Vermont: A Grid in Transition

SEPA
Kerrick Johnson
kjohnson@velco.com
July 27, 2017
Corporate structure: for-profit organized to deliver co-op benefits

Shareholders & Customers*

VT Distribution Utilities & VLITE†

VT DUs own 73% of VELCO & 98% of VT Transco (directly or through VELCO ownership); balance owned by VLITE

Vermont Corporation

VELCO
Vermont Electric Power Company, Inc.
• Hires staff
  • Manages VT Transco
  • Owns & manages VETCO
  • Manages Highgate Converter

Vermont Limited Liability Corporation
Vermont Transco LLC
• Owns transmission system assets

Vermont Corporation

VETCO
Vermont Electric Transmission Company, Inc.
• Owns & maintains 52-mile direct current line in northeastern VT
• Bills New England utilities for DC line maintenance

* Vermont utilities are VELCO shareholders and customers. Minimal service (.5% of revenue) provided to New Hampshire Electric Cooperative and Public Service of New Hampshire.

†VLITE: VT Low Income Trust for Electricity, Inc.
Innovation workbench

Statewide infrastructure

- eEnergy VT smart grid
  - 92-94% smart meters
- Fiber optic network
- Radio system
- High-performance computing cluster—HPCC

high-speed, real-time communications

= greater reliability & innovation platform
**Vermont System Planning Committee structure**

- **Six sectors** with equally weighted votes
  - Advisory votes:
    - Affected Utilities
    - Solution selection
    - Cost allocation
    - Implementation strategy
  - Binding votes: (where utilities disagree)
    - System level (bulk vs sub)
    - Lead utility assignment.
Solar PV impacts in April
Vermont Net Loads

Lowest daytime net loads in April

VT MW Load

Hour

0 5 10 15 20 25

0 100 200 300 400 500 600 700 800
Vermont Weather Analytics Center

A powerful weather, energy data and analytics platform built that utilizes four coupled models and leading-edge analytics to deliver the most precise and accurate wind and solar generation forecasts in the world. VWAC enables us to:

- Increase grid reliability, community resiliency
- Lower weather event-related operational costs
- Garner full value from renewable generation
Demonstrated Benefits

Operations

• Improved outage scheduling
• Ability to determine grid capacity for additional solar on the transmission system down to substation level
• Demand analysis capability to substation level
• Short-term load forecast
• Contingency Analysis

Planning

• Increased reliability of planning assessments due to AMI data integration
• Improved NTA development
• Enabling ISO New England to improve day-ahead (over next 6 months)
• Statewide solar potential map – both total expected energy output and irradiance volatility
• Storage potential analysis depicts system congestion and approximate size (but not cost) of a scaled storage solution.

Demand management

• Greater visibility to potential demand response events
• Increased peak management capability
• Efficiency measures validation
Joint Venture: Utopus Insights

Asset Analytics

GRID PULSE
Intelligent and intuitive network-wide asset analytics application

Renewable Forecasting

HYPER CAST
Accurate hyper-local renewable energy forecasting service

Energy Analytics Platform

MAESTROS
The most advanced and extensible hybrid SaaS/On-Premises/IoT energy analytics platform
Current Challenge:
SHEI area: new generation plus solar since 2005
Deliver Value

**Leverage project management experience**
Create and secure opportunities to leverage existing capabilities as provider of project management and other services

**Embrace analytics**
Comprehensively mine data and apply analytics to generate operational information of value to VELCO, DU customers and other stakeholders

**Create greater fiber network value**
Identify and secure opportunities to improve system reliability, enable owners to better serve customers and advance state broadband objectives