vermont electric power company

VELCO

VELCO Grid Capacity & Long-Range Planning

March 20, 2025

House Energy & Digital Infrastructure

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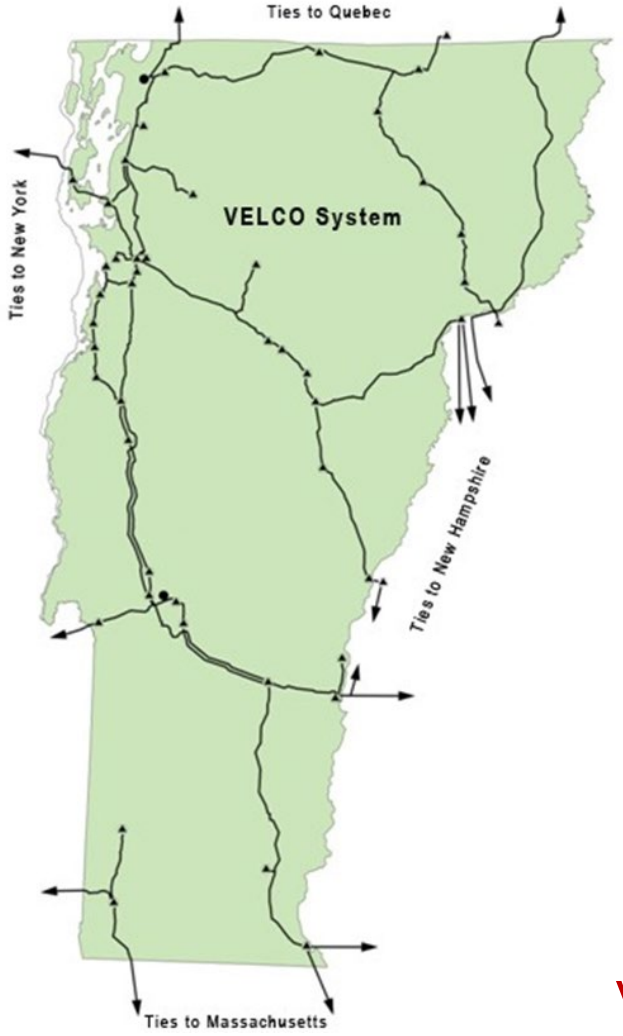
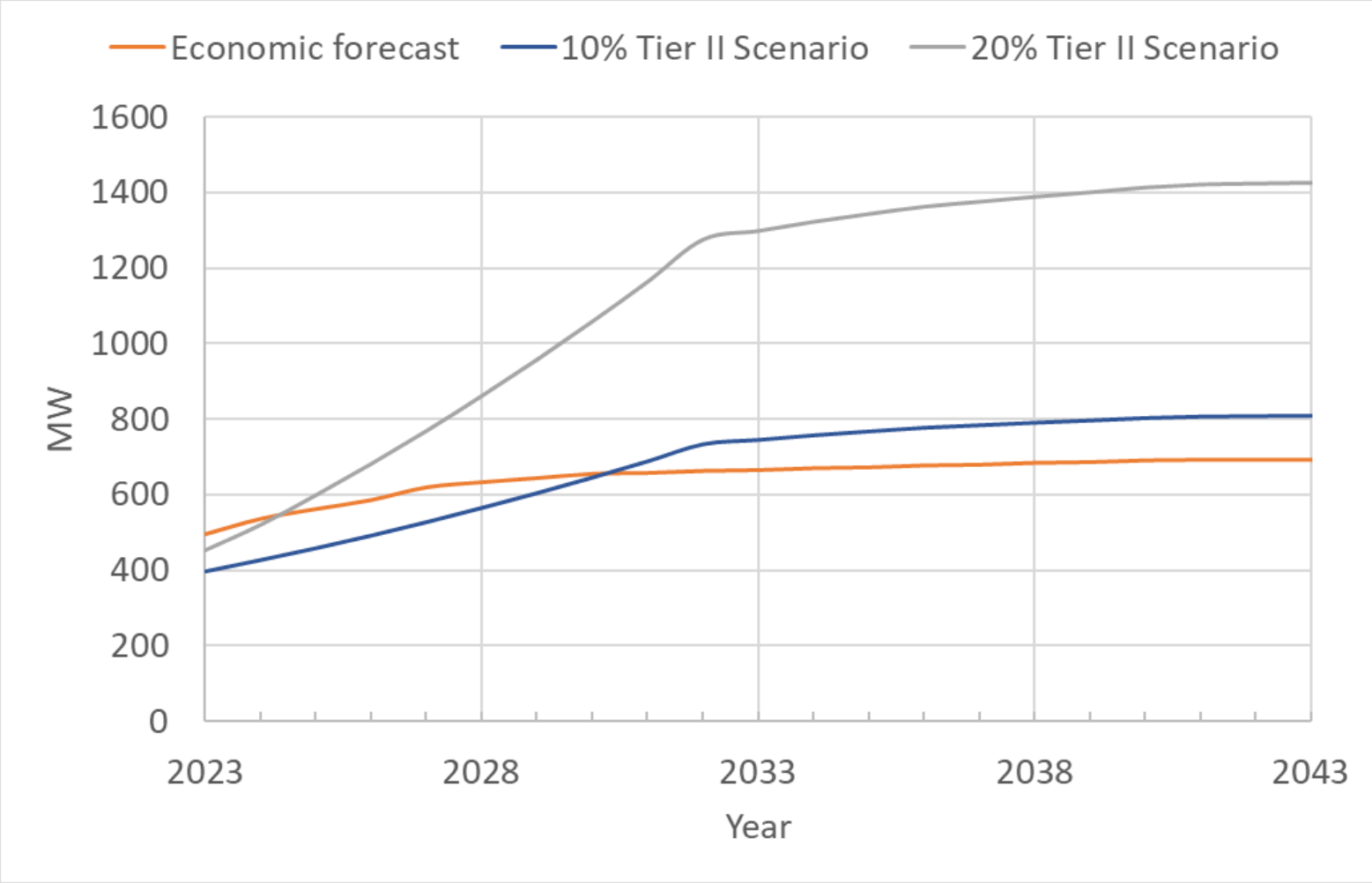
Vermont's resource mix



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		About 550 and growing
Small scale farm methane, wind, hydro		About 87 and growing
TOTAL IN-STATE GENERATION SUMMER NAMEPLATE CAPACITY		**~ 1115**

VT Peak net load about 1000 MW (winter and summer)

Solar PV forecast

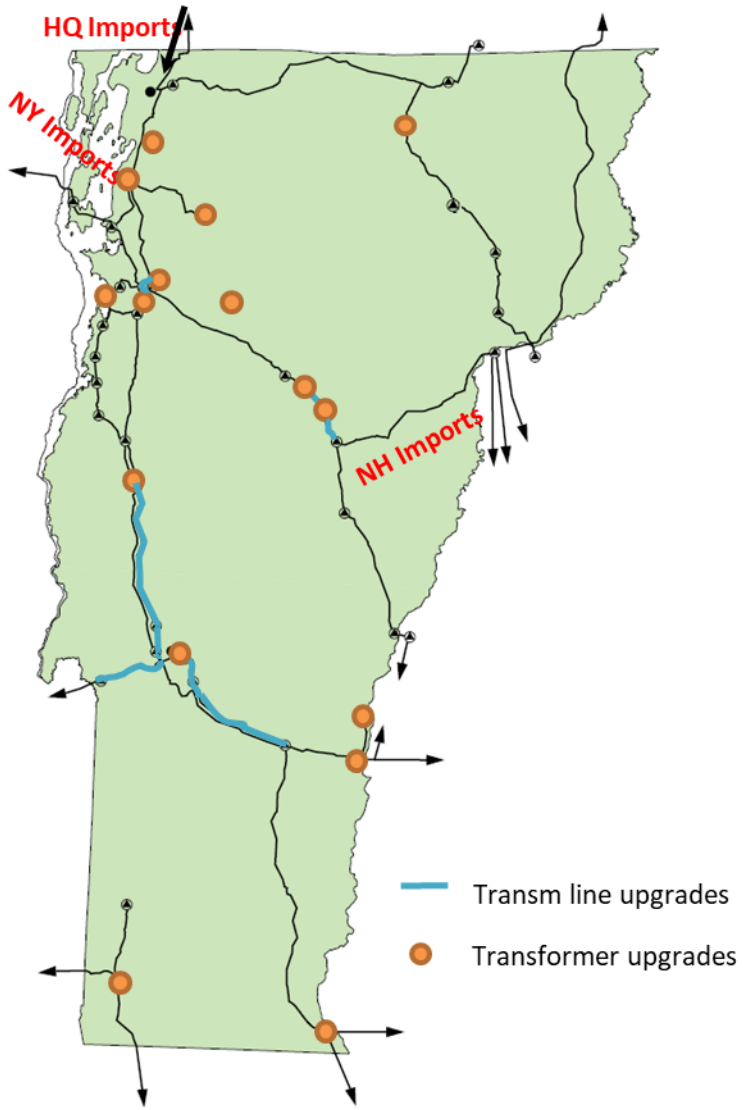


Vermont Renewable Energy Standard, Tier II – Distributed Renewable Generation

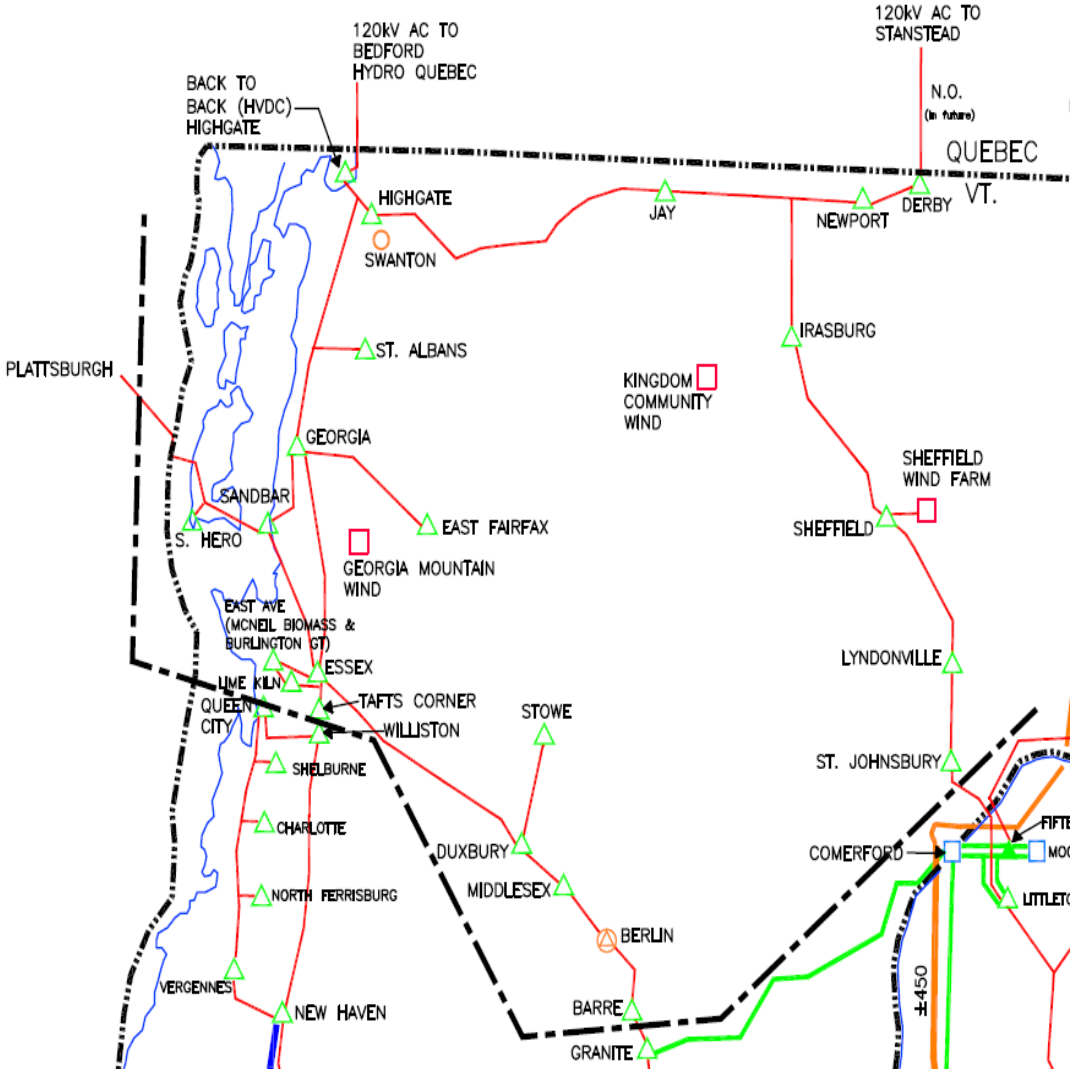
RESULTS
VT ROADMAP
LOAD GROWTH SCENARIO

Policy Scenario 2043

- 75 miles of overloaded transmission lines
- 19 overloaded transformers



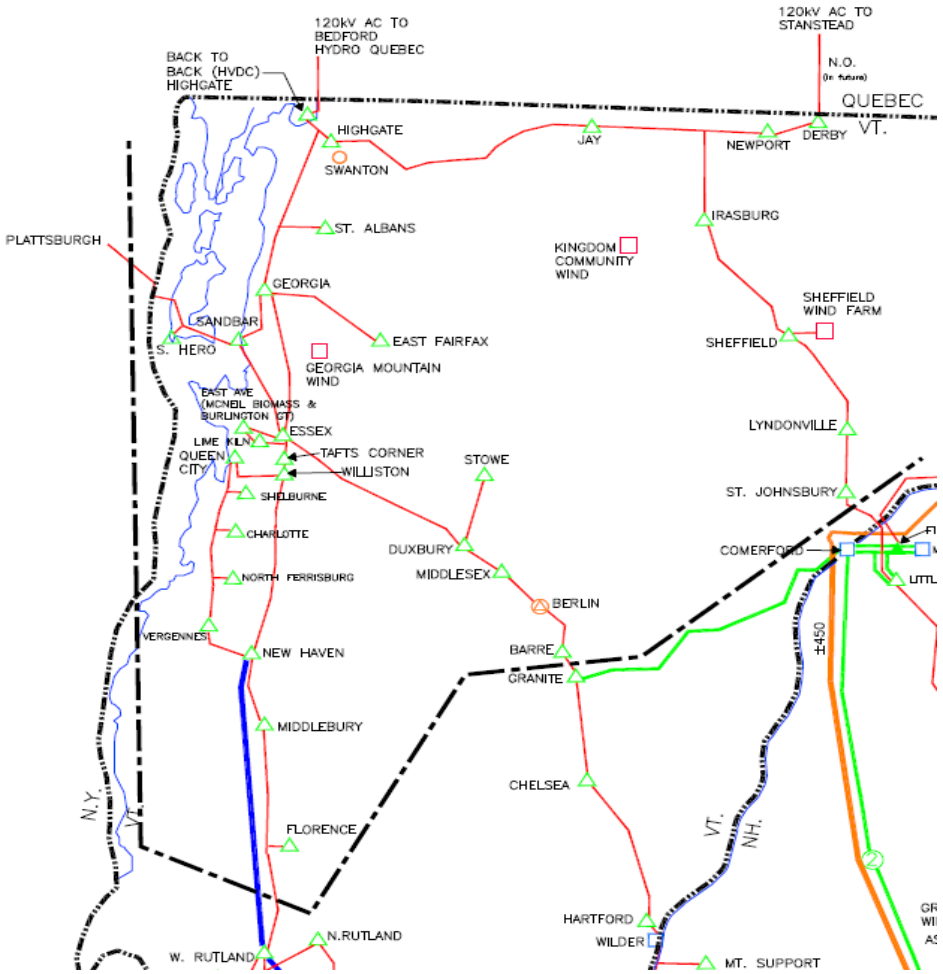
Northern Vermont area of concern

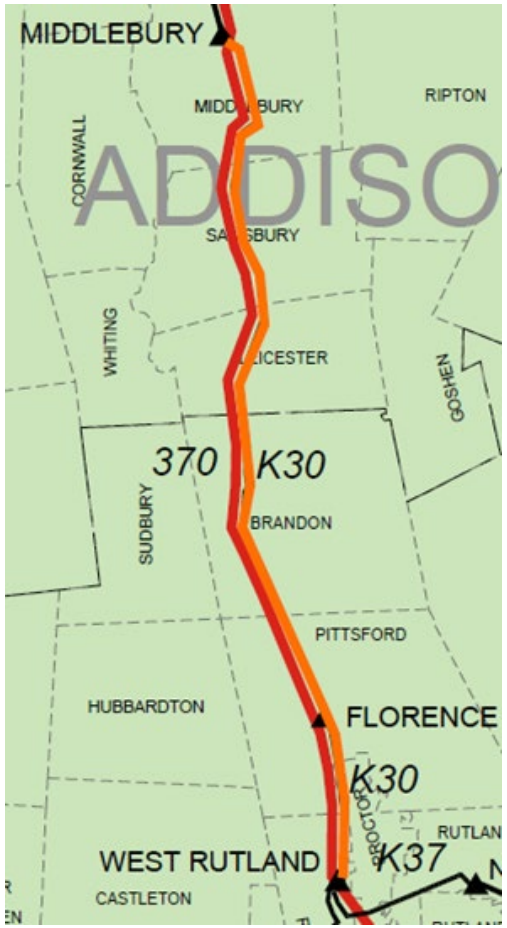


- N-1-1 contingencies causing thermal overloads and voltage collapse exposure
- Affected transformers: Queen City, Tafts Corner, Barre
- New 115 kV line between Essex and Williston
- Timing: 2032 based on winter forecast
- NTA: 75 MW of load reduction in the northern area by 2033. Grows over time.

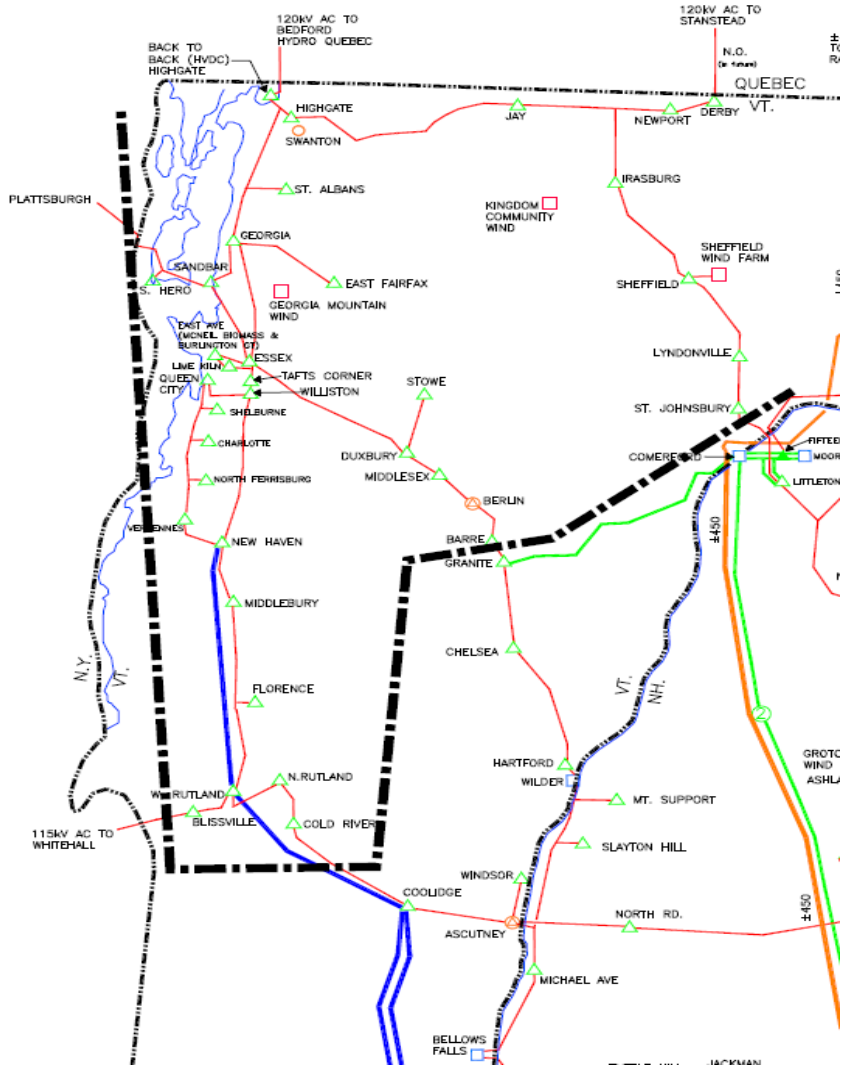
POLICY SCENARIO 2033

Northwest Vermont area of concern



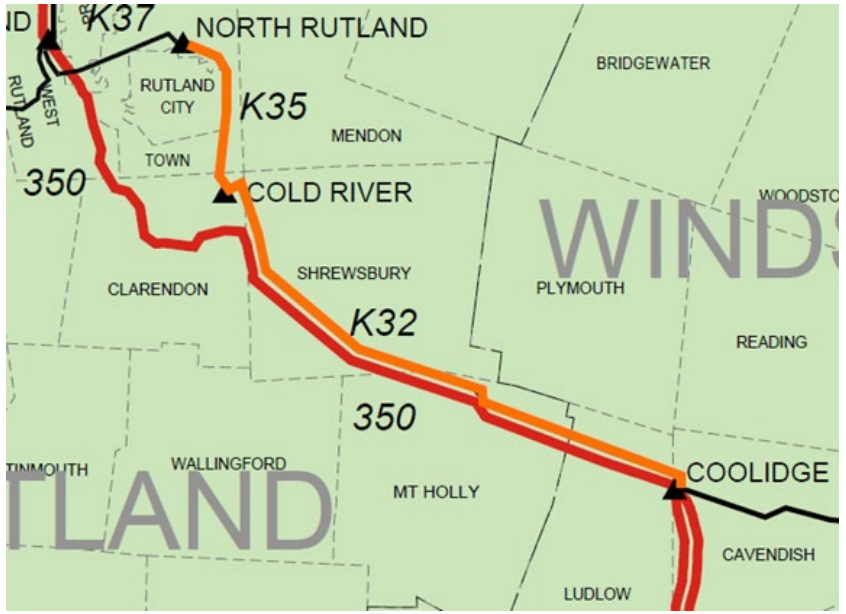


- N-1-1 contingencies causing thermal overload
- Affected transformer: Middlebury
- Rebuild West Rutland to Middlebury 115 kV line
- Timing is 2029 based on summer forecast
- NTA: 80 MW of load reduction in northwest area by 2033. Grows over time

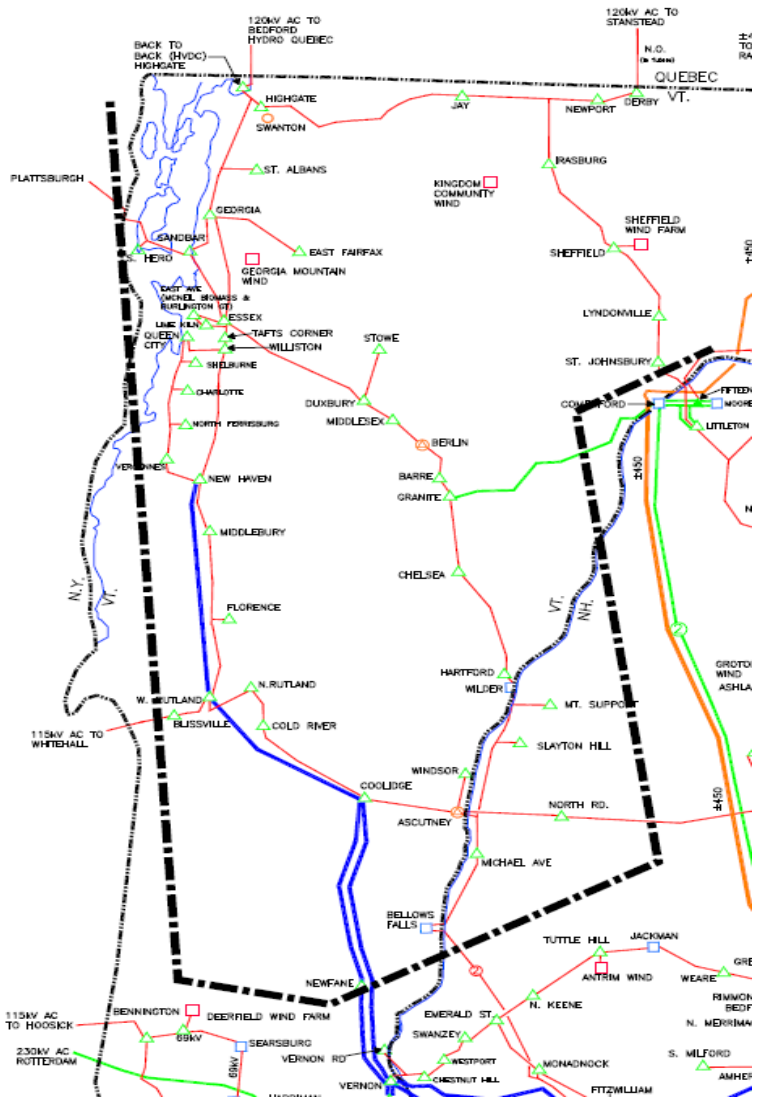


POLICY SCENARIO 2033

Central Vermont area of concern



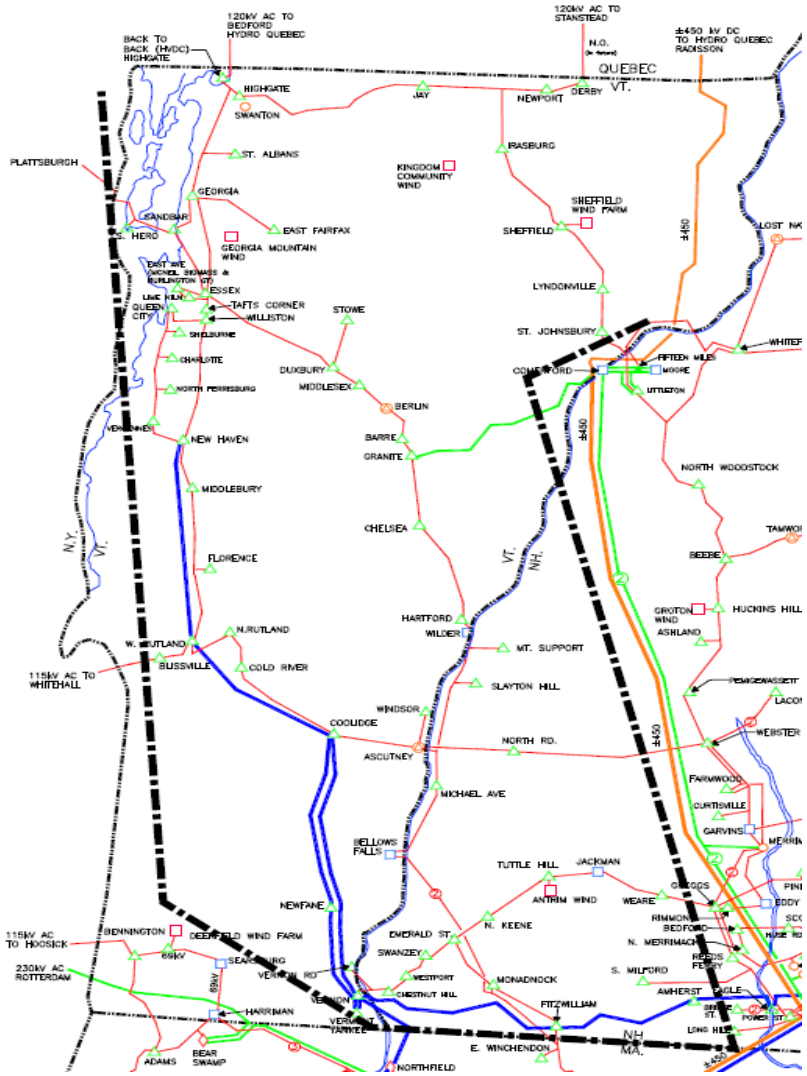
- N-1-1 contingencies causing thermal overload
- Affected transformers: North Rutland, Cold River, Windsor
- Rebuild Coolidge - Cold River - North Rutland 115 kV line
- Timing: 2034 based on summer forecast
- NTA: Keep load below 2033 load level in central area



POLICY SCENARIO 2033

Southern Vermont area of concern

- N-1-1 contingencies causing thermal overload
- Affected transformer: GMP Vernon Road 115/46 kV
- Rebuild NGRID Bellows Falls-Ascutney Tap 115 kV line and GMP Vernon Road to Newfane 46 kV
- Timing: 2034 based on summer expected forecast
- NTA: Keep load below 2033 load level in central area



POLICY SCENARIO 2033

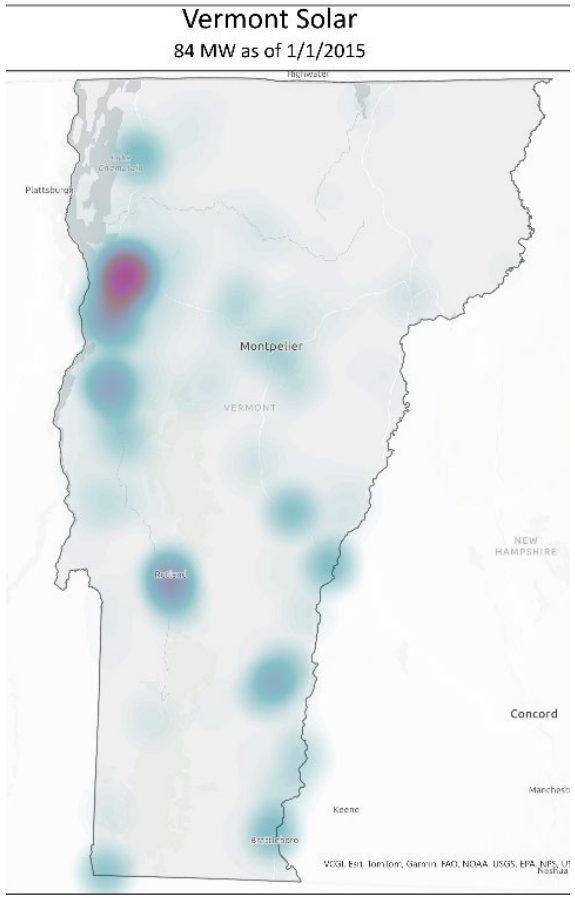
Vermont area of concern

- N-1-1 contingencies causing thermal overload
- Install a new 345 kV line between Vernon and Eversource Northfield, MA
- Timing: 2034 based on summer forecast
- NTA: Keep Vermont load below 2033 load level

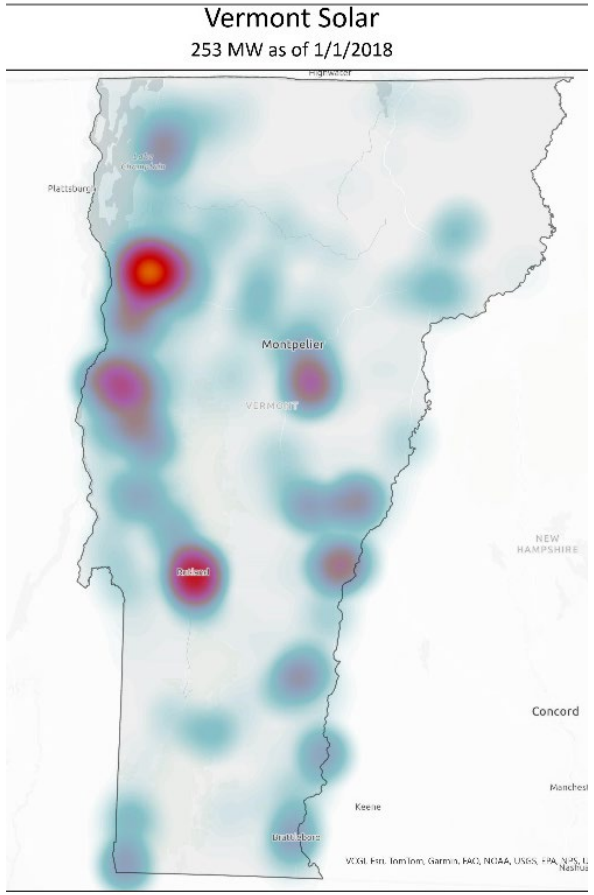
SOLAR PV HOSTING CAPABILITY

Geographical heat maps of DG 2015-2023

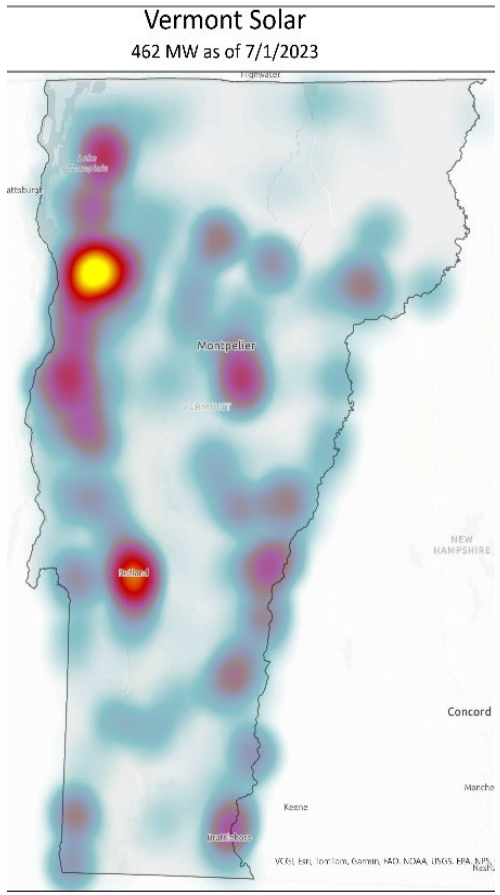
2015



2018

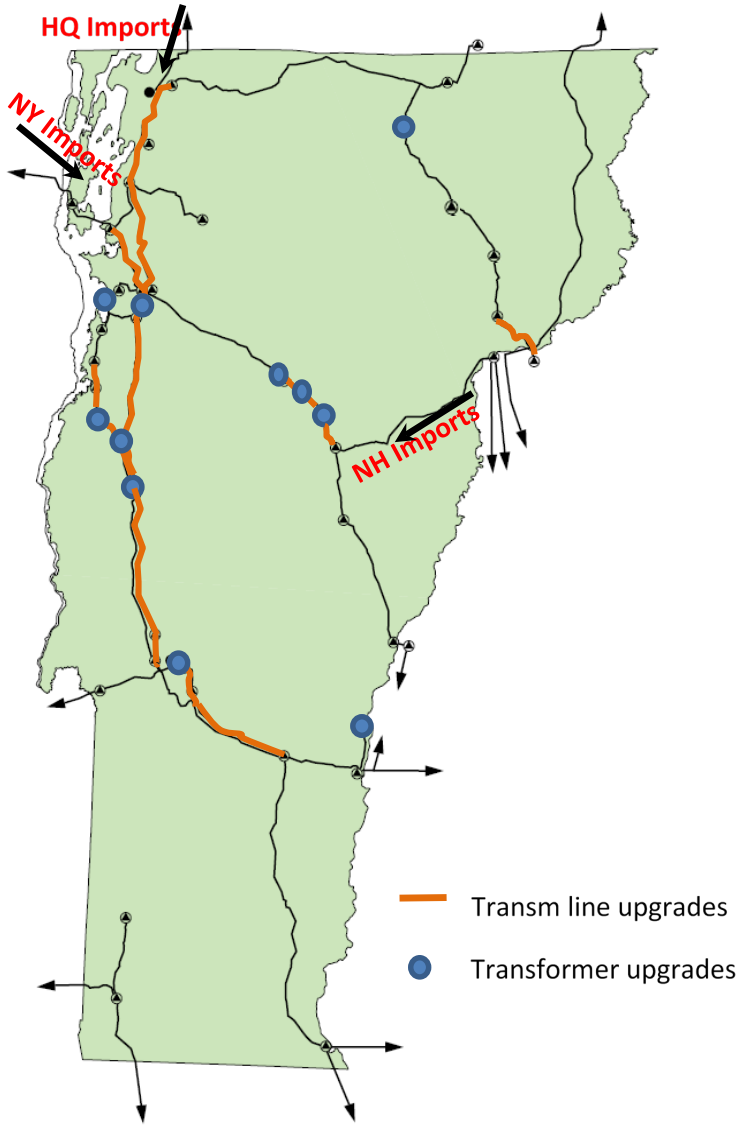


2023



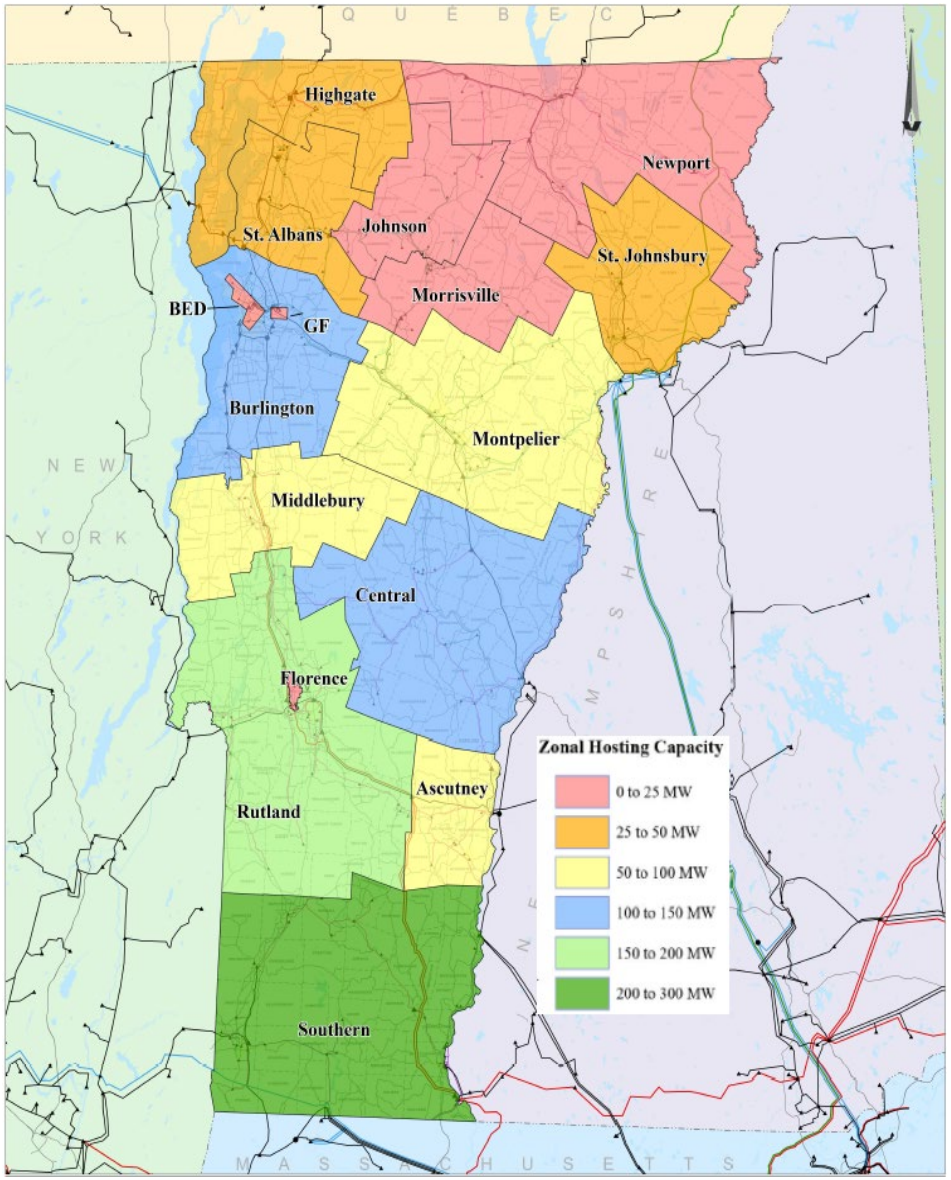
Overloaded Transmission Facilities at 1300 MW DG

- 156 miles of overloaded transmission lines
- 10 overloaded transformers



Location Matters

- 5% overload allowed
- 1053 MW Maximum solar
  - Considering transmission and subtransmission constraints



LOAD CONTROL

Generation/Storage/Demand Response

Load reductions to address peak load issues

Policy Peak N-1-1, 2043

- Total Load Reduction(*) Needed in MW

	Winter Peak	Summer Peak
GMP	394	365
VEC	20	10
BED	25	25
Total	**439**	**400**

(*) this could be demand response, load reduction, DER, Battery production, microgrid solutions, etc…

Load additions to address excess DG issues

	Load Increase (MW)
VELCO	125
GMP	250
VEC	70
BED	20
STOWE	15
Total	480

PV Hosting Capacity (DER = 1300 MW)

- Load Increase in MW
  - Solution could be energy storage, generation curtailment, demand response, etc…

Takeaways

- Vermont will continue to depend on transmission
- VT Roadmap forecast scenario will lead to reliability concerns in about 10 years
- Significant DG growth in the same historical pattern will exceed system capacity
- Collaboration and innovation needed to achieve renewable goals
  - Storage
  - Grid upgrades
  - Curtailment
  - Grid support from inverters
  - Load management
  - Statewide coordinated planning
- **NTA study will begin this year to determine the least-cost solution**

H.278 considerations & resources

- **Considerations**:
  - Existing processes facilitate energy storage solutions (NTA studies, IRPs)
  - Financial viability typically requires “stacked” or “shared” applications to capture multiple value streams, e.g. peak load shaving and frequency regulation
  - Mapping challenge: each use-case is situation dependent

- **Resources:**
  - 2024 VT Long-Range Transmission Plan (link)
  - VT DPS Act 53 & 31 Reports: Deploying Storage on the Vermont Electric Transmission & Distribution Systems (link)
  - DPS Annual Energy Report – Slides 53 & 54
  - Distribution utilities’ Integrated Resource Plans
  - VT PUC energy storage workshop series (Case No. 21-3883)