Regional System Plan Transmission Projects October 2006 – April 2007 Update

Project Data Received as of March 28, 2007

ISO new england

Table of Contents

	Slide
• Highlights	3
• April 2007 Changes	4 – 16
• Status of Major Transmission Projects	17 – 24
• Appendix	25 – 34

Note: See Page 16 for graph of investment for projects placed in service under the Regional System Plan (RSP)

Highlights

Summary of Changes of Reliability Projects
October 2006 versus April 2007 Update

New Projects (total projects now in the Plan = 299)	16
Cancelled Projects	13
Projects Advancing to 'Planned' Status (Review of Market Participant's Proposed Plans (I.3.9) - Approved)	7
Projects Commencing Construction	13
Projects Placed In Service	27
System Plan Cost Estimate Change from October 2006 Update (RSP06 total estimate: $3.7 billion)	+ $432 million

April 2007 Changes

Cost Estimate Comparisons of Reliability Projects
October 2006 vs. April 2007 Update (1)

	As of October 2006 Plan Update (in millions $)	As of April 2007 Plan Update (in millions $)	Change in Plan Estimate (in millions $)
MAJOR 345 kV PROJECTS			
Northwest Vermont Reliability Project	210.1	210.1	0
Southwest Connecticut Reliability Project (Phase I)	357 (2)	343.2 (2)	-14
Southwest Connecticut Reliability Project (Phase II)	1321	1303	-18
NSTAR 345 kV Transmission Reliability Project	225.6	225.6	0
Northeast Reliability Interconnect Project	109.9	109.9	0
New England East - West Solution (NEEWS) (3)	TBD	TBD	0
Greater Rhode Island Transmission Reinforcements (3)	TBD	195	195
Springfield 115 kV Reinforcements (3)	TBD	TBD	0
Merrimack Valley / North Shore Reliability Project	14.0	134	120
SUBTOTAL	**2238**	**2521**	**283**
OTHER PROJECTS	1589	1626	37
NEW PROJECTS		85	85
TO BE DETERMINED (TBD) PROJECTS WITH COST ESTIMATES		27	27
TOTAL	**3827**	**4259**	**432**
minus 'in-service'	-504	-900	
(Aggregate estimate of active projects in the Plan.)	**3323**	**3359**	

(1) All costs provided by Transmission Owners

(2) Includes $117.4 million of Localized Costs

(3) See subsequent slide for footnote

April 2007 Changes, *Con't*

(3) The Southern New England Transmission Reliability (SNETR) analyses have generated three groups of projects:

1. New England East – West (NEEWS)
   a. Interstate Reliability Project
   b. Greater Springfield Reliability Project
   c. Rhode Island Reliability Project
   d. Central Connecticut Reliability Project
2. Springfield 115 kV Reinforcements
3. Greater Rhode Island Transmission Reinforcements *

(*) Some projects that were a result of separate analyses have been added to this group for I.3.9 study purposes

April 2007 Changes, *Con't*

Make-up of Cost Estimate Change of Reliability Projects October 2006 vs. April 2007 Update (1)

Project	April 2007 ($ millions)	Change ($ millions)	Cause of Change
Greater Rhode Island Transmission Reinforcements	195	195	First reported cost estimates for components of the project
Merrimack Valley / North Shore Reliability Project	134	120	Updated cost estimate based on a better defined scope of work
Auburn St Substation – expansion of 345 kilovolt (kV) station to include second 345/115 kV autotransformer	78	78	First reported cost estimate for components of this conceptual project
Bangor Hydro Electric (BHE) Northern Area Project	20	20	First reported cost estimate for components of this conceptual project
Southwest Connecticut (SWCT) Reliability Project (Phase II)	1303	-18	United Illuminating component deemed to be independent of the overall project
Southwest Connecticut Reliability Project (Phase I)	343.2	-14	Attributed to aggressively placing portions of project in-service ahead of schedule
Other (aggregate) (thirty-nine projects)	163	51	Various (i.e. cancelled, new/updated estimates, new projects)
		+ $432	

(1) All costs provided by Transmission Owners

April 2007 Changes, *Con't*

Sixteen New Projects and Corresponding Needs

Transmission System Upgrades	Need
Mystic Substation – upgrade three 115 kV circuit breakers to Independent Pole Tripping (IPT) in 2007 (Boston)	Improve system stability performance in the area
Mystic Substation – add one new 115 kV West Bus circuit breaker in 2007 (Boston)	Minimize number of affected elements for stuck breaker and bus fault conditions
Mystic Substation – add one new 115 kV West Bus circuit breaker and two on the East Bus in 2009 (Boston)	Minimize number of affected elements for stuck breaker and bus fault conditions
Upgrade existing 115 kV Mystic – Everett line by adding a parallel cable next to existing line (Boston)	Improve thermal capability of the line
West Framingham Substation – add 115 kV 54 Mega Volt-Amperes-reactive (MVArs) capacitor bank (Boston)	Improve voltage control in the Boston area

April 2007 Changes, *Con't*

Sixteen New Projects and Corresponding Needs

Transmission System Upgrades	Need
Canal Substation – upgrade 345 kV circuit breaker #112 to IPT (Southeastern Massachusetts)	Improve system stability performance in the area
Canal Substation – upgrade 345 kV circuit breaker #512 to IPT (Southeastern Massachusetts)	Improve system stability performance in the area
Barnstable Substation – upgrade 115 kV capacitor bank to 35.3 MVArs (Southeastern Massachusetts)	Improve voltage control in the Cape Cod area
Falmouth Substation – upgrade 115 kV capacitor bank to 35.3 MVArs (Southeastern Massachusetts)	Improve voltage control in the Cape Cod area
Orleans Substation – upgrade 115 kV capacitor bank to 13.5 MVArs (Southeastern Massachusetts)	Improve voltage control in the Cape Cod area

April 2007 Changes, *Con't*

Sixteen New Projects and Corresponding Needs

Transmission System Upgrades	Need
Auburn St Substation – expansion of 345 kV station to include second 345/115 kV autotransformer (Southeastern Massachusetts)	Improve post-contingency voltage and thermal performance in the area
Baird Substation – replace two 115 kV Oil Circuit Breakers (OCB) (Southwest Connecticut)	Increase short circuit interrupting capability
Quinnipiac Substation – replace one 115 kV OCB (Southwest Connecticut)	Increase short circuit interrupting capability
Mix Avenue Substation – replace one 115 kV OCB and foundation (Southwest Connecticut)	Increase short circuit interrupting capability and address structural issues

April 2007 Changes, *Con't*

Sixteen New Projects and Corresponding Needs

Transmission System Upgrades	Need
Dynamic Swing Recorder (DSR) Project – upgrade seven of eight DSRs in the New England region (Regional)	Comply with NERC[1], NPCC[2], and ISO-New England Standards
Distribution Substation Work [3]	**Need**
Trapelo Road Substation – install two 115 kV circuit breakers (Boston)	Support installation of transformer and switchgear to meet local area load

(1) North American Electric Reliability Corporation

(2) Northeast Power Coordinating Council

(3) Projects may contain Pool Transmission Facilities (PTF) components (115 kV switchgear)

April 2007 Changes, *Con't*

Twenty-seven Projects Placed In-Service and Corresponding Needs

Transmission System Upgrades (Con't)	Cost (in millions)	Improvement/Need
Installation of West Rutland to New Haven overhead 345 kV line (Vermont) – part of Northwest Vermont Reliability Project	66.4	Improve post-contingency voltage and thermal performance in the area
Blissville Substation – installation of 115 kV Phase Angle Regulator (PAR) (Vermont) – part of Northwest Vermont Reliability Project	8.4	Prevent post-contingency overloads
Canal Substation – upgrade 115 kV circuit breaker #12612 (Southeastern Massachusetts)	0.2	Increase short circuit interrupting capability
Tremont Substation – add 115 kV bus tie circuit breaker (Southeastern Massachusetts)	0.6	Eliminate post-contingency overloads and low voltages
Orleans Substation – add 115 kV 30 MVAr capacitor bank (Southeastern Massachusetts)	1.2	Improve post-contingency voltage performance

April 2007 Changes, *Con't*

Twenty-seven Projects Placed In-Service and Corresponding Needs

Transmission System Upgrades	Cost (in millions)	Improvement/Need
Reconductor Wachusett to Fitch Road (M-39) 69 kV line (Central Massachusetts) – part of Central Massachusetts Reinforcements	2.8	Increase thermal capability of the line
Reconductor Wachusett to West Boylston (P-142N) 115 kV line (Central Massachusetts) – part of Central Massachusetts Reinforcements	0.3	Increase thermal capability of the line
West Boylston Substation – add 115 kV circuit breaker and conform to NPCC criteria (Central Massachusetts) – part of Central Massachusetts Reinforcements	0.5	Comply with NPCC Bulk Power System criteria
Wachusett Substation – add second115/69 kV transformer (Central Massachusetts) – part of Central Massachusetts Reinforcements	2.1	Operation of W-23 69 kV line changed to normally closed
Upgrade terminals at both ends of the Southington to Haddam Neck 345 kV (362) line (Connecticut)	1.9	Increase thermal capability of the line

April 2007 Changes, *Con't*

Twenty-seven Projects Placed In-Service and Corresponding Needs

Transmission System Upgrades (Con't)	Cost (in millions)	Improvement/Need
Killingly Substation – new 345/115 kV substation with autotransformer and circuit breaker (Eastern Connecticut) – part of Killingly Project	28.6	Improve post-contingency voltage and thermal performance in the area
Card Substation – add 345 kV circuit breaker (Eastern Connecticut) – part of Killingly Project	*(1)	Eliminate stuck breaker contingency
Installation of Plumtree to Norwalk overhead/ underground 345 kV line (Southwest Connecticut) – part of SWCT Reliability Project (Phase I)	342	Improve post-contingency voltage and thermal performance in the area
Norwalk Substation – new 345/115 kV substation with autotransformer and circuit breakers (Southwest Connecticut) – part of SWCT Reliability Project (Phase I)	*(2)	Accommodate Plumtree to Norwalk 345 kV line

(1) Cost is reflected in the Killingly Project cost estimate of $28.6 million

(2) Cost is reflected in Northeast Utilities' portion of the SWCT (Phase I) cost estimate of $342 million

April 2007 Changes, *Con't*

Twenty-seven Projects Placed In-Service and Corresponding Needs

Transmission System Upgrades (Con't)	Cost (in millions)	Improvement/Need
Modification of Cross Sound Cable 387 Line-End-Open Special Protection System (SPS) (Southwest Connecticut) – part of SWCT Reliability Project (Phase II)	*(1)	Prevent thermal overloads when SPS is triggered
South End Substation – terminal upgrades and reconductoring of five spans of the South End to Cos Cob (1750) 115 kV line (Norwalk/Stamford)	0.6	Increase thermal capability of the line
South End Substation – add 115 kV series circuit breaker (Norwalk/Stamford)	1.3	Eliminate stuck breaker contingency
Mystic Substation – upgrade three 115 kV circuit breakers to IPT in 2006 (Boston)	0.7	Improve system stability performance in the area

(1) Cost is reflected in Northeast Utilities' portion of the SWCT (Phase II) cost estimate of $1.047 billion

April 2007 Changes, *Con't*

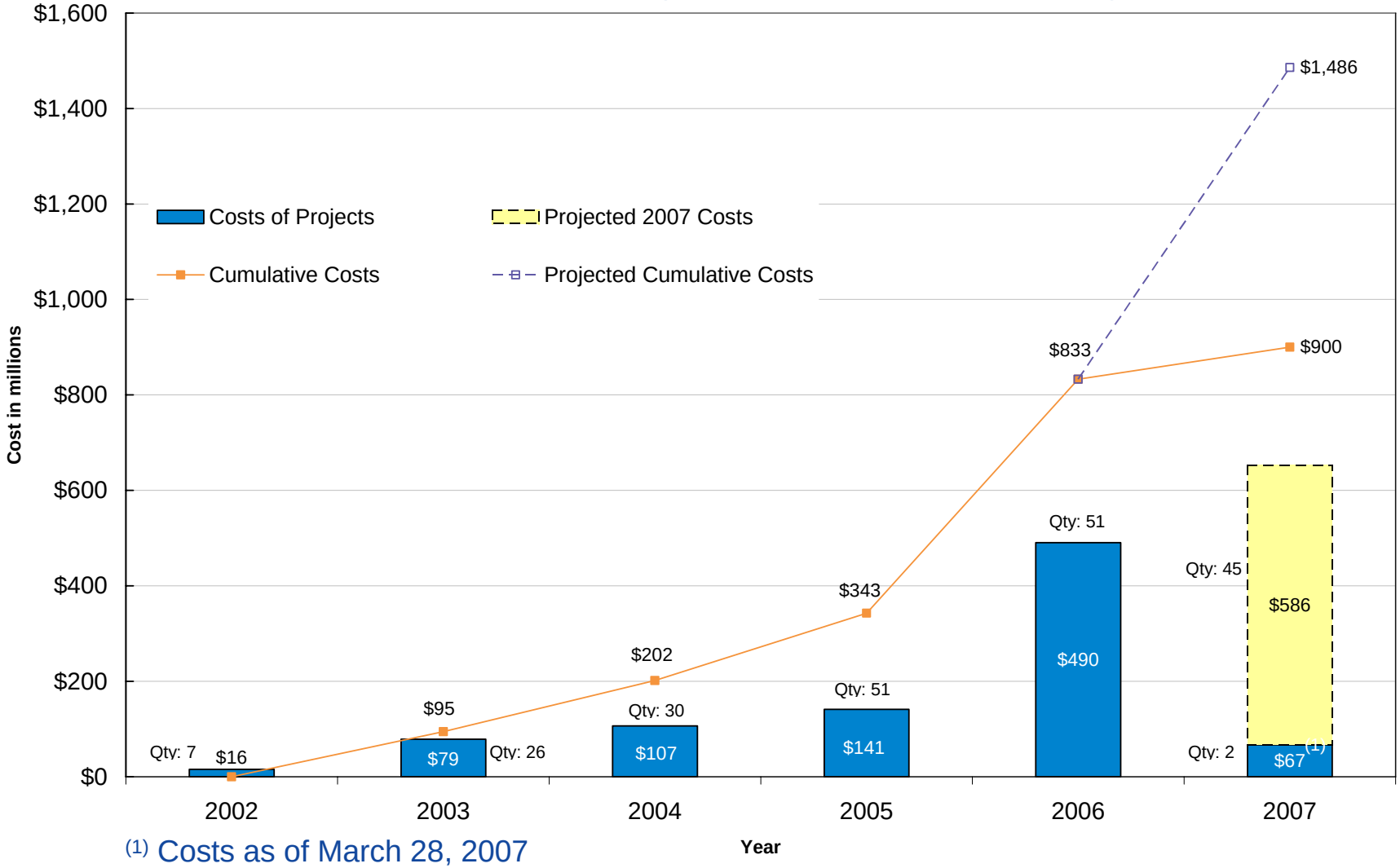
Twenty-seven Projects Placed In-Service and Corresponding Needs

Transmission System Upgrades (Con't)	Cost (in millions)	Improvement/Need
Seven components of the NSTAR 345 kV Transmission Reliability Project involving: installation of Stoughton to Hyde Park underground 345 kV line, Hyde Park autotransformer and circuit breakers, and K St 160 MVAr reactor and circuit breaker additions (Boston)	*(1)	Improve post-contingency voltage and thermal performance in the area
Distribution Substation Work (2)		**Improvement/Need**
Slayton Hill Substation – new 115 kV air break switch (New Hampshire)	0.2	Minimize extent of maintenance outages
Somerset Substation – upgrade 115 kV bus work (Southeastern Massachusetts)	0.6	Improve capacity to supply load

(1) Cost is reflected in the NSTAR 345 kV Project cost estimate of $225.6 million
(2) Projects may contain PTF components (115 kV switchgear)

April 2007 Changes, *Con't*

Investment of In-Service New England Transmission Projects



(1) Costs as of March 28, 2007

Status of Major Transmission Projects

Northeast Reliability Interconnect Project

- I.3.9 Approval – March 2003
- TCA Approval – May 2006 (ISO approved revised TCA Application)
- Siting approved for Canadian section of line
- Maine Public Utilities Commission (PUC) Siting approval – July 2005
- Maine Department of Environmental Protection (DEP) Permit received October 2005
- Department of Energy (DOE) Presidential Permit approved and received in December 2005
- Army Corps of Engineers Clean Water Act Permit received January 2006
- Right-Of-Way complete. Line construction 40% complete
- Orrington Substation work 40% complete. Series capacitor 35% complete
- Completion of work on Canadian section of the line on target
- Estimated in-service date – December 2007

Status of Major Transmission Projects, *Con't*

Northwest Vermont Reliability Project

- I.3.9 Approval – January 2003
- TCA Approval – Vermont Electric Power Company to develop amended TCA application expected June 2007
- Vermont Supreme Court upholds Vermont Public Service Board's approval of project
- Blissville Substation 115 kV PAR placed in-service December 2006
- West Rutland – New Haven 345 kV line placed in-service January 2007
- Granite autotransformers expected in May 2007 and September 2007. Phase Angle Regulators expected in early fall 2007
- Permits for Vergennes and Queen City 115 kV substations received and construction has begun
- New Haven – Queen City 115 kV line permit anticipated in second half of 2007
- Estimated in-service date – December 2007 (for remainder of project)

Status of Major Transmission Projects, *Con't*

NSTAR 345 kV Transmission Reliability Project

- I.3.9 Approval – February 2005
- TCA Approval – September 2005
- Energy Facilities Siting Board (EFSB) and Massachusetts Department of Telecommunications and Energy (MA DTE) approval received on December 23, 2004
- Pipe installation complete
- Cable pulls for Stage 1 completed
- Substation equipment installation completed
- Stoughton Substation energized May 6, 2006
- Stoughton – Hyde Park (3164) 345 kV cable fully operational November 2006
- Final testing and energization tasks underway for Stoughton – K St (3162) 345 kV cable
- Estimated in-service date – April 2007 (Stage 1) / 2008 (Stage 2)

Status of Major Transmission Projects, *Con't*

Lower SEMA (Southeastern Massachusetts) Upgrades

- I.3.9 Approval – Application for Short-Term upgrades expected summer 2007
- TCA Approval – TBD
- Studies to define Short-Term and Long-Term needs and solutions alternatives for the area
- Short-Term alternatives defined
- Long-Term needs analysis underway
- Long-Term alternatives expected December 2007
- Estimated in-service date – December 2008 (Short-Term) / 2010 (Long-term)

Status of Major Transmission Projects, *Con't*

Merrimack Valley / North Shore Reliability Project

- I.3.9 Approval – TBD
- TCA Approval – TBD
- Project involves multiple steps over a ten year horizon
- 2007 – 115 kV line reconductoring
- 2008 – new 345 kV Wakefield Junction Substation, circuit breaker additions at Sandy Pond 345 kV Substation, and capacitor bank addition at Revere Substation
- 2009, 2010, 2017 – 115 kV line replacement and reconductorings
- Task force approvals have been received
- Estimated in-service date – 2007 through 2017

Status of Major Transmission Projects, *Con't*

Southwest Connecticut Reliability Project

Phase I: Bethel (Plumtree Substation) – Norwalk (Norwalk Substation)

- I.3.9 Approval – February 2004
- TCA Approval – ISO Final Determination Letter issued September 2006, which finds $117.4 million of the total estimated cost constitutes Localized Costs
- Placed in-service – October 2006

Phase II: Middletown (Scovill / Beseck Substations) - Norwalk

- I.3.9 Approval – January 2006
- TCA Approval – Application expected August 2007
- Siting approved April 2005
- Construction is in progress
- Estimated in-service date – December 2009

Status of Major Transmission Projects, *Con't*

New England East – West Solution (NEEWS)

- Comprised of the Interstate, Greater Springfield, Rhode Island, and Central Connecticut Reliability Projects
- I.3.9 Approval – expected winter 2007
- TCA Approval – initial applications expected spring 2008
- Determination of final transmission alternatives completed June 2006
- Selection of final plan expected in summer 2007
- Tentative start for siting processes is 2008
- Estimated in-service date – 2011 - 2013

Status of Major Transmission Projects, *Con't*

Springfield 115 kV Reinforcements

- I.3.9 Approval – expected winter 2007
- TCA Approval – expected spring 2008
- Estimated in-service date – 2010

Greater Rhode Island Transmission Reinforcements

- I.3.9 Approval – expected winter 2007
- TCA Approval – expected spring 2008
- Estimated in-service date – 2009 - 2012

APPENDIX

April 2007 Changes

Project Count Update and Reconciliation – October 2006 to April 2007 Update

253	Reliability projects: as of October 2006 Update
+70	Projects added as a result of further study and scope definition of previously identified projects
+16	New projects
339	
-27	Projects placed in service
-13	Projects cancelled
299	Projects as of April 2007 Update

April 2007 Changes, Con't

Project Status Changes – October 2006 vs. April 2007 Update

October 2006 Status		April 2007 Status	Total Projects Changing Status
Conceptual	→	Cancelled	10
Conceptual	→	Proposed	74
Conceptual	→	Planned	2
Conceptual	→	Under Construction	0
Conceptual	→	In-Service	0
Proposed	→	Cancelled	3
Proposed	→	Planned	5
Proposed	→	Under Construction	0
Proposed	→	In-Service	3
Planned	→	Cancelled	0
Planned	→	Under Construction	13
Planned	→	In-Service	3
Under Construction	→	In-Service	21
		Total	**134**

April 2007 Changes, Con't

Reliability Project Status of Active Projects – April 2007 Update

Project Status	Reliability Projects Published in October 2006 Update	New Projects Added with April 2007 Update	Total Projects in the Plan
Conceptual	61	4	65
Proposed	113	10	123 (1)
Planned	77	1	78
Under Construction	32	1	33
Total	**283**	**16**	**299**

(1) Eighty-two projects are in advanced stages of studies.
(NEEWS, Greater Rhode Island Transmission Reinforcements, Springfield 115 kV Reinforcements, New Hampshire Seacoast Area Reliability, Merrimack Valley/North Shore, Lower SEMA (Short Term), and Rumford-Woodstock-Kimball Road Corridor Projects)

April 2007 Changes, Con't

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

Project Stage (Status)	Project Count	Estimate Range Minimum	Estimate Range Maximum	Estimated Costs ($millions)	Range Minimum ($millions)	Range Maximum ($millions)
Concept	65	-50%	200%	218	109	655
Proposed	123	-25%	50%	636	477	954
Planned	78	-25%	25%	679	510	849
Under Construction	33	-10%	10%	1826	1644	2009
Total April 2007 Plan	**299**			(2) **3359**	**2740**	**4467**
In-Service	27			396		
Cancelled	13			9.9		

(1) All costs provided by Transmission Owners

(2) Not included here is the cost of 124 reliability projects for which no estimates have been provided. Estimates for these projects are noted as TBD in the Project Listing

Project Listing *(as of 03/28/07)*

Project Listing Column Definitions for:

- Reliability Projects
- Interconnection Projects
- Economic Projects
- Elective Projects
- Merchant Projects
- Projects In-Service
- Cancelled Projects

April 2007 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 economic 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 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

April 2007 Project Listing–Column Definitions, Con't

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 Description

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.

Status (October 2006 / April 2007)

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 has received I.3.9 approval (if required), but may or may not have received TCA approval. The TCA approval may be applied for at a later date at the project owner's risk. Generator Interconnection projects are considered 'planned' when they have interconnection agreements filed with and accepted by the Federal Energy Regulatory Commission (FERC).

Proposed: A significant degree of analysis is available to show potential need for the project, but I.3.9 approval has not been received yet. ISO New England has been provided with a copy of the analysis associated with the project.

Concept: There is little or no analysis available to support a specific project, but there is sufficient information to suggest a pending need for future study work and a remedial project.

Cancelled: Project has been cancelled.

April 2007 Project Listing–Column Definitions, Con't

Right-Of-Way (ROW – Substation/Transmission)

These columns provide information on ROW.

Substation:
a. Expand existing; own property
b. Expanding existing; purchase required
c. New Station; own property
d. New Station; purchase required
e. No ROW required

Transmission:
a. Expansion of existing ROW required
b. New ROW required
c. No new or expanded ROW required

I.3.9 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.

April 2007 Project Listing–Column Definitions, Con't

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.

TCA Category (Transmission Cost Allocation)

This entry represents the most likely category for cost allocation, prior to TCA approval, and the actual category, post TCA approval.

'GI' – Generator Interconnection Related Upgrade
'EL' – Elective Transmission Upgrade
'NM' – NEMA Upgrade
'02' – Regional Transmission Expansion Plan (RTEP) 02 Upgrade
'RBU' – Regional Benefit Upgrade
'ECO' – Economic Upgrade

Estimated Costs (October 2006 / April 2007)

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 (-50%, +200%),
Proposed Project that has been reviewed and approved to proceed by ISO-NE (-25%, +50%),
I.3.9-Approved Project (+/-25%), and
TCA-Approved Project (+/-10%)