Eversource 115-kV and 230-kV Wood Pole and Shield Wire Replacements 2021-2022

Reliability Committee Meeting

December 14th, 2021

Agenda

- Project Scope Summary
- Project Drivers
  - Wood Pole Asset Condition
  - Shield Wire Asset Condition
- Project Geographic Locations
- Project Summary

Project Scope Summary

- Eversource manages ~4,000 circuit miles of overhead transmission lines including ~3,400 structure miles
  - Nearly 40% of all transmission in New England
- Inspections show significant signs of age-related degradation on our wood poles
- This presentation provides an overview of the TCAs covering 115-kV and 230-kV lines in MA, NH and CT with wood poles and associated shield wire replacement projects for 2021 and 2022

Project Drivers – Wood Pole Asset Condition

- Structure Inspections:
  - Foot Patrol – line crews walk/drive along line to observe general condition of structures above ground level and general ROW conditions
  - Structure Ground Line – specialized crews excavate ~18” below grade at each structure to determine subsurface integrity of pole and apply treatment as necessary
  - High Resolution Aerial – entire system flown with detail hover review at most structures resulting in high resolution photos
  - Thermography – infra-red camera (typically on helicopter) observes line for hot-spots
  - Comprehensive Drone – combines foot patrol and high-resolution aerial aspects of inspection
- Inspections indicate significant degradation and decreased load carrying capacity for wood structures
- Replacing wood structures with light duty steel poles resolves structural and hardware issues, and supports safe and reliable operation

Project Drivers – Wood Pole Asset Condition (cont'd)

1751, Structure #3-331
Split Pole Top, Cracks, Decay

D121, Structure #46
Woodpecker Damage

240-510, Structure #197
Pole Top Rot

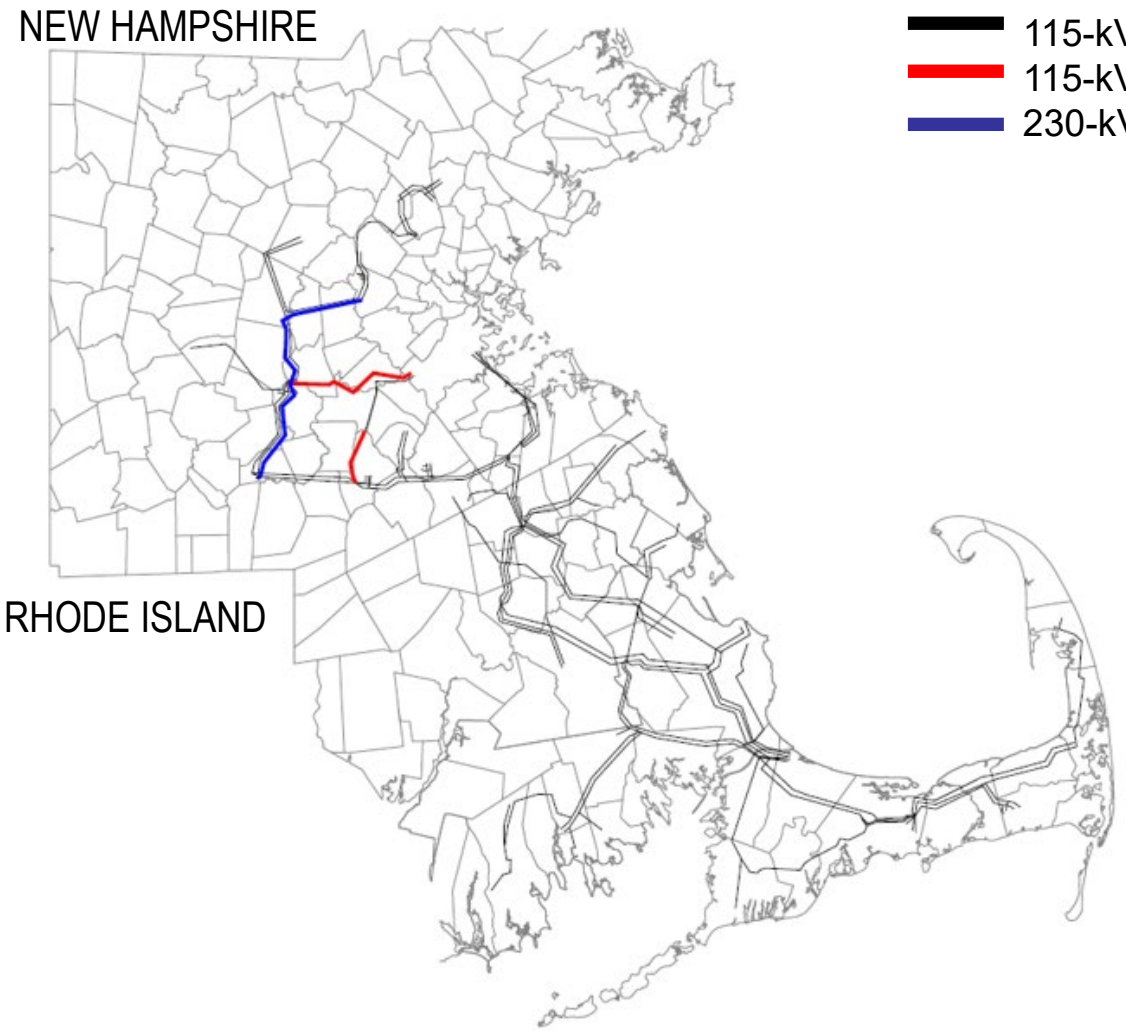
342-603, Structure #101
Woodpecker Damage

456-522, Structure #2
Pole Top Split

Project Drivers – Shield Wire Asset Condition

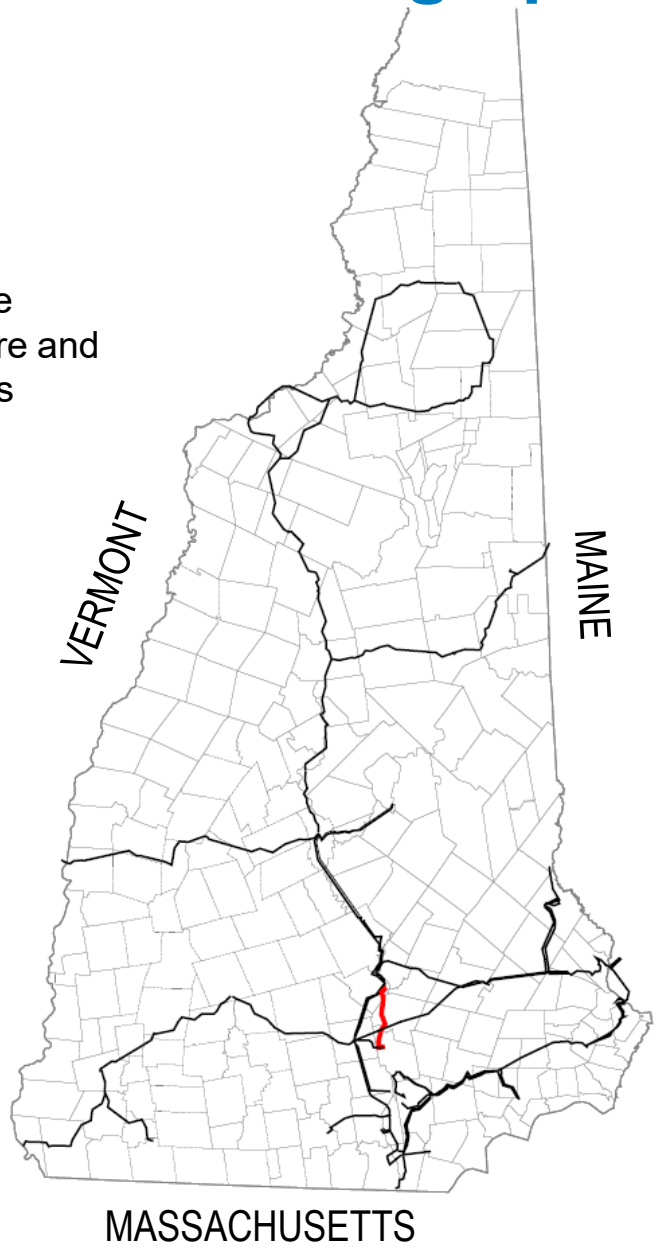
- Existing Copperweld shield wire
  - Obsolete and susceptible to failure
  - Equipment and parts for repair no longer manufactured or stocked
  - Aging components are failing system-wide
- New OPGW
  - Up-to-date and readily available
  - Similar cost to a like-for-like shield wire replacement
  - OPGW both shields lines and increases communication and reliability within the Eversource System
  - OPGW installation expands a private Eversource OPGW / Synchronous Optical Networking (SONET) loop
  - CIP: OPGW provides the necessary bandwidth for physical security monitoring and triaging of alarms for BES Cyber Systems
  - OPGW is considered generally immune to the effects of geomagnetic disturbances

Eastern Massachusetts 115-kV and 230-kV Geographic Locations

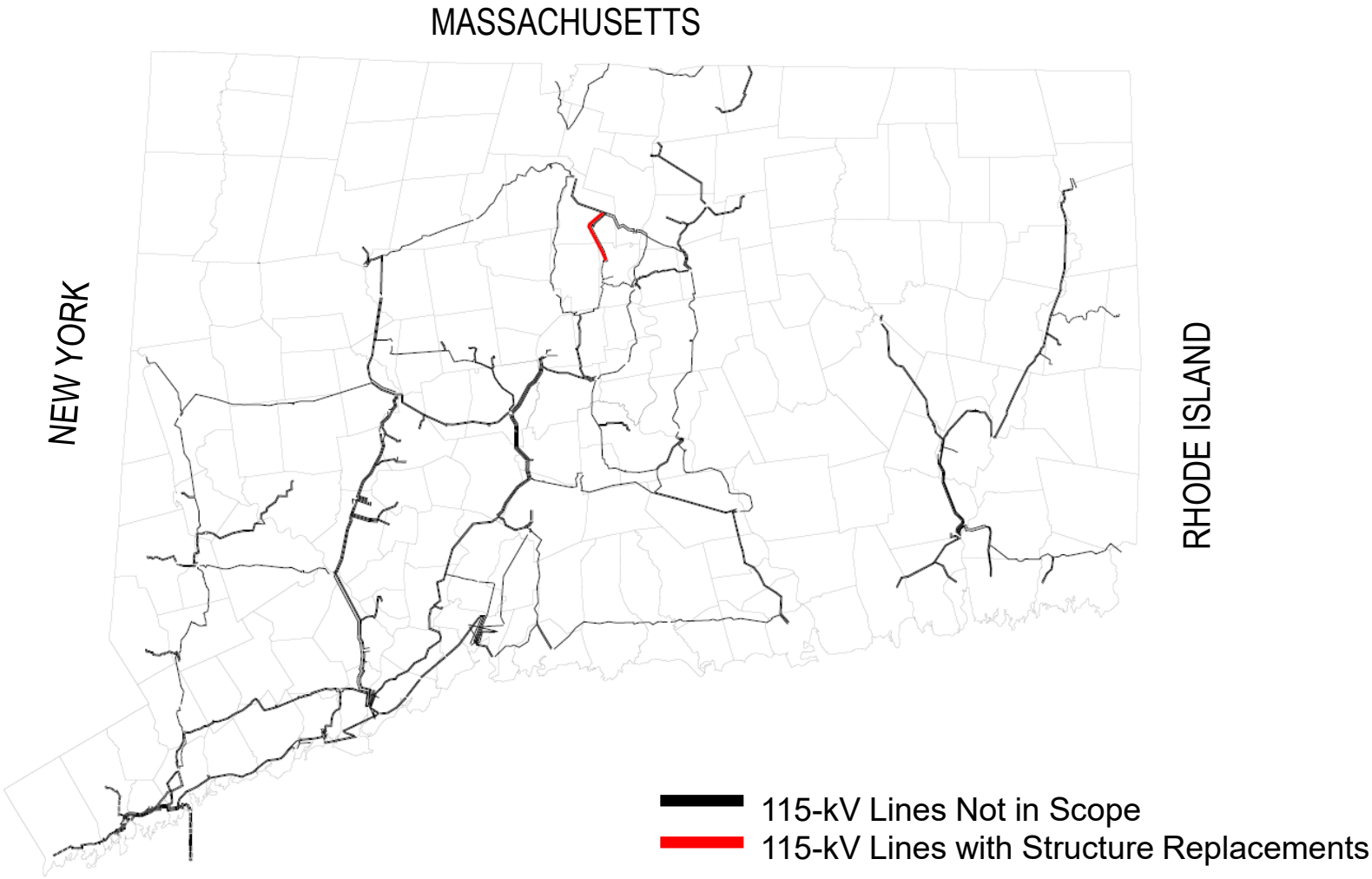


New Hampshire 115-kV Geographic Locations

115-kV Lines Not in Scope
115-kV Lines with Structure and Shield Wire Replacements



Connecticut 115-kV Geographic Locations



115-kV and 230-kV Lines Summary - Costs

115-kV and 230-kV Wood Pole and Shield Wire Replacements 2021-2022					
Location	Line	Voltage	TCA #	Description	TCA Submitted Cost ($Ms)
MA	456-522	115-kV	ES-21-TCA-36	Walpole Substation – Dover Substation	$5.672
MA	240-510	115-kV	ES-21-TCA-37	Framingham Substation – Baker Substation	$11.636
MA	342-603	230-kV	ES-21-TCA-38	Framingham Substation – Sudbury Substation	$5.451
NH	D121*	115-kV	ES-21-TCA-43	Merrimack Substation – Eddy Substation	$13.105
CT	1751	115-kV	ES-21-TCA-48	NW Hartford Substation – Bloomfield Substation	$28.794
				Total	**$64.658**

* Scope includes installation of replacement Shield Wire

Project Summary

- Inspections have indicated significant degradation of system-wide 115-kV and 230-kV wood poles
  - Replacing the structures resolves multiple structural and hardware issues to support safe and reliable operation
- System data and recent hardware failures show a need for shield wire replacements
  - Existing shield wire consists of outdated industry materials with associated replacement hardware that is now obsolete
  - Replacement with new OPGW allows for updated hardware, continued line shielding, and increased communication and reliability throughout the system
- All replacements and upgrades will be designed to meet current design criteria

The total estimated TCA cost for the 115-kV and 230-kV wood pole and shield wire replacements is $64.7 M

Note: The ISO-NE PAC presentation was on June 16, 2021

Questions