vermont electric power company

VELCO

January 26, 2023

Senate Natural Resources & Energy

Transmission – Reliability – Grid Capabilities

Kerrick Johnson and Hantz Présumé

Vision, roles and responsibilities

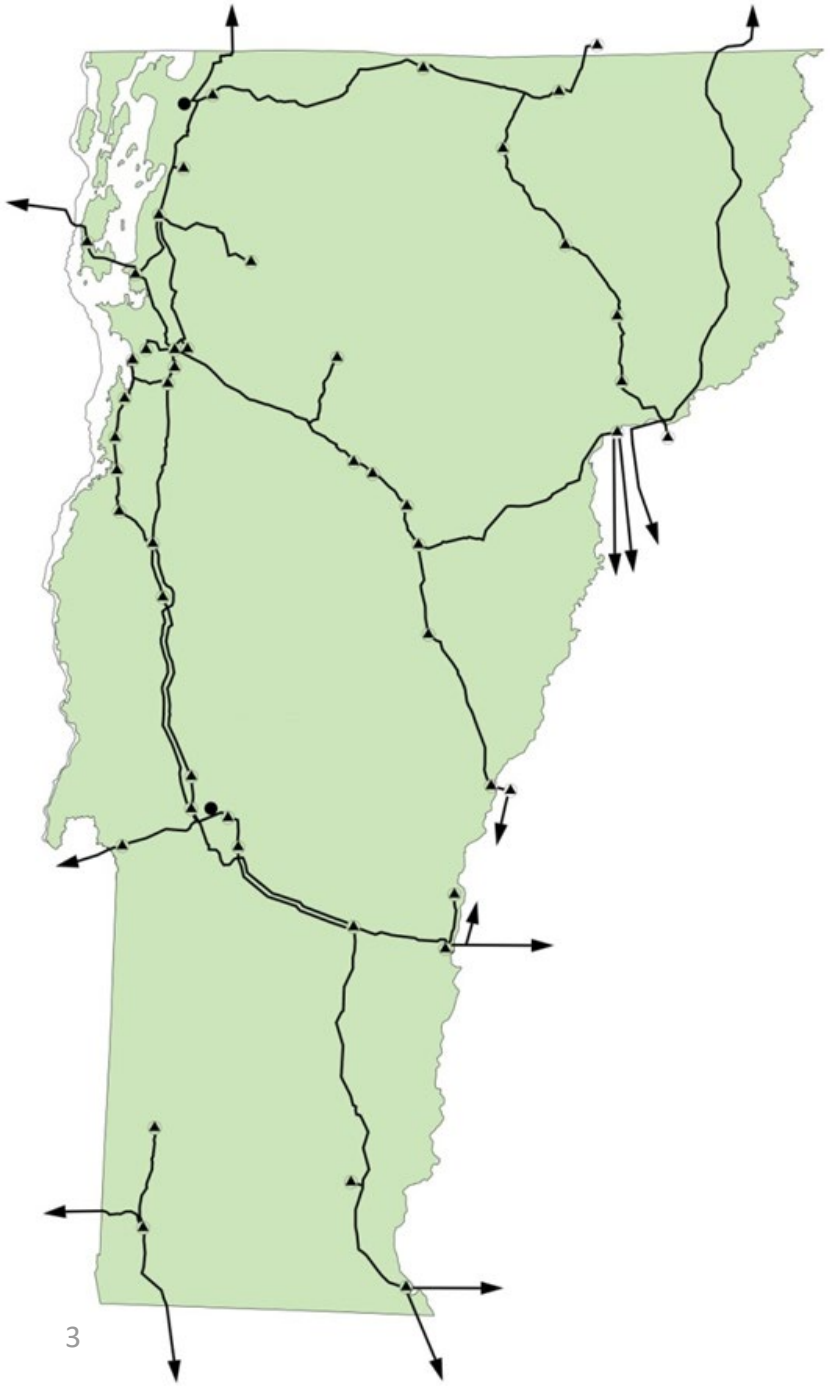
VELCO's vision: create a sustainable Vermont through our people, assets, relationships, and operating model.

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

Danny Tremblay, VELCO System Operator

Related responsibilities:

- Serve as Local Control Center for VT grid operations
- Serve as VT's metering and power contract settlement agent
- Manage the Vermont System Planning Committee
- Develop and submit Vermont's Long-Range Transmission Plan

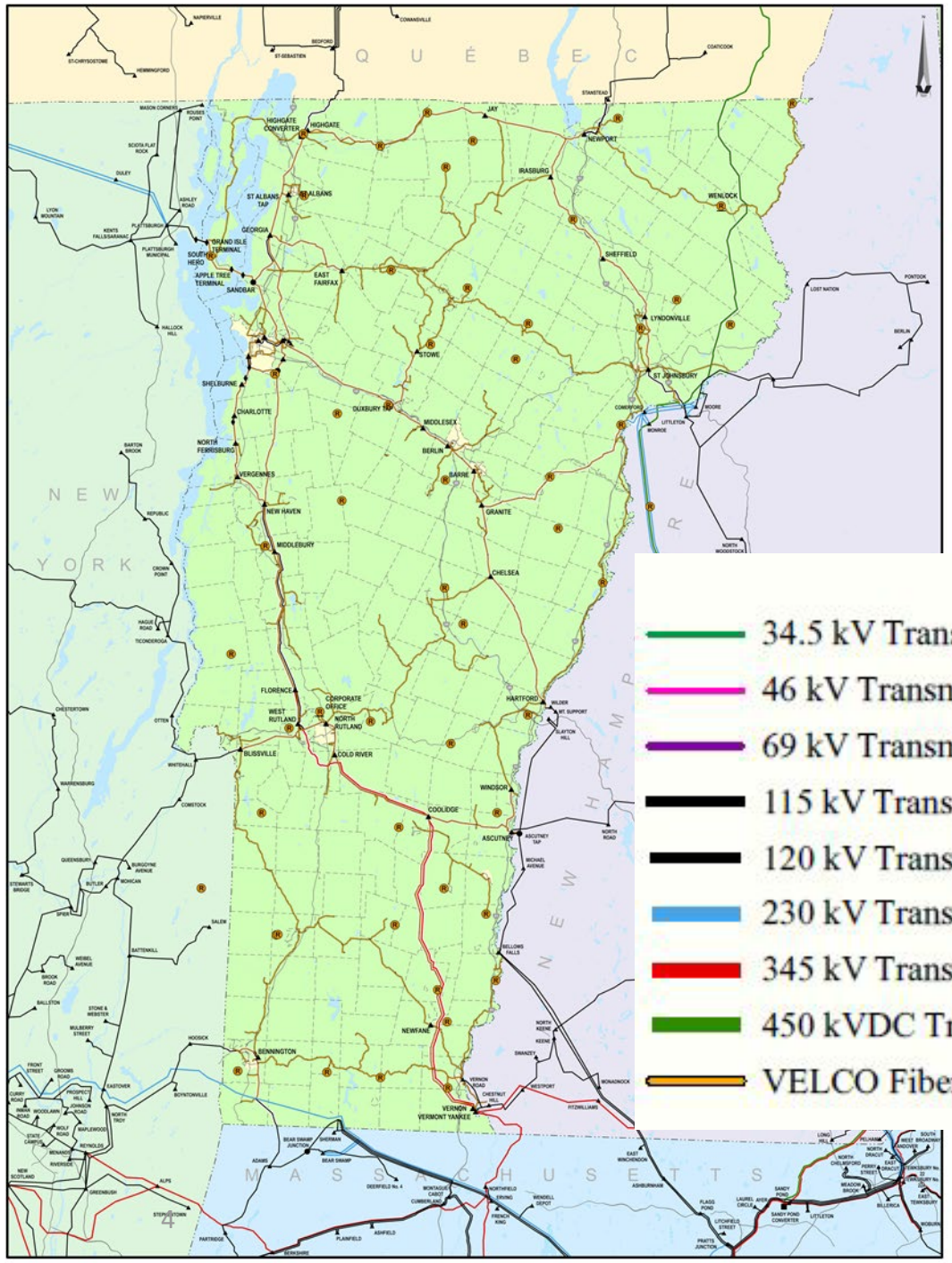


Managed assets

- 738 miles of transmission line, 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
- 1600+ fiber optic communication networks that monitor and control the electric system and contributes to Vermonters' high-speed data internet access
- 56-site Statewide Radio System to enable both daily operations and emergency response
- 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
- First statewide, "transmission-only" company
- Owned by Vermont's 17 local electric utilities and VLITE



- 34.5 kV Transmission Line
- 46 kV Transmission Line
- 69 kV Transmission Line
- 115 kV Transmission Line
- 120 kV Transmission Line
- 230 kV Transmission Line
- 345 kV Transmission Line
- 450 kVDC Transmission Line
- VELCO Fiber

- VELCO HV Substation
- Non-VELCO HV Substation
- Low Voltage Substation
- Switching Station
- Converter
- Underground Cable Terminal
- VELCO Corporate Office or Service Center
- (R) Radio Sites

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Current Priorities

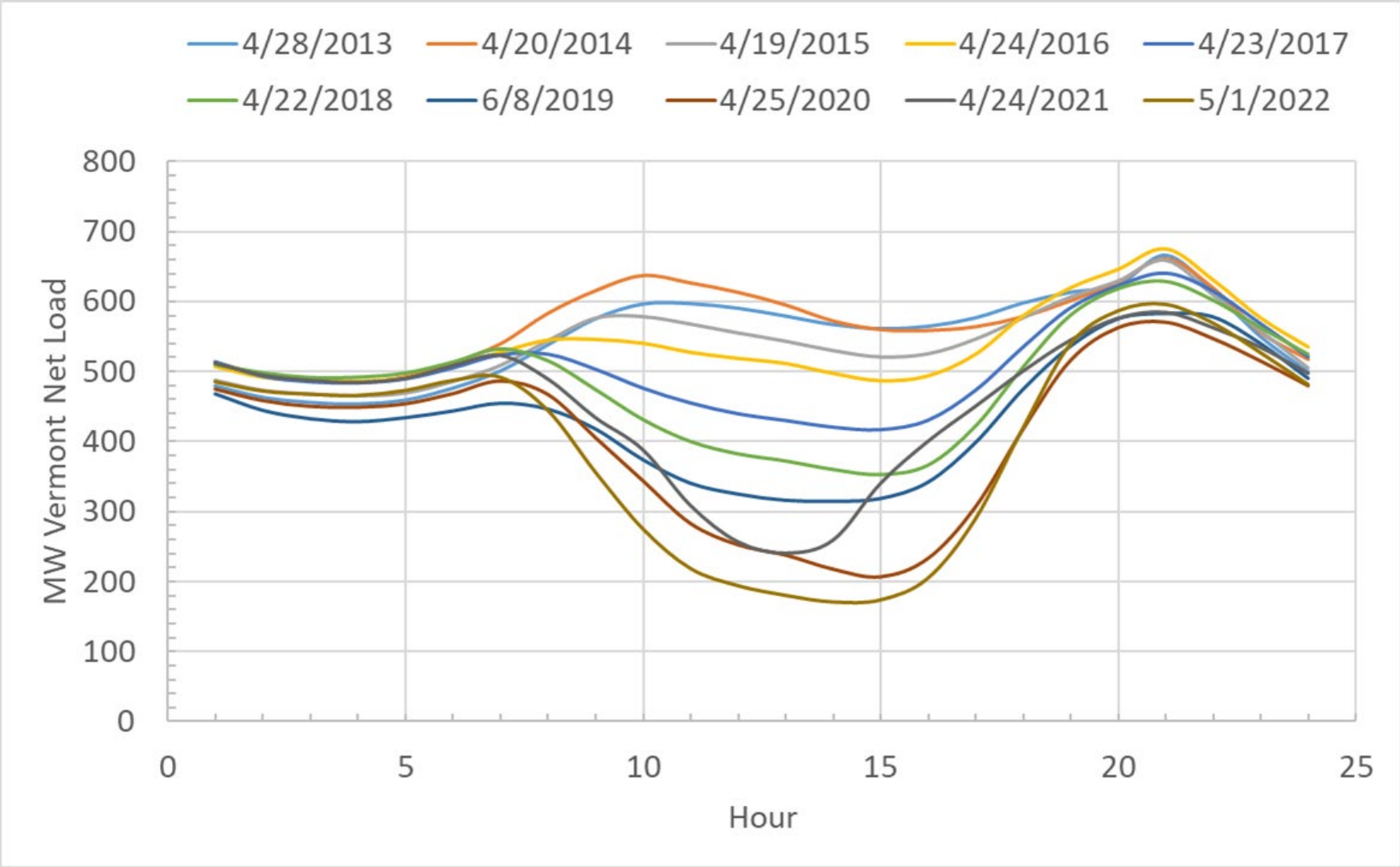
- Optimize existing transmission system
- 600-mile fiber reliability project:
  - Enables visibility of Distributed Energy Resources (~500 MW)
  - Enables system planning using actual data vs. estimated data
  - Accelerates Vermont broadband access
- New transmission improves resilience, delivers clean energy and moderate rate pressures
  - Franklin County Line Upgrade Project
  - New England Clean Power Link
  - Active pursuit of other options

Vermont's in-state generation

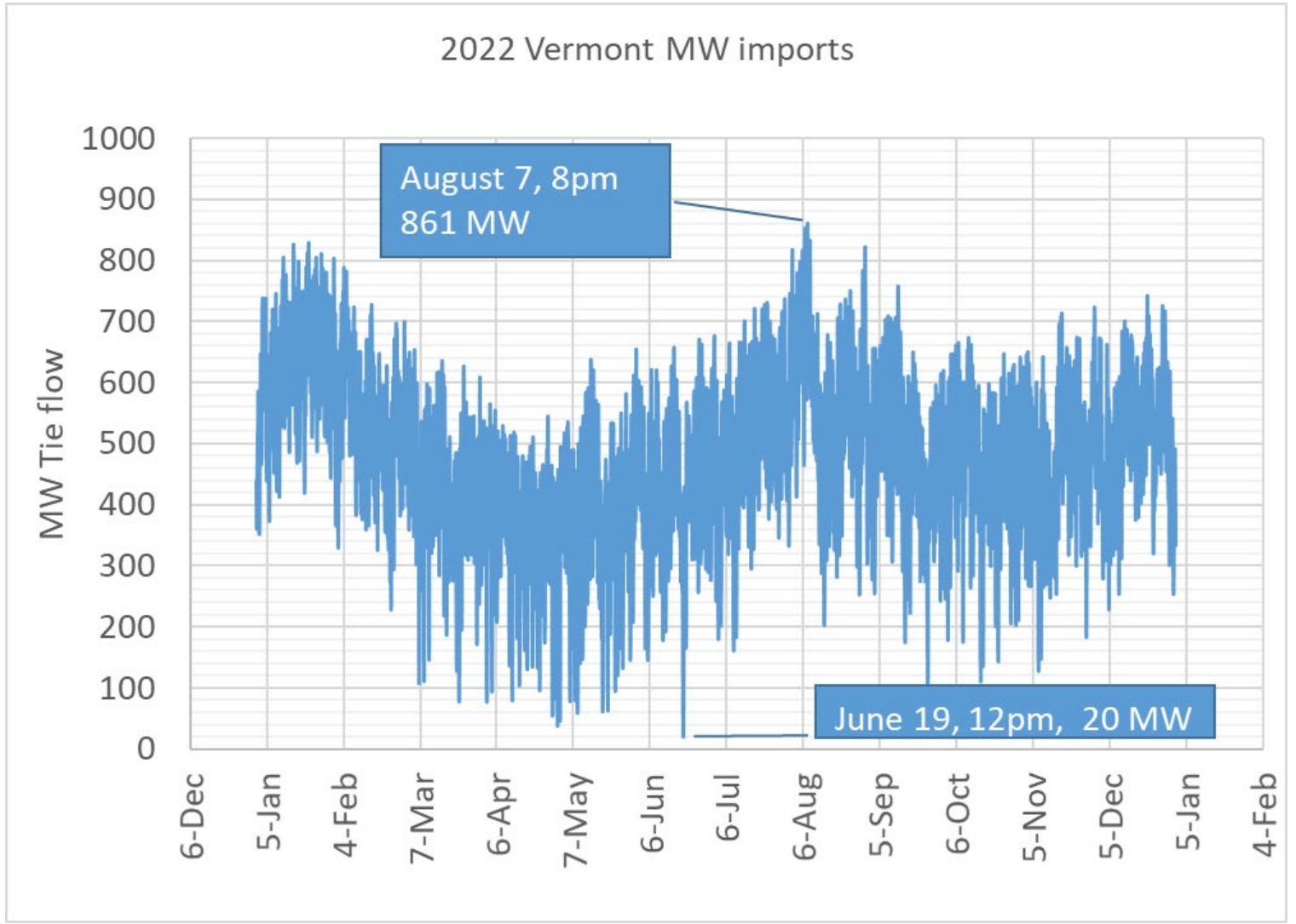
Type		MW
Fossil (fast start units)	Winter	173
	Summer	124
Hydro		152
Wind		151
Landfill gas		9
Biomass (wood)		72
Utility scale solar PV		20
Small scale solar PV		450 and growing
Small scale farm methane, wind, hydro, storage		60 and growing
TOTAL IN-STATE GENERATION SUMMER NAMEPLATE CAPACITY		**~ 1040**

- Mostly renewable
- Intermittent, weather-dependent
- Reduces reliance on out-of-state resources

Solar PV impacts on net loads

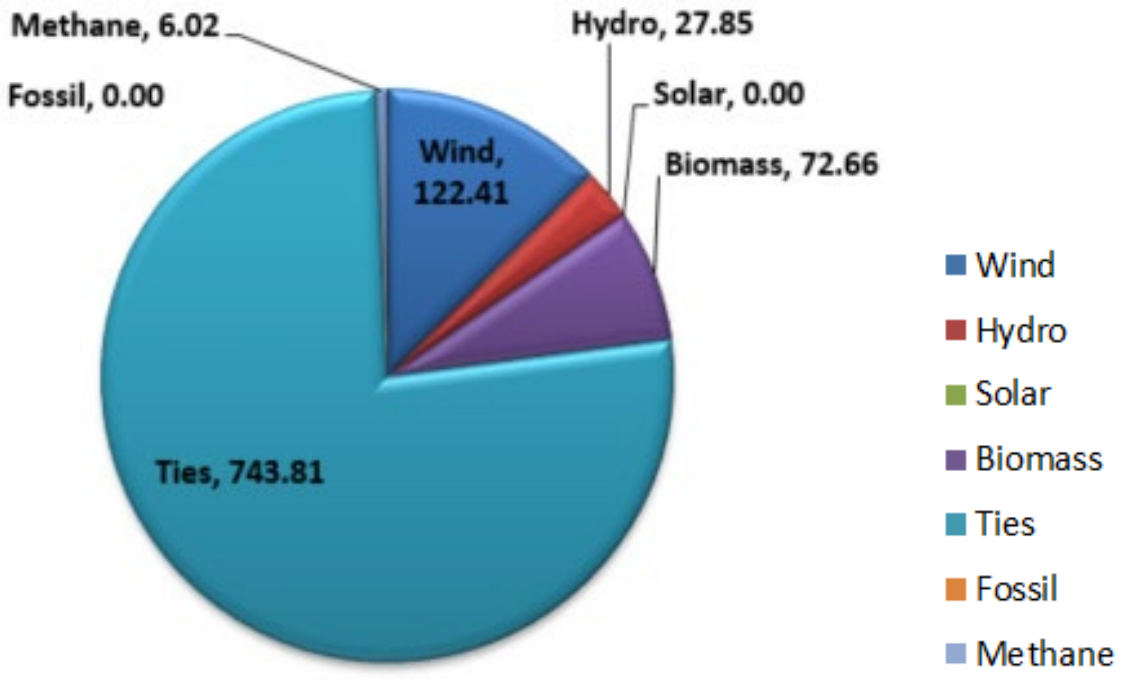


Vermont imports electricity 100 percent of the time

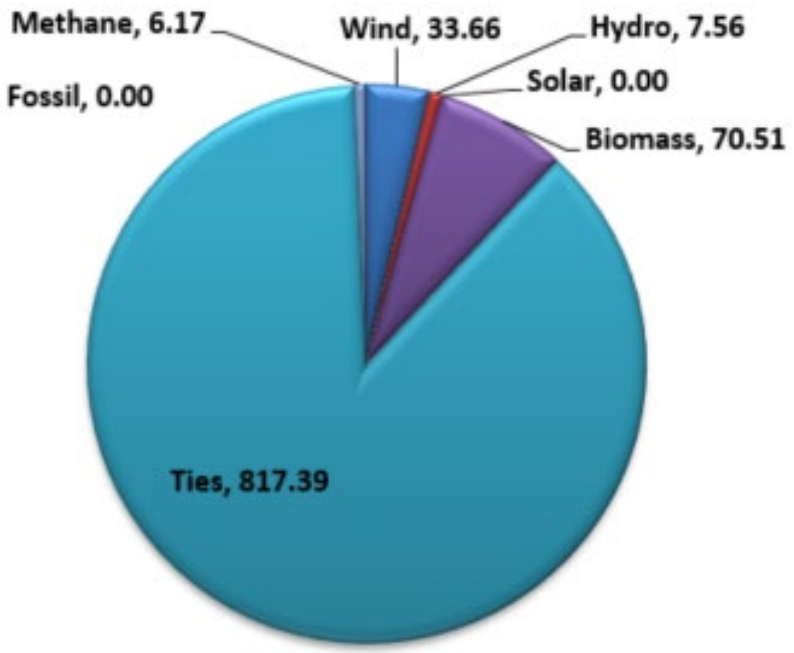


Vermont generation performance at the peak hour

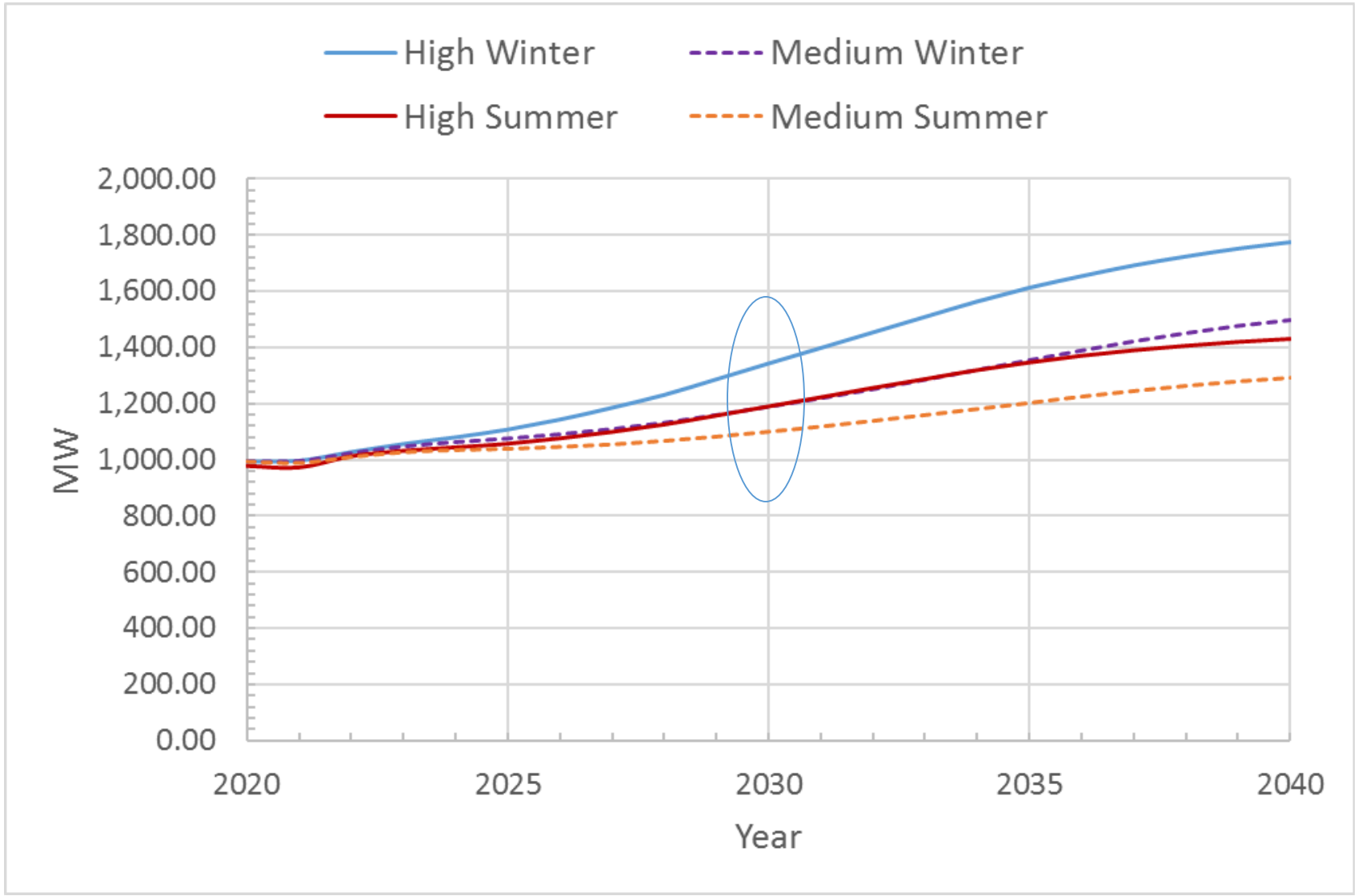
- 2021/22 winter peak day (1/29/22, 6:00 PM)
- Load was 972.7 MW

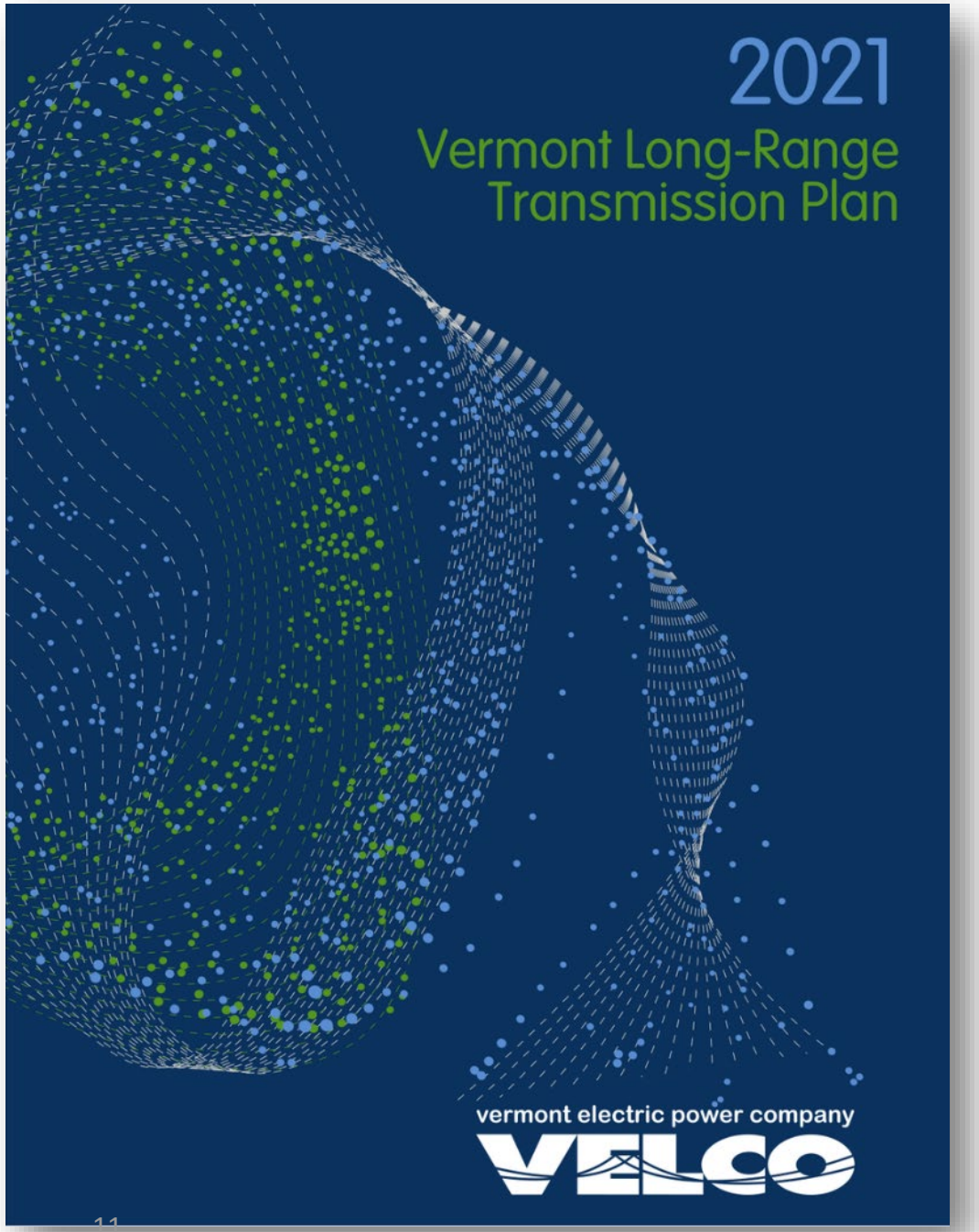


- 2022 summer peak day (8/30/22, 6:00 PM)
- Load was 935.3 MW



Load forecast scenarios





20-year outlook

- System reliability will be maintained
- Vermont is a transmission-dependent state
- Significant load growth expected – winter peaking
- Incremental solar does not reduce load at peak hour
  - Efficiency and solar PV have provided great value
- No major upgrades needed to serve load within the 10-year horizon
  - Presumes additional load management capability
  - Does not resolve all local concerns
- Upgrades more likely beyond 10-year horizon
  - Likelihood or scale reduced by EE, storage, load management, grid-support inverters
- VT utilities continue to implement innovative programs
- Further collaboration and innovation needed to achieve renewable and climate-driven requirements

Key takeaways

- **Give greater weight to grid impacts when siting generation**
- **Bring to scale flexible load management**
  - Deepen/broaden fiber communications network
  - Unlock ability of renewables and storage to provide grid support functionality, i.e., select inverter settings than enable voltage control and ride-through capability
  - Continue to evolve with storage
  - Establish data organizational architecture
- **Grid reinforcements (e.g., transmission, subtransmission and distribution investments)**

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