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

Planning Advisory Committee Meeting

June 16th, 2021

Agenda

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

Project Background

- 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 covers additional wood pole and associated shield wire replacement projects on Eversource's 115-kV and 230-kV lines planned for 2021 and 2022
  - December 2019 PAC presentation (rev 1) included 33 projects
  - This presentation identifies four additional projects based on recent inspections, plus a modification to one 2019 project
  - Additional projects will be brought to PAC in the future as needed

Project Drivers – Wood Pole Asset Condition

- Inspections have indicated significant degradation and decreased load carrying capacity of wood 115-kV and 230-kV structures
- Replacing the structures with light duty steel pole equivalents resolves multiple structural issues, hardware issues, and supports safe and reliable operation
- If not addressed, the issues noted above jeopardize the long-term mechanical and electrical integrity of the transmission system and its continued reliability
- 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

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

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Asset Condition Inspection Grading & Project Scoping

- Structures are graded in accordance with EPRI Guidelines
  - *A: Nominal Defect – No Action Required*
  - *B: Minimal Defect – Monitor Degradation*
  - *C: Moderate Defect – Repair or Replace under next maintenance*
  - *D: Severe Defect – Repair, Reinforce, or Replace immediately*
- Replace C and D structures in one mobilization
  - Other structures (A/B) may be replaced during scope due to engineering requirements and to minimize costs and environmental impacts
- Engineering provides training to inspectors on appropriate grading criteria
  - Field inspectors provide structure grade while in field and observe the entire structure
  - Results are reviewed by engineering team and field operations

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

Typical Wood Pole Degradation within Eversource System

Pole Top Split –
Line 456-522,
Structure #2

Pole Breaks and Woodpecker Damage –
Line 456-522,
Structure #54

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

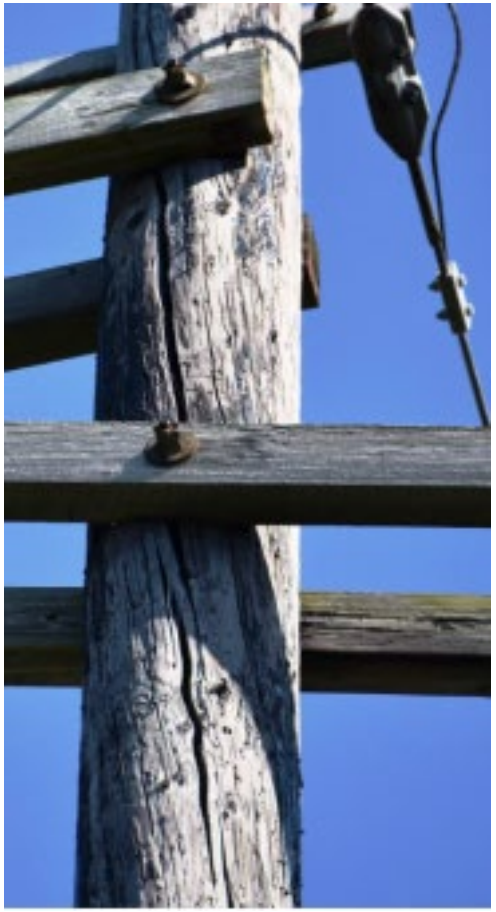
Typical Wood Pole Degradation within Eversource System

Woodpecker Damage –
Line 240-510,
Structure #185

Pole Top Rot –
Line 240-510,
Structure #197

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

Typical Wood Pole Degradation within Eversource System



Pole Splits –
Line 342-603,
Structure #83

Woodpecker Damage –
Line 342-603,
Structure #101

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

Typical Wood Pole Degradation within Eversource System

Woodpecker Damage – Line D121, Structure #46

Woodpecker Damage – Line D121, Structure #77

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

Typical Wood Pole Degradation within Eversource System

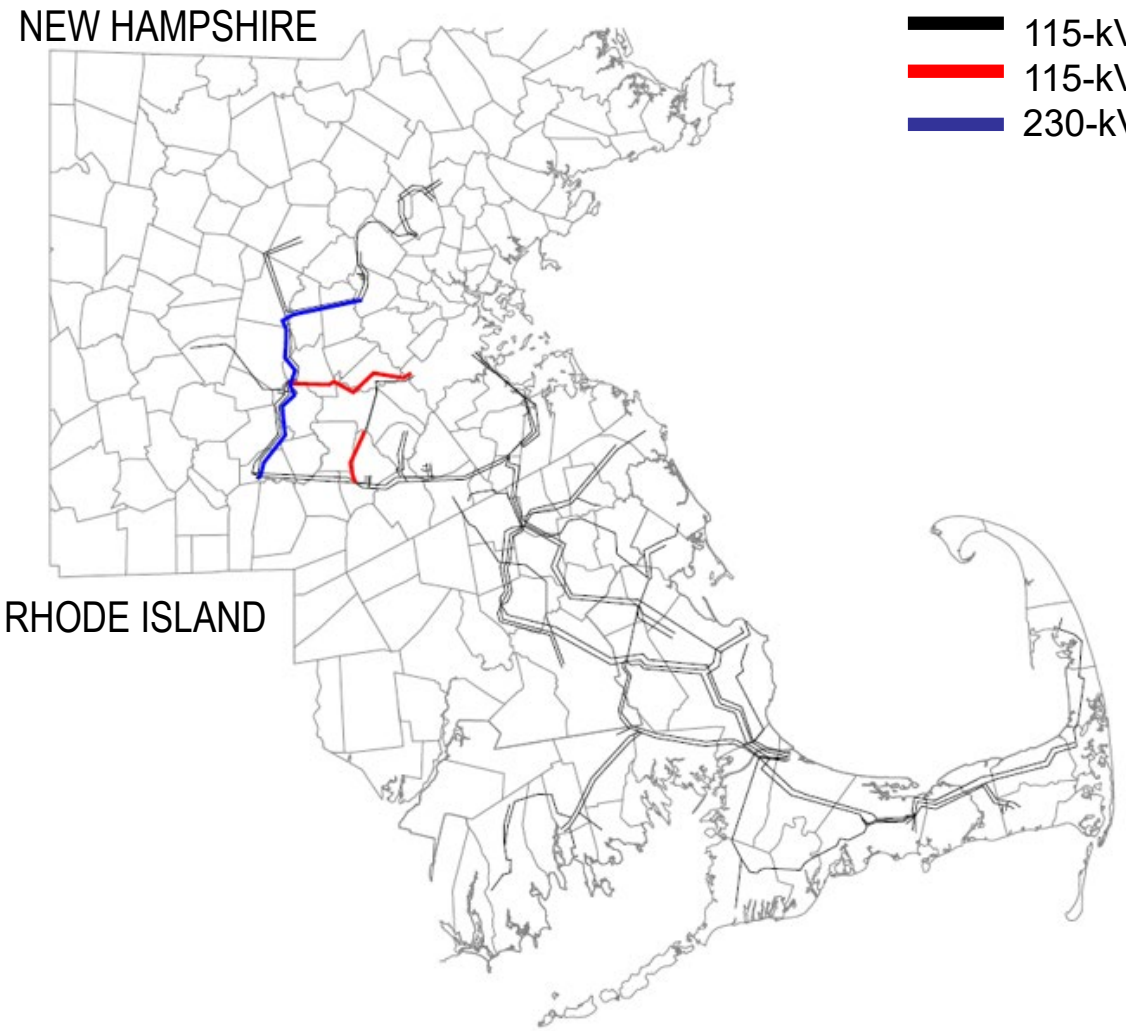
Split Pole Top, Cracks, Decay –
Line 1751,
Structure #3-331

Split Pole Top, Cracks, Decay –
Line 1751,
Structure #3-363

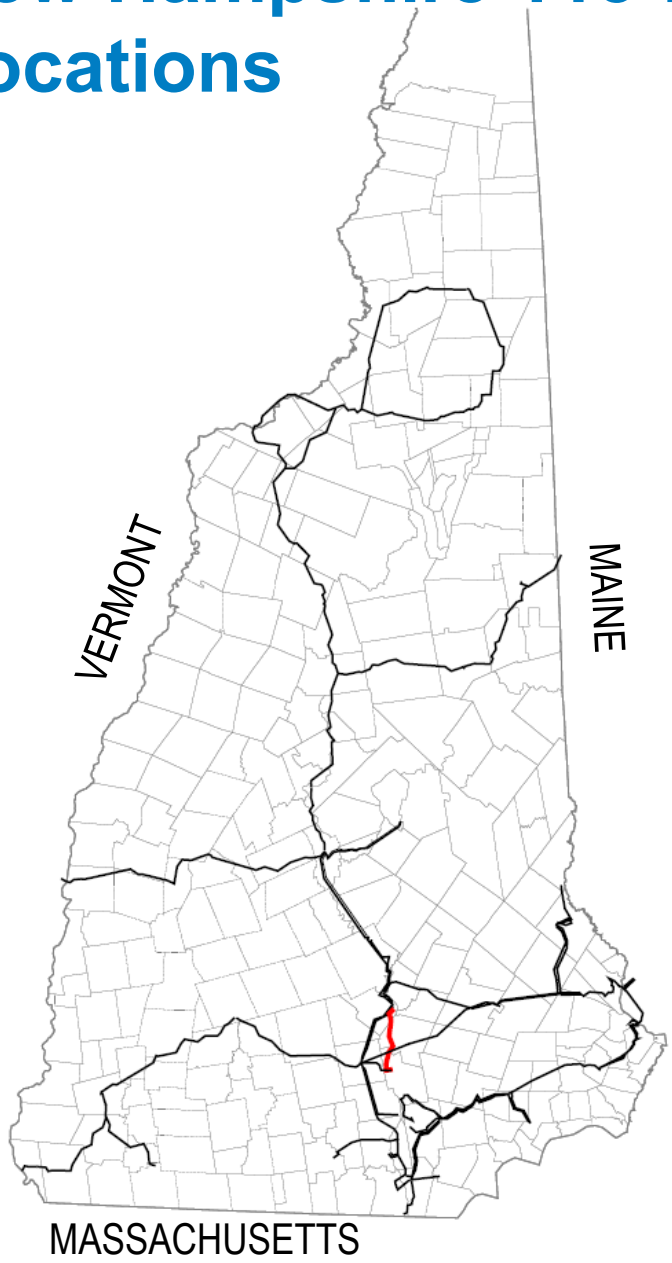
Project Drivers – Shield Wire Asset Condition

- Existing Copperweld shield wire is obsolete and susceptible to failure due to thermal rating degradation and degradation due to environmental factors
- Equipment and parts for the repair of these materials are no longer stocked because the technology is obsolete and no longer manufactured
  - System is currently experiencing hardware failures due to aging
  - When they do fail, replacement hardware is difficult to find
- Fiber Installation Drivers:
  - Up-to-date and readily available hardware
  - Similar cost to a like-for-like shield wire replacement
  - Fiber will not only shield the lines, but increase communication and reliability within the Eversource system
- Addressing shield wire issues when replacing structures is more efficient than addressing these issues through separate projects

Eastern Massachusetts 115-kV and 230-kV Geographic Locations

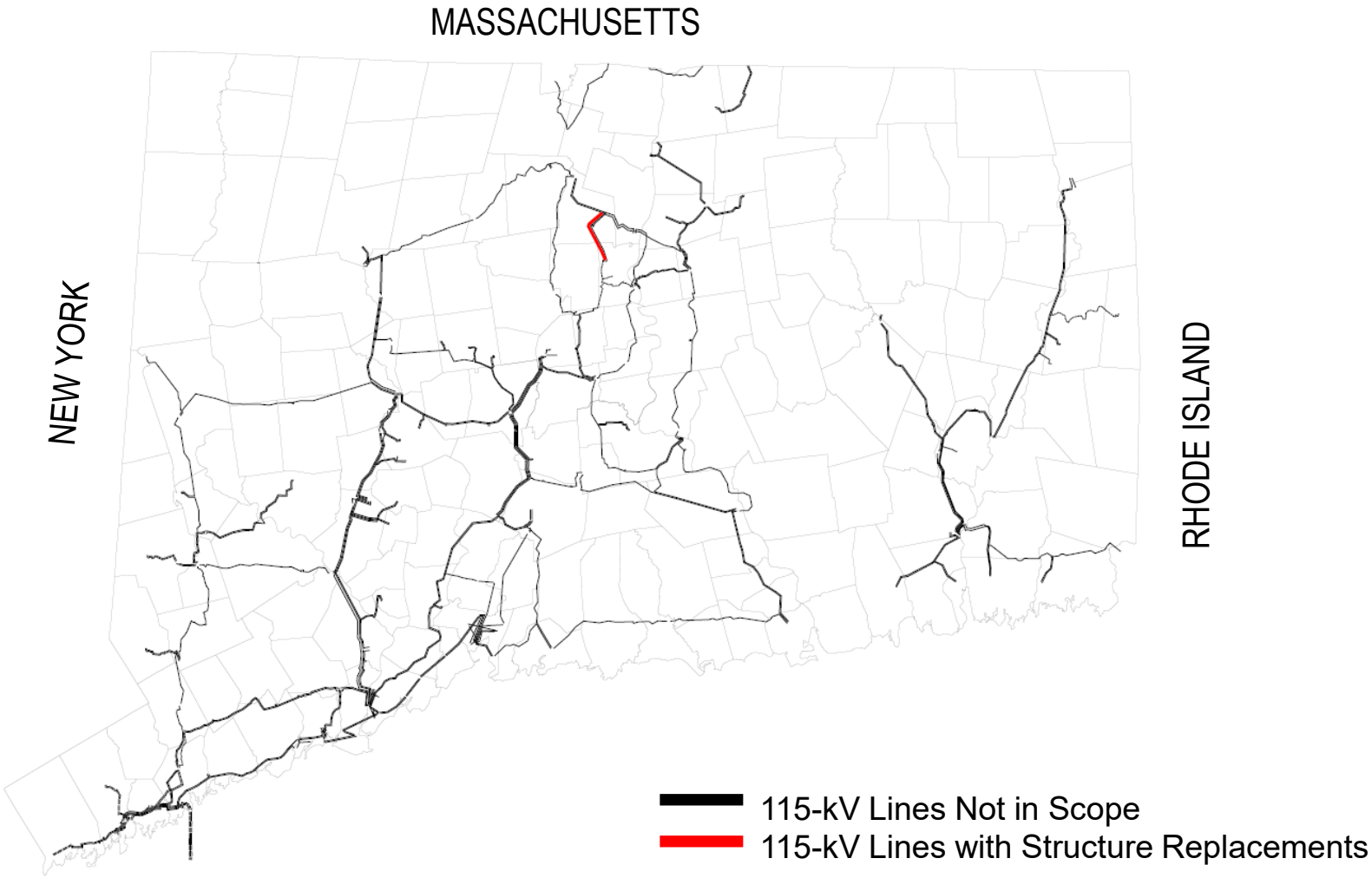


New Hampshire 115-kV Geographic Locations



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

Connecticut 115-kV Geographic Locations



Project Scope

State	Line	Voltage	Replacement Structures	Total Structures	Cost Estimate (-25% / +50%)	In-Service Date
MA	456-522	115 kV	25	70	$5.7 M	Q3 2021
MA	240-510	115 kV	48	165	$11.6 M	Q3 2021
MA	342-603	230 kV	20	60	$5.5 M	Q4 2021
NH	D121*	115 kV	33	154	$13.4 M	Q4 2022
CT	1751†	115 kV	82	159	$28.8 M	Q4 2022
Totals:			**208**	**608**	**$65.0 M**	-

* Scope Includes Installation of Replacement Shield Wire

† Replaces ACL-226 (43 structures, $10.75 M, projected in-service date December 2023)

Conclusion

- 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
- Proposed scope for 2021-2022 115-kV and 230-kV work is estimated at ***$65.0 M*** (-25% / +50%)

Questions