

# THE TRANSMISSION GRID & WHY IT MATTERS

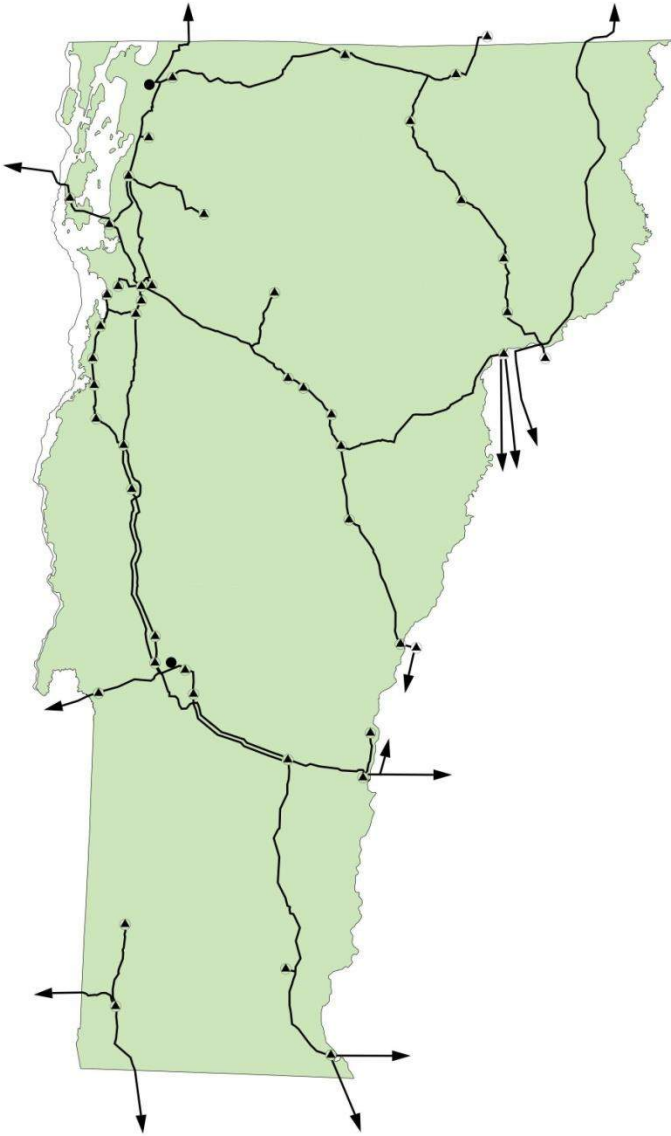
- ✓ Local
- ✓ Vermont
- ✓ New England
- ✓ Innovation

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VELCO CEO

VECAN  
December 3, 2015



# What is VELCO?



- We manage 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.
- **Our vision** is to serve as a trusted partner and honest broker of sound information and guidance as Vermont transitions to a brighter energy future.

# Evolution



Operations



Construction



Information



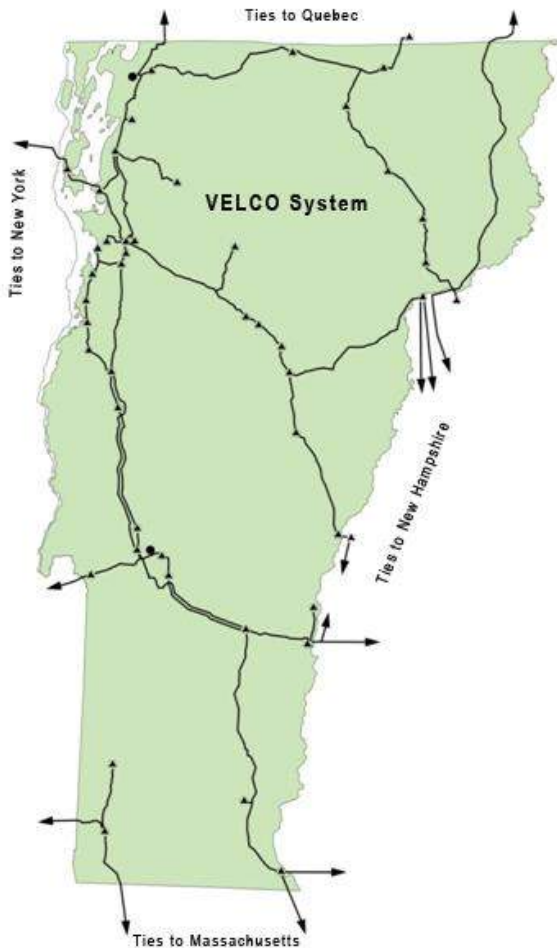
# Transmission planning: why should you care?

- 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

VT's collaborative approach to planning—VT System Planning Committee—helped defer \$400M of transmission upgrades through generation & energy efficiency

Visit [www.VermontSPC.com](http://www.VermontSPC.com)

# 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 |
| <b>TOTAL IN-STATE GENERATION</b> |        | <b>1265</b>      | <b>640</b>       |

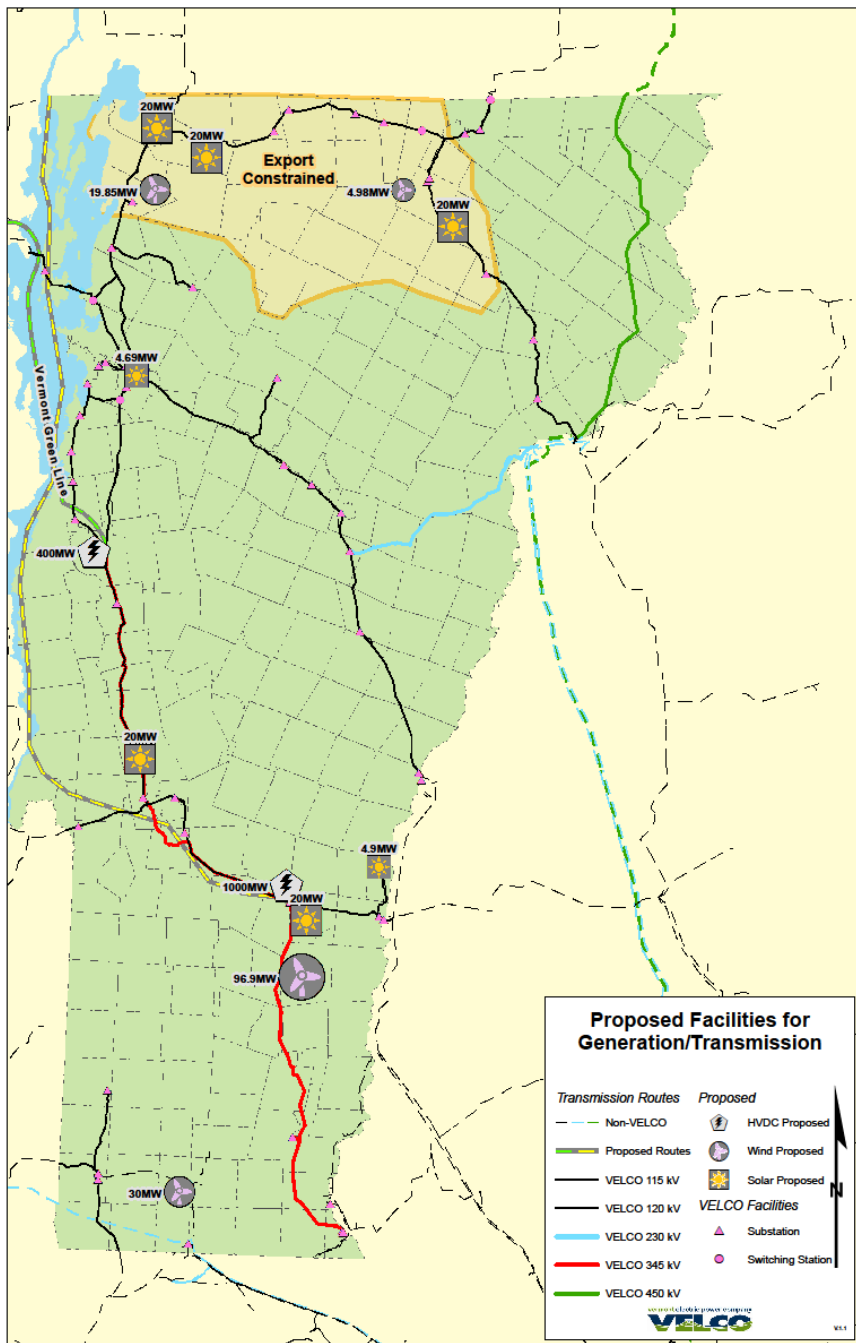
**73% of 2014 hours VT was exporting power**

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

# Many new generation & transmission projects in various stages

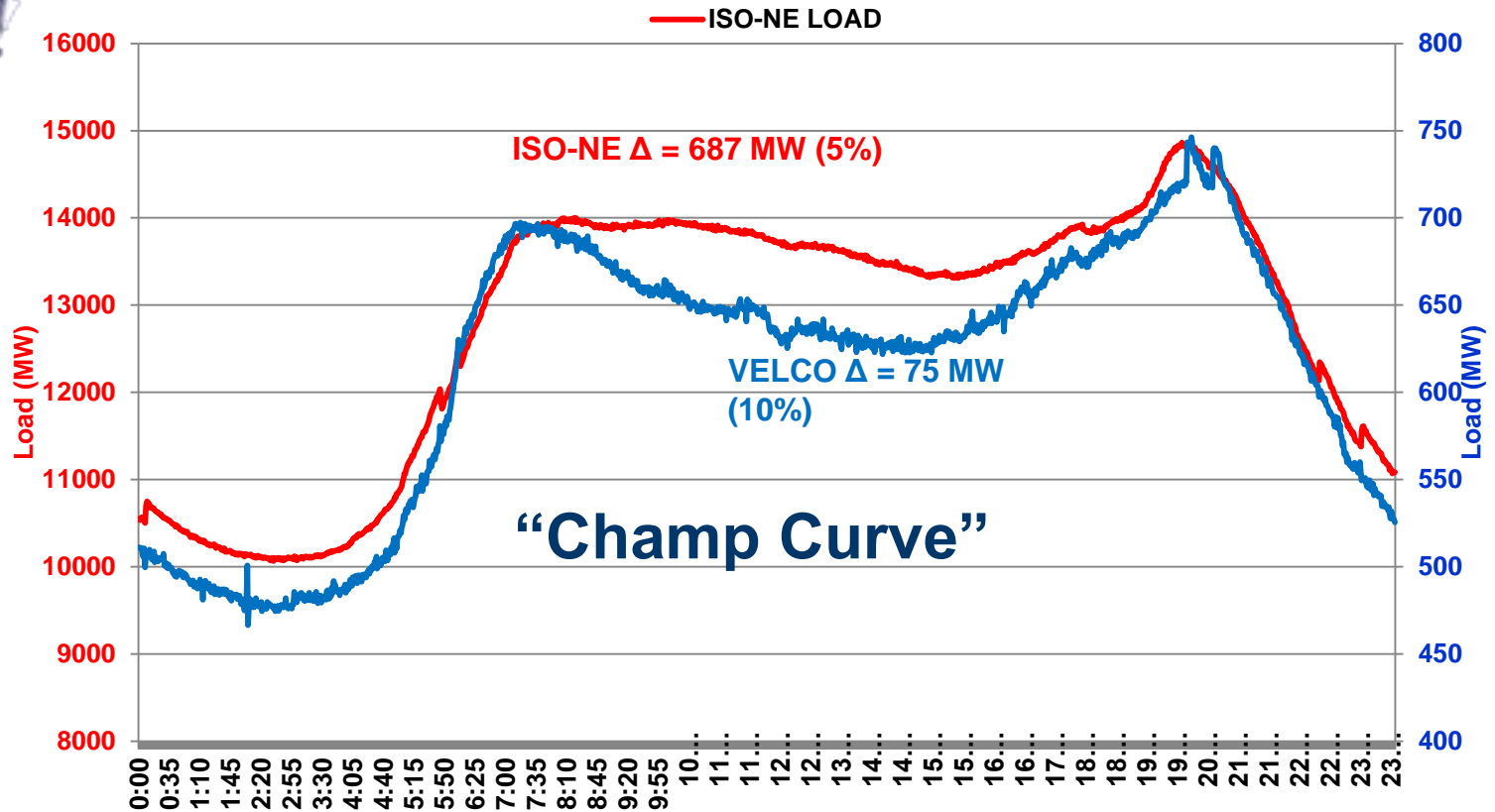
*In just the past eight months, Vermont's Public Service Board has approved 79 nonresidential solar projects across the state, including 11 commercial-scale installations. Last year, the board approved 138 nonresidential solar projects, including 23 commercial-scale installations...The Public Service Department is now reacting to a handful of 20-megawatt commercial projects—which are 10 times larger than any of the existing projects in Vermont.*

—VT Digger 9/15/15



# Boom in distributed solar is already changing VT's load shape

VELCO vs. ISO-NE load curve—illustrative day (Tues 4/13/2015)



# Securing benefits of distributed generation: location matters

- Northern VT has an operating limit constraining how much generation can be exported from Northern VT
- Even without additional new projects, existing wind and hydro generation is sometimes curtailed in that area
- Constraints on generation NOT a reliability issue at ISO-NE; they will just turn off generation
  - Therefore, costs of needed upgrades must be paid for by developers or locally



# Vermont Weather Analytics Center benefits diverse stakeholders

**Safety/reliability**— more precise, localized weather prediction

**Operations**—better preparedness

**Maintenance/construction**—better informed scheduling

**Planning**—improved prediction of renewables output

**Generation siting**—more location-specific information

**Compliance**—Act 56, water quality and other regulations

**Demand-side management**—better informed demand response and peak management, and efficiency measure validation

