



Senate Natural Resources
and Energy Committee

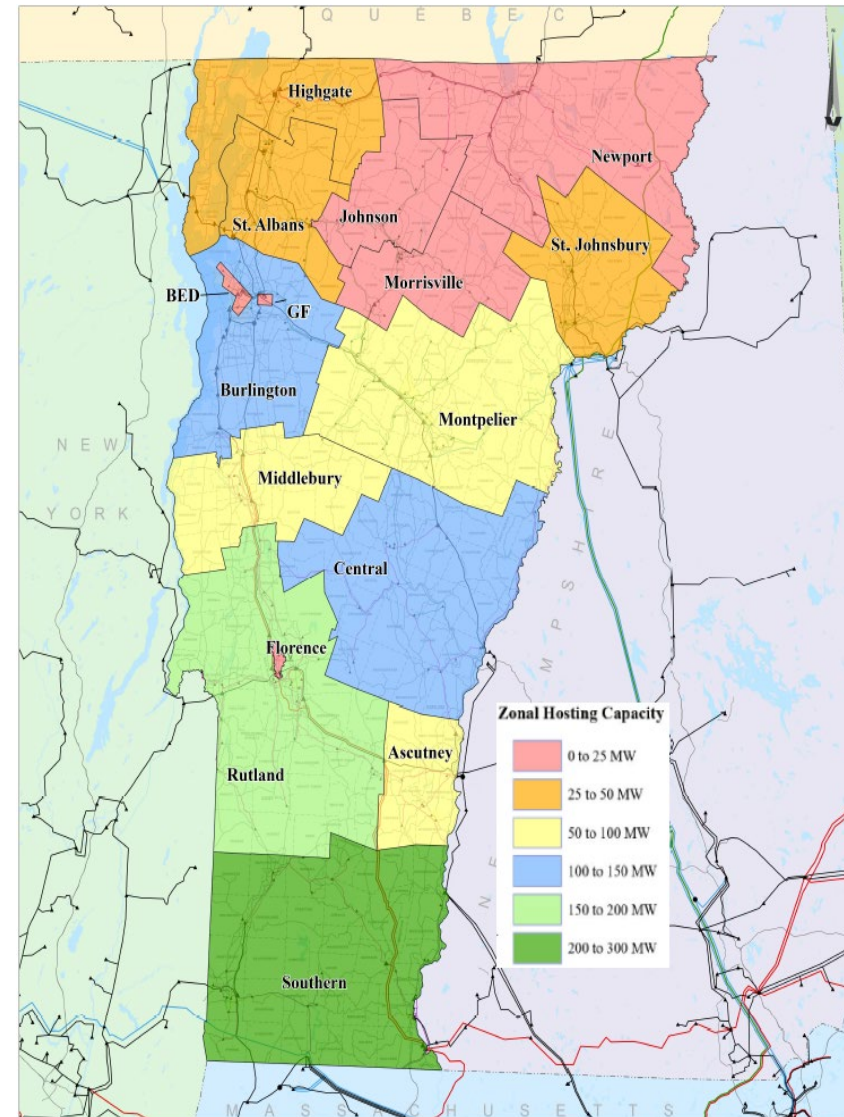
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Optimized geographical distribution of distributed generation (DG)

- Allowed 5% overloads
- Maximum DG amount
 - 1175 MW (considering Transmission limits)
 - 1057 MW (considering Transmission and subtransmission limits)

UTILITY	INSTALLED SOLAR PV AS OF 2023 (MW)	ADDITIONAL SOLAR PV (MW)	OPTIMIZED SOLAR PV DISTRIBUTION (MW)
BED	9	0	9
GMP	396	525	921
HYDE PARK	1	0	1
VEC	41	34	75
VPPSA	25	7	32
WEC	10	4	15
STOWE	3	0	3
TOTAL	487	570	1057



2024 Draft VT Long-Range Transmission Plan Takeaways

- Vermont will continue to depend on transmission
- Vermont 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 – Action needed now
 - Storage
 - Grid upgrades
 - Curtailment
 - Grid support from inverters
 - Load management
 - Statewide coordinated planning
- Non-transmission alternative (NTA) study needs to be performed within two years

Estimated Transmission Charges to Vermont

	2022	2023	2024	2025	2026	2027	2028
(in Thousands)							
New England OATT	104,192	107,216	113,796	122,196	129,996	138,356	146,116
91 VTA	34,366	39,426	41,416	49,166	53,360	51,711	54,085
Earnings before Tax	(99,362)	(99,685)	(103,226)	(108,892)	(113,411)	(119,467)	(125,522)
Net Cost of Transmission	39,196	46,957	51,986	62,470	69,945	70,600	74,679



Grid Enhancing Technologies (GETs): SmartValve

Optimizing Interregional Transfer Capacity Using Advanced Power Flow Control: EPRI, VELCO, Smart Wires

- \$47.7 million project, includes 50% contingency
- Install advanced power flow control (APFC) at interregional tie lines
- Modular power electronics-based device to optimize network flows and increase automation, visibility, and controllability of the grid
- **\$14 million award from US DOE GRIP Topic Area 2: Smart Grid Grants**
- **Regional funding support for remaining \$20 million**

Benefits

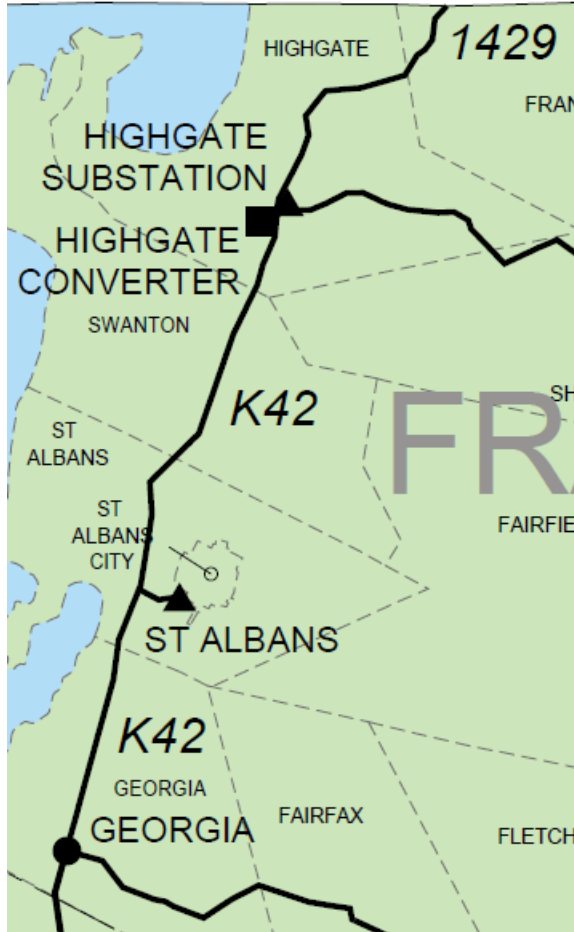
- **Lower-cost Non-transmission Alternative**
- 50% redundancy – keeps line closed and flow controlled after a Phase Shifting Transformer (PST) failure
- Extends live of PST
- Facilitate increased energy dispatch of renewable energy top accelerate reaching renewable energy goals
- Optimize cross-border power flows
- Reduce maintenance and outage costs of existing phase-shifting transformer
- Portable and can grow with system and be reapplied to 230 kV system

Project elements

- Installation of grid enhancing technology (GET) in northwestern Vermont located between VELCO's South Hero substation and Grand Isle Terminal
- 6 valves per phase in a 82 foot x 65 foot area
- Series of power system studies to assess the economic, operational, and reliability benefits of larger adoptions of APFC on system
- **Estimated in service date Q2 2027**



Franklin County Line Upgrade



Franklin County Line Upgrade, VELCO

- \$85 million project
- Replace existing K42 transmission line
- **Right-sizing existing transmission 16.7 mile transmission line**
- Georgia – Highgate, main transmission path for energy from Quebec and in-state wind generation toward load center of Burlington

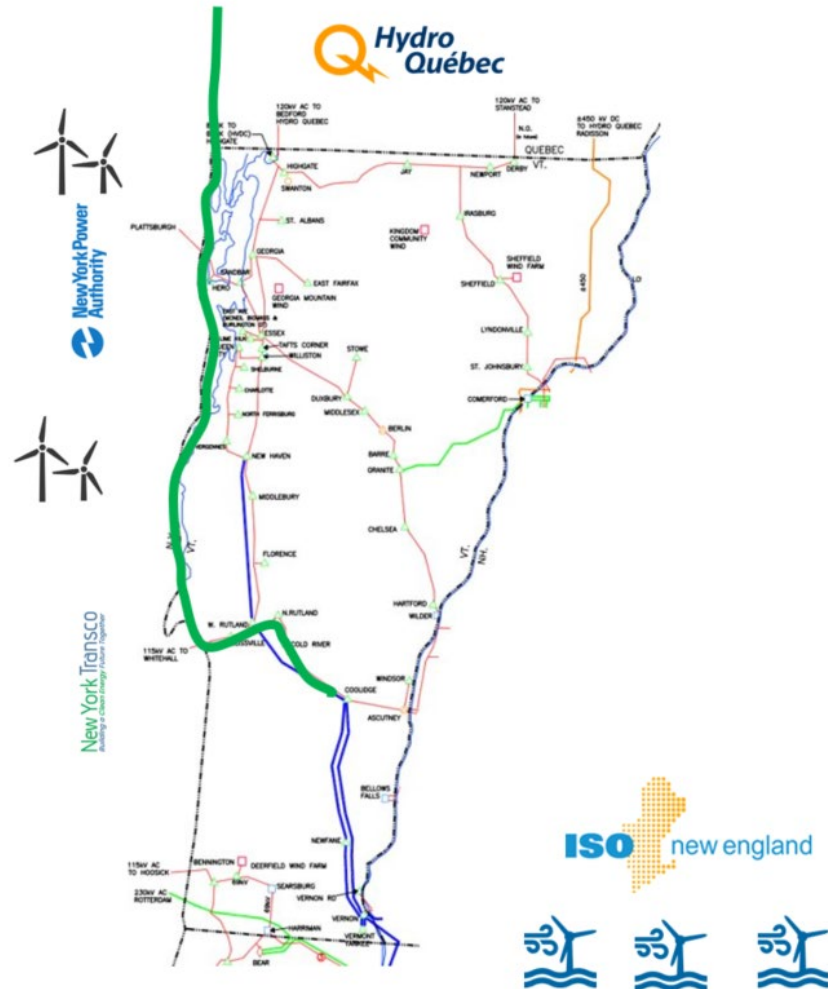
Benefits

- Replaces 212 structures of which 146 will not last until the next inspection
- Maintain safe operation of system
- Increased reliability
- Creates space in existing right-of-way for future line to serve region
- Increased property tax contributions to host towns
- Double-bundled conductor reduces energy-line losses
- **Facilitates 20 MW in additional renewable energy growth capacity in area**

Project elements

- Maintains existing line in service during construction, avoiding 30 daily outages
- Mono-pole double-conductor design
- Steel structures bring lower maintenance costs and longer useful life
- Certificate of Public Good expected summer 2024
- Construction begins September 2024
- Commissioning 2026

New England Clean Power Link



— New England Clean Power Link, TDI, Vermont PSD, VELCO

- \$2.9 billion project
 - Buried 1000 MW bi-directional HVDC line from Hydro-Quebec
 - New HVDC converter station in Ludlow
 - Connects to VELCO system at the Coolidge substation

Benefits

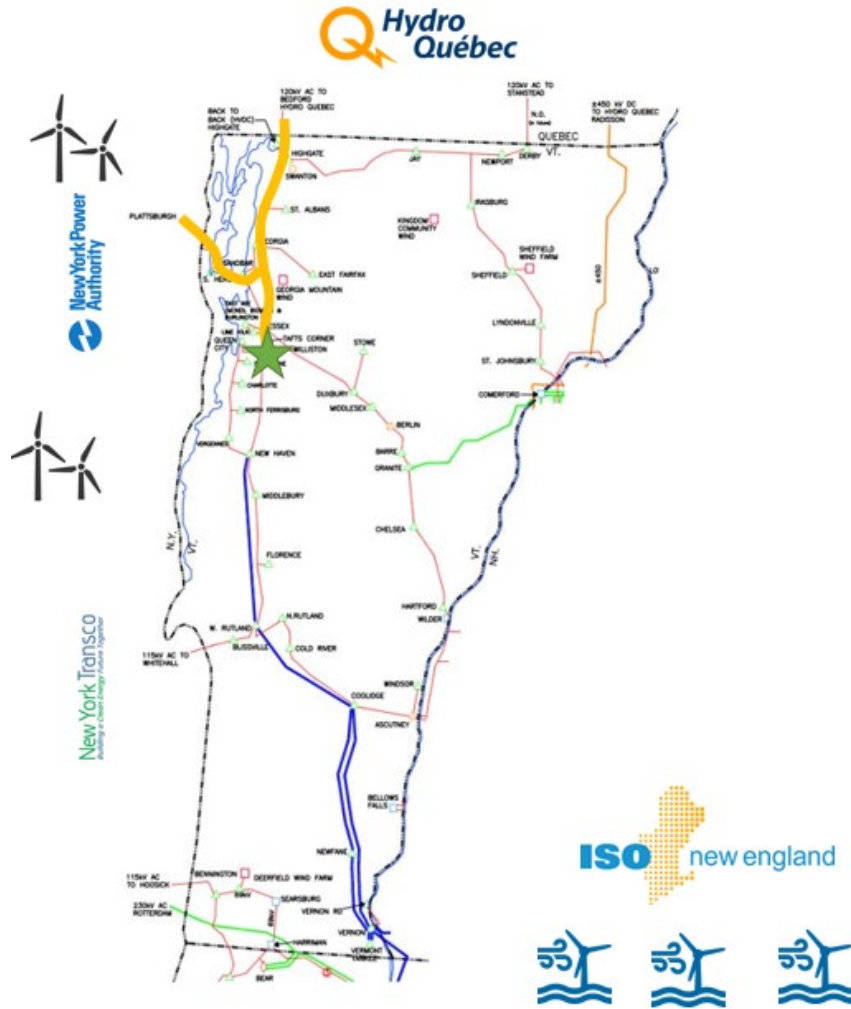
- **\$136 million to Vermont Electric Ratepayer Benefit Program (VELCO)**
- \$202 million Lake Champlain Pollution Abatement and Restoration Fund
- \$109 million to Vermont Renewables Programs through Clean Energy Development Fund
- Increases interregional transfer capacity
 - Leverages banked storage capacity of Hydro-Quebec
- Improves overall system resiliency
 - **Includes system reinforcements identified in 2024 Vermont Long-Range Transmission Plan and other long-range planning studies from ISO-NE**
- Accelerates clean energy transition
 - Provides access to renewable energy resources

Current Status

- Maintaining interconnection queue position with ISO-NE for past decade with next renewal due in April 2024
- **Seeking \$250 million from U.S. Department of Energy Grid Resilience and Innovation Partnerships (GRIP) Program**
- **VT DPS submitted full application 4/17**



Alliance Transmission



Alliance Transmission – VELCO & Grid United (GU)

- \$3 billion project
 - New bi-directional HVDC line from HQ
 - 1500 MW import
 - Replace Highgate converter with new converter in Williston
 - Possible NYPA interconnection
 - **Will drive indeterminate VELCO system reinforcements including 345 kV upgrades**

Emerging Benefits

- Leverages existing assets, including rights-of-way and company-owned land
- Replaces/relocates aging Highgate Converter out of SHEI
- Improves overall VELCO system resiliency
 - **Includes system reinforcements identified in 2024 Vermont Long-Range Transmission Plan and other ISO NE long-range planning studies**
 - **Will drive upgrades that increase hosting capacity for in-state renewables**
- Increases interregional transfer capacity
 - Foundational element to NE-HQ energy exchanges
 - Unlocks NY renewables
- Creates investment opportunity that accelerates clean energy transition
 - Provides access to new renewable energy resources

Current Status

- **GU-funded preliminary engineering and aesthetic reviews underway to evaluate viability**
- **Pursuing \$100m U.S. DOE Grid Resilience and Innovation Partnerships (GRIP) Program grant**
 - Advances engineering, planning, and environmental work
- Ongoing Hydro-Quebec engagement
- In midst of NYPA project partnership discussions





Thank you!

