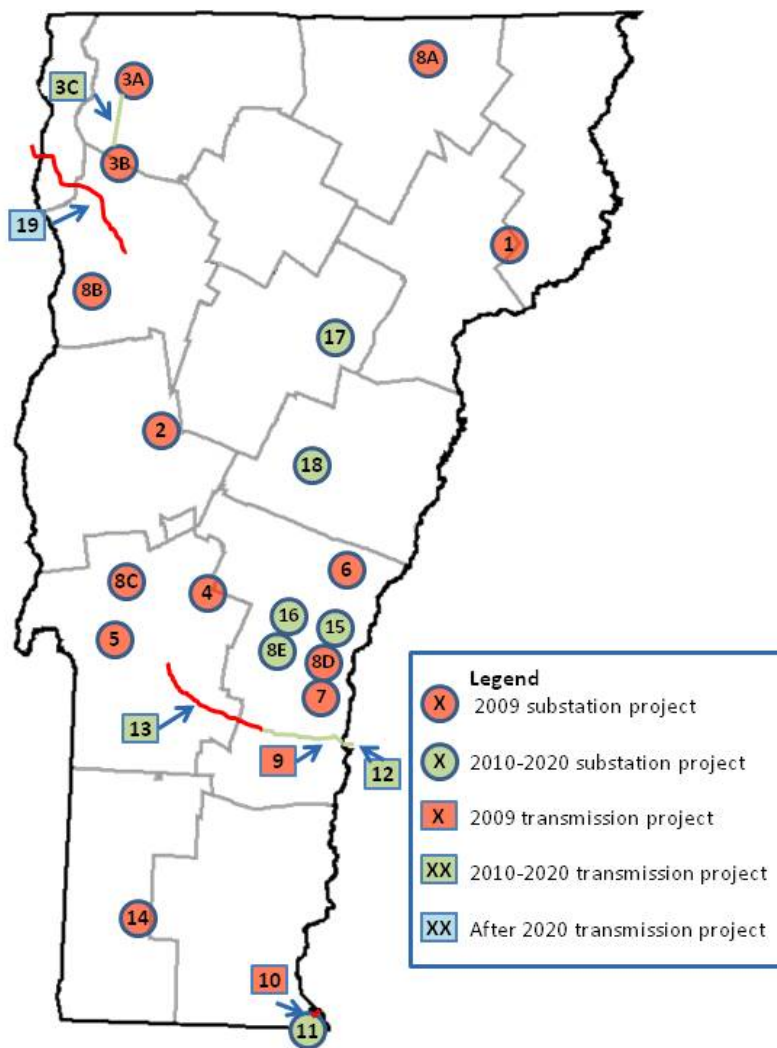
The 2009 analysis identified 23 transmission performance issues that require reinforcement to comply with reliability and planning standards. Twenty-two new **transmission system reinforcements** were identified to address the 23 identified **reliability deficiencies**. These reinforcements describe the potential transmission solutions to the identified deficiencies, should it be determined through the planning process that transmission is the best alternative. One reinforcement may address more than one reliability deficiency, so the fact that there are 25 reinforcements and 23 deficiencies is merely coincidental.

The numbers on the map in Figure 1-1 are keys to the locations, type and timing of the proposed reinforcements. (See page 17, Figure 3-5, for descriptions of the numbered projects.) Of the 25 projects, six involve transmission lines, and the rest are substation related. The substation reinforcements involve the addition of equipment to existing facilities, and sometimes the expansion o. Of the six transmission line projects, projects 3B and 19 involve new lines whereas the other projects propose rebuilding existing lines to a higher capacity.

VELCO currently estimates the total cost of transmission solutions to all 25 issues will range from \$512 million to \$902 million at today’s costs (year 2008 dollars). Based on VELCO’s analysis, 14

reinforcements are needed as soon as practicably possible, representing about 38 percent of the proposed dollar investment total. One single reinforcement (number 19), also represents about 35 percent of the proposed total investment. That project is currently identified as being needed in 2021 for system reliability reasons but may be considered sooner to facilitate access to **renewable** resources in New York State among other factors. The remaining reinforcements are needed between 2010 and 2020, and represent about 27 percent of the proposed total investment.

Figure 1-1. Proposed transmission related project locations.



In addition to performance issues on the transmission system, planners identified seventeen potential **subtransmission** performance issues when they applied a single explicit set of criteria for uniform examination of the 34,000 to 70,000 **kilovolt (kV)** part of Vermont’s power system. (See [Figure 3.2](#) for a list of the potential subtransmission performance issues planners identified.) The subtransmission facilities are for the most part owned and operated by Vermont’s local **distribution utilities**. At this time federal standards do not apply to these areas, giving local utilities more flexibility concerning the reliability level to which the subtransmission system is designed when compared to transmission. Local distribution utilities determine what, if any, projects are required to address the potential reliability issues on the subtransmission system. However, given that the transmission and the subtransmission systems are parts of an interconnected, interdependent network and the reliability of one affects the reliability of the other, VELCO is required to understand how the subtransmission system will perform.

The transmission reinforcements identified in the 2009 plan would address only the identified reliability concerns. The plan does not include transmission projects that could be needed to accommodate the purchase and delivery of renewable generation, to replace resources that may retire, to facilitate the operation of the energy market, or as the result of large, localized increases in **load** due to potential development. It is possible that one or more transmission projects will be proposed for these reasons within the plan’s horizon. For instance, two major energy sources that supply a large percentage of Vermont energy needs – Vermont Yankee and Hydro Quebec – may become unavailable within the next ten years. Replacing these resources may require transmission system reinforcement. If New England decides to access renewable resources from Canada or New York, transmission reinforcements may also be needed in Vermont.

During April and May of 2009, public meetings will be held in locations around the state to gather input on the draft plan. For a schedule of these meetings, please visit the VELCO website at www.velco.com/publicoutreach. Once the plan is finalized, further study of transmission and **non-transmission alternatives (NTAs)** to the proposed transmission projects will be conducted where applicable. If a proposed transmission project is determined to be the best alternative, the project will undergo additional detailed study and extensive review. The planning process anticipates public input into each of these steps, as well as opportunities for public input when and if any project is ready for a permit application to the Public Service Board.