



Regional System Plan

Transmission Projects and Asset Condition

June 2019 Update

Planning Advisory Committee Meeting

Eva Mailhot

ASSISTANT ENGINEER, TRANSMISSION PLANNING



TABLE OF CONTENTS

	<u>Slide</u>
<i>Highlights</i>	3
<i>June 2019 Changes</i>	4 – 12
<i>Status of Major Transmission Projects</i>	13 – 14
<i>June Asset Condition Changes</i>	15 – 17
<i>Appendix</i>	18 – 24

Highlights of the RSP Project List Update

- **Major cost estimate changes that occurred between the March 2019 and June 2019 Project List:**
None
- **New Projects:**
None
- **4 Upgrades on the project list have been placed in-service since the March 2019 update:**
(MA) Greater Boston – Central - 3 projects in-service
(MA) Southeast Massachusetts/Rhode Island Reliability Project – 1 project placed in-service
- **1 project cancelled since the March 2019 update:**
(ME) Newcastle Substation Upgrades Project – addition of two 115 kV circuit breakers at the existing 115 kV bus at Newcastle substation to reconfigure the existing 115 kV bus to a 4-breaker ring bus. LSP project was cancelled do to a change in needs.
Cost reduction: \$7.3 M



June 2019 Changes

No New Projects

Project ID #	Transmission System Upgrades	Cost (in millions \$)	Improvement/Need
--------------	------------------------------	-----------------------	------------------



June 2019 Changes, *cont.*

4 Projects Placed In-Service and Corresponding Needs

Project ID #	Transmission System Upgrades	Cost (in millions \$)	Improvement/Need
1518	Station upgrades to create a second normally closed 115 kV bus tie at Kingston Station and reconfigure the 345 kV switchyard (Massachusetts) Greater Boston - Central	14.5	Resolve thermal overloads
1741	Rebuild the Middleborough Gas and Electric (MGED) portion of the E1 line from Bridgewater to Middleborough (2.5 miles) (Massachusetts) Southeast Massachusetts/Rhode Island Reliability Project	3.3	Resolve thermal overloads
1352	Add a second Mystic 345/115 kV autotransformer and Mystic bus reconfiguration (Massachusetts) Greater Boston - Central	19.4	Resolve thermal overloads
1357	Open up lines 329-510/511 and 250-516/517 at Mystic and Chatham respectively. Operate K Street as normally closed station (Massachusetts) Greater Boston - Central	1.5	Reconfiguration needed to resolve short circuit concerns



June 2019 Changes, *cont.*

Cost Estimate Comparisons of Reliability Projects

March 2019 vs. June 2019 Update ⁽¹⁾

	As of Mar 2019 Plan Update (in millions \$)	As of Jun 2019 Plan Update (in millions \$)	Change in Plan Estimate (in millions \$)
MAJOR PROJECTS			
Maine Power Reliability Program (MPRP)	1466	1466	0
Greater Hartford & Central Connecticut (GHCC)	307	307	0
New England East - West Solution (NEEWS) NEEWS (Greater Springfield Reliability Project) \$676.0 NEEWS (Rhode Island Reliability Project) \$362.3 NEEWS (Interstate Reliability Project) \$482.3 NEEWS \$59.6	1581	1581	0
Southeast Massachusetts/Rhode Island Reliability Project	326	327	1
Pittsfield/Greenfield Project	179	179	0
Greater Boston - North, South, Central, Western Suburbs	832	832	0
New Hampshire Solution - Southern, Central, Seacoast, Northern	328	328	0
Vermont Solution - Southeastern, Connecticut River	82	82	0
Southwest Connecticut (SWCT)	399	399	0
SUBTOTAL ⁽²⁾	5500	5501	1
OTHER PROJECTS	6794	6792	-2
NEW PROJECTS		0	0
PROJECTS WHOSE COST ESTIMATES WERE PREVIOUSLY REPORTED AS TO BE DETERMINED (TBD)			
TOTAL ⁽²⁾	12294	12294	0
Minus 'in-service'	-10908	-10947	
Aggregate estimate of active projects in the Plan ⁽²⁾	1386	1347	

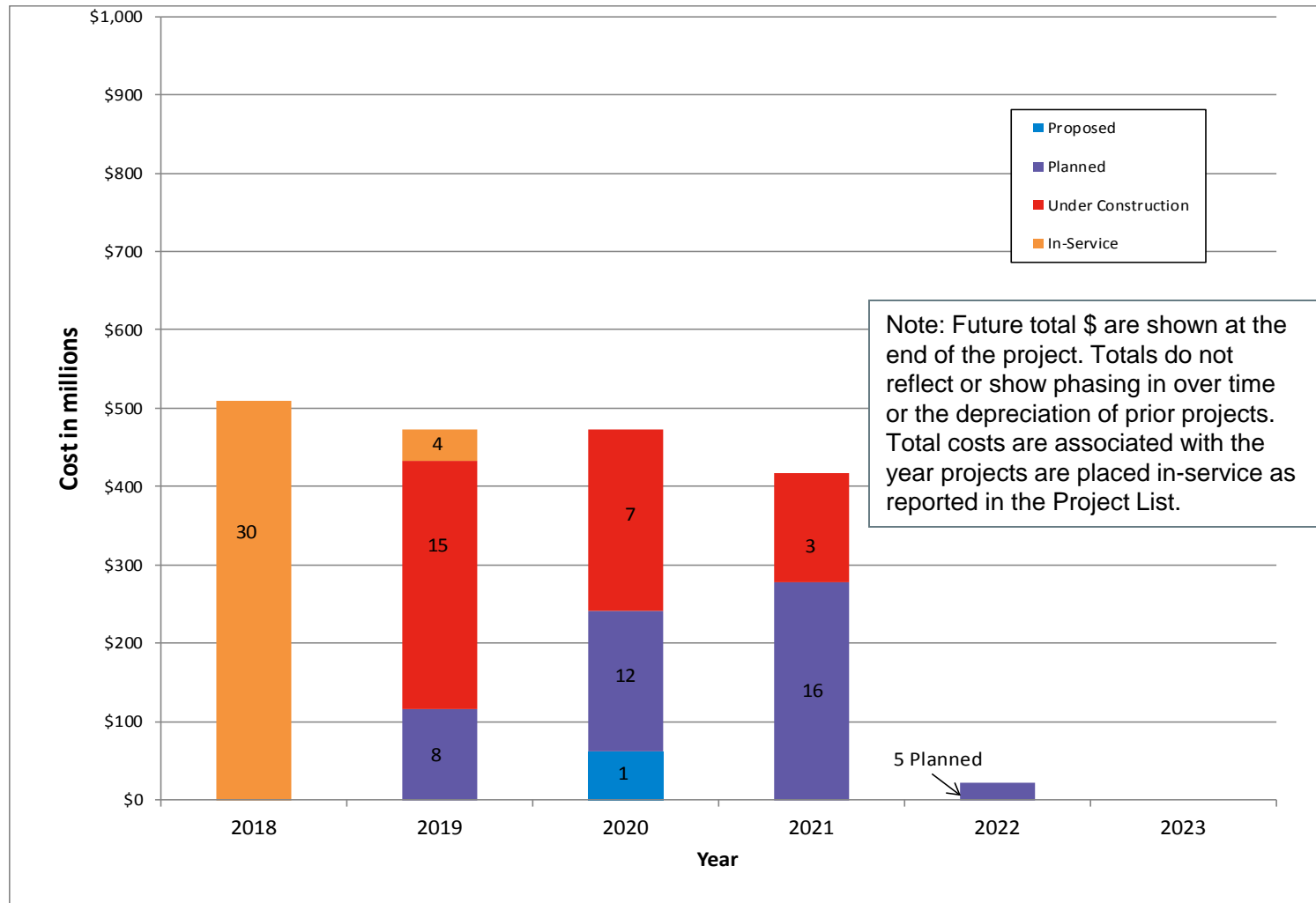
⁽¹⁾ Transmission Owners provided all estimated costs, which may not meet the guidelines described in Planning Procedure 4, Attachment D

⁽²⁾ May not sum exactly due to rounding

⁽³⁾ The cost estimates for projects in the "Major Projects" category are moved to the "Other Projects" category once they are fully completed.

June 2019 Changes, *cont.*

Investment of New England Transmission Reliability Projects by Status through 2023

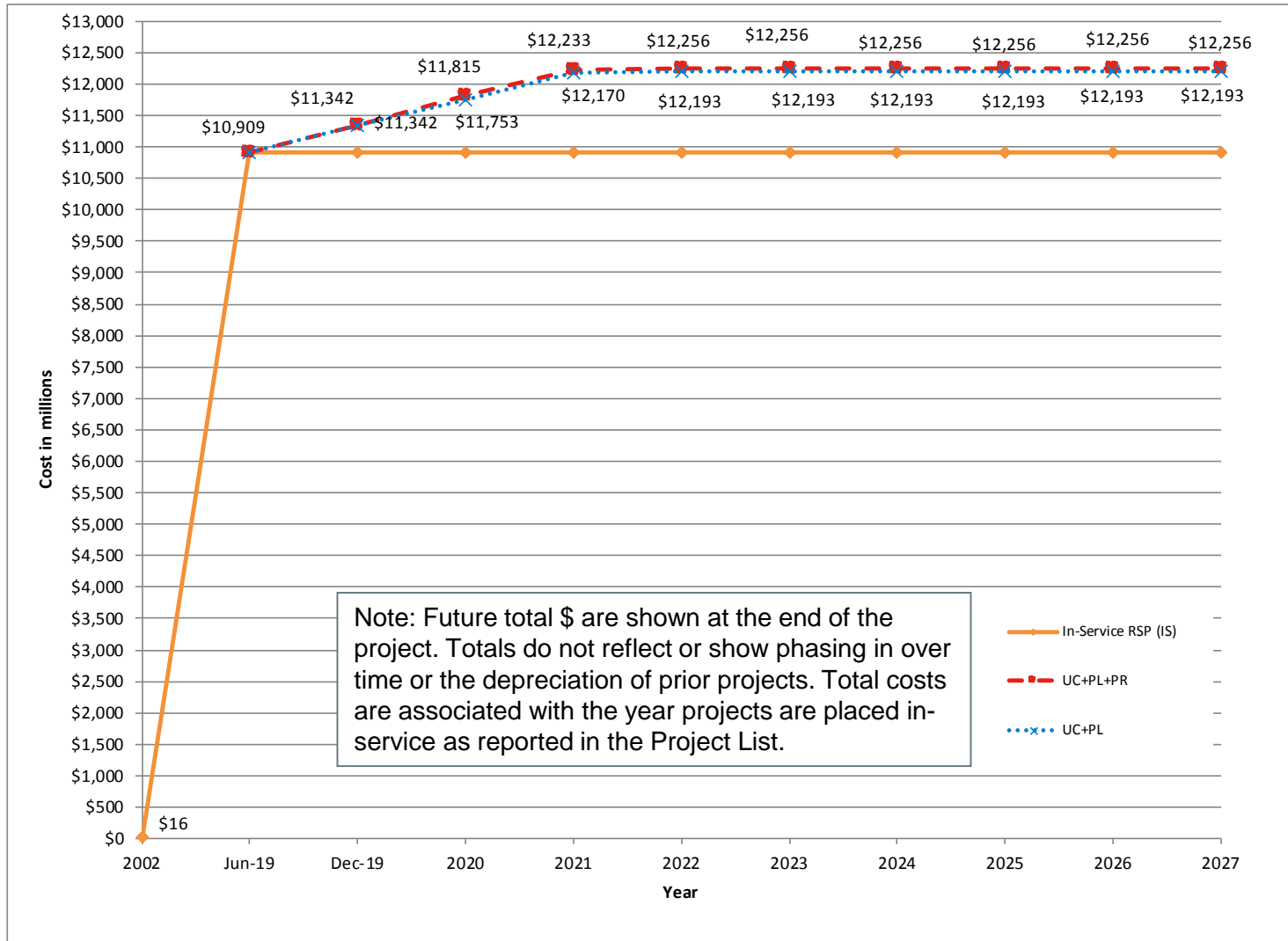


Note: Numbers shown represent project quantities



June 2019 Changes, *cont.*

Cumulative Investment of New England Transmission Reliability Projects through 2027



Note: UC – Under Construction, PL – Planned, PR – Proposed

June 2019 Changes, *cont.*

Reliability Project Counts and Aggregated Cost Estimates by Project Stage with Applied Accuracy Ranges ⁽¹⁾

Project Stage (Status)	Component / Project / Plan Count ⁽²⁾	Estimate Range		Estimated Costs (\$millions)	Range	
		Minimum	Maximum		Minimum	Maximum
Proposed	1	-25%	25% ⁽³⁾	63	47	78
Planned	41	-25%	25%	596	447	745
Under Construction	25	-10%	10%	688	619	757
Total Plan (excluding Concept)	67			⁽⁵⁾ 1347	1113	1581
Concept	0			⁽⁴⁾ 0		
In-Service	4	-10%	10%	39	35	43
Cancelled	1			7		

(1) All costs provided by Transmission Owners. The costs in the table reflect all projected in-service dates

(2) Efforts need to be made to describe projects on a more consistent basis

(3) All estimates may not yet be at this level of accuracy; many estimates may be -25%/+50%

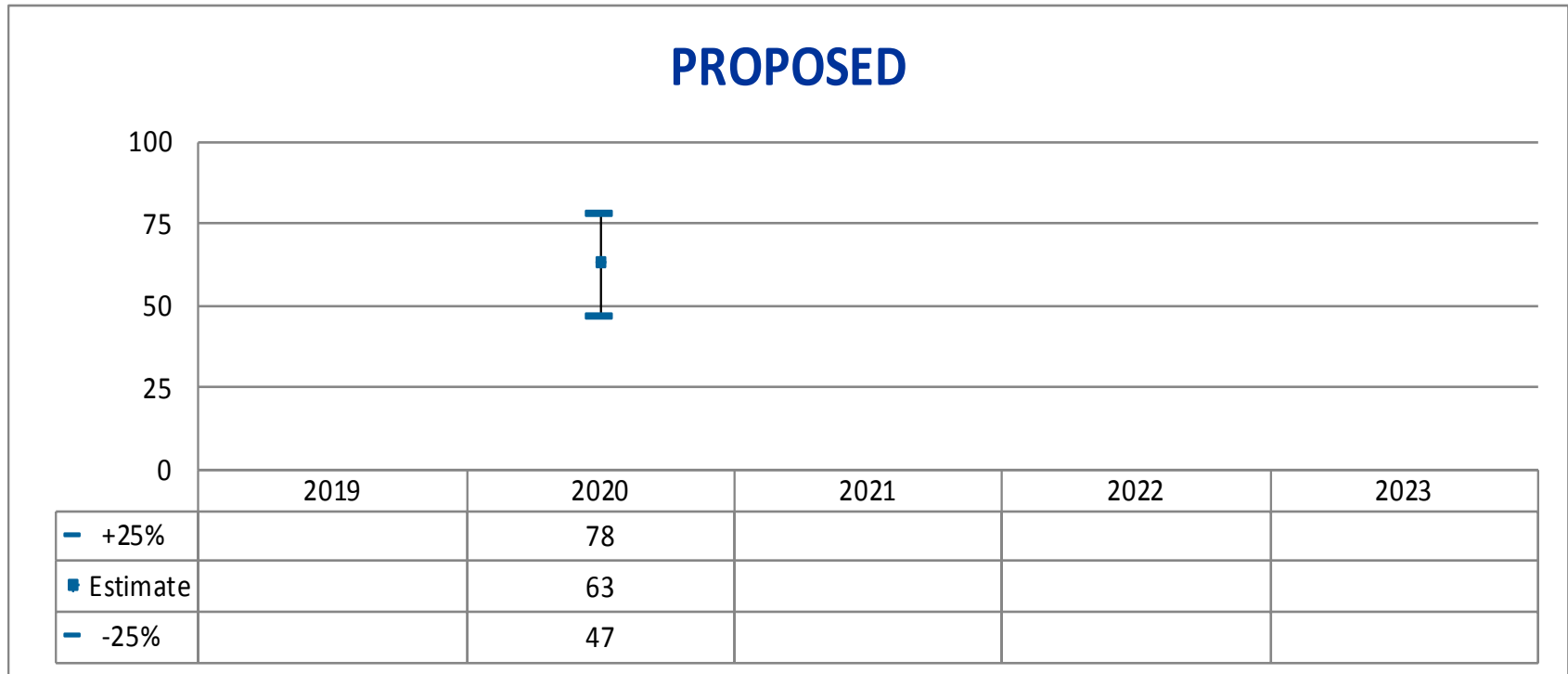
(4) Not included here are the costs of reliability projects for which no estimates have been provided.

Estimates for these projects are noted as TBD in the Project Listing and are only Concept Projects.

(5) May not add up due to rounding.

June 2019 Changes, *cont.*

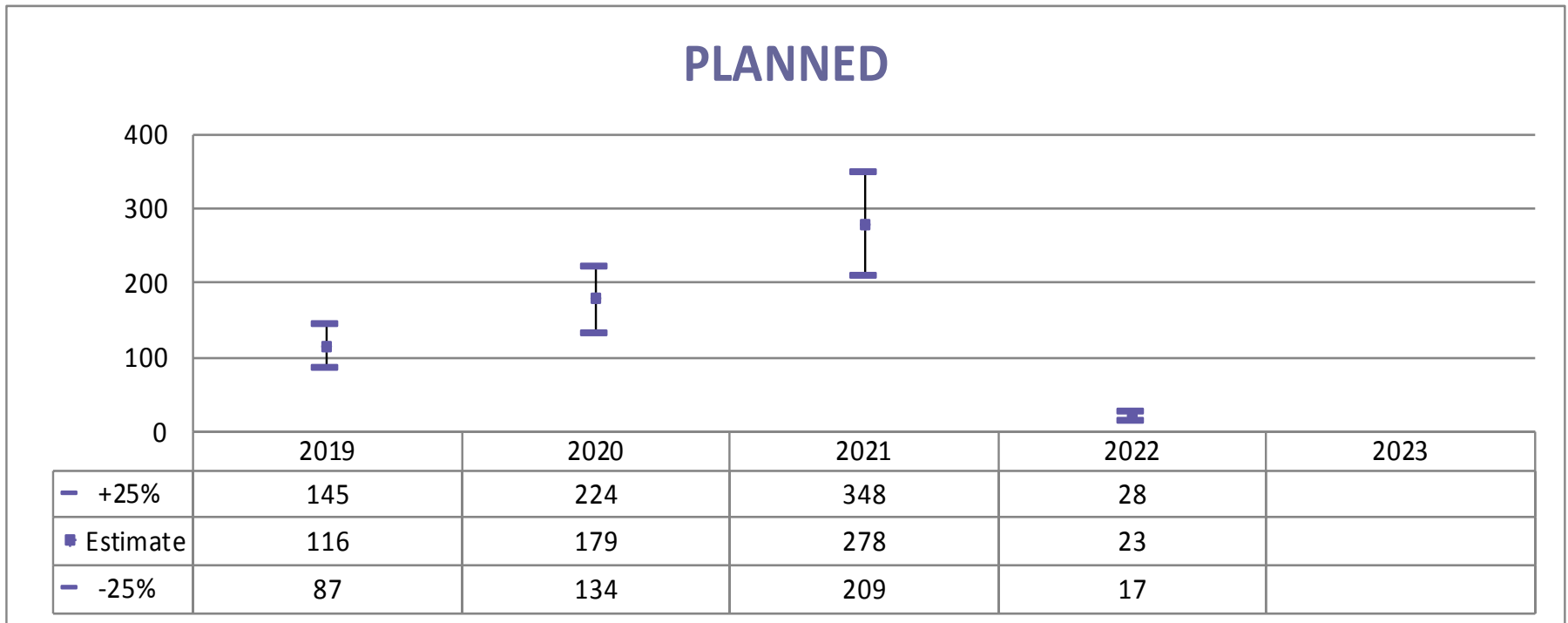
Project Cost Estimate Tolerances by Status and Year in Millions \$



Note: 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 2019 Changes, *cont.*

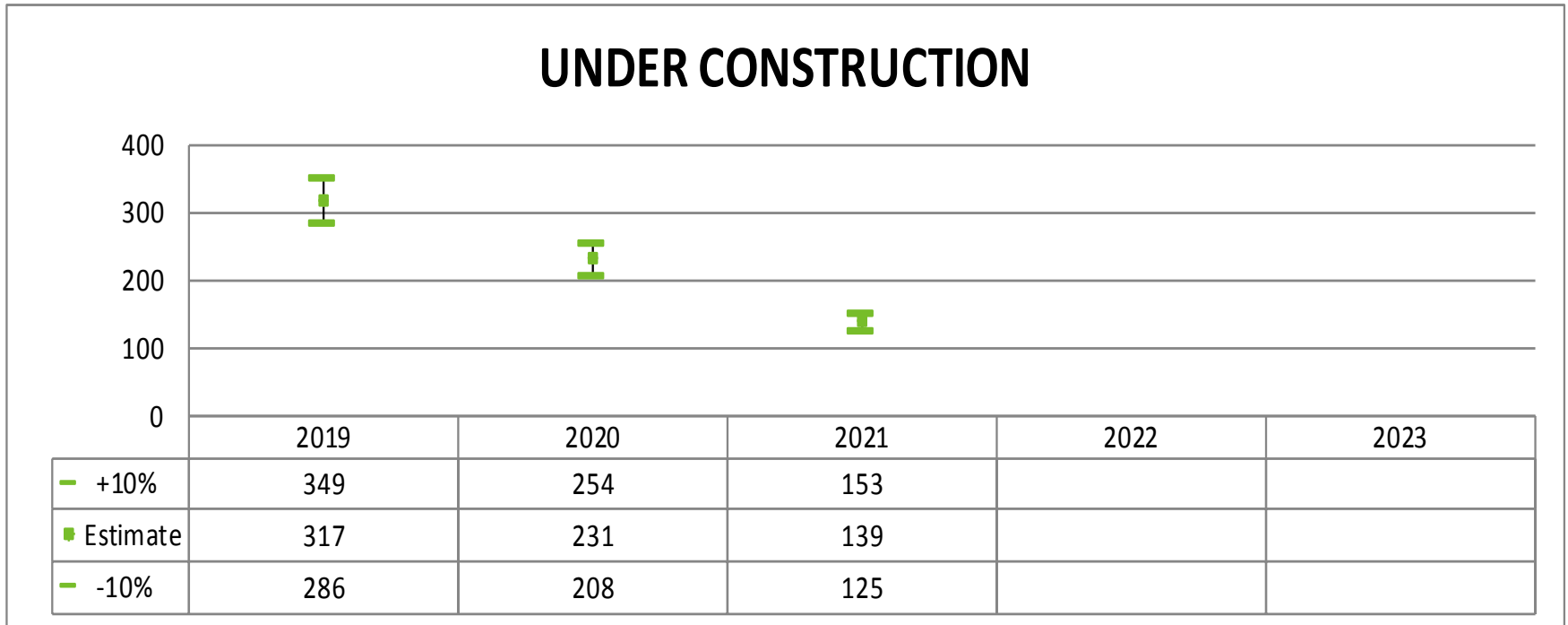
Project Cost Estimate Tolerances by Status and Year in Millions \$



Note: 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 2019 Changes, *cont.*

Project Cost Estimate Tolerances by Status and Year in Millions \$



Note: 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
Pittsfield/Greenfield Project	Approved 12/12, 01/16, 05/16	Partial 2/11/16, 7/17/17, 2/15/19	Project completion 2014-2020
Southwest Connecticut (SWCT)	Approved 4/15	Complete 7/16/15, 4/15/16, 5/13/16, 1/3/18, 2/15/19	Project completion 2013-2020
Southeast MA/RI Reliability	Approved 5/17, 4/18	Submitted	Project completion 2017-2021
Central/Western MA Reinforcements	Approved 12/07, 3/11	Group 1 2/29/2012	Project completion 2009-2019
Greater Boston – North, South, Central and Suburbs	Approved 4/15, 5/15, 6/16	TCA Submitted	Project completion 2013-2021

Status of Major Transmission Projects, *cont.*

	PPA	TCA	Construction
New Hampshire Solution – Western, Central, Southern and Seacoast	3/13	Seacoast 11/5/15 Southern 1/7/16 Western 12/17/15 Central 11/25/15	Project completion 2013-2019
Greater Hartford & Central Connecticut (GHCC)	4/15	Partial 10/4/2016	Project completion 2015-2019



June 2019 Asset Condition

1 New Project

Project ID #	Transmission System Upgrades	Cost (in millions \$)
163	667 69 kV line rebuild and asset condition project (Connecticut)	24.1



June 2019 Asset Condition, *cont.*

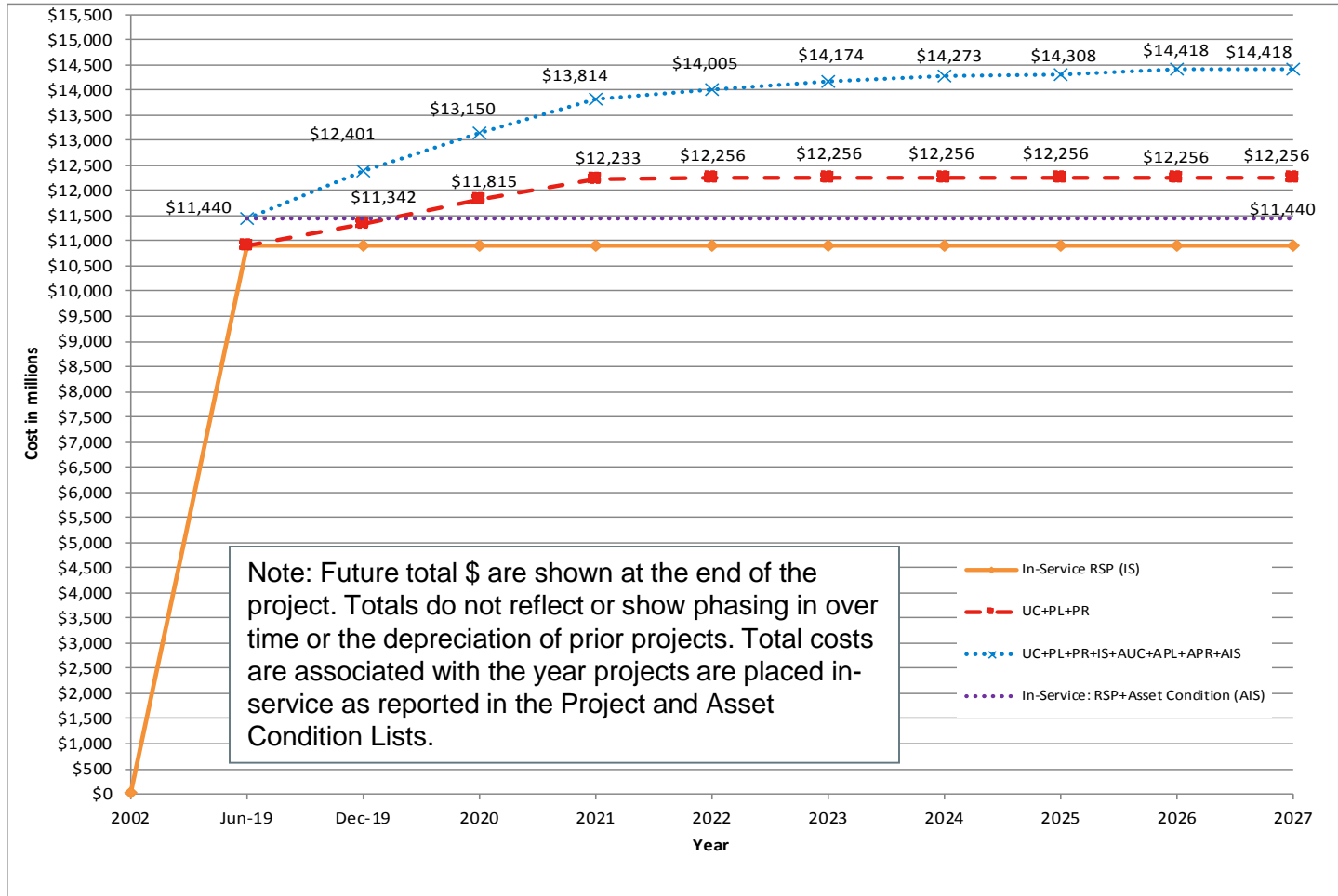
3 Projects Placed In-Service

Project ID #	Transmission System Upgrades	Cost (in millions \$)
68	Card-Montville-Tunnel Corridor Asset Condition and OPGW Installation Project (Connecticut)	55.0
73	Eversource 345 kV Structure Replacement Project - Line 330 (Connecticut)	13.7
116	1880 115 kV Line Cable Replacement (Connecticut)	7.2



June 2019 Changes, *cont.*

Cumulative Investment of New England Transmission Reliability Projects and Asset Condition through 2027



Note: RSP - UC – Under Construction, PL – Planned, PR – Proposed, IS – In-service
 Asset Condition - AUC – Under Construction, APL – Planned, APR – Proposed, AIS – In-service

Appendix



Summary: Project Listing Definitions

- **ISO New England Inc. Transmission, Markets and Services Tariff Section II Attachment K, Regional System Planning Process**
 - Project Listing Subcategories**
 - **Concept:** shall include a transmission project that is being considered by its proponent as a potential solution to meet a need identified by the ISO in a Needs Assessment or the RSP, but for which there is little or no analysis available to support the transmission project. (Project not well-defined, costs not well-defined, solution implementation not supportable).
 - **Proposed:** The project will include a regulated transmission solution that has been proposed in response to a specific Needs Assessment or the RSP and has been evaluated or further defined and developed in a Solutions Study or in the competitive solutions process and communicated to PAC. (Project well-defined, cost estimate quality sufficient for comparison of alternatives).
 - **Planned:** The project will include a Transmission upgrade that has been approved by the ISO, pursuant to Section I.3.9 (presumes Needs Assessment and Solutions Study have been completed). (Still subject to Schedule 12C review for Transmission Cost Allocation)

Project Listing

Project Listing Column
Definitions for:

- Reliability Projects
- Interconnection Projects
- Market Efficiency Upgrades
- Elective Projects

Project Listing – Column Definitions

Part Number (Part #)

The Part #'s designate the 'need' category of the project. Original categories are not changed when a project is placed 'In-Service' or 'Cancelled'.

Part 1 – These projects are Reliability Upgrades.

1a: Planned or Under Construction

1b: Concept or Proposed

Part 2 – These projects are Generator Interconnection Upgrades.

2a: Planned (I.3.9 approval with Generator Interconnection Agreement including FCM related transmission upgrades to meet the Capacity Capability Interconnection Standard), or Under Construction

2b: Concept or Proposed (at a minimum, a completed System Impact Study and I.3.9 approval but no Generator Interconnection Agreement)

Part 3 – These projects are Market Efficiency Upgrades.

3a: Planned or Under Construction

3b: Concept or Proposed

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 or Under Construction

4b: Concept or Proposed

Project Listing – Column Definitions, *cont.*

Project ID

This number is generated from ISO-NE System Planning Information Tracking System. It may change in the future as the tracking system evolves.

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 given to a project that consists of smaller subprojects.

Project / Project Component

A brief, high-level description of the project is entered here. It will either include 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: The project will include a Transmission upgrade that has been approved by the ISO.

Proposed: The project will include a regulated transmission solution that has been proposed in response to a specific Needs Assessment on the RSP and has been evaluated or further defined and developed in a Solutions Study and communicated to PAC.

Concept: Shall include a transmission project that is being considered by its proponent as a potential solution to meet a need identified by the ISO in a Needs Assessment or the RSP, but for which there is little or no analysis available to support the transmission project.

Cancelled: Project has been cancelled.



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 either because the project has been cancelled or no/very minimal PTF costs are involved.

Estimated Costs

The pool-supported 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:

Concept Project

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%)