

# Regional System Plan Transmission Projects June 2014 Update

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*Planning Advisory Committee Meeting*

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# Highlights

- Cost estimate changes that occurred between the March 2014 and June 2014 project list include:
  - (CT) SWCT overall costs decreased by \$22M
    - Baird to Congress line upgrades – (additional \$11.2M) – Cost adjustments were due to detailed engineering
    - Pequonnock 115 kV disconnect switch & bus upgrade (decrease \$26M) – Cost adjustments were due to canceling the delayed clearing aspect of the project
    - 3 cancelled projects – Grand Ave, Sackett 115 kV capacitor bank additions and Glen Lake – Mix Ave line upgrade
  - (NH) Southern New Hampshire Solution – Cancelled project – Reconductoring the 345 kV 326 line portion from Sandy Pond to MA/NH state line (decreased by \$39.0M)
- 2 reliability projects were added to the Project List since the March 2014 update
  - (CT) Housatonic River Crossing 115 kV line rebuild (proposed) \$16.0M
  - (MA) Greater Boston (common) – add a new 345 kV breaker at Stoughton (proposed) \$1.6M
- 16 upgrades on the project list have been placed in-service since the March 2014 update

The major projects are listed below:

- (ME) MPRP – 10 projects were placed in service during this period
- (RI) Add new 115/13.8 kV Highland Drive Substation by looping the J-16 line in and out
- (MA) Auburn Area Transmission System Upgrades – Dupont Substation upgrade bus work and convert to BPS substation
- (MA) Greater Boston – upgrade 115 kV line 201-501 (Medway-Depot St) and the 201-502 (Beaver Pond-Depot Street Tap) to a higher capacity line
- (MA) Central/Western MA Upgrades – Reconductor from (A-127E/B-128E) Millbury –Tower 510 115 kV line
- (NH) Southern NH Solution – Upgrade 115 kV line P145 (Oak Hill-Merrimack)
- (ME) Add two 115 kV circuit breakers and 115/34.5 transformer to North Augusta Substation

BPS – Bulk Power System

MPRP – Maine Power Reliability Program



# Highlights – Greater Boston Projects

- As a part of the March 2014 project listing update, the Greater Boston projects were modified to reflect the November 2013 GBWG update that was provided to PAC
  - Projects were divided into “Common” projects and projects unique to the “AC Only” plan
  - Several of the costs were either based on the March 2012 GBWG presentation or were not included in the project listing
- A net cost reduction of \$21M was seen between the October 2013 project listing update and the June 2014 Project listing update
  - \$300M of project costs were no longer a part of the GB solution and were cancelled in March 2014
  - \$279 M of project costs were either updated or added in the June 2014 project listing
  - The projects that were added in the March 2014 project listing without cost were moved to “Proposed” status from the “Concept” status with the updated costs
- GB total cost in the project listing is \$695M
  - Upgrades Common to “AC Only” and “SeaLink HVDC” plan: \$221M
  - Upgrades unique to “AC Only” plan: \$450M
  - Common projects - Under Construction: \$5M
  - Common projects - In-service projects: \$19M
  - However, some upgrades related to BPS and stability concerns have not been included in the totals
- A review of the AC Only and SeaLink HVDC plan continues at this time



# June 2014 Changes,

## 2 New Projects and Corresponding Needs

Project ID #	Transmission System Upgrades	Cost (in millions)	Improvement/Need
1555	Housatonic River Crossing 88006A & 89006B 115 kV line rebuild (Connecticut)	16.0	Address asset condition concerns for line sections in SWCT
1558	Add a new 345 kV breaker in series with the 104 breaker at Stoughton (Massachusetts) Greater Boston South (Common)	1.6	Address high voltage concerns in the 345 kV system South of Boston

Does not include concept projects



# June 2014 Changes, *cont.*

## 16 Projects Placed In-Service and Corresponding Needs

Project ID #	Transmission System Upgrades	Cost (in millions)	Improvement/Need
1510	Add a new 115/13.8 kV Highland Park Substation by looping the J-16 line in and out of this new substation (Rhode Island) New Highland Park Substation Project	3.8	Addition of new substation to address load growth
919	Dupont substation - Upgrade bus-work and convert to BPS substation. Includes adding 5 breakers ring bus configuration and a second distribution transformer. Terminal upgrades to increase ratings on G18 and C2. (Massachusetts) Auburn Area Transmission System Upgrades	12.5	Improve reliability in the Auburn area
1175	Upgrade the 115 kV line 201-501 (Medway-Depot St.) and the 201-502 (Beaver Pond - Depot Street Tap) to a higher capacity line (Massachusetts) Greater Boston – South (Common)	6.2	Resolve thermal overloads
935	Reconductor from (A-127E/B-128E) Millbury - Tower 510 115 kV line (Massachusetts) Central/Western Massachusetts Upgrades	12.9	Increase load serving capability in the Central/Western MA area
1308	Upgrade 115 kV line P145, Oak Hill-Merrimack (New Hampshire) Southern New Hampshire Solution	1.7	Relieve thermal overloads in the Southern New Hampshire area
1406	Add a new 345 kV transmission line (3021) between South Gorham and Maguire Road (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine



# June 2014 Changes, *cont.*

## 16 Projects Placed In-Service and Corresponding Needs

Project ID #	Transmission System Upgrades	Cost (in millions)	Improvement/Need
1409	Tap the 243 115 kV line between Rumford and Rumford I.P. at junction Section 243 and extend the new 243A to Livermore Falls (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1410	Add a new 115 kV transmission line (251) between Livermore Falls and Larrabee Road (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1419	Rebuild a portion of the 115 kV transmission line (89) between Livermore Falls and Riley (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1424	Reconductor the entire length of the 115 kV transmission line (160) between Cape and Hinckley Pond (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1428	Add a new 345/115 kV autotransformer #1 at the expanded Maguire Road Substation (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1430	Expand the 345/115 kV South Gorham Substation to interconnect the new 3021 345kV line to Maguire Road (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine



# June 2014 Changes, *cont.*

## 16 Projects Placed In-Service and Corresponding Needs

Project ID #	Transmission System Upgrades	Cost (in millions)	Improvement/Need
1440	Expand the existing Livermore Falls 115 kV Substation interconnecting lines 243A, 251, 89, 278 between substations Rumford I.P., Larrabee Road, Riley and Sturtevant (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1447	Remove Section 232 (Spring Street to Westbrook) and Section 234 (Spring Street to Redbrook) at the Spring Street 115 kV Substation and tie lines together in the right-of-way to bypass the Spring Street Substation (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1459	Install a new 10.8 MVAR 34.5 kV capacitor bank at existing Belfast 115/34.5 kV substation (Maine) Maine Power Reliability Program (MPRP)	Part of RSP 1402 (\$1,362.5 billion)	Increase load serving capability in Maine
1333	Add two 115 kV circuit breakers and 115/34.5 kV transformer at North Augusta Substation (Maine) CMP-LSP Augusta	0.9	Improve system reliability and increase load serving capability in Western Maine

MVAR – megavolt-amperes reactive





# June 2014 Changes, *cont.*

## Cost Estimate Comparisons of Reliability Projects

### March 2014 vs. June 2014 Update <sup>(1)</sup>

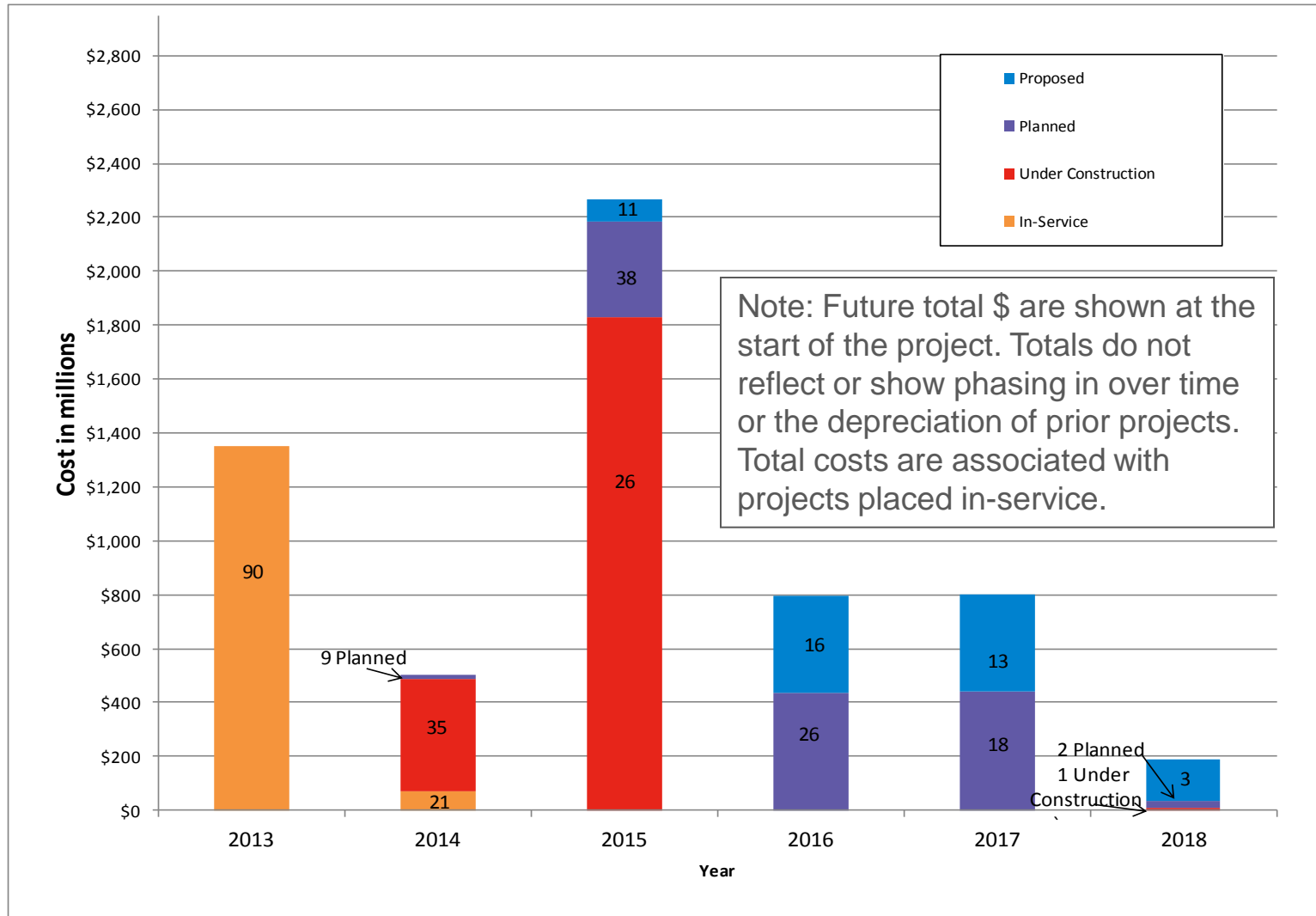
	As of March 2014 Plan Update (in millions \$)	As of June 2014 Plan Update (in millions \$)	Change in Plan Estimate (in millions \$)
<b>MAJOR PROJECTS</b>			
Maine Power Reliability Program	1453	1453	0
Merrimack Valley / North Shore Reliability Project	155	155	0
Long Term Lower SEMA Upgrades	114	114	0
New England East - West Solution (NEEWS)	1886	1886	0
NEEWS (Greater Springfield Reliability Project) \$676			
NEEWS (Rhode Island Reliability Project) \$315			
NEEWS (Central Connecticut Reliability Project) \$301			
NEEWS (Interstate Reliability Project) \$525			
NEEWS \$69			
Greater Rhode Island Transmission Reinforcements (including Advanced NEEWS)	151	151	0
Pittsfield/Greenfield Project	146	146	0
Greater Boston - North, South, Central, Western Suburbs	416	695	279
New Hampshire Solution - Southern, Central, Seacoast, Northern	380	336	-44
Vermont Solution - Southeastern, Connecticut River	99	93	-6
SWCT	317	295	-22
SUBTOTAL <sup>(2)</sup>	<b>5117</b>	<b>5324</b>	207
<b>OTHER PROJECTS</b>	5788	5858	70
<b>NEW PROJECTS</b>		18	18
<b>PROJECTS WHOSE COST ESTIMATES WERE PREVIOUSLY REPORTED AS TO BE DETERMINED (TBD)</b>		0	0
TOTAL <sup>(2)</sup>	<b>10905</b>	<b>11200</b>	295
Minus 'concept'	-119	-119	
Minus 'in-service'	-6557	-6595	
<b>Aggregate estimate of active projects in the Plan <sup>(2)</sup></b>	<b>4229</b>	<b>4485</b>	

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

<sup>(2)</sup> May not sum exactly due to rounding

# June 2014 Changes, *cont.*

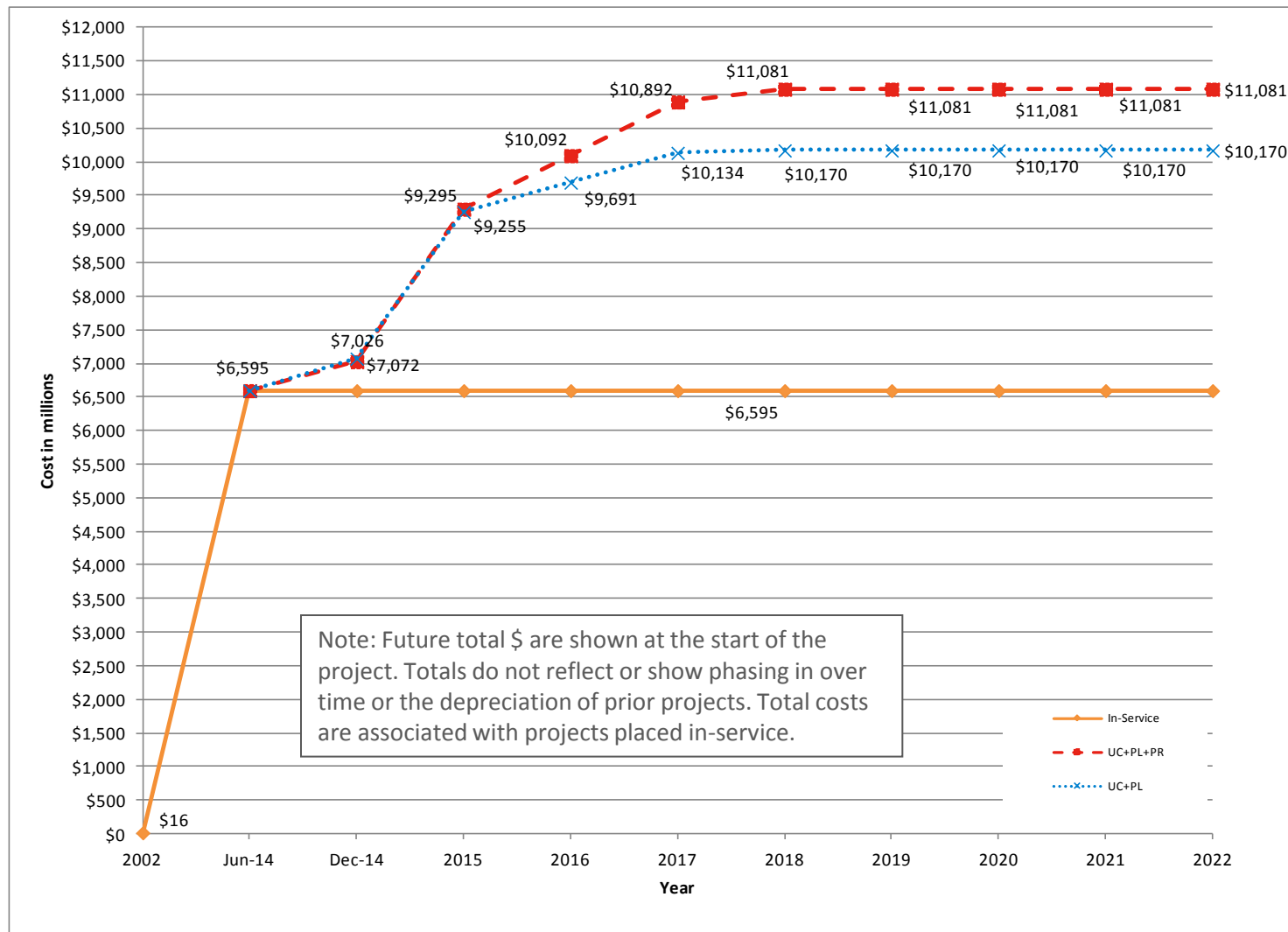
## Investment of New England Transmission Projects by Status through 2018



Note: Numbers shown represent project quantities

# June 2014 Changes, *cont.*

## Cumulative Investment of New England Transmission Projects through 2022



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

# June 2014 Changes, *cont.*

## Reliability Project Counts and Aggregated Cost Estimates by Project Stage with Applied Accuracy Ranges <sup>(1)</sup>

Project Stage (Status)	Component / Project / Plan Count <sup>(2)</sup>	Estimate Range		Estimated Costs (\$millions)	Range	
		Minimum	Maximum		Minimum (\$millions)	Maximum (\$millions)
Proposed	43	-25%	25% <sup>(3)</sup>	957	718	1196
Planned	93	-25%	25%	1280	960	1600
Under Construction	63	-10%	10%	2249	2024	2474
<b>Total Plan (excluding Concept)</b>	<b>199</b>			<sup>(5)</sup> <b>4486</b>	<b>3702</b>	<b>5270</b>
Concept	23			<sup>(4)</sup> 119		
In-Service	16	-10%	10%	38	34	42
Cancelled	6			77		

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

<sup>(2)</sup> Efforts need to be made to describe projects on a more consistent basis

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

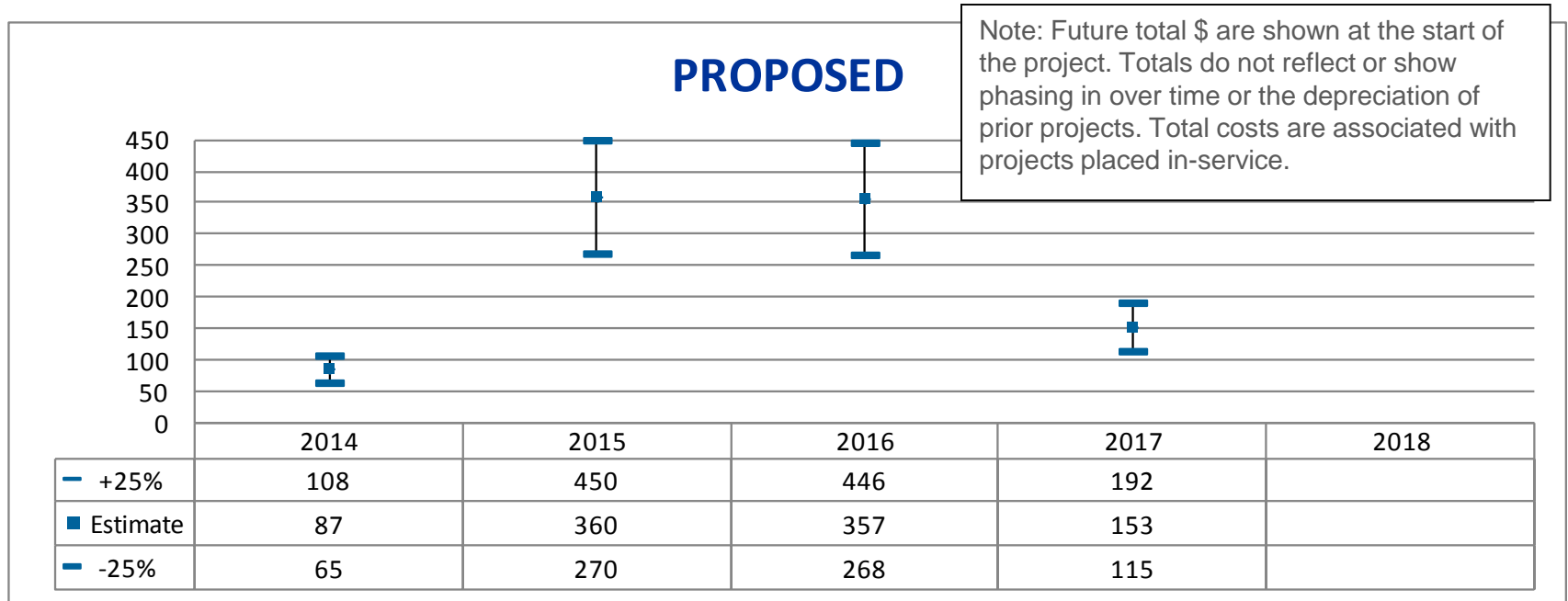
<sup>(4)</sup> Not included here are the costs of 20 reliability projects for which no estimates have been provided.

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

<sup>(5)</sup> May not add up due to rounding.

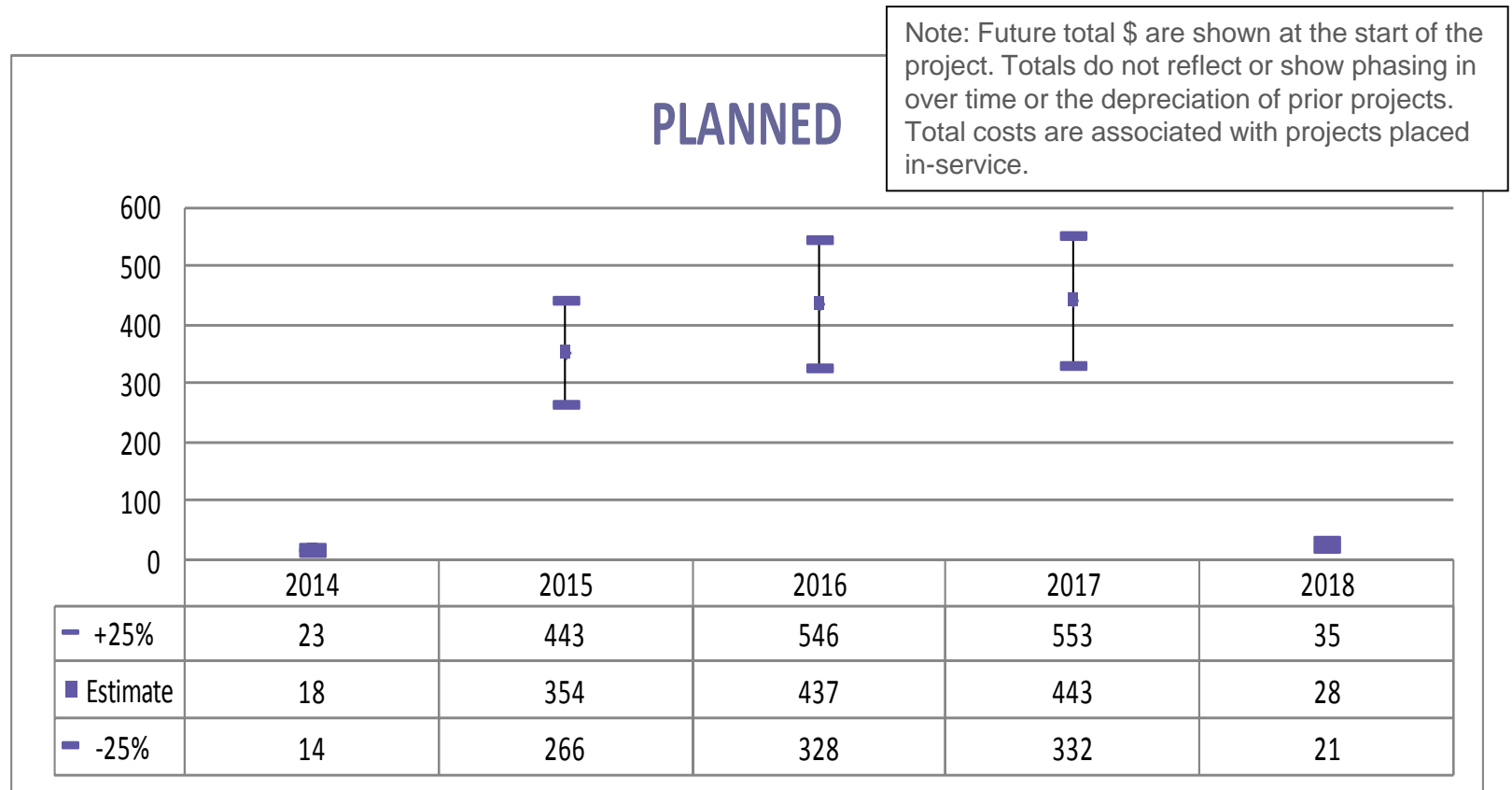
# June 2014 Changes, *cont.*

## Project Cost Estimate Tolerances by Status and Year in Millions



# June 2014 Changes, *cont.*

## Project Cost Estimate Tolerances by Status and Year in Millions



# June 2014 Changes, *cont.*

## Project Cost Estimate Tolerances by Status and Year in Millions

### UNDER CONSTRUCTION

2100  
1800  
1500  
1200  
900  
600  
300  
0

Note: Future total \$ are shown at the start of the project. Totals do not reflect or show phasing in over time or the depreciation of prior projects. Total costs are associated with projects placed in-service.

	2014	2015	2016	2017	2018
+10%	454	2011			
Estimate	413	1828			
-10%	372	1645			

# Status of Major Transmission Projects

	PPA	TCA	Construction
Auburn Area Transmission System Upgrades	Approved 1/08, 2/10	Approved 10/13, 2/14	Project completion 2013-2015
Long-term Lower SEMA Upgrades	Approved 11/09, 7/11	Approved 12/16/11	Project completion 2014
Pittsfield/Greenfield Project	Approved 12/12	Not Submitted	Project completion 2016-2017
MPRP	Approved 7/08, 2/09, 11/10	Approved 1/29/10	Project completion 2014-2017
Vermont Solution – Connecticut River Valley	Not Submitted	Not Submitted	Project completion 2016
SWCT	Approved 2/12, 7/12, 8/12, 10/12, 11/12, 1/13	Not Submitted	Project completion 2013-2018



# Status of Major Transmission Projects, *cont.*

	PPA	TCA	Construction
Central/Western MA Reinforcements (NGrid)	Approved 12/07, 3/11	Group 1 2/29/2012	Project completion 2009-2017
New England East-West Solution (NEEWS)	Approved 9/08, 5/12	Greater Springfield Reliability Project (GSRP) Approved 2/24/2014	Rhode Island Reliability Project and GSRP are completed; Projected completion of other components 2013-2017
Greater Boston – North, South, Central and Suburbs	Small portions of the Project have PPA approval	Not Submitted	Project completion 2013-2018
New Hampshire Solution – Western, Northern, Southern and Seacoast	3/13	Not Submitted	Project completion 2013-2016



# APPENDIX

# Summary: Project Listing Definitions

- **ISO New England Inc. Transmission, Markets and Services Tariff Section II**
  - **Attachment K, Regional System Planning Process**
    - Definition Of Needs Assessment
    - Definition of Solution Studies
  - **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 on the RSP and has been evaluated or further defined and developed in a Solutions Study 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
- Merchant Projects
- Projects In-Service
- Cancelled 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: Conceptual or Proposed

Part 2 – These projects are Generator Interconnection Upgrades.

2a: Proposed (I.3.9 approval but without Generator Interconnection Agreement), Planned (I.3.9 approval with Generator Interconnection Agreement), or Under Construction

2b: Conceptual or Proposed

Part 3 – These projects are Market Efficiency Upgrades.

3a: Planned or Under Construction

3b: Conceptual or Proposed

Part 4,5 – 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.

4,5a: Planned or Under Construction

4,5b: Conceptual 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 (+/-25%),

- I.3.9-Approved Project (+/-25%), and

- TCA-Approved Project (+/-10%)

