VELCO Overview to House Energy & Technology Committee

Shana Louiselle
Kerrick Johnson

January 19, 2017

vermont electric power company
VELCO

Mission

VELCO manages the safe, reliable, cost-effective transmission of electrical energy throughout Vermont. Our goal is to provide an optimal system of electric transmission facilities as part of an integrated regional network designed to meet both current and future energy needs.

Vision

VELCO's vision is to serve as a trusted partner in all we do

Values

VELCO values people, safety, creativity and great work

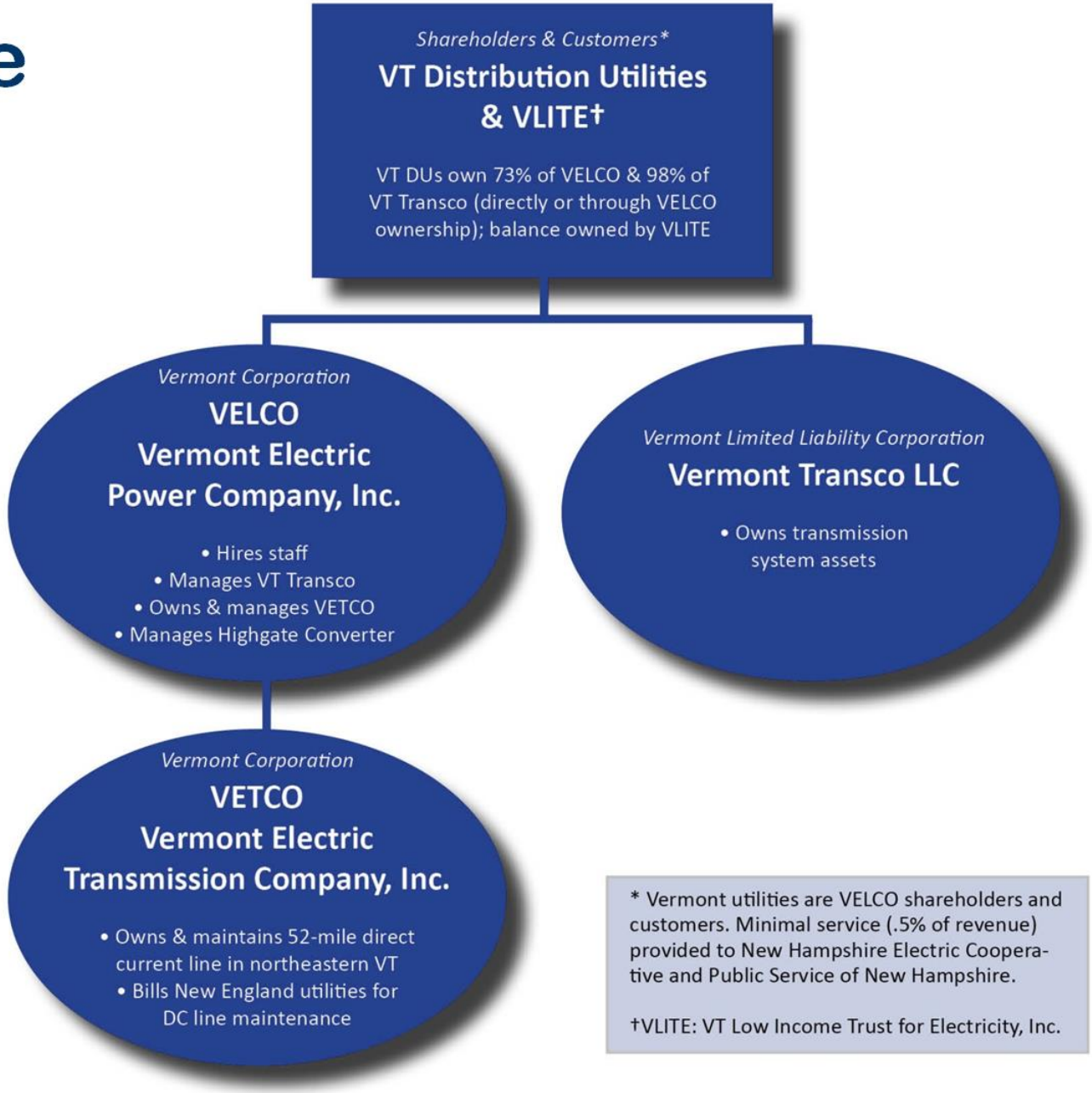
To live our values we…

- Treat everyone with respect
- Act with care
- Empower people
- Expect the best from everyone

Motives

- Provide public benefit
- For-profit company structured to achieve cooperative goals

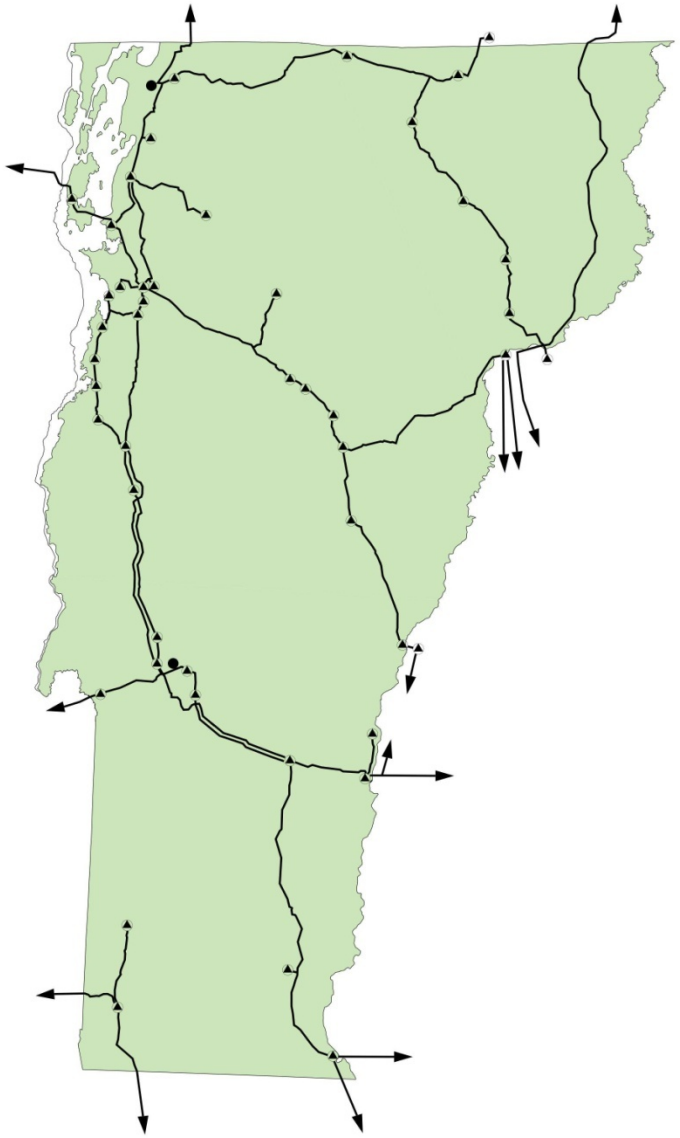
Corporate structure



* 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.

VELCO-managed assets

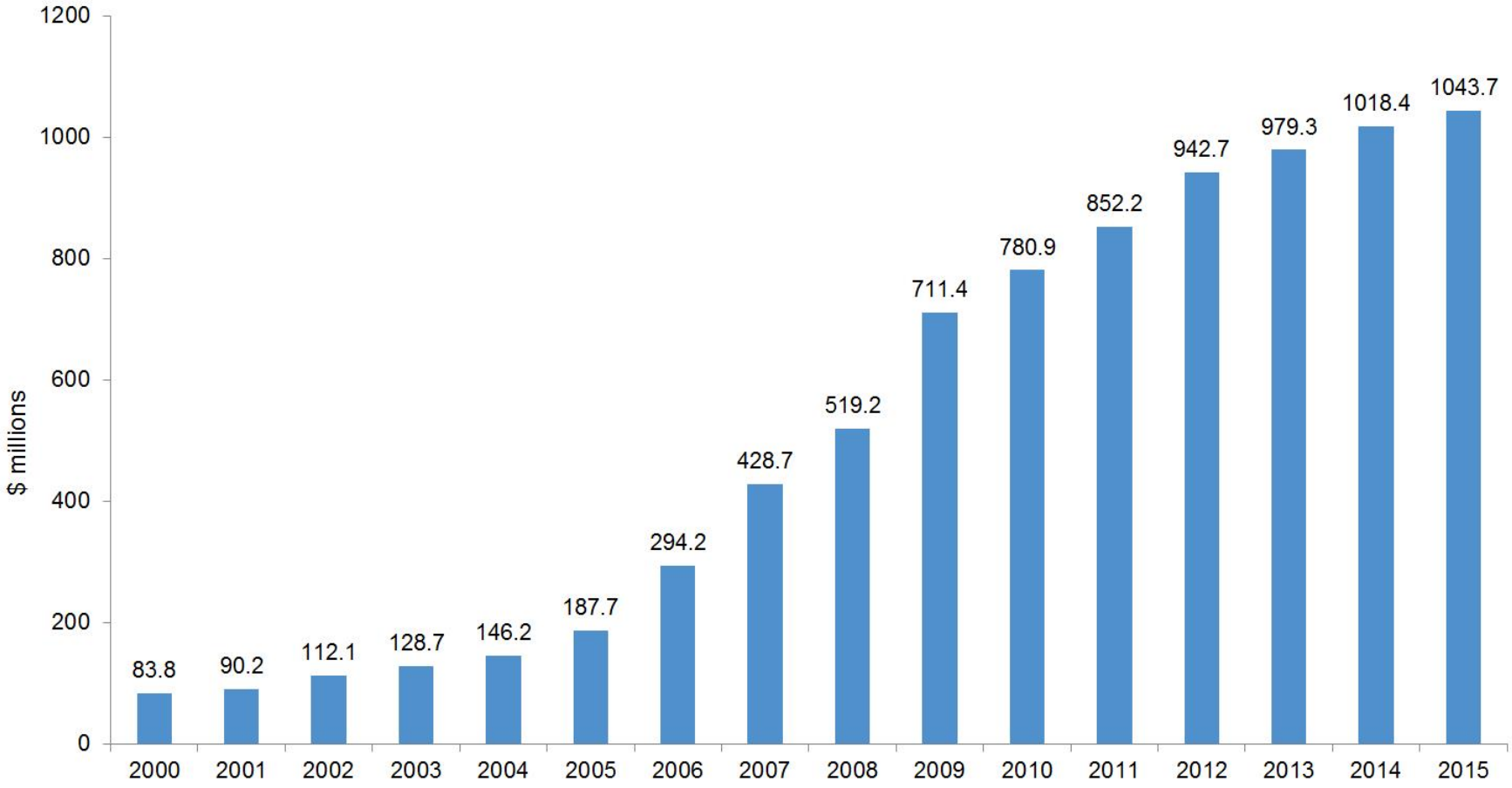


- 738 miles of transmission lines, 115 kV and higher
- 14,000 acres of rights-of-way
- 55 substations, switching stations and terminal facilities
- Equipment that enables interconnected operations with Hydro-Québec
- 1500 Fiber optic communication networks that monitor and control the electric system and provide the backbone for most Vermonters' high-speed data internet access
- 52-site Statewide Radio System
- 52-mile high-voltage direct current line through the Northeast Kingdom owned by Vermont Electric Transmission Company (VETCO)

Background

- Formed in 1956 by local utilities to share access to clean hydro power and maintain the state's transmission grid
- Nation's first statewide, "transmission-only" company
- Owned by Vermont's 17 local electric utilities and VLITE

VELCO asset growth 2000-2015



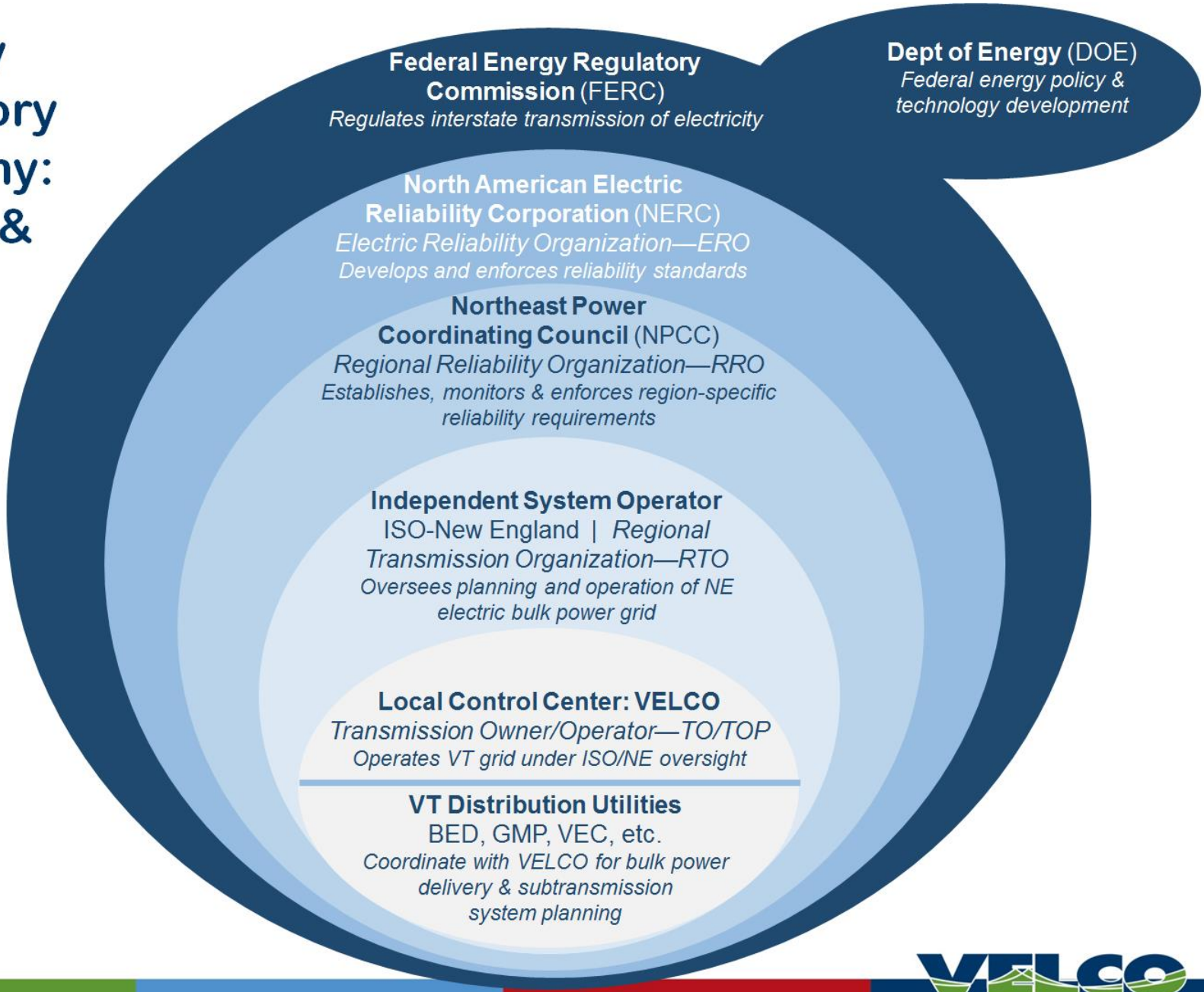
Roles & responsibilities

VELCO's role is to ensure transmission system reliability by planning, constructing, operating and maintaining the state's high-voltage electric grid.

Related responsibilities

- Serve as Local Control Center for grid operations in Vermont
- Develop and submit Vermont's Long-Range Transmission Plan
- Manage Vermont System Planning Committee
- Advocate owner and state positions at ISO-NE
- Enable utilization of fiber network to advance state telecommunications goals consistent with utility purpose
- Provide metering and billing services for SPEED projects
- Provide GIS mapping data to owners and regulators

Electric industry regulatory hierarchy: VELCO & VT DUs



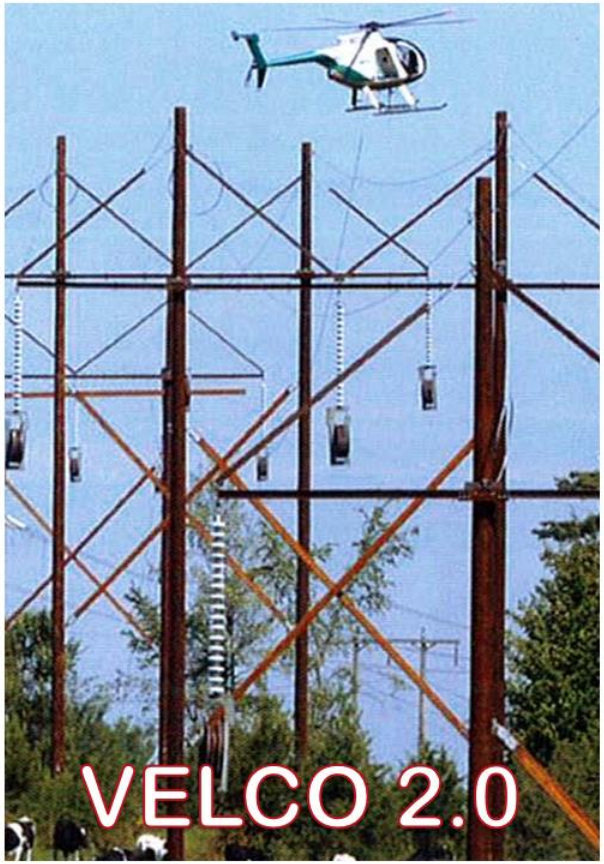
Transmission planning: why should you care?

- ISO-NE responsibility for grid planning means regional strongly influences local. ISO-NE determines:
  - **How much renewables "count"**
  - Economics of renewables
  - Need for transmission upgrades
  - Merchant projects
  - Cost of our power

- Key issues to understand
  - Vermont influential for our size, but we are only 4% of regional load
  - Vermont dependence on imported power
  - Renewables—particularly solar—are changing the grid
  - **Location of distributed resources determines benefit to grid**
  - Innovation is creating new tools with many uses: local, state, regional

Evolution

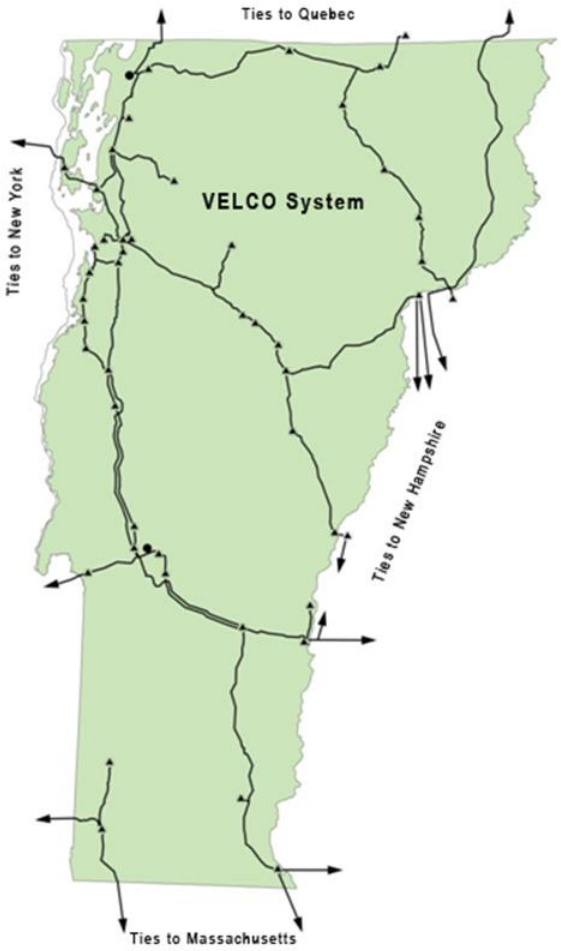
Operations



Construction

Information

Vermont now imports close to half its power



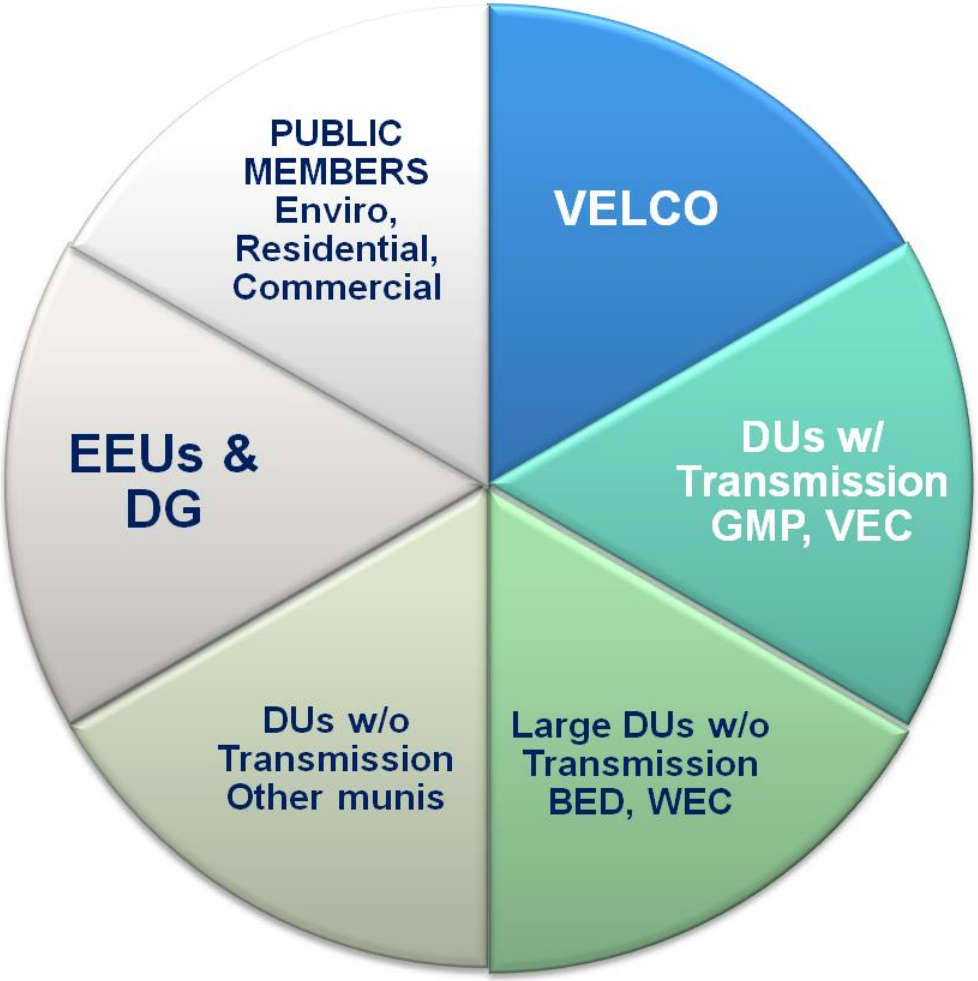
Type		MW 2014	MW 2015
Fossil (fast start units)	Winter	188	188
	Summer	138	138
Hydro		152	152
Wind		123	123
Trash-to-energy		9	9
Biomass (wood)		72	72
Nuclear		625	0
Solar and other, e.g. methane		~100 and growing	~100 and growing
TOTAL IN-STATE GENERATION		**1265**	**640**

73% of 2014 hours VT was exporting power

~84% of 2015 hours VT will import >400 MWs

Vermont System Planning Committee

full, fair & timely consideration of all cost effective solutions



Key concepts:

Collaborative grid planning

Broadly inclusive stakeholder process

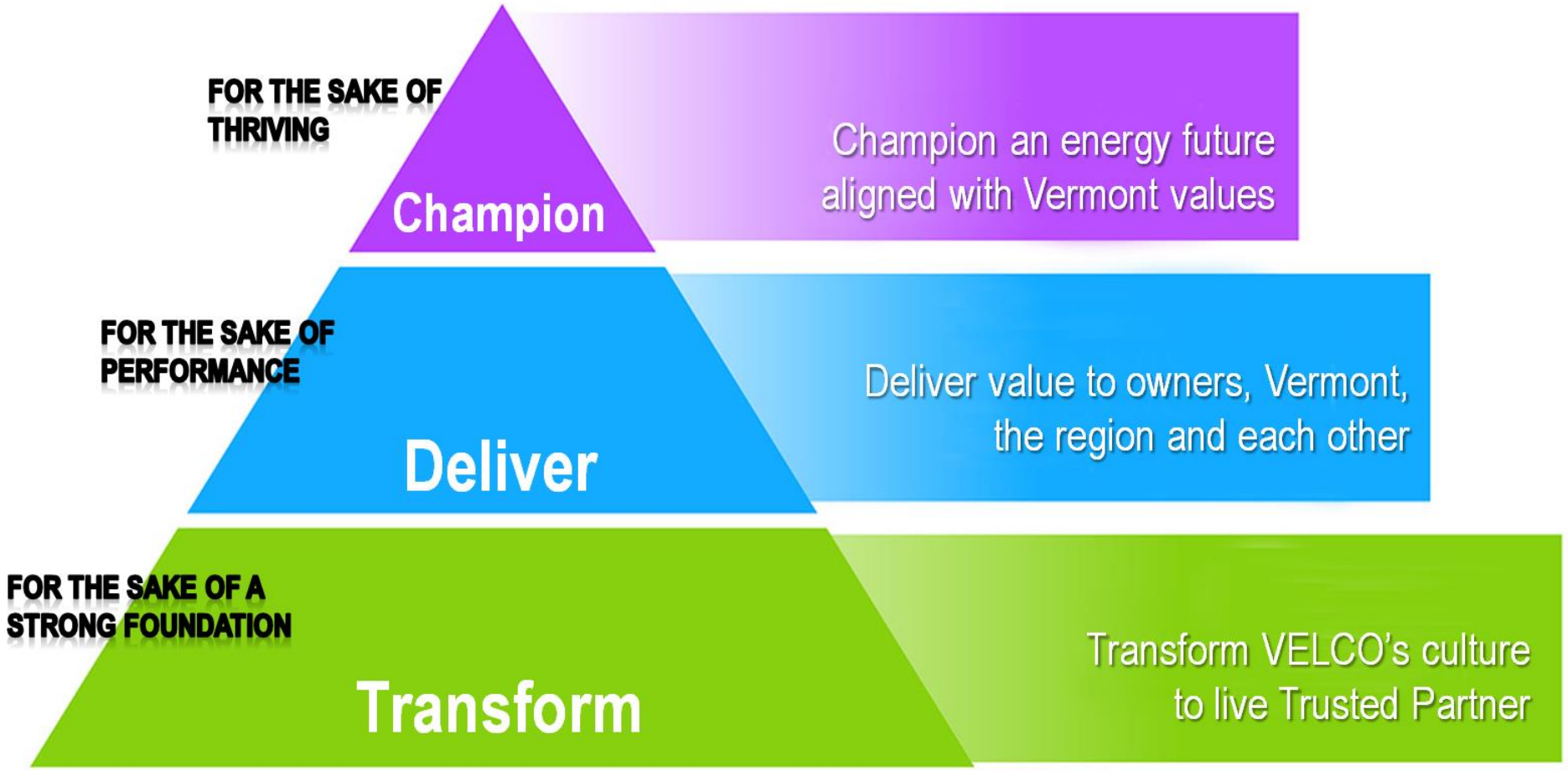
Six sectors with equally weighted votes

Advisory and binding votes

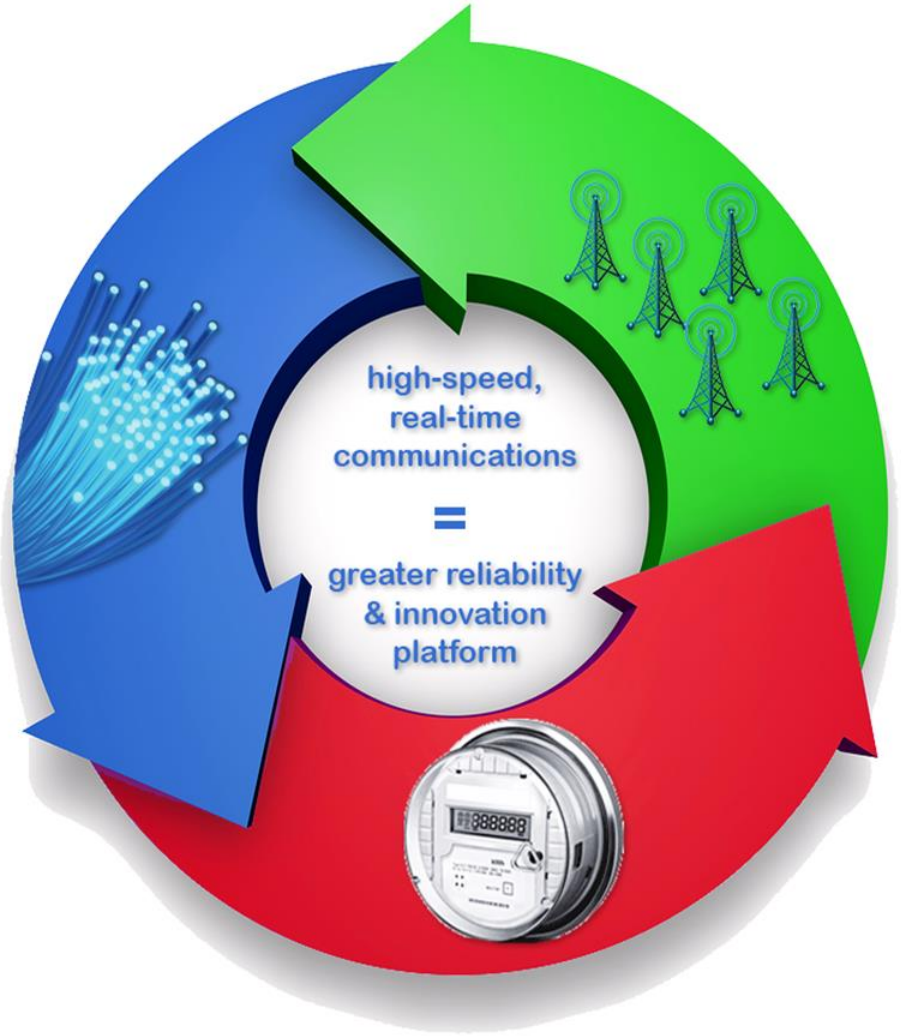
Transparency

Public engagement

Strategic Initiatives



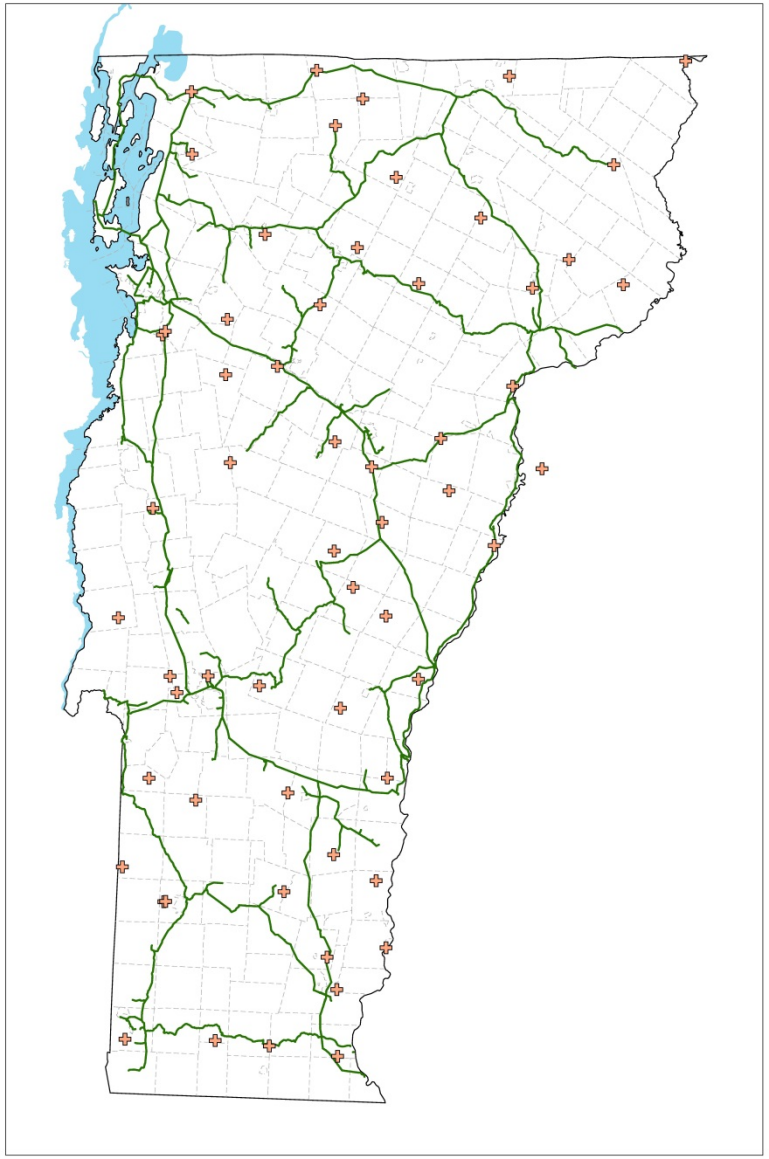
Communications critical; platform in place



Statewide Infrastructure

- eEnergy VT smart grid
- Fiber optic network
- Radio system

VELCO fiber optic and radio networks

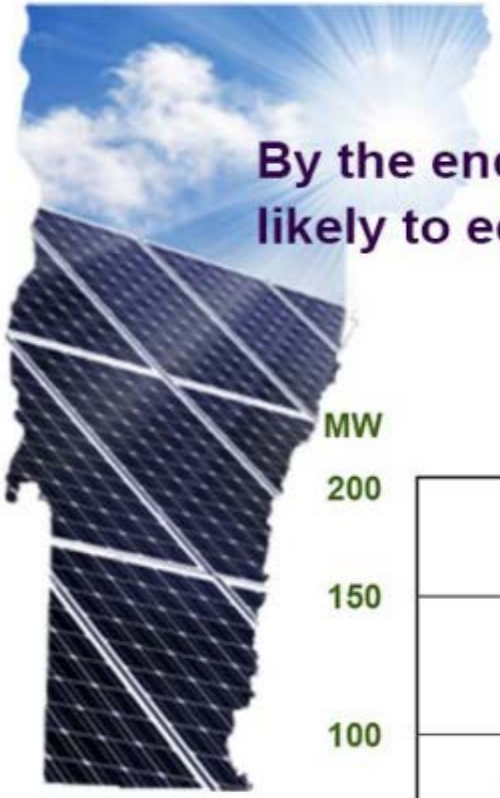


Fiber

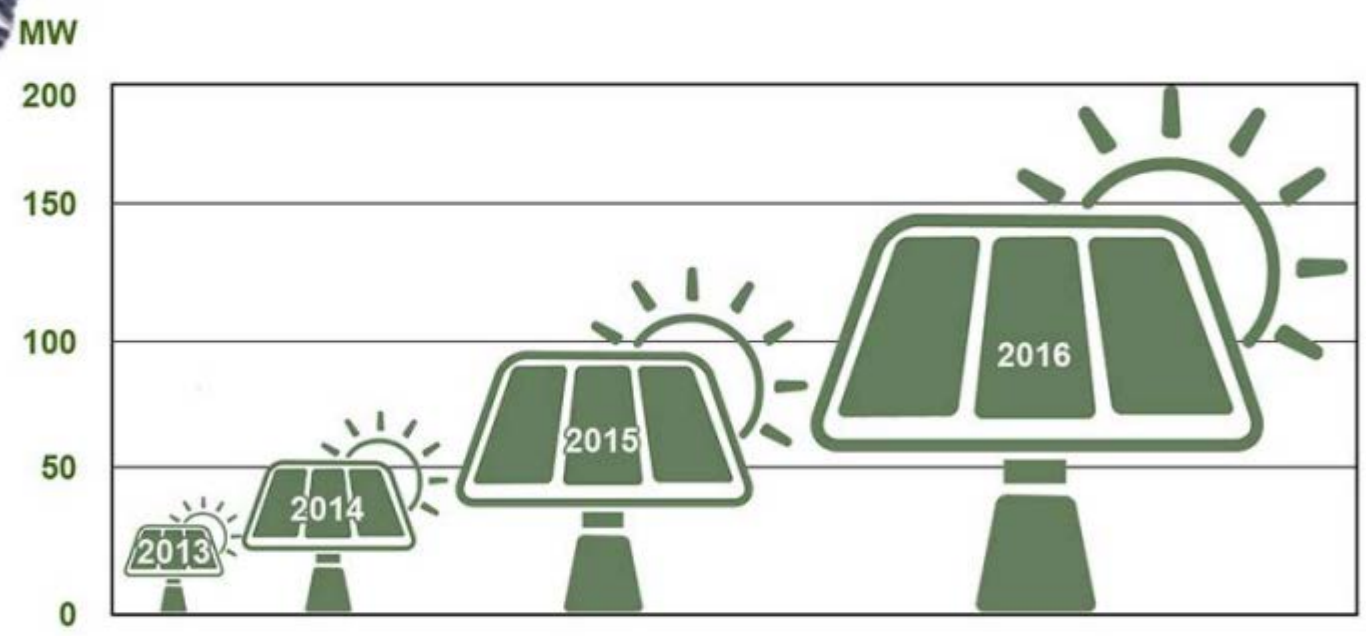
- Enhances overall electric grid stability, speed and reliability
- 1,500-mile, 72-strand fiber optic cable installed on transmission, subtransmission and distribution lines
- Connects over 250 substations; provides access to 172 communities
- Provides ~$19M in value annually in growing VELCO/DU operational, corporate voice and data transport services

Radio

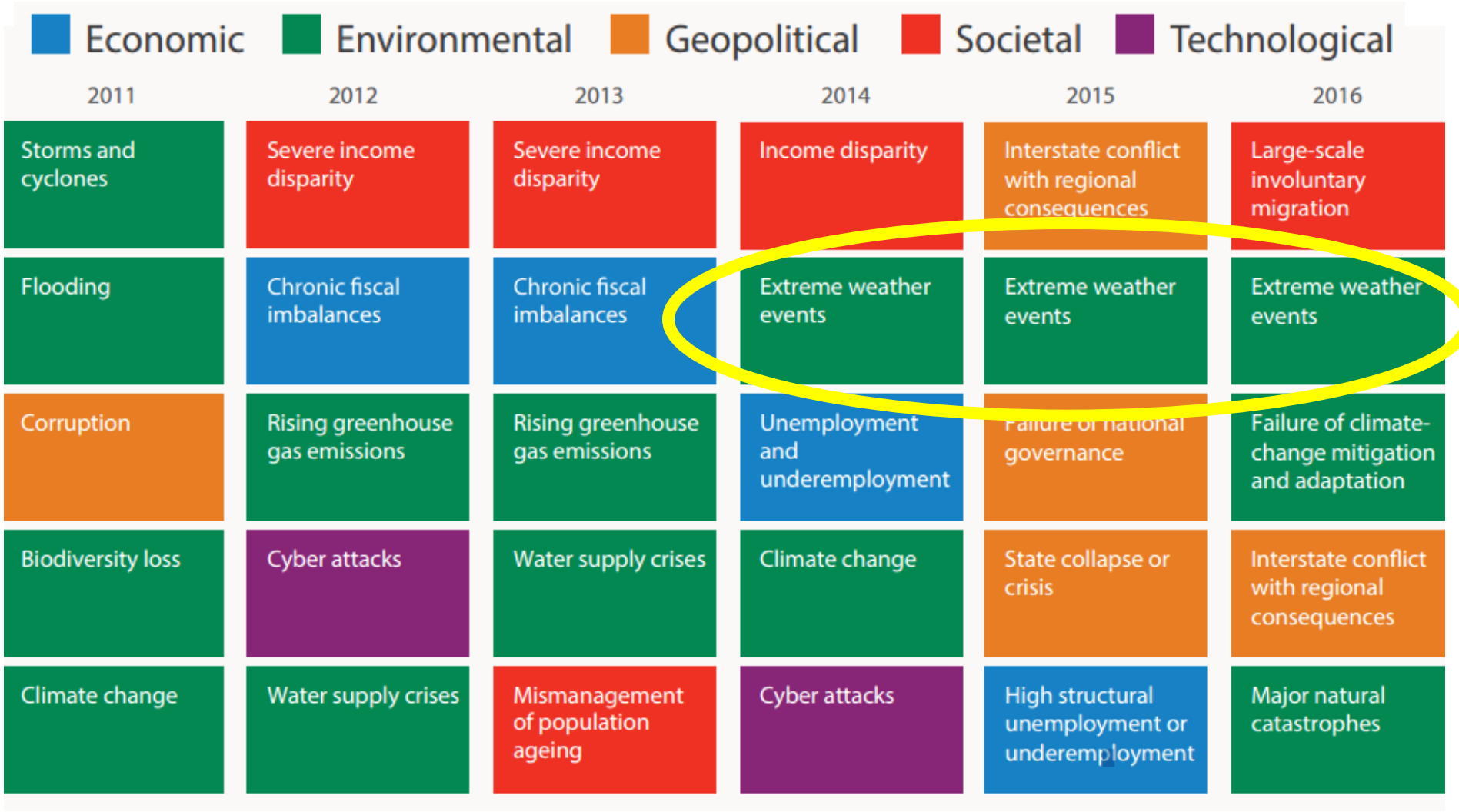
- Used for utility maintenance and emergency operations
- Driven by FCC “narrowbanding” deadline by January 1, 2013
- 53-site Statewide Radio System 98% statewide coverage
- Shared tower use with Dept. of Public Safety in Brighton, St. Albans under discussion



By the end of 2016, installed solar is likely to equal 20% of Vermont's electric demand



Extreme weather a top global risk



Source: World Economic Forum

Vermont Weather Analytics Center

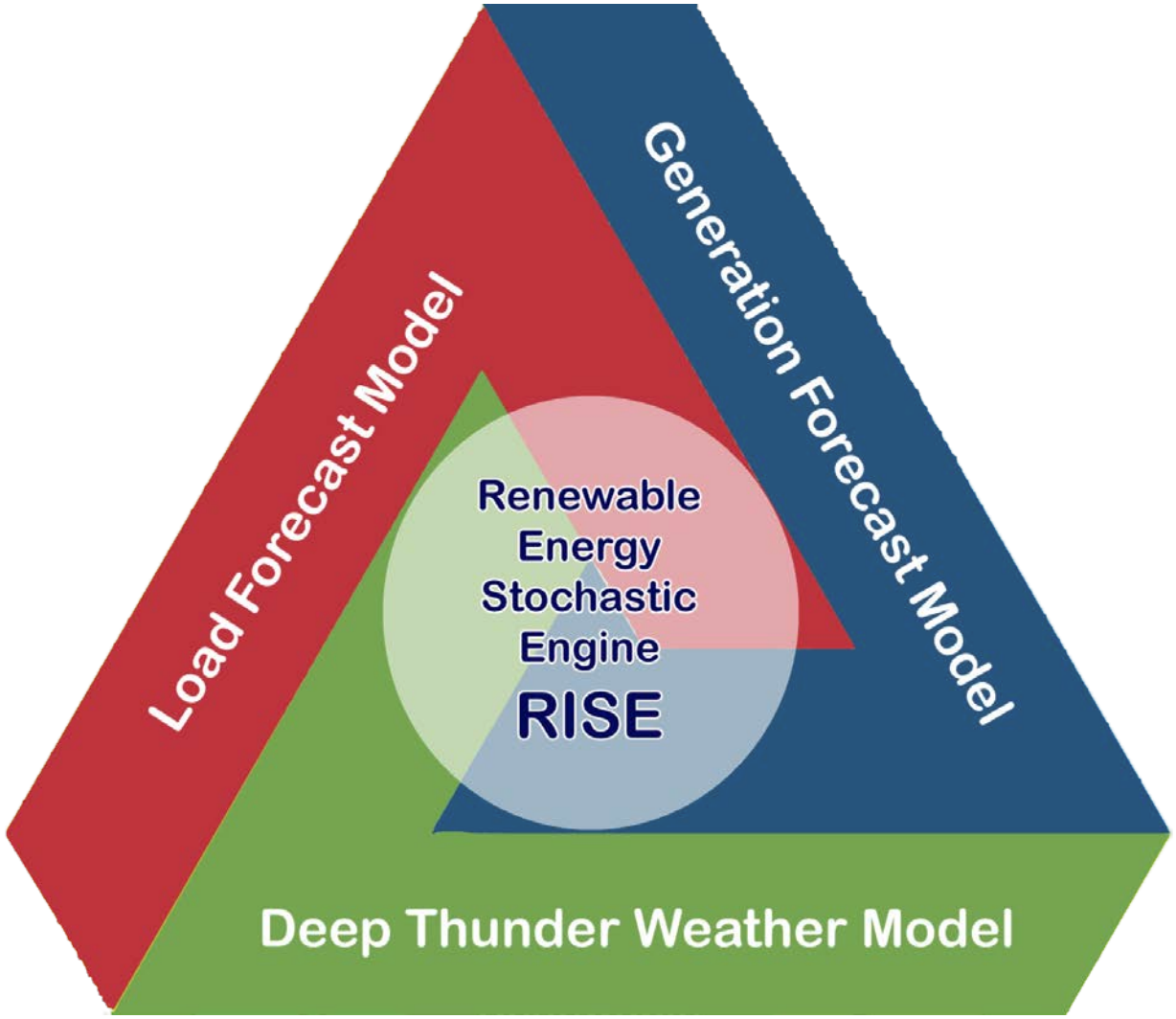
A powerful weather, energy data and analytics platform built with IBM that utilizes four coupled models and leading-edge analytics to deliver the most precise and accurate wind and solar generation forecasts in the world. VWAC enables us to:

Increase grid reliability, community resiliency

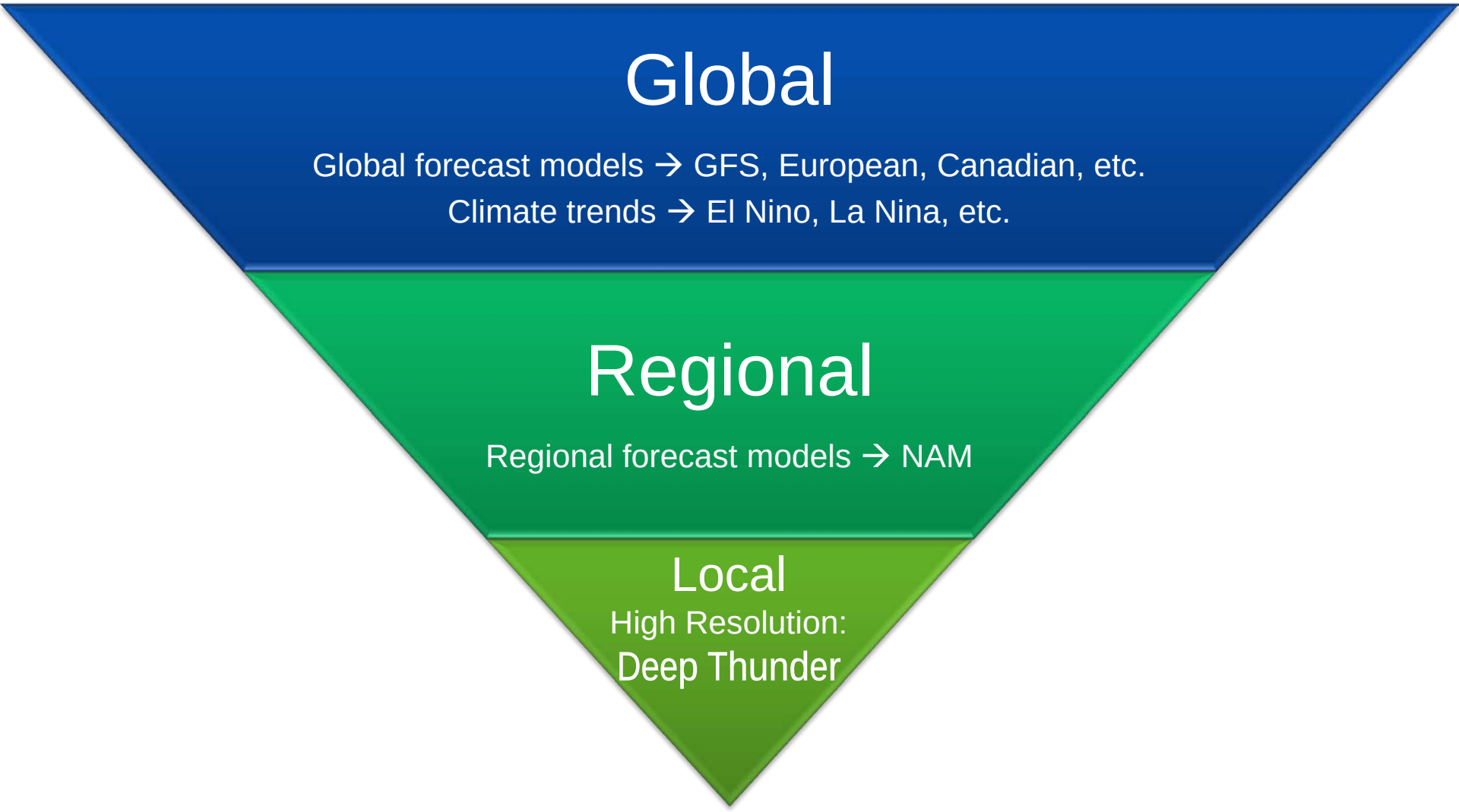
Lower weather event-related operational costs

Garner full value from renewable generation

Vermont Weather Analytics Center

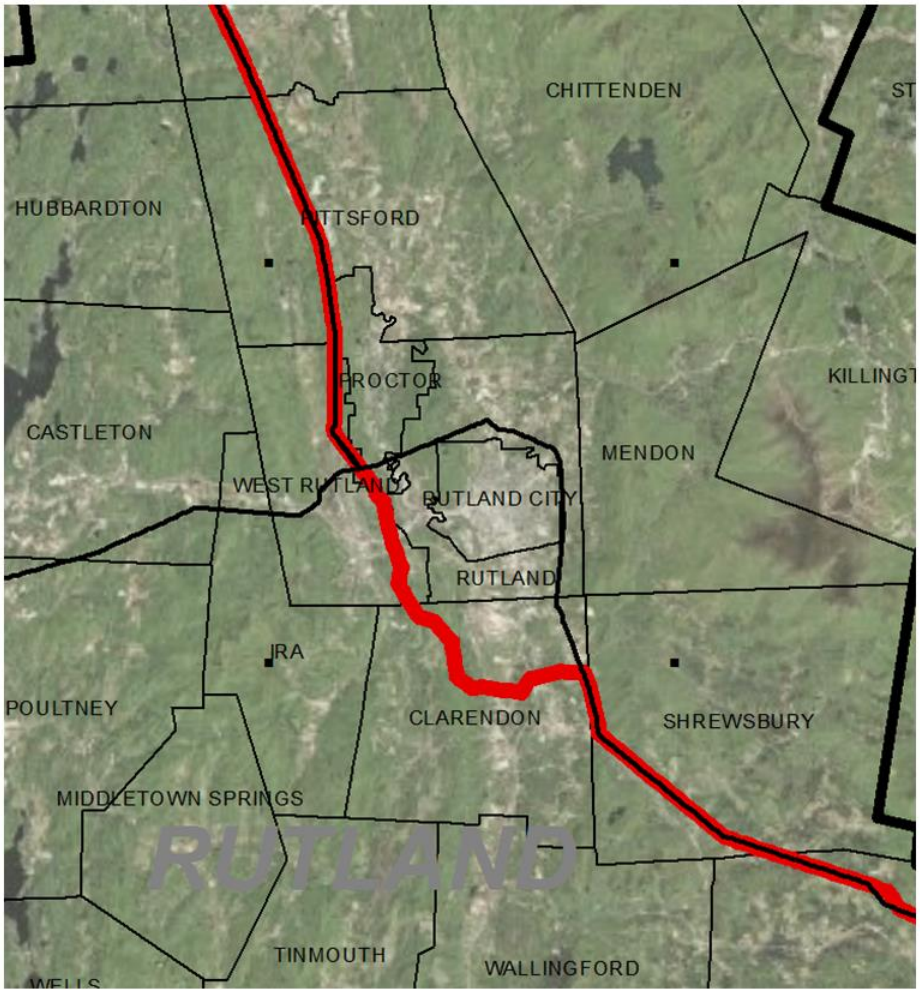


Weather forecasting tools

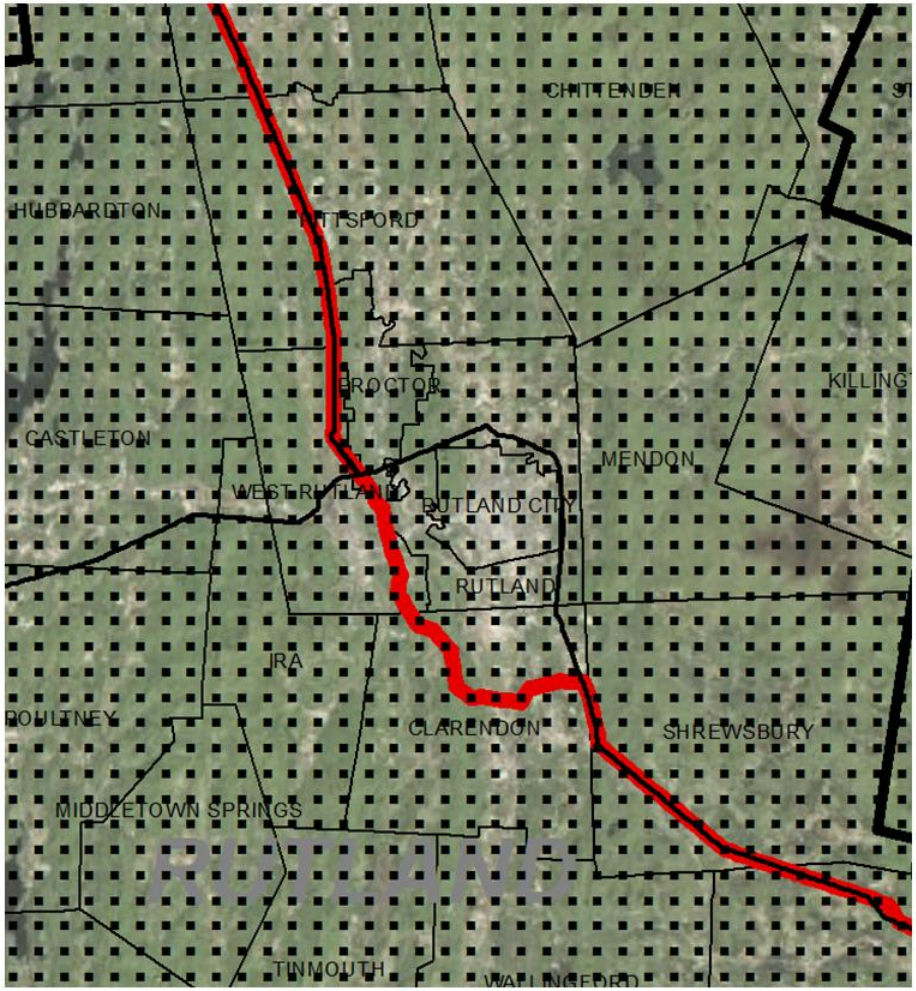


Bottom line: Deep Thunder is a powerful, complementary and increasingly critical weather prediction tool

Model specifications



16km Resolution
(i.e. European Model)



1km Resolution
(Deep Thunder)

Demonstrated Benefits

Safety & Reliability

More informed emergency response

Road condition updates

Geographically targeted customer updates

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

Planning

Increased reliability of planning assessments due to AMI data integration

Improved non-transmission alternative development

Demand Management

Greater visibility to potential demand response events

Increased peak management capability

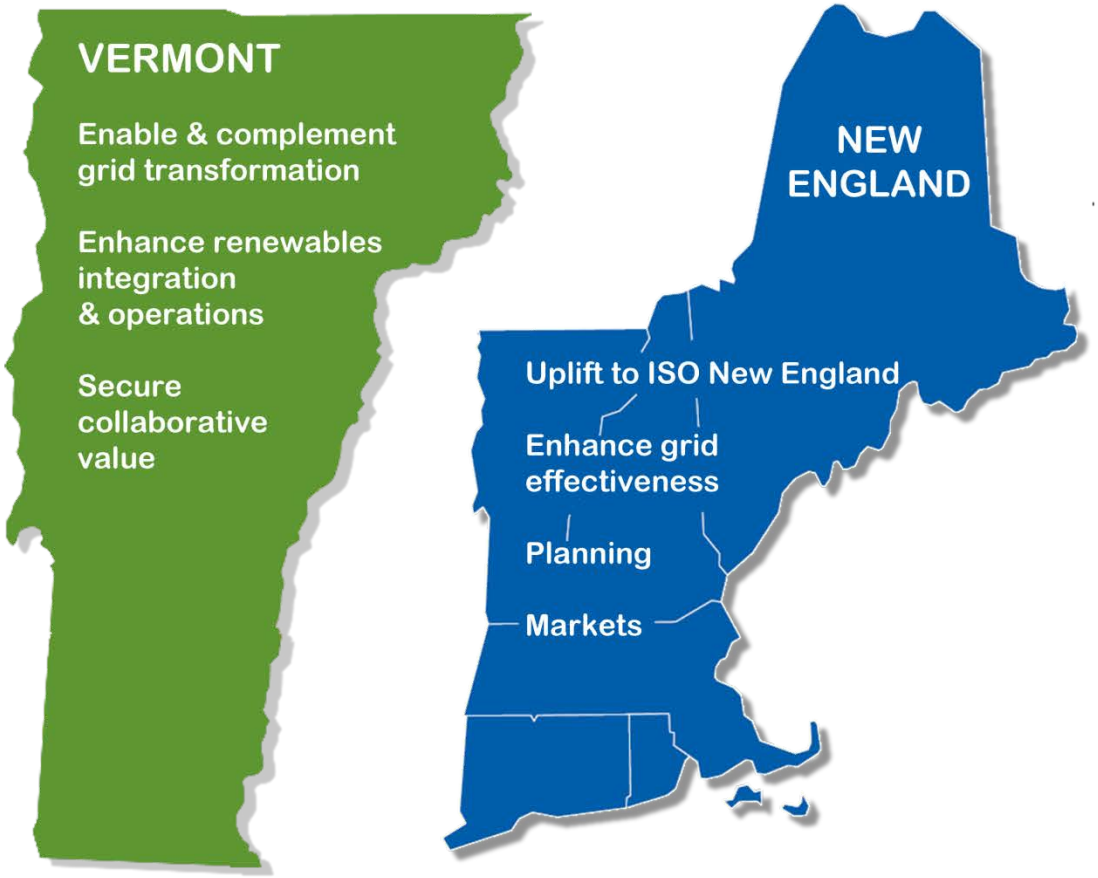
Efficiency measures validation

Next steps – operationalize/quantify value

VELCO

Improve core service delivery

Develop core competence independent of IBM



Transformative collaboration

VELCO's ongoing work

- Deliver transmission services for reliability, power supply de-carbonization and microgrid deployment
- Evolve from construction to data analytics and advanced communication networks
- **Create more adaptable, resilient and efficient grid that better serves customer choice**
- Advocate appropriate recognition of DERs' value at regional level
- Serve as resource/broker, innovation enabler and advocate

Shana Louiselle
Communications & Policy Advocate
(802) 770-6381
slouiselle@velco.com

www.velco.com
www.vermontspc.com
http://www.velco.com/our-work/innovation/vtwac2

Kerrick Johnson, Vice President
Strategy and Communication
kjohnson@velco.com
(802) 770-6166
kjohnson@velco.com