

NSTAR

Local System Plan

Needs Assessment / Potential Solutions

PAC Mtg.

November 17, 2011



Purpose of Local System Plan

Per Attachment K – Local, the Local System Plan (LSP):

- Describes projected improvements to non-PTF transmission system that are needed to maintain reliable customer service
- Reflects:
 - LSP Needs Assessments
 - Corresponding transmission system planning and expansion studies
- Identifies:
 - Local Planning Process
 - Criteria, Data and Assumptions

LSP Communication

- LSP is communicated to the PAC at the end of an ISO-NE PAC RSP meeting at least once per year
- ISO posts the material not less than 3 days prior to the meeting
- Transmission Customers and Stakeholders have 30 days to provide written comments for consideration by NSTAR

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LSP Communication (cont.)

- The ISO-NE RSP project list contains links to each individual PTO's LSP transmission project list
- NSTAR's LSP is located at:
 - http://www.nstar.com/business/rates_tariffs/open_access/
 - “Local Transmission Planning” folder
 - Includes project list and criteria

LSP Project List

- The LSP project list is a cumulative listing of proposed regulated transmission solutions intended to meet LSP needs
- The LSP project list contains the status of each project:
 - **Concept:** Project is under consideration as a possible solution but the needs assessment is not yet completed
 - **Proposed:** Needs assessment completed and project proposed as the solution, but Proposed Plan Application (PPA) not yet filed
 - **Planned:** PPA has been filed and approved by ISO-NE
 - **Under Construction:** Final engineering and internal approvals completed and project being implemented
 - **In-service:** Project completed

Local System Planning Process

- Local System needs can result from:
 - Load Growth
 - Sub-area reliability assessments
 - Point of delivery requests from customers
 - Generator interconnection requests
- Local System Plan consists of:
 - Summary of needs assessment results
 - Listing of criteria, data and study assumptions
 - Identification of proposed alternative solutions
 - Solution study results and selection of preferred alternative

Criteria, Data and Assumptions

- All NSTAR facilities are designed in accordance with the *NSTAR Electric Transmission Planning Criteria*
- Loads based on 2011 CELT Report forecasts for the New England area (90/10), NSTAR specific substation forecasts and municipal customer forecasts
- Studies use the ISO-NE provided base cases and the ISO-NE short circuit database

LSP – Concept Status

Need	Projected In-service Year	Service Area	Project	Status	Needs Assessment	Potential Alternatives
Load Growth	Transformer Upgrades 2013 Oil Return Line 2012/2013	NEMA / Boston	Improve Newton Station Capacity or 2nd Newton Area Substation	Concept	Newton Highlands transformer capacity is projected to be exceeded in 2017. The single line in service transmission capacity will be exceeded in 2012.	New transmission and substation in North Brighton area. -OR- Construct an oil return line to increase transmission line ratings.
Load Growth	2014	SEMA	115 kV line from Orleans to Wellfleet	Concept	A single 115kV line feeds Wellfleet. Loss of the 115 kV circuit results in overload of the distribution backup from Orleans and area low voltage.	1) Install a 2 nd 115kV, 13.1 mile transmission line from Orleans to Wellfleet. 2) Additional distribution backup from Orleans
Load Growth	2014	SEMA	Fisher Road Supply Upgrade – 115 kV 4.4 mile line from Cross Road to Fisher Road	Concept	A single 4.4 mile 115kV line feeds Fisher Rd. The distribution backup from Cross Rd will be overloaded for loss of the 115kV line.	1) Install a 2 nd 115 kV transmission line from Cross Rd to Fisher Rd Substations 2) Construct additional distribution circuit backup from Cross Rd.

LSP – Concept Status

Need	Projected In-service Year	Service Area	Project	Status	Needs Assessment	Potential Alternatives
Load Growth & Reliability	2014	SEMA	<p>New 115 kV overhead line from Barnstable to Harwich Tap</p> <p>Reconductor the 119 line from Harwich Tap to Harwich Bulk to increase capacity.</p>	Concept	<p>1. Loss of either the 118 or 119 line, with all Nantucket load supplied from Lothrop Ave results in an overload of the line that remains in service.</p> <p>2. 115 kV Lines 118 and 119 out of Barnstable Station are on a DCT for 7.2 miles of the 16 mile length. Loss of the DCT results in the loss of all Lower Cape Cod load (three major NSTAR substations + National Grid Lothrop Ave Nantucket supply).</p> <p>3. Loss of the 118 line with all Nantucket load supplied from Lothrop Ave, results in an overload of the 119 line from Harwich Tap to Harwich Bulk (~4.5 miles).</p>	<p>Install a new 115 kV line for 7.2 miles from Barnstable to Harwich Tap and construct a switching facility at Harwich Tap.</p> <p>Reconductor the 119 line from Harwich Tap to Harwich Bulk to increase capacity.</p>

LSP – Concept Status

Need	Projected In-service Month/Year	Service Area	Project	Status	Needs Assessment	Solutions
Load Growth & Reliability	2015	SEMA	Re-conductor 112 and 114 cables to increase capacity	Concept	<p>The 112 and 114 cables (Aachusnet to Pine St) are ~60 years old.</p> <p>Breaker failure or bus fault contingencies at Aachusnet result in either the 112 or 114 cable supplying all Pine St. loads (City of New Bedford), overloading the cable.</p>	Re-conductor 112 and 114 cables to increase capacity
Reliability	2016	NEMA	Maynard – Concord Supply Upgrade	Concept	A pair of 115 kV cables supplies two area substations, Maynard and Concord Municipal. The capacity of the cables is expected to be exceeded for N-1 in 2016	<p>Alt #1 Install a 3rd 115 kV UG cable for 6.5 miles from Sudbury to Maynard</p> <p>Alt #2 Install oil return piping and cooling equipment for circuits from Sudbury to Maynard</p>

LSP – Proposed Status

Need	Projected In-service Month/Year Est. Cost	Service Area	Project	Status	Needs Assessment	Potential Alternatives
Load Growth	6/2012 \$13 Mill.	NEMA / Boston	Cambridge Transmission Reliability Improvement Project	Proposed	Load growth in Cambridge at the Putnam and East Cambridge Stations is projected to exceed the capacity of the radial 115kV transmission supply.	Install oil return line to increase cooling for two pipe type cable circuits between Alewife and Putnam
Reliability	6/2012 \$1.2 Mill.	NEMA / Boston	Replace 110C transformer at Newton Highlands Substation	Proposed	Existing 110C transformer's preventive auto-transformer associated with one LTC has failed, preventing operation of the LTC under load. The transformer is ~40 years of age.	The existing 110C transformer is a 50 MVA unit with two secondary windings. There is no replacement in kind unit available. The standard 62 MVA NSTAR unit will be used, requiring addition of 115 kV breakers.
Load Growth & Reliability	6/2013 \$6 Mill.	NEMA / Boston	Dorchester Supply	Proposed	A pair of 115 kV UG cables supplies two major Boston area substations, Dewar St. and Andrew Square. The capacity of the cables was exceeded for N-1 in 2011. A N-1-1 event could produce a long duration event.	Install two(2) 1 mile 115 kV UG cables from K Street to Day Street Boulevard tap. Break the existing 3 terminal joints and create two 2 terminal joints. Final arrangement will consist of two UG cables (K St. to Andrew Sq), and two UG cables (K St. to Dewar St).

LSP – Proposed Status

Need	Projected In-service Month/Year Est. Cost	Service Area	Project	Status	Needs Assessment	Potential Alternatives
Reliability	6/2013 \$4 Mill.	NEMA / Boston	Putnam 115 kV Bus Reconfiguration	Proposed	A single fault within the 115 kV bus could cause loss of electric supply to a large amount of load.	Add a 115 kV breaker to the bus and reconfigure line terminations to the bus in order to eliminate the problem.
Load Growth and Reliability	6/2014 \$1.5 Mill.	SEMA	New Yarmouth Substation	Proposed	Recent load growth in the area has accelerated the need date.	Install a new 115 kV – 23 kV substation in Yarmouth supplied by Lines 118 and 119

LSP – Planned Status

Need	Projected In-service Month/Year Est. Cost	Service Area	Project	Status	Needs Assessment	Solutions
Load Growth	6/2012 \$3 Mill.	SEMA	Increase firm capacity of Hopkinton Substation	Planned	Substation peak load of ~68 MVA have exceeded the LTE rating of one transformer plus the load transfer capability of the substation.	Replace to two existing 40 MVA transformers with 57 MVA units.

LSP – Under Construction Status

Need	Projected In-service Month/Year	Service Area	Project	Status	Needs Assessment	Solutions
Load Growth	12/2011	NEMA / Boston	Newton Highlands Station Upgrade	Under Construction, transmission elements are in service	Projected Summer peak load will exceeded the capacity of the Newton Highland Station transformers.	Six breaker 115kV ring bus and installation of a 4th 115-14kV transformer completed.
Load Growth and Reliability	12/2011	SEMA	Upgrade the Cross Road Substation	Under Construction	Load growth in Dartmouth, Westport and parts of New Bedford will exceed the substation capacity in the area	Upgrade the station by replacing the two existing 115/13.8 kV transformers and 13.8 kV switchgear.
Load Growth & Reliability	12/2011	SEMA	Reconnect terminal of Line 123	Under Construction	115 kV Line 123 is a radial feed from Barnstable Station to Hyannis Station transformer #1. Line 123 connects to line 119 immediately adjacent to Barnstable Station. Loss of Line 119 causes the forced outage of Line 123.	Remove Line 123 from existing tap off Line 119 and bring it into a breaker position in an existing spare bay at Barnstable Substation.

LSP – 2010 Projects In Service

Need	Projected In-service Month/Year	Service Area	Project	Status	Needs Assessment	Solutions
Reliability	2010	SEMA	Disconnect Switch Upgrade Project	In Service	Failure of certain 115kV lines can result in the loss of customer loads that are supplied from step-down transformers that are tapped off the line. Restoration of loads requires manual switching to return unfaulted transmission line segments or distribution switching which can take up to three hours to complete. Auto-sectionalizing at 115kV allows for unfaulted line segments to be restored immediately and reduces customer load loss exposure.	Upgrade motor-operated disconnect switches with auto-sectionalizing switches at the following locations: 1) Acushnet # 11277 2) Acushnet # 11477 3) Acushnet # T1-112-114 4) Dartmouth# 10957
Reliability	2010	SEMA	Kingston Substation Bypass Switch	In Service	The topology of the 115 kV transmission system at the Kingston Substation prevents bus outages for required O&M work	Install a new 115 kV SEECO switch on Line 191 to bypass the Kingston Substation

***Thank you for participating in the
NSTAR LSP Presentation***

Questions / Comments?