

**Questions everource needs to answer, submitted to the PAC before everource’s presentation of its proposed X-178 Line rebuild and permanent Terrain alteration.**

What are the size, type, age and amperage of the Conductors on each section of the X-178?

2023: everource, says 336 and 795 Conductor (project documents)

2023: everource says all of X-178 is 795. (email via ISO; August 2023)

Which Structures or Poles have been replaced since 1948, and when?

What condition were They in (excluding the 1986 rebuild, most of which was dumped in the row)?

In 2018 everource proposed to replace 56 of the 570 Structures on the X-178. Which Structures were these and what Condition were they in (A, B, C or D?)

Since this 2018 “asset condition” Proposal was withdrawn, that indicates the Structures were at worst; in condition B, ‘check at next inspection cycle’ which would be 2026-2028. Is this correct?

Can we assume that Structures (Poles) on which the Crossbars and Insulators were replaced in 2016-7 were sound at that time? (see below)



Can we assume the Poles on the structures on either side of the Structures on which the Crossbars and Insulators were replaced, were sound at that time?

Are there any Structures on the X-178 that are category D; in need of immediate replacement?

What evidence has eversource supplied of the condition/classification (A, B, C, D) of each of the 570 Structures proposed to be replaced?

What proof has eversource provided that the existing Structures are not safe to carry the existing Conductor and Ground-wire?

Penta treated Poles have a life of at least 70 years. This makes replacement of the 35 Miles of the 1986 X-178 line ( from Beebe River to the Streeter Pond substation) not potentially needed until 2056.

Has eversource provided any proof of any need for the replacement of the 336 and 795 Conductor, and proof of any need for replacement with 1272 ACSS (which would double and quadruple the capacity of the Line) ?

What is eversource justification for not including the alternative of re-conductoring the 1986 H-frames with ACCC conductor? ( **if new Conductors are actually needed which has not been shown**)

Yellowstone, ACCC Conductor weighs: 630 lbs per 1,000' and can carry 1280-1350 amps.  
The existing 1986 Conductor weighs: 1,100 lbs per 1,000' and can carry 907 amps.  
The existing 1948 Conductor which weighs 463 lbs per 1000' and can carry 528 amps,  
The proposed conductor weighs 1,432. or 1,633 lbs/1,000' and can carry 2,000 amps

Has eversource provided any Documentation supporting its Claim of an increase in reliability from the OPGW, and if this justifies its increased weight which it claims requires larger Structures, Roads, Construction Pads and massive alteration and degradation of Terrain?

Has eversource provided a cost/benefit Analysis of using ACCC Conductor vs. an equivalent amperage ACSS Conductor?

If we assume that the majority of the Structures are sound, and the costs associated with the optical ground Wire are not justified, could any class D Poles on the X-178 Line be replaced with the 1986 height/size wood Poles and reconductored with ACCC Conductor, which would carry the same amperage as the proposed 1272 conductor, with less weight and sag?

What is the capacity of 336 ASCR, 795 ASCR, 1272 ACSS and 900 amp and 2000 amp ACCC for carrying **simultaneous** HVAC/HVDC? <https://www.mdpi.com/2079-9292/11/1/108>

Given that the existing 795 section of the X-178 was done without the Crude Construction Methods now proposed by eversource, please provide eversource's Documentation showing that it's proposed 100' x 100' construction Pads, construction of extensive and permanent Roads, Masses of imported Gravel, breaking up and bulldozing of Glacial Erratics and permanent alteration of Terrain, is necessary for any Structure, Conductor or OPGW replacement.

Eversource has completely replaced, or plans to completely replace (for example the X-178, Q-195 and U-199) its Wood H-Frame 115kV lines from MA to the Moore/Comerford, with steel Structures and

1272 conductor, using the asset condition category. Is it able to connect this line to Hydro-Quebec or other power sources at the Moore or Comerford, and to export this Power to Massachusetts, (or to Maine via the B-112?)

What cost/benefit analysis has eversource supplied to the PAC for this north to south, 1272/1595 completely rebuilt transmission Line, and each section of it?

Has eversource supplied to the PAC the construction methods for it's so-called asset condition transmission Line rebuilds and replacements, for example Alteration of Terrain Plans or Photographs before, during and after, Construction?

Has eversource informed the Public, at any of the public meetings or via "outreach" Mailers, of the existence and activities of the PAC?

Has eversource provided a yearly Graph of power transmission on each section of the X-178?

How often has the X-178 line been unable to supply electricity to serve the reasonable needs of service to the public, or the unlimited consumption of electricity by the public, in the last ten years?

What are the Ambient Adjusted Ratings on the X-178 line since the FERC order 881 requiring these?

On what percentage of its rebuilt lines has eversource removed the imported and dumped Gravel from the construction Pads and Roads, restored the 100' x 100' flat construction Pads to 30' x 60' as called for in alteration of terrain Plans, replaced the Topsoil, removed the Roads, replaced the Glacial Erratics to their original locations and regraded the Roads to the Land's original contours?

WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

Has eversource hired its inspection/treatment contractor, Osmose, to do a loading Analysis of the Structures on the X-178?

Has eversource done a cost- benefit Analysis of Structure Supports vs. Structure replacement?

Did eversource, in an abundance of caution, notify the NH Site Evaluation Committee of any line replacements other than the A-111?

Has eversource placed pole-top Protection on any of its transmission lines?

On the F-138 & V-182 lines; "The total land disturbance for the project was calculated to be approximately 61.1 acres. The disturbance area includes the work pads, access roads, and the estimated limits of necessary grading." This ROW is stated to be 14.3 miles long. Is 200 acres a reasonable estimate for "disturbance" that would be done to the undisturbed X-178 ROW?

What is the largest conductor; ACCC or ACSS; that the proposed steel structures could carry?

Can the proposed steel Structures be made taller by replacing the upper Sections?

Eversource is not permitted to break up, bulldoze, pile or move the Glacial Erratics that are here, but will leave them where the last glacier left them, with their Ecosystems of Lichen and Mosses intact. The existing Terrain shows this is possible.

Where is eversource's Documentation showing:

“Design Portion

- A. Age (Original Installation Date)
  - B. Structure Type (Wood, Steel, Lattice)
  - C. Conductor Type (Size, Material & Stranding)
  - D. Static Wire Type (Size & Material)
  - E. Foundation Type (Grillage, Direct Embed, Caisson, Guyed V, Drilled Pier etc.)
  - F. Insulator Type (Material)
  - G. Shielding and Grounding Design Criteria (Ground Rod, Counterpoise, “Butt Wrap” etc.)
  - H. Electrical Configuration
    - a. Three Terminal Lines
    - b. Radial Facilities
  - I. NESC Standards Compliance
    - a. Structural Strength (NESC 250B, 250C & 250D Compliance)
    - b. Clearances (TLES-047 Compliance)
- Physical Condition
- A. Open Conditions (existing and unaddressed physical conditions associated with a Transmission Line component)
  - B. Closed Conditions (previously addressed physical conditions associated with a Transmission Line component)
  - C. Emergency Fixes (History of emergency fixes) quantifies how an asset or a group of assets has historically impacted the Transmission system's reliability and Transmission connected customers, helps identify the primary contributing factors to a facility's performance, and baselines the outage probability used in our Future Risk analysis. The metrics used as part of this historical performance assessment include:
  - D. Accessibility (Identified areas of difficult access) Historical Performance assessment
- A. Forced Outage Rates
  - B. Manual Outage Rates
  - C. Outage Durations (Forced Outage Duration in Hours)
  - D. System Average Interruption Indices (T-SAIDI, T-SAIFI, T-SAIFI-S, T-MAIFI)
  - E. Customer Minutes of Interruption (CMI)
  - F. Customer Average Interruption Indices (IEEE SAIDI, CAIDI & SAIFI)
  - G. Number of Customers Interrupted (CI)”

Below: X-178 July 2023; glacial Erratics above and below the surface of the land:



Below: eversource 307 or 391 ROW after rebuilds:



Eversource must post bonds in each town to ensure restoration of the ROWs, should damage like that shown above remain unrestored (inasmuch as that is possible) by eversource.

When was the last time rare Plant and Animal searches were done on the X-178 ROW?

When does eversource plan to update this data?

Does eversource plan to leave all felled “danger” Trees on the ROW, as it has done on other Line replacements; letting Firewood and millable Wood go to waste so it can avoid paying Timber tax?

What is the carbon footprint of the proposed rebuild of the X-178?

Since the proposed X-178 rebuild is a sizeable change; doubling or quadrupling the capacity (amperage) of the existing Lines; where is the required Review by the NH Site Evaluation Committee?

The existing 1986 conductor (795 ASCR) can carry 907-amps.

The existing 1948 conductor (336 ASCR) can carry 528-amps

The proposed conductor (1272 ACSS ) can carry 2,000 amps

### **N.H. Rev. Stat. § 162-H:5**

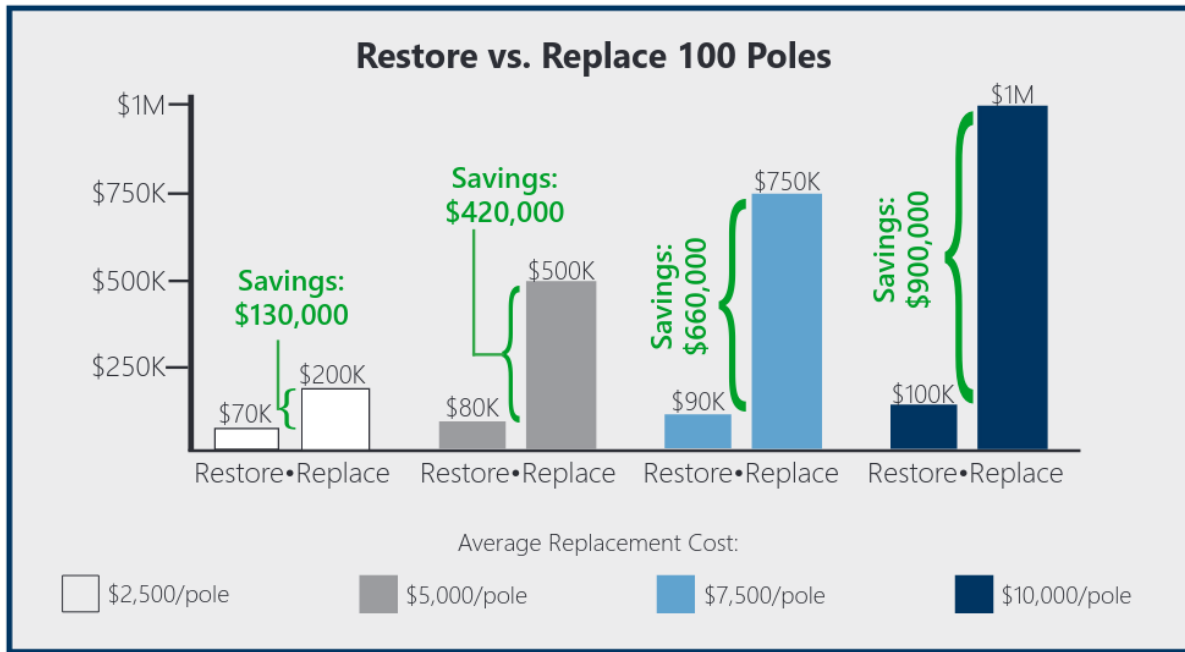
**“I.** No person shall commence to construct any energy facility within the state unless it has obtained a certificate pursuant to this chapter. Such facilities shall be constructed, operated and maintained in accordance with the terms of the certificate. Such certificates are required for **sizeable changes** or additions to existing facilities. Such a certificate shall not be transferred or assigned without approval of the committee.”

“Whether a proposed addition or change to an energy facility is sizeable is a fact-driven determination. See Order Granting Motion for Declaratory Ruling, Docket No. 2014-01, at 9. In previous decisions, the Committee considered the following factors in determining whether a change or addition to an existing facility was sizeable: (i) the existing size of the energy facility and the size of the proposed change; (ii) whether the proposed change will require the acquisition of new land; **(iii) whether the proposed change will create a change in the capacity of the existing facility; (iv) whether the proposed change is merely a replacement of existing components of the facility as opposed to an expansion or increase in size of those components; and (v) whether the proposed addition or change to a facility will cause disruption in the existing environment.** Id. At 9-10; see Order Granting Motion for Declaratory Ruling, Docket No. 2012-02, at 4; see also Order Denying Motion for Declaratory Ruling, NHSEC Docket No. 2009-01, at 8 (vacated on jurisdictional grounds in *In re Campaign for Ratepayers’ Rights*, 162 N.H 245 (2011)). “The vast difference in size, type and capacity of existing energy facilities must govern the nature of the consideration and the weight applied to various factors.” Order Granting Motion for Declaratory Ruling, Docket No. 2014-01, at 10.”

[https://www.nhsec.nh.gov/projects/2018-02/orders\\_notices/2018-02\\_2018-08-02\\_order\\_grant\\_petition.pdf](https://www.nhsec.nh.gov/projects/2018-02/orders_notices/2018-02_2018-08-02_order_grant_petition.pdf)

<https://www.osmose.com/wood-pole-strength-upgrading> (below)

## Cost Benefit Analysis: It Pays to Restore Versus Replace



Will eversource disrupt the existing Environment by grinding the X-178 Plants, Animals Insects, Shrubs and saplings into the Soil; as has been done on lines down south?





Simultaneous HVAC/HVDC; eversource lags behind Ethiopia:

## “Abstract

Electric power consumption has been increasing rapidly across the globe; this increase specially accelerated in the last decade. Consequently, existing transmission lines are becoming overloaded beyond their power transfer capability. The inadequacy of the transmission lines has contributed to power interruptions and instability of the power system. Construction of new transmission lines can be a solution to mitigate these problems. However, to build the whole structure of a new transmission line, a huge investment is required. Besides this, environmental concerns would create further barriers that delay the accomplishment of the project. Therefore, the effective and quickest solution to tackle this problem is enhancing the power transfer capability and stability margin of existing transmission lines. This paper studied the techno-economic feasibility of converting an existing HVAC line into a simultaneous AC-DC power transmission system to enhance power transfer capability as well as to improve power system stability. Using the proposed method, the loadability of Tana Beles to Addis Ababa 400 kV, 476.2 km AC line has increased to more than double which is from 1091.66 MW to 2196.85 MW. The active power loss and corona loss evaluation of the two systems ensured that simultaneous AC-DC system is more efficient than HVAC system. It is also shown that the instability can be effectively improved by simultaneous AC-DC power transmission with fast DC power modulation. From the economic point of view, rather than constructing new HVAC line, converting existing HVAC line into simultaneous AC-DC transmission system has a price reduction of about 107,984,968.56 USD or 32.46% of the new HVAC line cost. Considering a 35-year project life cost analysis, it is observed that the life cycle cost of the simultaneous AC-DC transmission system is about 29.2% lower than the life cycle cost of a new 400 kV HVAC line. Thus, the designed simultaneous AC-DC power transmission system has better technical performance and also is less costly than constructing a new HVAC line.”

<https://www.ijert.org/research/stability-analysis-of-simultaneous-ac-dc-power-transmission-system-IJERTV8IS070110.pdf>

“Long extra high voltage (EHV) ac lines cannot be loaded to their thermal limits in order to keep sufficient margin against transient instability. With the scheme proposed in this paper, it is possible to load these lines very close to their thermal limits. The conductors are allowed to carry usual ac along with dc superimposed on it. The added dc power flow does not cause any transient instability. This paper presents the feasibility of converting a double circuit ac line into composite ac-dc power transmission line to get the advantages of parallel ac-dc

transmission to improve stability and damping out oscillations. Simulation and experimental studies are carried out for the coordinated control as well as independent control of ac and dc power transmissions. No alterations of conductors, insulator strings, and towers of the original line are needed. Substantial gain in the loadability of the line is obtained. Master current controller senses ac current and regulates the dc current orders for converters online such that conductor current never exceeds its thermal limit.”

[https://www.researchgate.net/publication/3267767\\_Power\\_Upgrading\\_of\\_Transmission\\_Line\\_by\\_Combining\\_AC-DC\\_Transmission](https://www.researchgate.net/publication/3267767_Power_Upgrading_of_Transmission_Line_by_Combining_AC-DC_Transmission)



2017 above, 2023 below; Ashland area 115kv line rebuild



The proposed X-178 rebuild will not be passed through the PAC like all the other eversource so-called asset condition transmission projects have been, but rather subject to a thorough review, assessment, interrogatories, etc., as required for prudence; financial and environmental.

Contact Jillian Macura at [jmacura@iso-ne.com](mailto:jmacura@iso-ne.com), 413-540-4648 for notification of the PAC meeting at which eversource's X-178 proposal will be presented.

PAC site: [https://www.iso-ne.com/event-details?eventId=150001&sort=normalized\\_document\\_title\\_s.desc](https://www.iso-ne.com/event-details?eventId=150001&sort=normalized_document_title_s.desc)

Eversource X-178 site: <https://author.eversource.com/content/residential/about/transmission-distribution/projects/new-hampshire-projects/beebe-river-to-whitefield-line-rebuild-project>