East Fairfax Substation Condition Assessment Project

September 11, 2025

VSPC Geotargeting Subcommittee

Project objective

- East Fairfax substation constructed in 1971
  - Radial 115/34.5 kV substation out of VELCO Georgia substation
  - Contains (1) 115/34.5 kV transformer, (1) 115kV circuit switcher, (1) 34.5 kV SF6 Gas Circuit Breaker, (2) 34.5kv VCBs, (2) 34.5kV Oil Circuit Breaker
- Project will mitigate asset condition concerns
  - 34.5 kV oil circuit breakers beyond useful life
  - Circuit Switcher does not accommodate switch failure scheme or redundant transformer protection
  - Structural steel deficiencies
    - Surface Rust removal, Replace cross bracing, other minor repairs per DeWolfe Engineering 3rd party assessment
  - Protection & control equipment obsolete
    - Mix of relay types with various vintages. Some electronics reaching 20+ years of age and will require replacement within 10 years. Some electromechanical relays still exist.
    - Many of the devices obsolete and unsupported by vendor. Obsolete protection and controls necessitate replacement.
  - Control Building Deficiencies
    - Rusted roof with water infiltration, Roof expectancy < 2 years. Roof extension required to cover the electrical panel
    - Building too close to oil containment system (Fire Hazard)
    - Space restricted for additional required Telecoms
    - No space for technicians to perform required battery testing/maintenance
    - No dedicated battery room (Fire and Safety Hazard)
    - Bathroom area exists with no walls

Project objective (continued)

- Also will make some improvements
  - Replace 34.5 kV SF6 breaker with Vacuum breaker for reduced GHG emissions
  - Replace 115 kV circuit switcher with 115 kV breaker and disconnect switch – Accommodates Redundant Transformer Protection
  - Replace station service
  - 34.5 kV rigid 1” CU bus insufficient in planning LRP Forecast. Upgrade shall not limit transformer capacity.
  - Replace control station to address roof leaks, equipment and working space limitations, fire protection, functional area for working.
    - Provide space for additional Telecom equipment and working space
    - Provide space for system B battery bank
    - Add additional protection/controls and replace obsolete protection/controls
    - Provide space in control house for technicians’ maintenance and testing functions
    - Addresses building energy efficiency shortcomings

East Fairfax project anticipated scope of work

Substation Improvements

- New control building
- New protection and control system
- Replace 34.5 kV oil circuit breakers
- Replace 34.5 kV SF6 gas circuit breaker (GHG sustainability initiative)
- Replace 115 kV circuit switcher with 115 kV breaker and disconnect switch – Accommodates Redundant Transformer Protection
- Replace station service
- Bring telecommunication, security, and monitoring systems up to VELCO Standard
- Perform maintenance upgrades

Temporary 115/34.5 kV Substation

- GMP has confirmed the need for a temporary 115/34.5 kV substation during construction.

Preliminary/conceptual Class A cost estimate is $15M

NTA screening

Vermont Non-Transmission Alternatives Screening Form

For use in screening to determine whether or not a reliability issue requires non-transmission alternatives (NTA) analysis in accordance with the Memorandum of Understanding in Docket 7081.

Identify the proposed upgrade: East Fairfax Asset Condition Mitigation Project
Date of analysis: July 7, 2025

1 Does the project meet the following definition of "impracticable": ☑ Yes ☐ No

a. The need for a redundant supply to a radial load; or
b. An economic transmission project[1], transmission built to achieve a public policy objective other than reliability, or other non-reliability-driven transmission or
c. Maintenance-related, addressing asset condition, operations, or safety; or
d. Addressing transmission performance, e.g., addition of high-speed protection or a switch to sectionalize a line; or
e. Needed to address stability or short circuit problems.[2].

*If so, check "yes" and **discontinue** screening; otherwise, continue to #2.*

2 What is the proposed transmission project's need date? _____

If the need for the project is based on existing or imminent reliability criteria violations (i.e., arising within one year based on the controlling load forecast), discontinue NTA screening; otherwise continue to #3.

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[1] "Economic transmission" used in this context refers to projects so classified under ISO-New England's planning process as defined in the ISO-NE Open Access Transmission Tariff (OATT).

[2] "Stability" refers to the ability of a power system to recover from any disturbance or interruption. Instability can occur when there is a loss of synchronism at one or more generators (rotor angle stability), a significant loss of load or generation within the system (frequency stability), or a reactive power deficiency (voltage stability). Stability problems are influenced by system parameters such as transmission line lengths and configuration, protection component type and speed, reactive power sources and loads, and generator type and configuration. Due to the nature of instability, non-transmission alternatives involving addition of generation or reduction of load will not solve these problems.

NTA screening (continued)

3 Could elimination or deferral of all or part of the upgrade be accomplished by a 25% load reduction or off-setting generation of the same magnitude? *(See note.)*

❑ Yes
❑ No

If so, check "yes" and continue to question 5; otherwise, check "no" and discontinue the NTA screening.

4 Is the likely reduction in costs from the potential elimination or deferral of all or part of the upgrade greater than $2.5 million. *(See note.)*

❑ Yes
❑ No

If so, check "yes" proceed to define the scope and timing of non-transmission alternative analysis.

Sign and date this form.

This analysis performed by: Marc Allen, Senior Transmission Planning Engineer
Print name & title

VELCO
Company

July 7, 2025
Date

Marc Allen
Signature