

VELCO's Fiber Optic Network: Purpose, Uses and Future



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VELCO Fiber Optic Network



- 1400-mile, 72-strand fiber optic cable
- Utilizes existing utility infrastructure
- Connects over 250 substations
- Provides access to 172 communities
- \$53m total cost with \$8.3m paid by VT electric customers

Purpose and uses

- **Directly increase transmission system reliability**
 - Provides instantaneous system information by enabling communications at load bearing transmission and subtransmission substations back to our operations center.
 - Provides efficient and reliable method to collect and monitor system measurements and facilitate electric system automation.
 - Enables ability to meet current and emerging federal and regional reliability, security, safety and control requirements.
- **Indirectly increase reliability by serving backhaul communications for:**
 - Data exchange backbone for eEnergy Vermont smart grid
 - Statewide Radio System
 - Vermont Weather Analytics Center
 - Emerging VELCO and distribution utility-owner strategic innovations for customers
- **Support state connectivity and broadband access goals**
 - Secured approximately 200-mile, value-for-value swap w/ Sovernet and VTel that to save electric customers \$5m; agreement not finalized but operating as if in place w/Waitsfield and Champlain Valley Telecom
 - Enables
- **Bottom line benefits:** *flexible and resilient communication network that improves reliability, lowers cost, improves service and serves as a foundational investment for future grid.*

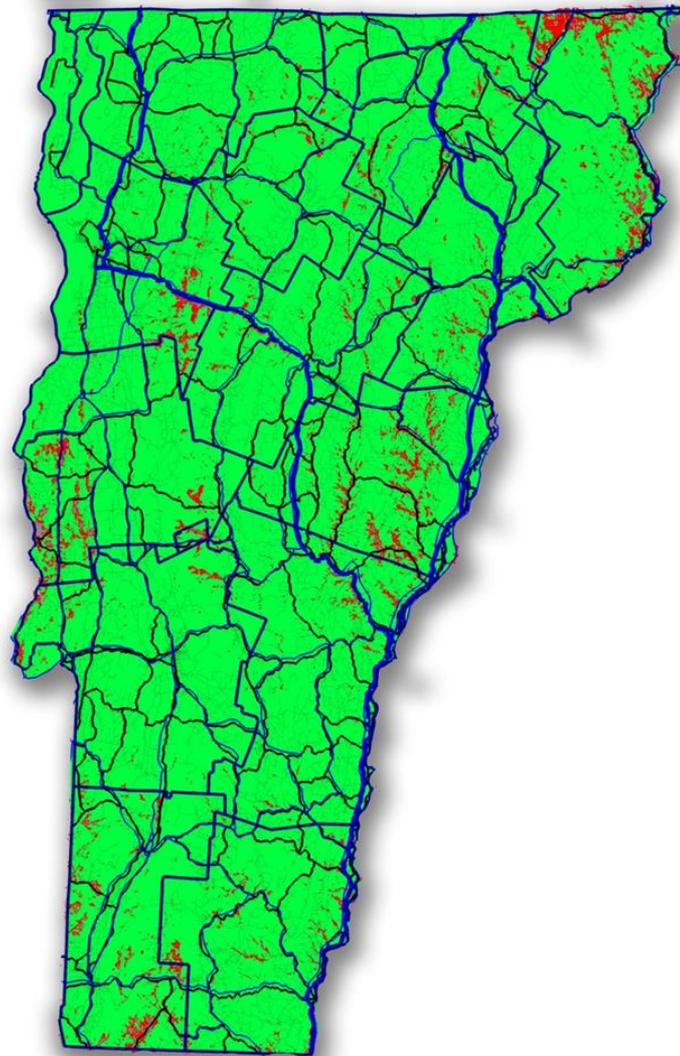
eEnergy Vermont: Statewide smart grid

- **Smart meters:** ~300,000 premises in the state connecting meters and utilities in real-time
- **Grid automation:** upgrades and new deployments of SCADA controls to substations and the distribution circuits
- **Dynamic rates tests:** pilots to test different combinations of dynamic rate structures and customer-side devices (in-home displays, etc...) to determine the most effective combinations of rates and electronics
- **Fiber optic backbone** (not ARRA funded): leverage separately financed VELCO 1000-mile fiber optic backbone project needed for grid reliability and communication to serve as eEnergy Vermont's "communications highway"

Statewide Radio System

Summary

- 37 sites currently “on air”
- 93% transmission and distribution line coverage vs. geographic coverage
- Collaborative partnerships secured with law enforcement and emergency response agencies
- Total project cost: \$31M
 - Regional - \$25M
 - Vermont - \$6M
- 14 additional sites currently planned for 2015 to increase coverage to 97%



VELCO-IBM research partnership

Weather Analytics Center Project—two-year undertaking to develop intellectual property using coupled data models and related software. Purpose is to **increase grid reliability, lower weather event-related operational costs** and **optimize utilization of renewable generation resources**.

Four models:

- **Deep Thunder:** produce accurate Vermont-specific weather forecasts up to 48 hours in advance down to 2 km²
- **Demand Forecast Model:** increase accuracy of state load forecasts
- **Renewable Forecast Model:** produce generation forecasts for solar and wind farms
- **Renewable Integration Stochastic Engine (RISE):** integrate results of above models to optimize value of Vermont's generation, demand response, and transmission assets

Strategic Initiatives

**FOR THE SAKE OF
THRIVING**

Champion

Champion an energy future
aligned with Vermont values

**FOR THE SAKE OF
PERFORMANCE**

Deliver

Deliver value to owners, Vermont,
the region and each other

**FOR THE SAKE OF A
STRONG FOUNDATION**

Transform

Transform VELCO's culture
to live Trusted Partner