

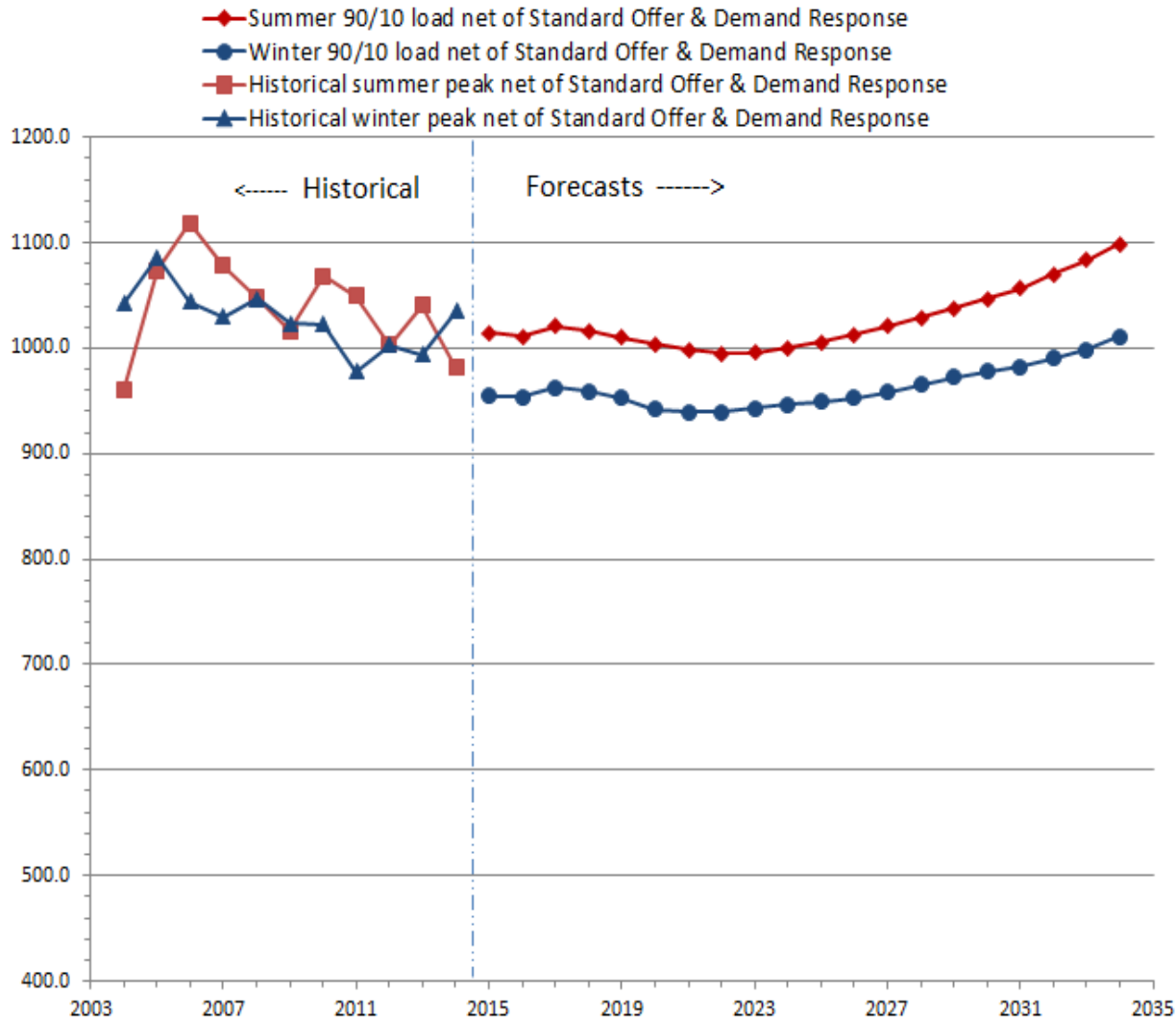
The VELCO logo is displayed in a bold, white, sans-serif font. The letters are thick and closely spaced, with a slight shadow effect. It is positioned on the left side of the top banner image.

VERMONT'S TRANSMISSION RELIABILITY RESOURCE

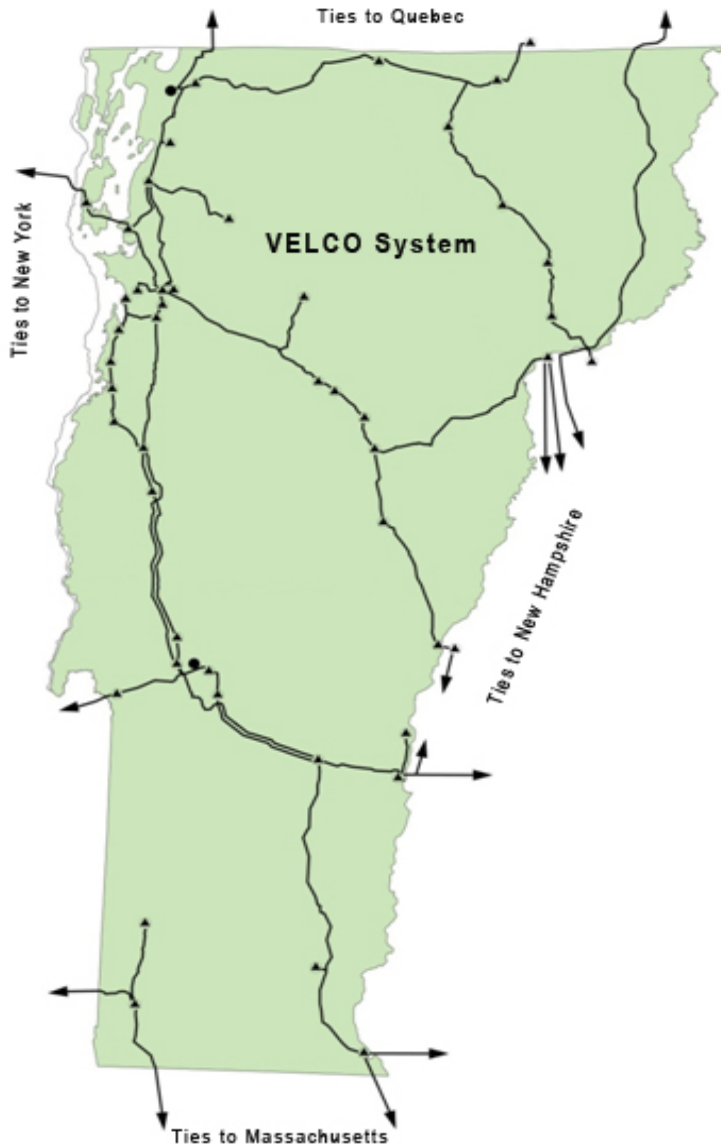
# State of Vermont's Transmission Grid

Board of Directors  
February 5, 2015

# Vermont historical load



# Vermont generation—import/export picture in 2014



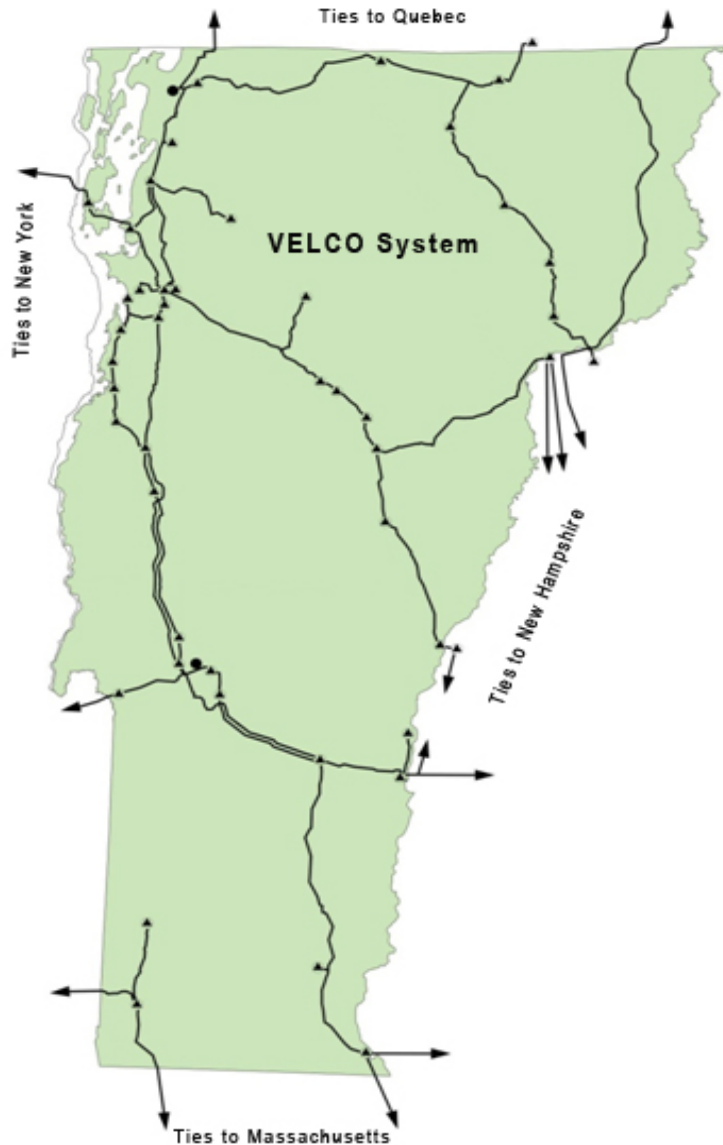
Type		MW
Fossil (fast start units)	Winter	188
	Summer	138
Hydro		152
Wind		123
Trash-to-energy		9
Biomass (wood)		72
Nuclear		625
Solar and other, e.g. methane		~100 and growing

Note: Vermont Yankee Nuclear Plant in decommissioning phase, off line 12/29/2014.

Total in state generation = 1265 MW

73% of 2014 hours VT was exporting power

# Vermont generation—import/export picture in 2015



Type		MW
Fossil (fast start units)	Winter	188
	Summer	138
Hydro		152
Wind		123
Trash-to-Energy		9
Biomass (Wood)		72
Nuclear		0
Solar and other, e.g. methane		~100 and growing

Note: Vermont Yankee Nuclear Plant in decommissioning phase, off line 12/29/2014.

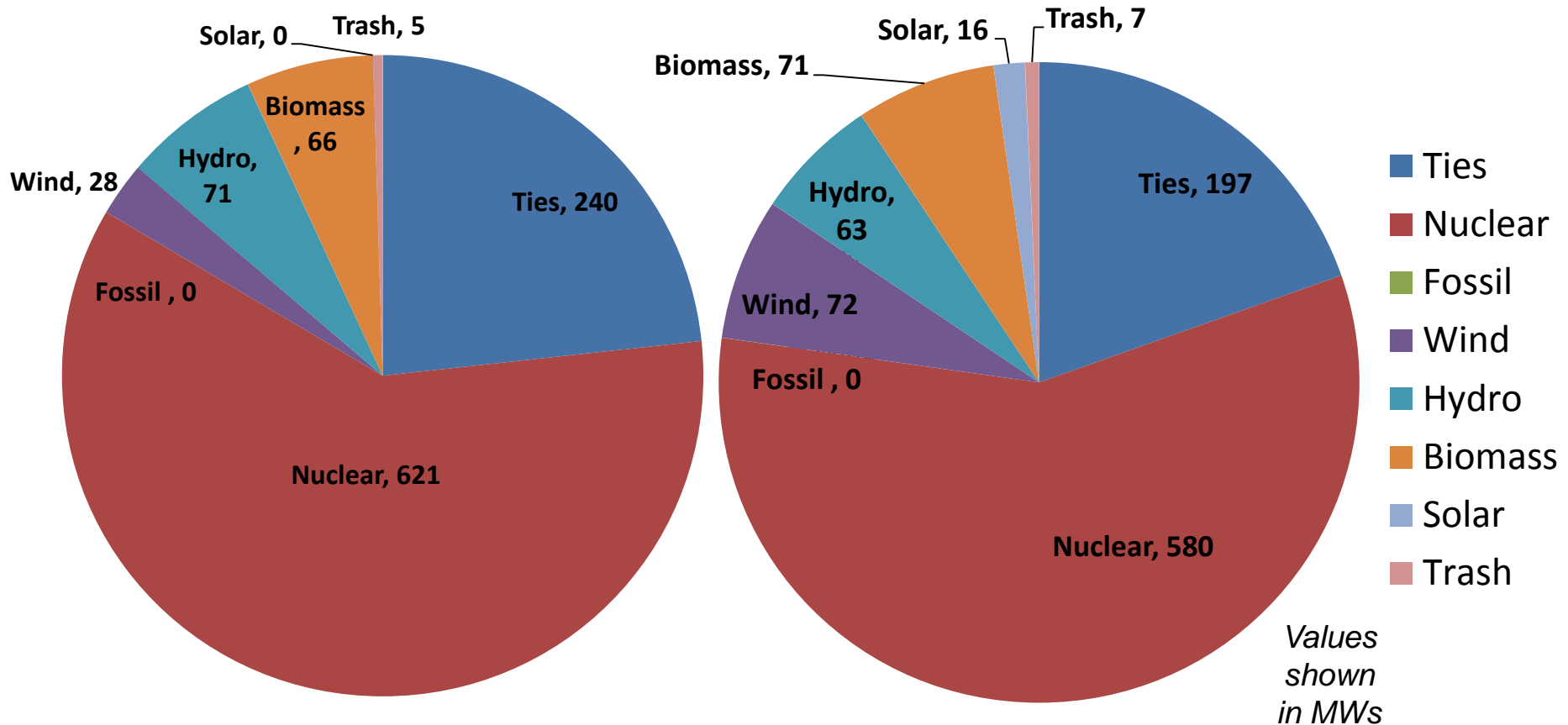
Total in state generation = 640 MW

An estimated 84% of 2015 hours VT will import >400 MW's

# Snapshot of peak power days

- 2014 **winter** peak day (1/2/14 18:00)
- Load was 1,029 MW

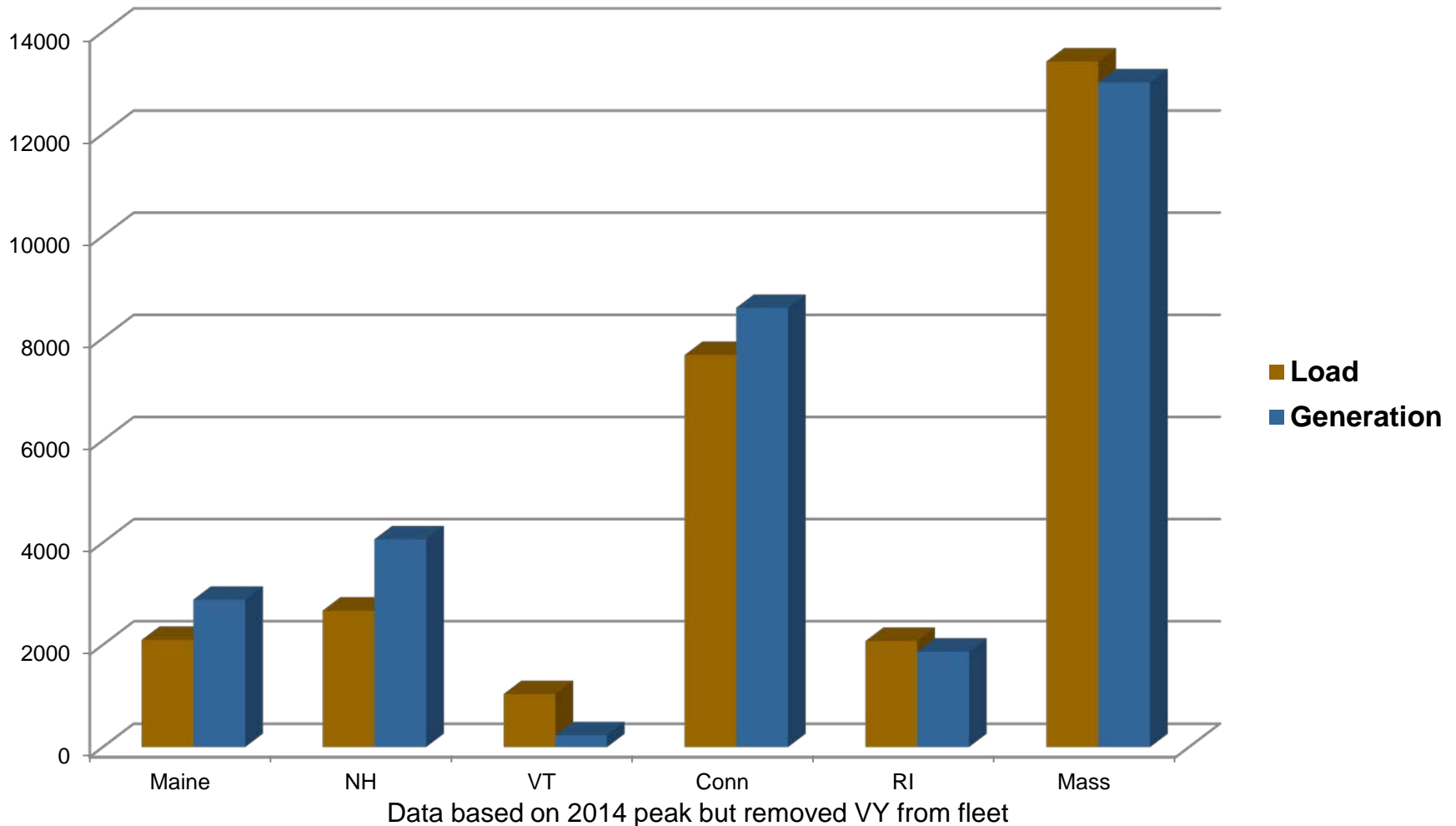
- 2014 **summer** peak day (7/2/14 12:00)
- Load was 1,006 MW



In 2015 nuclear generation loss will be made up through imports.

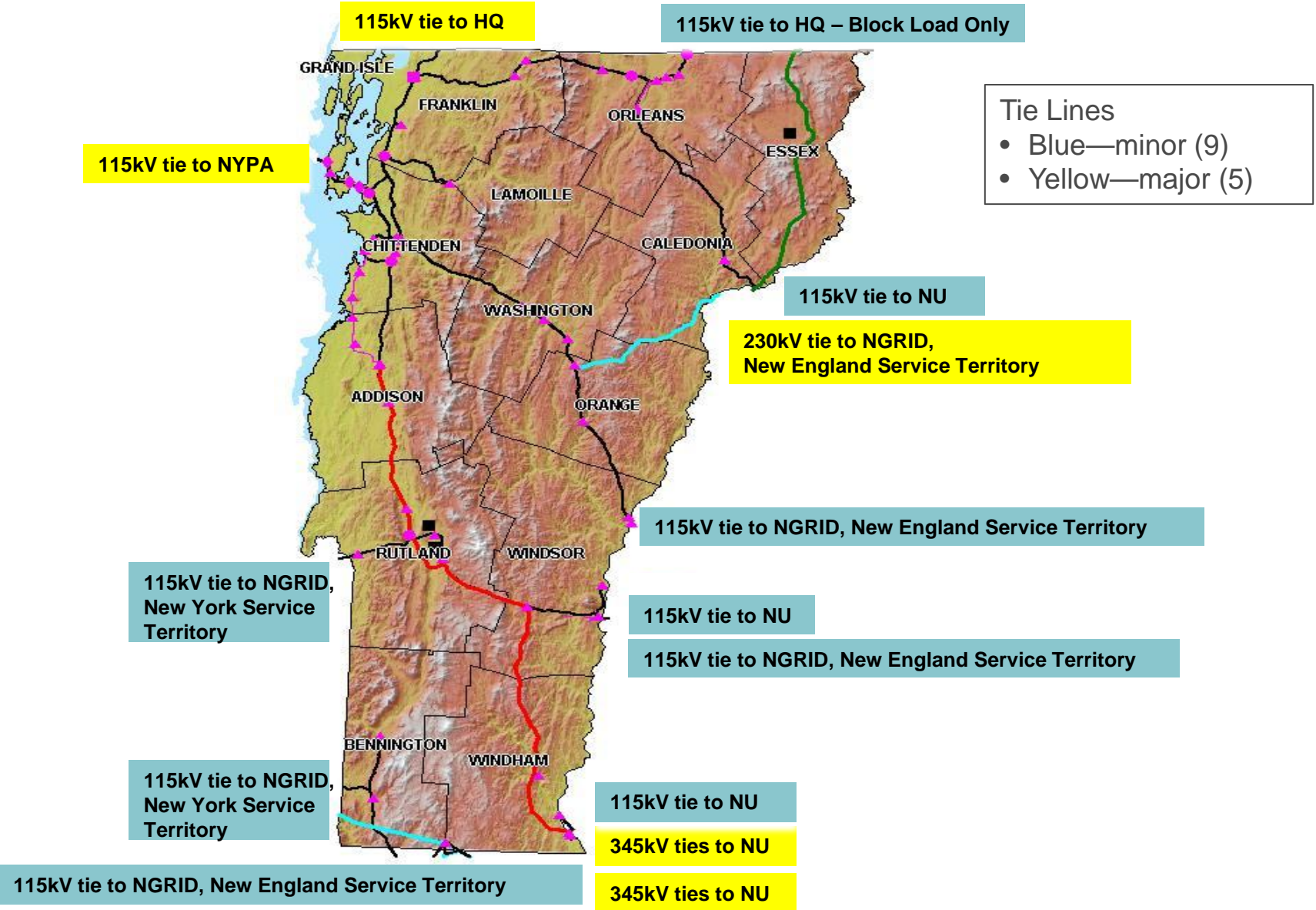
# Generation and load by state (2015)

Vermont is the only New England state that has a major generation vs. load deficit



# VELCO transmission system imports

Generation deficit must be made up by imports





# 2015 is a different operating condition than 2014

- PV20 – Limits NY deliveries to VT to 140MW and is not considered firm
- Highgate – Reliable import except during Hydro-Québec high-load periods
  - Critical generation source for Vermont reliability
  - New VT Joint Owners contract does not require delivery over Highgate
- Distance from generators
  - Many miles from sources in ME, NH, MA and CT
- Significant amounts of variable generation in VT
  - Generation levels constantly changing
  - Balancing harder
  - Varying voltage



# Opportunities/Challenges

- PV20 – Cable replacement project planning underway
- Highgate – will study impacts of a long-term outage
- Distance from generators
  - New NERC planning criteria in 2016 may drive need for new transmission projects to improve regional system reliability
- Significant amounts of variable generation in VT
  - New Static VAR Compensator at Ascutney will allow for better dynamic voltage control

# Summary

- Grid is reliable with increasingly rigorous requirements and increasingly virulent threats
- Region is generally aligned on need for low-carbon, centralized and distributed sources of energy
- Vermont's generation mix in transition
- Continuum of views in VT and region on appropriate role of transmission