Vermont's Electric Transmission System:
What You Need to Know

Thursday, November 9, 2006

Published by

VermontEnergyPartnership
Working for Reliable Affordable Clean Energy for Vermont

Introduction

Vermonters depend on a reliable supply of electricity every day as the lifeblood of our businesses, homes and municipalities.

The blackouts that blanketed California, St. Louis and parts of New York City last summer serve as a stark reminder of our dependence on efficiently-transmitted, free-flowing electricity.

In Queens, New York, approximately 100,000 people were without electricity during a ten day period.[1] City officials estimated that at least 750 businesses were affected with their losses totaling millions of dollars.[2]

In St. Louis more than half a million people were without power at the height of the outage[3] which left hospitals overcrowded with patients who relied on electricity for oxygen and other medical related equipment.[4]

When blackouts occur during peak periods of electricity use, such as the ones experienced this summer when temperatures consistently were in the 90's and 100's, the strain that is placed on public health, public safety and the economy is enormous.

To secure a reliable supply of power, decision-makers often focus on what fuel sources can and should be used to generate electricity. It is well understood that energy portfolios must be broad and diverse.

Base-load sources of power, such as nuclear, large-scale hydro, and natural gas, are the foundation of any portfolio because these sources reliably generate power 24 hours a day, seven days a week. Additional sources of electricity that are necessary components to create a strong balanced portfolio will typically include solar, wind, small-scale hydro, biomass, and energy efficiency and conservation practices.

The key element supporting any successful electricity portfolio though is the transmission system. Today Vermont "imports" approximately half of its power from other states and Canada. This, coupled with the fact that our two largest power sources operate in diametrically different corners of the state, makes it imperative that Vermont has a high quality electricity transmission system.

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[1] Nick Divito, "NYC Utility Praises Its Work in Blackout," The Washington Post, 12 October 2006, http://www.washingtonpost.com/wp-dyn/content/article/2006/10/12/AR2006101201830.html
[2] MSNBC, "Blackout hits mall business owners hard," July 25, 2006, http://www.msnbc.msn.com/id/14022768/.
[3] Ibid.
[4] MSNBC, "Power remains out for 231,000 in St. Louis," July 24, 2006, http://www.msnbc.msn.com/id/13954663/.

Vermont's transmission system allows electricity, at a high voltage, to travel from power plants scattered throughout the region to various substations both inside Vermont's border and across New England. A reliable transmission system is crucial for Vermonters because it provides:

- *Economic Security* – For businesses to be competitive they must have the assurance that the electricity they require for operations will be available when needed. Without this reliability, businesses would abandon Vermont, leaving many Vermonters without the jobs they need to support their families.

- *Public Safety* – Without a stable supply of electricity the public health of Vermonters may be endangered. Added strain during any blackout particularly afflicts the young, elderly and those coping with medical problems.

- *Diverse Resource Options*- In more than 20 years, Vermont has not built nor brought on-line one major power facility, and there are no plans at present to begin building any. With insufficient in-state power sources, utilities are forced to go outside the state border to meet the electricity demands of Vermonters. This is only made possible through the transmission system.

The Vermont transmission system consists of 534 miles of power lines and 25 substations, all operated by the Vermont Electric Power Company (VELCO)[5], a member of the Vermont Energy Partnership (www.vtep.org), which is also responsible for building and maintaining the system statewide, as reflected in the transmission map that follows.

[5] VELCO, "Welcome to the Vermont Electric Power Company," <http://www.velco.com/Templates/default.asp?pageId=5.

Vermont's Transmission System – The Main Arteries[6]

[6] VELCO, Photo Gallery, http://www.velco.com/Files/northwest/map.pdf..

Why is Vermont upgrading its transmission system?

Growing demand: ISO–New England, the regional transmission grid operator stated that Northwest Vermont has the highest electricity demand in all of Vermont.[7] Furthermore, electricity demand continues to grow statewide, despite progress with conservation efforts. The Department of Public Service estimates that electricity demand in Vermont will continue to increase by one percent per year through 2020.[8]

During the summer, when consumers use the most electricity at any time of the year, this peak period has grown nine percent from 1999–2002.[9]

Age of system: Vermont's transmission system has not received a major upgrade in over 20 years.[10] The PSB addressed the aging system by saying, "the same four high-voltage electric transmission lines have been in place (without systemic improvements) for more than two decades. Two of those lines are susceptible to extended outages."[11]

Couple an old system with increasing demand during the summer in particular and the risk for blackouts rises dangerously.

Insufficient local generation: ISO–New England noted that Northwest Vermont has the highest electricity demand in the state, but it lacks power generation facilities.[12] This means that the region is highly dependent on imported power to meet its electricity needs.

The PSB did consider, as an alternative to the transmission upgrade, building a new generation facility in the region, but it concluded that the "timely availability" was "at best uncertain."[13] It also noted that "no party has emerged that is willing to take responsibility for that construction, and analysis of the environmental effects of such an installation has not even been outlined."[14]

Three upgrade projects in various stages of development that can help maintain a sound transmission system are the Northwest Reliability Project, the Lamoille Project, and the Southern Loop Project.

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[7] ISO – New England, "New England's Power System and Wholesale Electricity Market, Vermont" http://www.iso-ne.com/nwsiss/grid_mkts/key_facts/vt_profile.pdf.
[8] Vermont Department of Public Service, "Vermont Electric Plan 2005". pp. 3-10.
[9] VELCO Handout, "Straight talk about the Northwest Reliability Project."
[10] Vermont Electric Power Company information sheet, "May we introduce ourselves?" p.2.
[11] State of Vermont Public Service Board, Certificate of Public Good Docket 6860, http://www.state.vt.us/psb/6860fnl012805.pdf, p.5.
[12] ISO – New England, "New England's Power System and Wholesale Electricity Market, Vermont."
[13] State of Vermont Public Service Board, Docket 6860, p.5.
[14] Ibid.

The Northwest Reliability Project

ISO–New England identified Northwest Vermont, home to Chittenden County, as one of two areas in New England in, "greatest need of reliability reinforcements."[15] The 2003 Regional Transmission Expansion Plan stated that, "the situation is critical today" and "expected to worsen considerably with continued load growth"[16] because of reliability problems and lack of new generation sources.

In order to move forward with this project, VELCO had to obtain a Certificate of Public Good (CPG) from the Vermont Public Service Board (PSB), the quasi-judicial board in charge of regulating the electric industry. In June 2003, VELCO and Green Mountain Power filed for a CPG which was granted in January 2005.

In its final report which approved the project, the PSB concluded "…increased electric demand in northwestern Vermont, both in the recent past and expected in the future, makes it necessary to strengthen the transmission grid serving that area in order to achieve and maintain desirable levels of reliability."[17]

This specific project is crucial to maintaining the reliability and stability of the entire system and avoiding power disruptions that could become reality if not addressed.

The project includes the construction of 36 miles of new transmission lines between West Rutland and New Haven, and the replacement of about 27 miles of lines between New Haven and South Burlington.[18] VELCO will also be upgrading 12 substations and replacing approximately six miles of electric lines from Williamstown to Barre.[19]

VELCO has taken several steps to limit the environmental and aesthetic impacts of this project, incorporating the suggestions and directions of the PSB. For example, VELCO is planning landscape improvements at various sites, including the planting of thousands of trees along the transmission route. It also hired archaeologists from the University of Vermont to identify and preserve artifacts from Native American and colonial cultures.[20]

VELCO continues to work with surrounding communities to ensure their questions are answered and their concerns met. They regularly host "open houses" in communities where the transmission upgrades will be seen, and invite the public to come and learn more about the project and ask any questions they may have. Open houses have been hosted in Stowe, Chittenden County and Lamoille.

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[15] Vermont Department of Public Service, "Vermont Electric Plan 2005." January 19, 2005, pp. 7-15.
[16] Ibid.
[17] State of Vermont Public Service Board, Docket 6860, p.4.
[18] Vermont Electric Power Company information sheet, "May we introduce ourselves?" p.2.
[19] Ibid.
[20] VELCO Handout, "A word about the environment" p. 3.

The Lamoille Project

In the past 30 years, greater Lamoille area residents have increased electricity demand while the transmission system received only minor improvements.[21] These two factors led VELCO, Green Mountain Power and the Town of Stowe to submit a request for a Certificate of Public Good for a transmission upgrade to the PSB on December 6, 2004.

The PSB granted a CPG for this project on March 16, 2006, and on August 25, 2006, VELCO submitted its final line-design proposal to the PSB.

The two major elements of this project include, "the construction of 9.4 miles of a 115 kV transmission line from Stowe to Duxbury, and a new substation in Stowe."[22]

Additional improvements include the construction of a 115-kilovolt circuit breaker at the Moretown substation; construction of a 0.3-mile 115-kilovolt connector and a switching station in Duxbury; the removal of the existing 34.5-kilovolt line between Duxbury and Blush Hill; the construction of a 115- and 34.5-kilovolt substation south of the Wilkins substation; the removal of Stowe's Moscow substation; the relocating a 34.5-kilovolt line between Blush Hill and Stowe's Wilkins substation; the construction of a 1.05-mile, 34.5-kilovolt line between the new Stowe substation and the Stowe Mountain Resort connector.[23]

VELCO hosted several open house meetings for community members this year. These meetings provided Vermonters the opportunity to speak with company representatives to learn more about the process and ask specific questions about the project.

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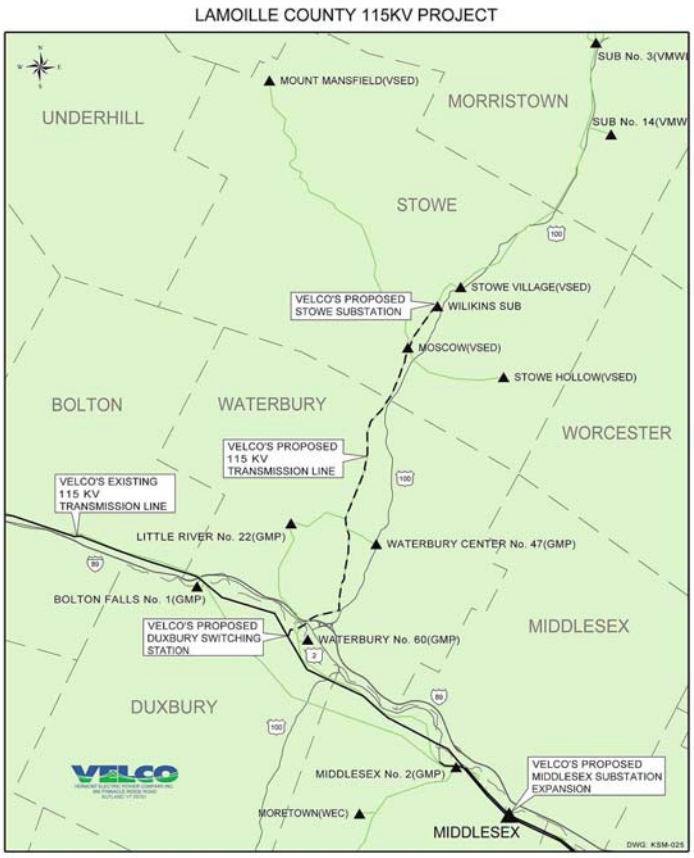
[21] Certificate of Public Good Request, December 6, 2004. http://www.velco.com/Files/lamoille/PetitionLetterCert.pdf, p.1.
[22] Ibid.
[23] Scott Monroe, "Power upgrade clears hurdle," The Stowe Reporter, 20 October 2005.

Lamoille County Transmission Project[24]



[24] VELCO, Photo Gallery, http://www.velco.com/Templates/default.asp?pageId=42.

The Southern Loop Project

The Southern Loop Project, also known as the Southern Vermont Reliability Project, is a 66-mile stretch of transmission lines from Bennington to Brattleboro.

On January 30-31, 2006, the Southern Loop Utility Search Conference took place that brought together leaders from government, local businesses, large commercial power users, environmental and alternative energy advocacy organizations, community organizations, emergency services and utilities to discuss the challenges facing the Southern Loop of the Vermont transmission system.[25]

These leaders drafted a general "statement of the problem" which reads: "Southern Vermont electrical transmission facilities have limited ability to support increased electrical demand and are unable to withstand failures of, or to have preventive maintenance conducted on, key components at present demand levels. The reliability of the regional bulk transmission system that connects southern Vermont, southwestern New Hampshire and northwest Massachusetts is at risk at existing demand levels, with increasing reliability risk as regional electrical demand levels increase."[26]

Before submitting recommendations to the PSB, VELCO and Central Vermont Public Service Corp. (CVPS), worked to obtain feedback and suggestions on moving this project forward. [27]

Beginning in March 2006, the Working Group discussed ways to ensure the system's reliability. By September 2006 their four main findings were improving the "voltage support equipment, intensive energy efficiency programs, new local generation, and upgrades to parts of the transmission system."[28]

At the time of this publication, VELCO and CVPS had not filed for a CPG with the Public Service Board.

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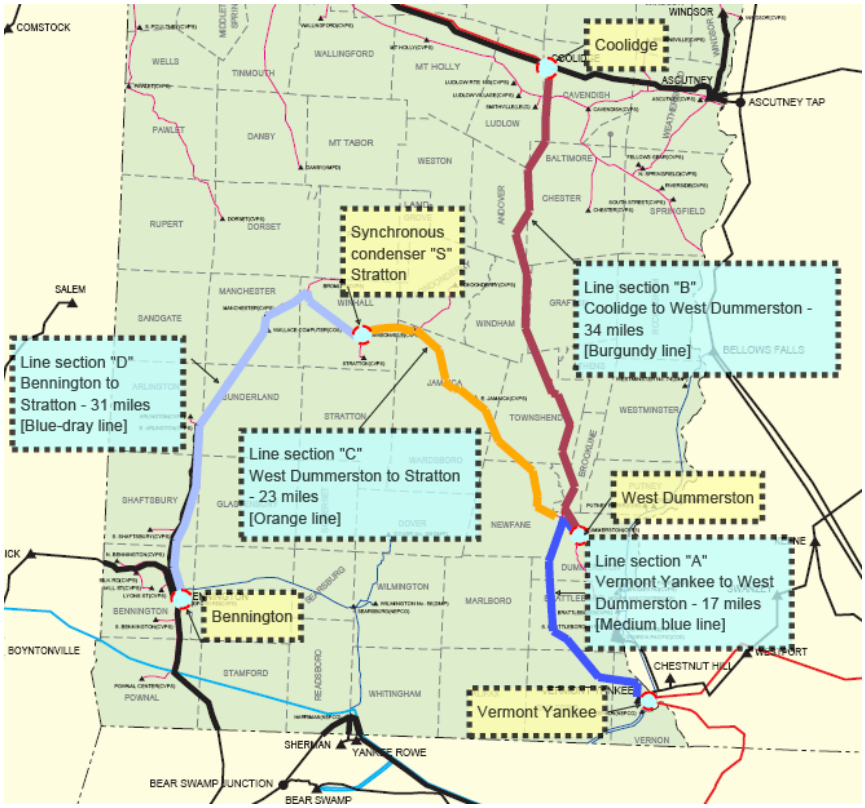
[25] Southern Loop Utility Search Conference Report, http://www.velco.com/Files/Southern%20Loop/USC%20Summary.Final.pdf, p.3.
[26] VELCO, Leadership Problem Statement http://www.velco.com/Templates/default.asp?pageId=48
[27] VELCO Website, "Southern Vermont Reliability Project," http://www.velco.com/Templates/default.asp?pageId=48
[28] VELCO News Release, September 5, 2006, http://www.velco.com/Files/Southern%20Loop/open%20house%20sept%2006.doc

Southern Loop Transmission Project[29]



[29] VELCO, Southern Loop Reliability Project, http://www.velco.com/Templates/default.asp?pageId=48.

Conclusion

Vermont is a "dual peaking" state, since the highest electricity demand in the summer and winter vary by only 25 MW,[30] so a reliable transmission system is critical to ensure that Vermonters have the electricity they need when they need it.

This past summer Vermont saw record breaking electricity usage. On August 2, 2006, one utility, Central Vermont Public Service showed its peak demand at 511.9 MW, that broke the previous record of 504.7 MW set just a day before.[31]

And Vermont was not alone. New England as a whole experienced record breaking electricity consumption levels. The Department of Public Service reported in an update to its 2005 Electric Plan that, "On August 2, 2006, ISO-NE reported record electricity demand, at 28,021 MW, approximately a 4% increase from the 2005 peak of 26,885 MW. Since 2004, peak demand has grown from just over 24,000 MW to over 28,000 MW. Five out of six of the highest electricity demand days have been in 2006, and nine out of ten have been in the last two years."[32]

This increase in electricity demand, without added generation places added strain onto the transmission system and jeopardizes the flow of electricity at a time when it is needed most.

Vermont must do all it can to reduce the chances of blackouts and brownouts that plagued the rest of the country, as any threat to our transmission system is a direct threat to our public health and safety.

With overall electricity demand in Vermont forecasted to increase by one percent per year through 2020,[33] the upgrades currently being undertaken by VELCO are necessary to ensure the electricity needs of Vermonters continue to be met.

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[30] ISO – New England, "New England's Power System and Wholesale Electricity Market, Vermont," http://www.iso-ne.com/nwsiss/grid_mkts/key_facts/vt_profile.pdf.
[31] Hinckley Sarah, "Energy-usage levels hit record-breaking high," Rutland Herald, 3 August 2006.
[32] Vermont Department of Public Service, "Update to the 2005 Electric Plan,"p.11 http://publicservice.vermont.gov/pub/other/drafteplanupdate.pdf
[33] Vermont Department of Public Service, "Vermont Electric Plan 2005," pp.. 3-10.