

RSP Project List and Asset Condition List June 2023 Update



Planning Advisory Committee Meeting

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Highlights of the RSP Project List Update

- **Major cost estimate changes greater than \$5M that occurred between the March and June 2023 Project List**
 - (MA) Greater Boston
 - Total cost increase of \$138.2M
 - Cost increase of \$84.3M for the 2nd Mystic-Woburn 115 kV cable presented at the [March 2023 PAC meeting](#) are due to:
 - additional restrictions imposed on design and construction,
 - underground interferences and work hour restrictions in the Boston area,
 - field conditions required change in construction design and work methods, and
 - different geotechnical conditions than subsurface exploration
 - Cost increase of \$30.8M for the new Woburn-Wakefield 345 kV cable are due to:
 - additional restrictions imposed on design and construction,
 - underground interferences and work hour restrictions in the Boston area,
 - actual mitigation requests from towns far exceeded anticipated mitigation, and
 - field conditions required change in construction design and work methods
 - Cost increase of \$23.1M for the new Sudbury-Hudson 115 kV line are due to:
 - lengthy siting/permitting and appeal process,
 - increased soil management and disposal costs,
 - increased groundwater treatment costs, and
 - increased material costs (bridge structure, components, conduit)

Highlights of the RSP Project List Update

- **Major cost estimate changes greater than \$5M that occurred between the March and June 2023 Project List, cont.**
 - (NH) NH 2029 Solutions
 - Cost increase of \$14.0M for the two Browns River 50 MVAR capacitor banks presented at the [May 2023 PAC meeting](#) are due to:
 - changes in the scope of work,
 - market price impacts, and
 - advanced engineering
 - (MA/RI) SEMA/RI
 - Cost increase of \$21.1M for the N12/M13 DCT separation & reconductoring between Somerset and Bell Rock project are due to:
 - materials, equipment and labor, and
 - longer project schedule for permitting, licensing, and property rights acquisition
 - (MA) New East Eagle 115 kV station between Mystic and Chelsea
 - Cost increase of \$32.1M presented at the [March 2023 PAC meeting](#) are due to:
 - labor cost increases based on contractual labor rates,
 - material cost increases based on supply chain market pricing, and
 - siting, legal, environmental, and other cost increases due to the extended siting hearing and decision-making processes
- **No new projects**
- **Five upgrades have been placed in-service since the March 2023 update**
 - (CT) Total of five projects
 - Eastern CT 2029 – five projects
- **No cancelled projects since the March 2023 update**

June 2023 RSP Project List Update

- **No New Projects**



June 2023 RSP Project List Update, cont.

- **Five Projects Placed In-Service and Corresponding Needs**

Project ID #	Transmission System Upgrades	Cost (in millions \$)	Improvement/Need
1852	Install one 115 kV circuit breaker in series with Card substation 4T (Connecticut) Eastern CT 2029	2.0	Resolve low voltage violations
1856	Rebuild 400-1 Line section to allow operation at 115 kV (Tunnel to Ledyard Jct.) (Connecticut) Eastern CT 2029	42.9	Resolve thermal overloads
1857	Add one 115 kV circuit breaker and re-terminate the 400-1 line section into Tunnel substation. Energize 400 Line at 115 kV (Connecticut) Eastern CT 2029	7.4	Resolve thermal overloads
1859	Rebuild the 400-3 Line Section to allow operation at 115 kV (Gales Ferry to Ledyard Jct) (Connecticut) Eastern CT 2029	6.9	Resolve thermal overloads
1864	Convert 69 kV equipment at Buddington to 115 kV to facilitate the conversion of the 400-2 line to 115 kV (Connecticut) Eastern CT 2029	3.2	Resolve thermal overloads



June 2023 RSP Project List Update, cont.

- **Cost Estimate Comparisons of Reliability Projects March vs. June 2023 Update***

	As of March 2023 Plan Update (in millions \$)	As of June 2023 Plan Update (in millions \$)	Change in Plan Estimate (in millions \$)
MAJOR PROJECTS ***			
Southeast Massachusetts/Rhode Island Reliability (SEMA/RI)	414	435	21
Greater Boston - North, South, Central, and Western Suburbs	1062	1200	138
Eastern CT 2029	259	260	0
Boston Area Optimized Solution (BAOS)	49	49	0
New Hampshire (NH) 2029	142	156	14
Upper Maine (UME) 2029	164	164	0
SUBTOTAL **	2089	2263	174
OTHER PROJECTS	11059	11090	32
NEW PROJECTS	0	0	0
TOTAL **	13148	13354	206
Minus 'in-service'	-11809	-11871	-62
Aggregate estimate of active projects in the Plan **	1339	1483	144

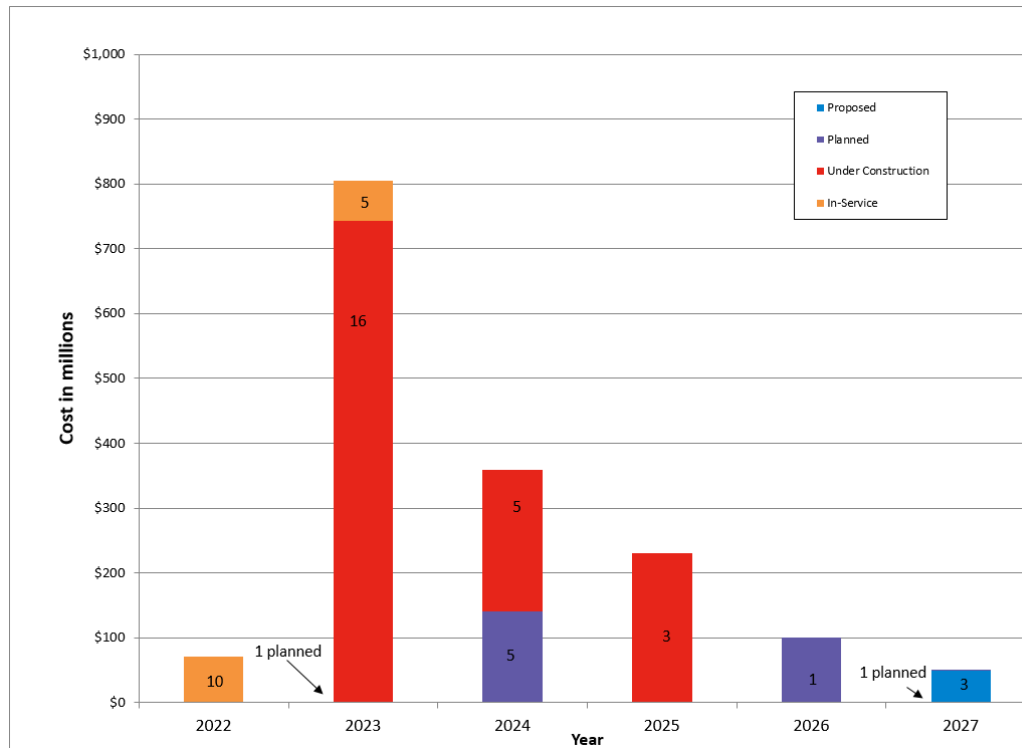
* Transmission Owners provided all estimated costs, which may not meet the guidelines described in Planning Procedure 4, Attachment D.

** May not sum exactly due to rounding.

*** The cost estimates for projects in the "Major Projects" category are moved to the "Other Projects" category once they are fully completed.

June 2023 RSP Project List Update, cont.

- Investment of New England Transmission Reliability Projects by Status through 2027

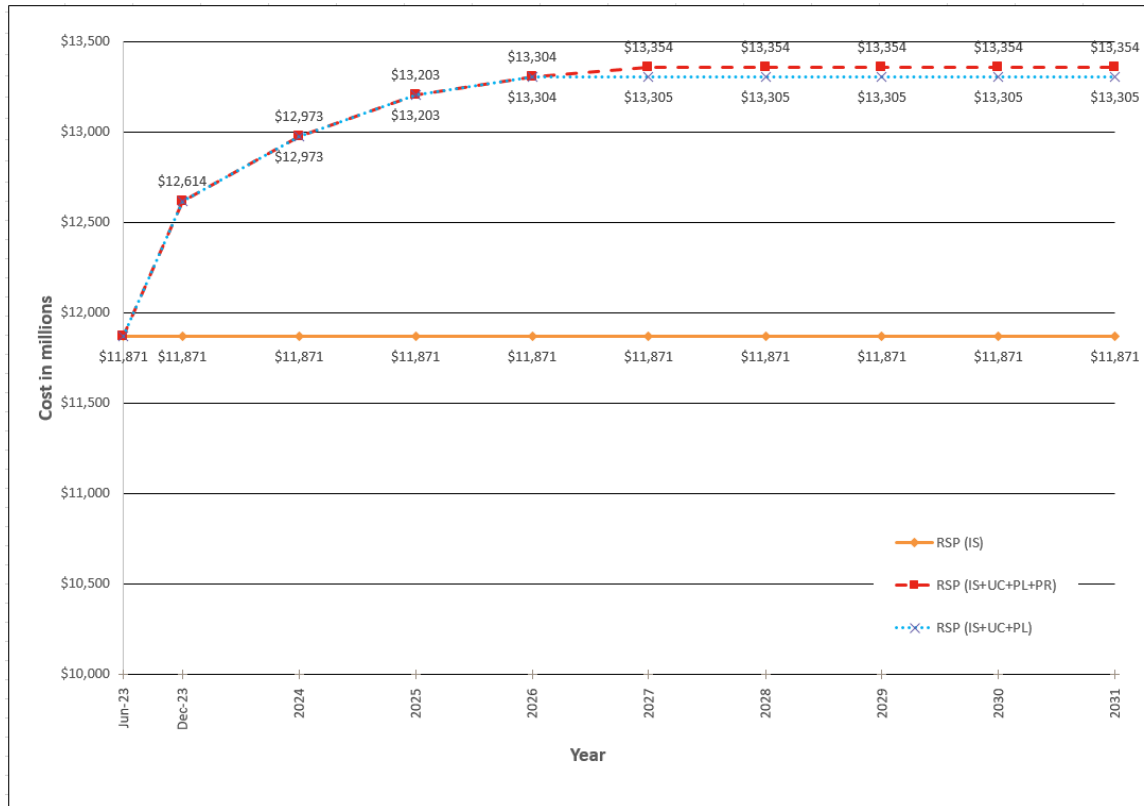


* Numbers shown represent project quantities.

** Future total \$ are shown at the end of the project. Totals do not reflect or show phasing in over time or the depreciation of prior projects. Total costs are associated with the year projects are placed in-service as reported in the Project List.

June 2023 RSP Project List Update, cont.

- Cumulative Investment of New England Transmission Reliability Projects through 2031



* IS – In Service, UC – Under Construction, PL – Planned, PR – Proposed

** Future total \$ are shown at the end of the project. Totals do not reflect or show phasing in over time or the depreciation of prior projects. Total costs are associated with the year projects are placed in-service as reported in the Project List.

June 2023 RSP Project List Update, cont.

- Reliability Project Counts and Aggregated Cost Estimates by Project Stage with Applied Accuracy Ranges*

Project Stage (Status)	Component / Project / Plan Count	Estimate Range		Estimated Costs (\$millions)	Range	
		Minimum	Maximum		Minimum	Maximum
					(\$millions)	
Proposed	3	-25%	25%**	49	37	61
Planned	8	-25%	25%	243	182	304
Under Construction	24	-10%	10%	1191	1071	1310
Total Plan	35			*** 1483	1290	1675
In-Service	*** 5	-10%	10%	62	56	68
Cancelled	0	-25%	25%	0	0	0

* All costs are provided by Transmission Owners. The costs in the table reflect all projected in-service dates.

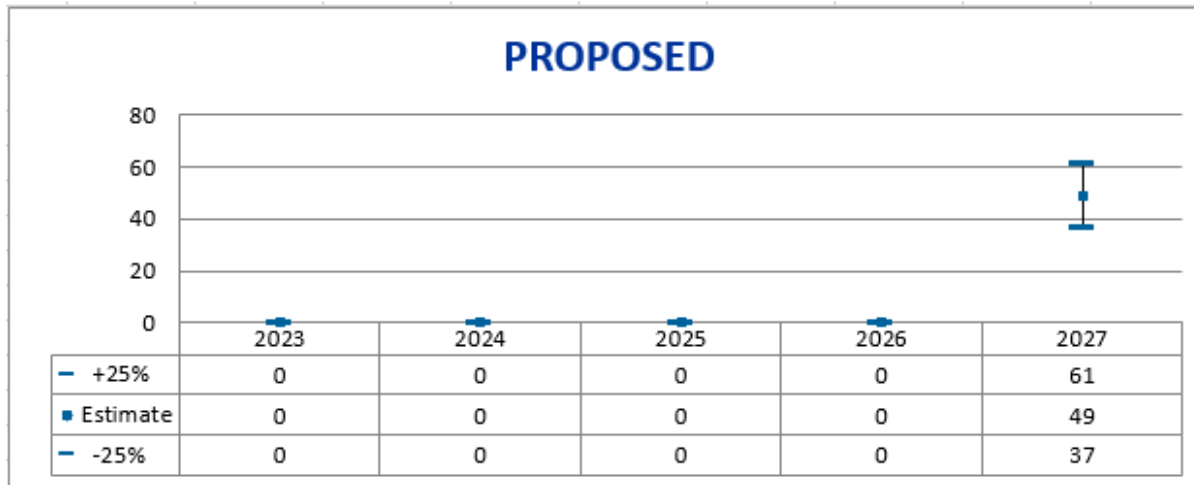
** All estimates may not yet be at this level of accuracy; many estimates may be -25%/+50%.

*** May not add up due to rounding.

**** In-Service projects are those projects that went into service since the last update.

June 2023 RSP Project List Update, cont.

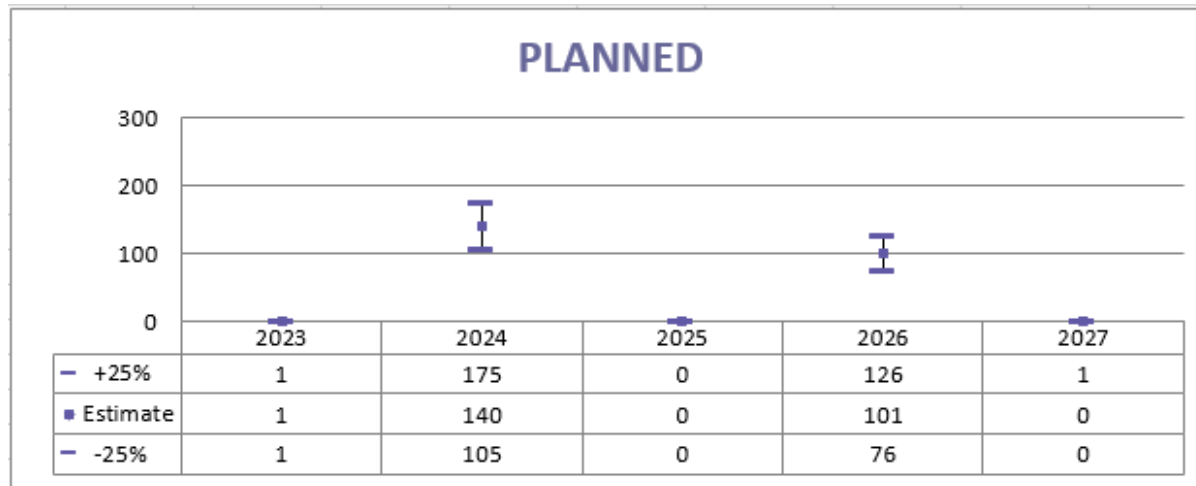
- Project Cost Estimate Tolerances by Status and Year in Millions \$ for the next five years



* Future total \$ are shown at the end of the project. Totals do not reflect or show phasing in over time or the depreciation of prior projects. Total costs are associated with the year projects are placed in-service as reported in the Project List.

June 2023 RSP Project List Update, cont.

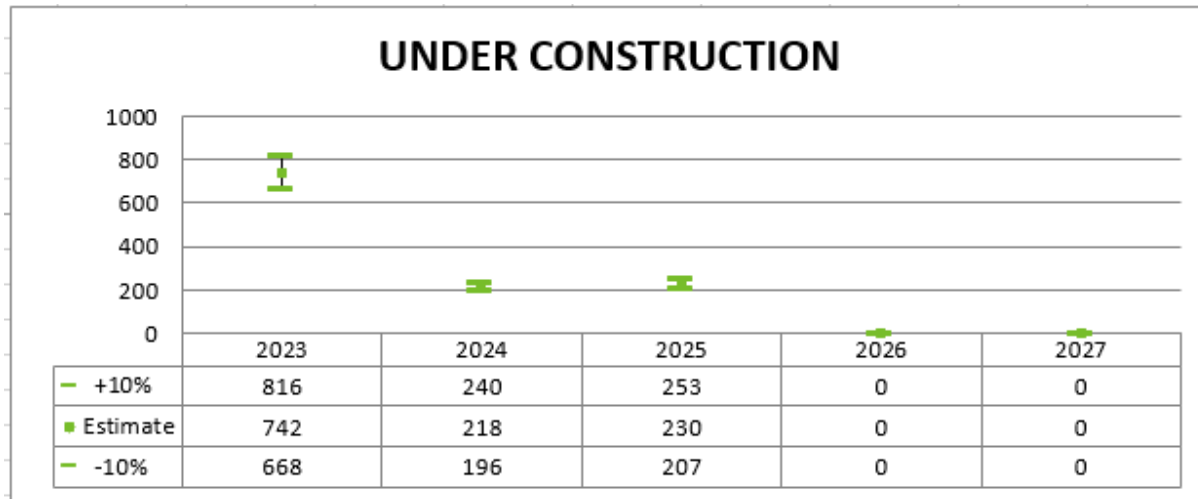
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June 2023 RSP Project List Update, cont.

- Project Cost Estimate Tolerances by Status and Year in Millions \$ for the next five years



* Future total \$ are shown at the end of the project. Totals do not reflect or show phasing in over time or the depreciation of prior projects. Total costs are associated with the year projects are placed in-service as reported in the Project List.

Status of Major Transmission Projects

	PPA	TCA	Construction
Southeast MA/RI Reliability (SEMA/RI)	Approved 5/2017, 4/2018	Submitted	Project completion 2018-2026
Greater Boston – North, South, Central and Western Suburbs	Approved 4/2015, 5/2015, 6/2016, 7/2019, 10/2020	Submitted	Project completion 2010-2025
Eastern CT 2029	Approved 6/2021	Partially Submitted	Project completion 2021-2024
Boston Area Optimized Solution (BAOS)	Approved 5/2021, 1/18/2023	Approved 4/2022	Project completion 2021 - 2023
New Hampshire (NH) 2029 Solution	Approved 1/2022, 6/2022	Partially Submitted	Project completion 2023 - 2024
Upper Maine (UME) 2029 Solution	Approved 2/2022 (Versant Power) Partially approved 5/2022 and remainder not submitted (Avangrid)	Not Submitted	Project completion 2023-2027

June 2023 Asset Condition List Update

- **30 New Projects**

Project ID #	Transmission System Upgrades	Cost (in millions \$)
371	South Naugatuck to Devon Rebuild - Segment 1 (Stevenson substation - Pootatuck substation) (Connecticut)	87.3
372	South Naugatuck to Devon Rebuild - Segment 2 (Pootatuck substation - West Devon Jct.) (Connecticut)	46.1
373	South Naugatuck to Devon Rebuild - Segment 3 (West Devon Jct. - Devon substation) (Connecticut)	41.1
374	South Naugatuck to Devon Rebuild - Segment 4 (Christian Street Jct. - Stevenson substation) (Connecticut)	53.0
375	South Naugatuck to Devon Rebuild - Segment 5 (Towantic substation - South Naugatuck substation) (Connecticut)	115.1
376	CT Asset Condition Project - Card to Montville Corridor (Reconductor/OPGW lines 1000 and 1090, OPGW lines 1070, 1080, 1490) (Connecticut)	37.2
377	CT Asset Condition Project - Line 376 (Connecticut)	9.0
378	CT Asset Condition Project - Line 1620 (Connecticut)	8.8

June 2023 Asset Condition List Update, cont.

- **30 New Projects**

Project ID #	Transmission System Upgrades	Cost (in millions \$)
379	CT Asset Condition Project - Lines 1132 and 1505 (Connecticut)	13.4
380	NH Asset Condition Project - H123 Line (New Hampshire)	5.8
381	NH Asset Condition Project - M183 Line (New Hampshire)	6.0
382	NH Asset Condition Project - F139 Line (New Hampshire)	58.0
383	Line K43 Asset Condition Structure Refurbishment (Vermont)	16.9
384	Shutesbury #704 Substation Rebuild (Massachusetts)	8.9
385	E-131 Asset Condition Refurbishment (Massachusetts)	138.3
386	Northern New Hampshire 115 kV Line Rebuilds - B112 Line (New Hampshire)	105.4



June 2023 Asset Condition List Update, cont.

- **30 New Projects**

Project ID #	Transmission System Upgrades	Cost (in millions \$)
387	Northern New Hampshire 115 kV Line Rebuilds - Q195 Line (New Hampshire)	100.0
388	Northern New Hampshire 115 kV Line Rebuilds - U199 Line (New Hampshire)	51.2
389	NH Wood Structure Replacements and OPGW Installation - 391 Line (New Hampshire)	12.4
390	NH Wood Structure Replacements and OPGW Installation - 373 Line (New Hampshire)	10.3
391	NH Wood Structure Replacements and OPGW Installation - R193 Line (New Hampshire)	7.7
392	NH Wood Structure Replacements and OPGW Installation - S153 Line (New Hampshire)	5.0
393	NH Wood Structure Replacements and OPGW Installation - A126 Line (New Hampshire)	8.4
394	NH Wood Structure Replacements and OPGW Installation - E194 Line (New Hampshire)	8.7



June 2023 Asset Condition List Update, cont.

- **30 New Projects**

Project ID #	Transmission System Upgrades	Cost (in millions \$)
395	NH Wood Structure Replacements and OPGW Installation - U181 Line (New Hampshire)	8.5
396	NH Wood Structure Replacements and OPGW Installation - D121 Line (New Hampshire)	5.0
397	NH Wood Structure Replacements and OPGW Installation - 307 Line (New Hampshire)	9.4
398	NH Wood Structure Replacements and OPGW Installation – B142 Line (New Hampshire)	17.3
399	NH Wood Structure Replacements and OPGW Installation – J114 Line (New Hampshire)	9.7
400	Adams #21 Substation Relocation (Massachusetts)	55.1



June 2023 Asset Condition List Update, cont.

- **12 Projects Placed In-Service**

Project ID #	Transmission System Upgrades	Cost (in millions \$)
265	345 kV Line Structure and PINCO insulator Replacement - Line 383 (Connecticut)	16.8
271	V-148S Asset Condition Refurbishment and Switch Replacement - MA Portion (Massachusetts)	9.8
306	V-174 115 kV Line Asset Condition Refurbishments and OPGW installation (New Hampshire)	26.3
312	Laminated Wood Structure Replacement Program Phase II - 3403 345 kV Line (Connecticut)	12.1
329	115 kV Line Structure and OPGW Replacements - Line 1428 (Massachusetts)	8.0
334	K-137/L-138W 115 kV Lines Pilot Protection Scheme (Massachusetts)	20.5
344	Line 373 Asset Condition Wood Structure Replacements (New Hampshire)	7.1
345	Line 326 Asset Condition Wood Structure Replacements (New Hampshire)	6.2

June 2023 Asset Condition List Update, cont.

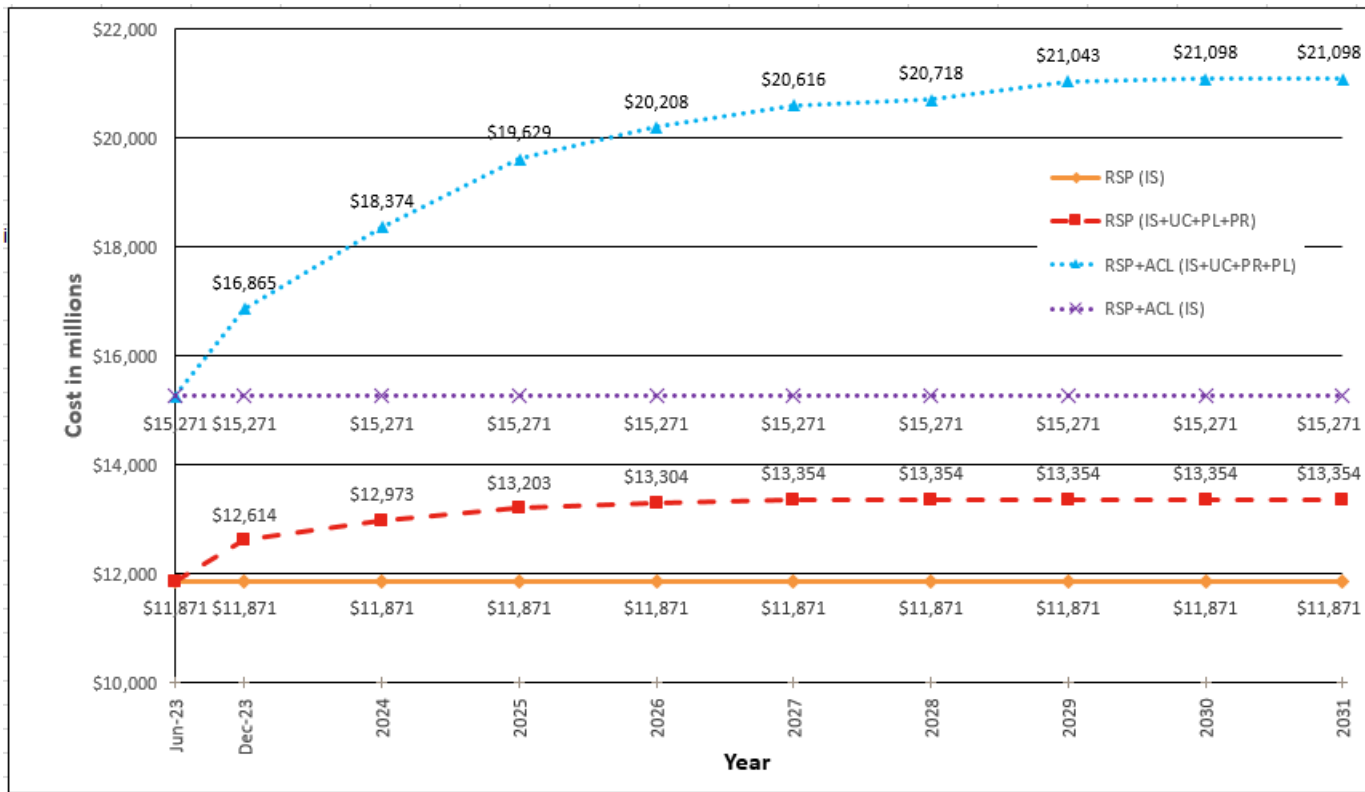
- **12 Projects Placed In-Service**

Project ID #	Transmission System Upgrades	Cost (in millions \$)
346	Line 385 Asset Condition Wood Structure Replacements (New Hampshire)	5.0
347	Line 391 Asset Condition Wood Structure Replacements (New Hampshire)	9.0
353	326 345 kV Line Structure Replacements (Massachusetts)	8.9
366	Eagle Substation 345/115 kV Autotransformer Replacement (New Hampshire)	6.4



June 2023 Asset Condition List Update, cont.

- Cumulative Investment of New England Transmission Reliability Projects and Asset Condition through 2031



* IS – In Service, UC – Under Construction, PL – Planned, PR – Proposed

** Future total \$ are shown at the end of the project. Totals do not reflect or show phasing in over time or the depreciation of prior projects. Total costs are associated with the year projects are placed in-service as reported in the Project List.

Questions



APPENDIX



Project Listing

- **Project Listing Column Definitions for**
 - Reliability Projects
 - Interconnection Projects
 - Market Efficiency Upgrades
 - Elective Projects

Project Listing – Column Definitions, cont.

- **Part Number (Part #)**

- The Part #'s designate the 'need' category of the project*
 - Part 1: these projects are Reliability Upgrades
 - » 1a Planned (must be the preferred solution to solve the needs and have I.3.9 approval) or Under Construction
 - » 1b Proposed (is supported by a Solutions Study or a Competitive Solution Process)
 - Part 2: these projects are Generator Interconnection Upgrades
 - » 2a Planned (I.3.9 approval with Interconnection Agreement including FCM related transmission upgrades to meet the Capacity Capability Interconnection Standard), or Under Construction
 - » 2b Proposed (at a minimum, a completed System Impact Study and I.3.9 approval but no Interconnection Agreement)
 - Part 3: these projects are Market Efficiency Upgrades
 - » 3a Planned (must be the preferred solution to solve the needs and have I.3.9 approval) or Under Construction
 - » 3b Proposed (is supported by a Competitive Solution Process)
 - Part 4: these projects may be promoted by any entity electing to support the cost of transmission changes. The entity sponsoring the changes will have their own justification for their actions
 - » 4a Planned (I.3.9 approval with Interconnection Agreement) or Under Construction
 - » 4b Proposed (I.3.9 approval but without Interconnection Agreement)

* Original categories are not changed when a project is placed 'In-Service' or 'Cancelled'.

Project Listing – Column Definitions, cont.

- **Project ID**
 - The Project ID is generated by ISO-NE System Planning
- **Primary Equipment Owner**
 - The company listed here is the responsible equipment owner/provider designated to design and implement the project
- **Other Equipment Owner**
 - For projects that involve multiple Transmission Owners, the company listed here is also a responsible equipment owner/provider designated to design and implement the project
- **Projected Month/Year of In-Service**
 - The month/year entered is the date the project is expected to be placed in service
- **Major Project**
 - Name is given to a project that consists of smaller subprojects
- **Project/Project Component**
 - The month/year entered is the date the project is expected to be placed in service
 - A brief, high-level description of the project is entered here
 - Includes major pieces of substation equipment and/or types of line work to be performed

Project Listing – Column Definitions, cont.

- **Status**

- In Service
 - The project has been placed in operation
- Under Construction
 - The project has received necessary approvals and a significant level of engineering or construction is underway
- Planned
 - A regulated transmission solution upgrade that has been approved by the ISO pursuant to Section I.3.9 of the Tariff, or
 - An interconnection related transmission upgrade that has been approved by the ISO pursuant to Section I.3.9 of the Tariff with Interconnection Agreement
- Proposed
 - A regulated transmission solution that has been selected by the ISO in response to a Needs Assessment and communicated to PAC, or
 - An interconnection related transmission upgrade that has been approved by the ISO pursuant to Section I.3.9 of the Tariff, but without Interconnection Agreement
- Cancelled
 - Project has been cancelled

* On December 10, 2019, FERC accepted Tariff changes that removed the 'Concept' category.

Project Listing – Column Definitions, cont.

- **PPA Approval (Review of Market Participant’s Proposed Plans)**
 - A date in this column signifies when the project received approval pursuant to Section I.3.9 of the ISO-New England Tariff. This approval indicates that the project will have no adverse impact on the stability, reliability, or operating characteristics of the system.
 - A ‘no’ indicates that an approval is required, but has not been received yet
 - An ‘NR’ indicates that an I.3.9 approval is not required
- **TCA Approval (Transmission Cost Allocation)**
 - A date in this column signifies when the project PTF costs were reviewed and approved. This approval indicates that it has been agreed whether, and by how much, the scope of the project and associated costs exceed regional needs
 - An ‘NR’ indicates that a TCA approval is not applicable because the project has been cancelled, has no/minimal PTF cost, or is associated with the interconnection of a resource or Elective Transmission Upgrade
- **Estimated Costs**
 - The PTF project cost estimate presented here should be the best estimate available. It is understood that the estimate accuracy may vary dependent on the maturity of the project. Accuracy tolerances for these estimates are targeted as follows:
 - Proposed Project that has been reviewed and approved to proceed by ISO-NE (+50%/-25%)
 - I.3.9-Approved Project (+/-25%), and
 - TCA-Approved Project (+/-10%)
 - An “NR” indicates that the PTF cost estimate is less than \$5M, either for the individual project or for the entire project when the individual project is part of a larger project (typically shown as Major Project), and/or not eligible for regional cost