



50 YEARS *as Vermont's Transmission Reliability Resource*

Moving Power. Moving Forward.



# **An Introduction to the 2009 Vermont Long Range Transmission Plan**

May 2009

# VELCO is . . .



# VELCO is not . . .



# Mandatory Reliability Standards

- **NERC standards:** System must be reliable with no outages, outages of one element and outages of two or more elements
- **ISO-NE standards:**
  - National standards PLUS
  - Long standing regional planning design
    - Stressed conditions: extreme weather, local generation unavailable; maxed out regional transfers

**NERC** = North American Electric reliability Council

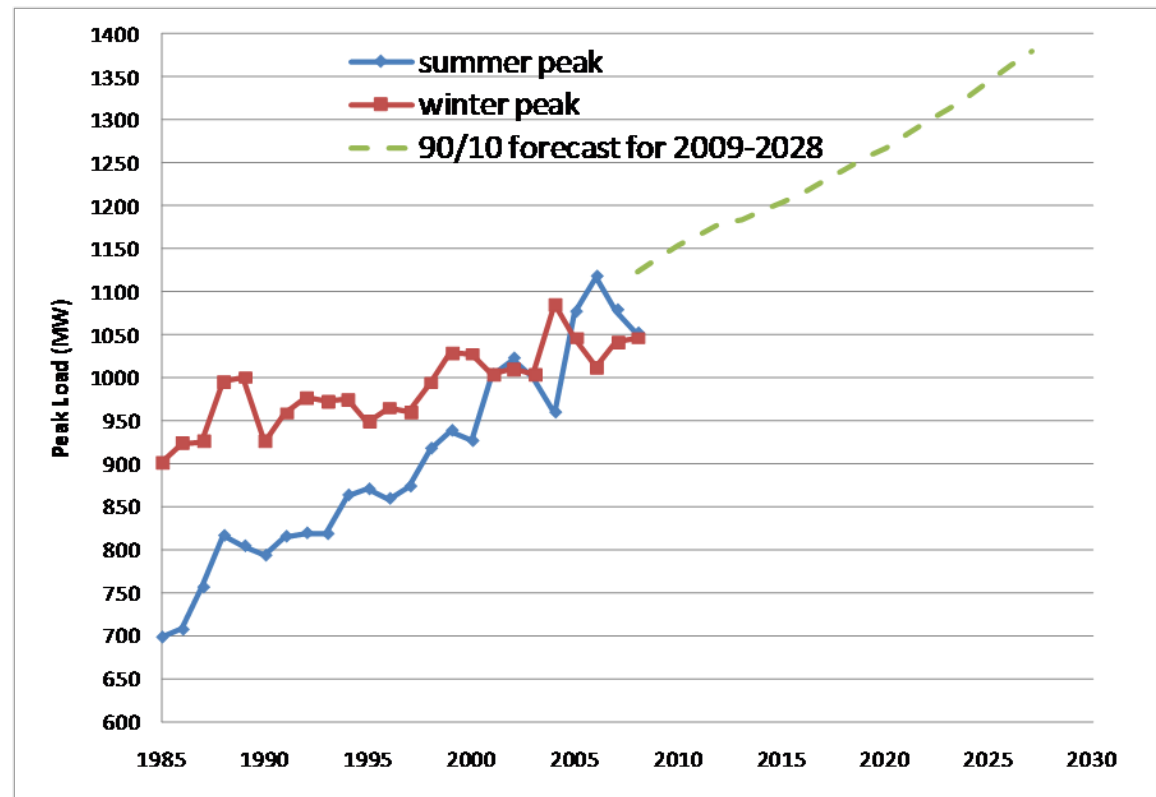
**ISO-NE** = Independent System Operator of the New England electric system

# Peak Electrical Demand or “Load” Forecast

“90/10”  
Loads

2018 = 1275 MW

2028 = 1425 MW



Note : Forecast Demand includes projected loads and losses

# Forecasting Factors to Keep in Mind

- **Plan and forecast must be updated** at least every three years.
- **Trigger for projects is typically LOAD**, not date, so if load does not materialize, project likely won't be built.
- **Energy Supply** also plays a significant role in system performance and, potentially system planning and project timing.

# Typical Reasons for Upgrades and Associated Solutions

<b>Types of Reliability Issues</b>	<b>Typical Solutions</b>
Voltage too low	Capacitor banks
Voltage too high	Shunt reactors
Voltage collapse on network	New line, transformer, or substation
Loss of a transformer due to low or high voltages	Add a transformer
Flow above equipment capacity	Replace equipment or add another a line, transformer or substation

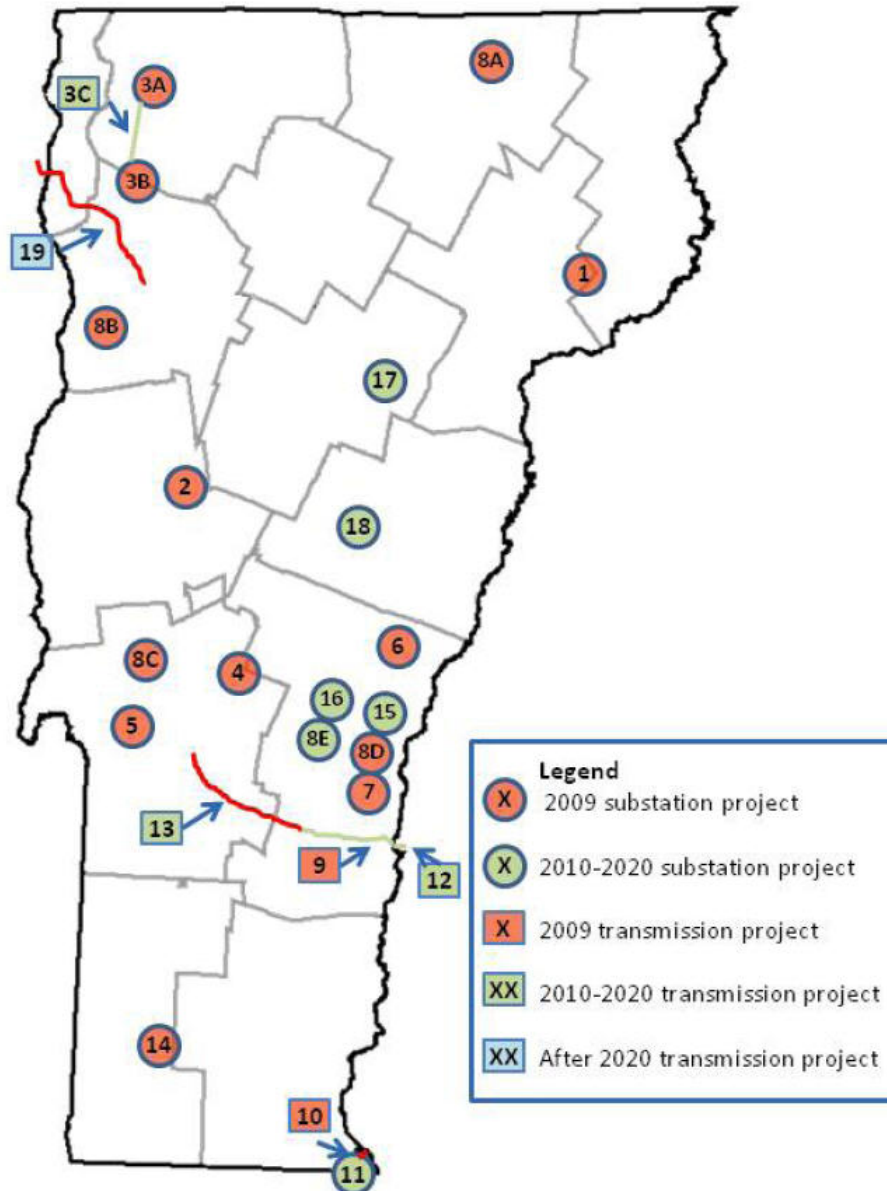
# Development Stage of Upgrades

- Upgrades are conceptual except Lyndonville
- Costs = 2008 dollars
- Costs are estimates based on recent experience
- Estimates not based on project-specific details
- Priorities based on: project planning stage, load exposure, and need dates

# List of Deficiencies

Repeated from 2006	New in 2009
Loss of Middlebury transformer	Loss of Bennington station
Loss of Blissville transformer	VY-Vernon Rd line overload
Loss of Hartford transformer	Loss of Vernon autotransformer
Loss of N Rutland/Cold River transformers	Coolidge-Ascutney line overload
Loss of Ascutney transformer & substation	Ascutney-Ascutney Tap line overload
Loss of St J transformer	Williston-Tafts Corner line overload
Loss of St Albans transformers	Loss of Chelsea transformer
Loss of Barre transformer	High voltage at light load
Loss of Georgia substation	System wide low transmission voltage
Coolidge autotransformer overload	System wide transmission voltage instability
Coolidge-Cold River line overload	
Cold River-N Rutland overload	
W Rutland-Florence overload	
New Haven-Williston overload	
Low voltage and voltage instability	

# Potential Capital Project Map



**For details** on reliability issues and potential projects, see Section 3 of the Draft Plan, beginning on page 13.

See especially Figure 3.5  
on pages 18 and 19 (centerfold).