AVANGRID

Transmission Owner Planning Advisory Committee Meeting
October 24th, 2019

Local System Plan Presentation

Presenter: Forrest Kugell, Transmission Planning Engineer (Avangrid)

Purpose of Local System Plan

Per Attachment K – Local, this LSP presentation:

- Describes projected improvements to non-PTF that are needed to maintain reliable customer service.
- Reflects:
  - LSP Needs Assessments
  - Corresponding transmission system planning studies
- LSP is communicated at the TOPAC meeting once a year.
- PAC, Transmission Customers, and other Stakeholders have 30 days to provide written comments for consideration to Avangrid.

- Avangrid Contact:

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Avangrid LSP Communication

- Each TO is individually responsible for publicly posting and updating the status of its respective LSP and the transmission projects list on a website in a format similar to the RSP project list

- The ISO-NE RSP project list contains links to each individual TO's transmission project list and is located at:

  Link to ISO-NE's RSP project list
- CMP's LSP project list is located at:

  Link to CMP's LSP
- UI's LSP project list is located at:

  Link to UI's LSP

Avangrid's Local System Planning Process

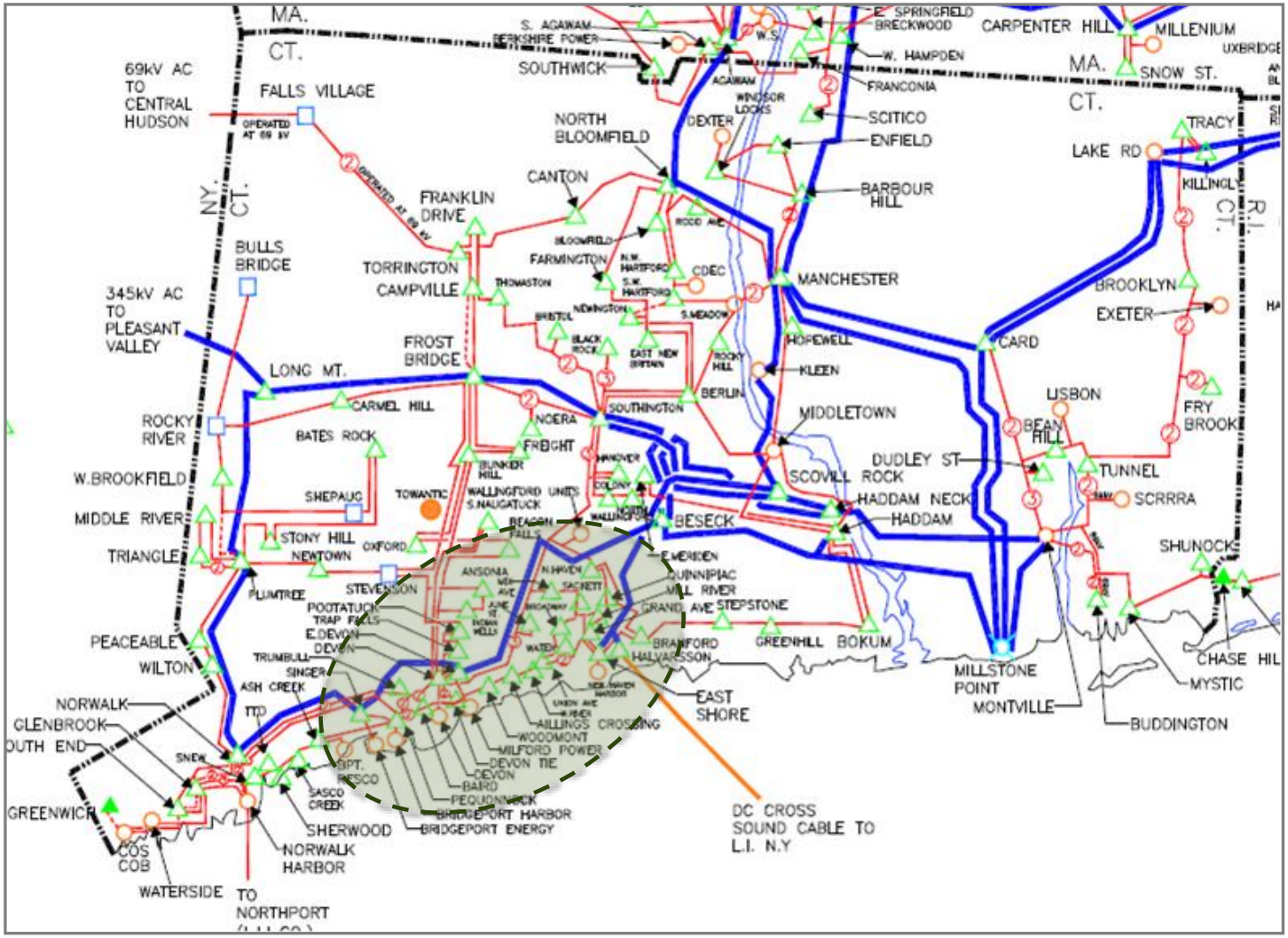
- All Avangrid local system upgrades are determined in accordance with ***Avangrid Transmission Planning Criteria.***

- LSP needs assessments can result from:
  - Periodic Assessment of Transmission Facilities
  - Load Growth
  - Retail or Wholesale Customer Request
  - Generator Interconnection Request
  - Asset Conditions
  - Public Policy Requirements

- Any new project or major project change since the 2018 LSP presentation will be highlighted using red text.

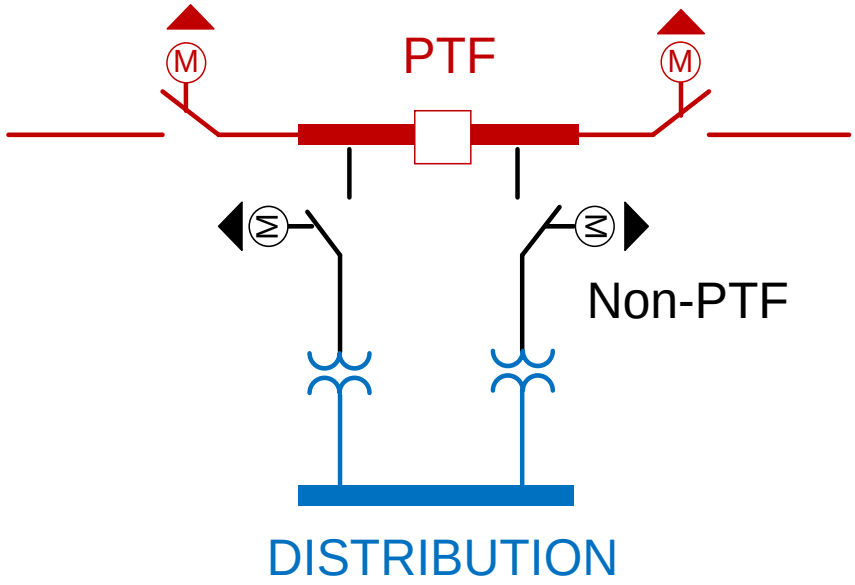
UI Local System Plan

There are currently no UI projects that qualify for the LSP



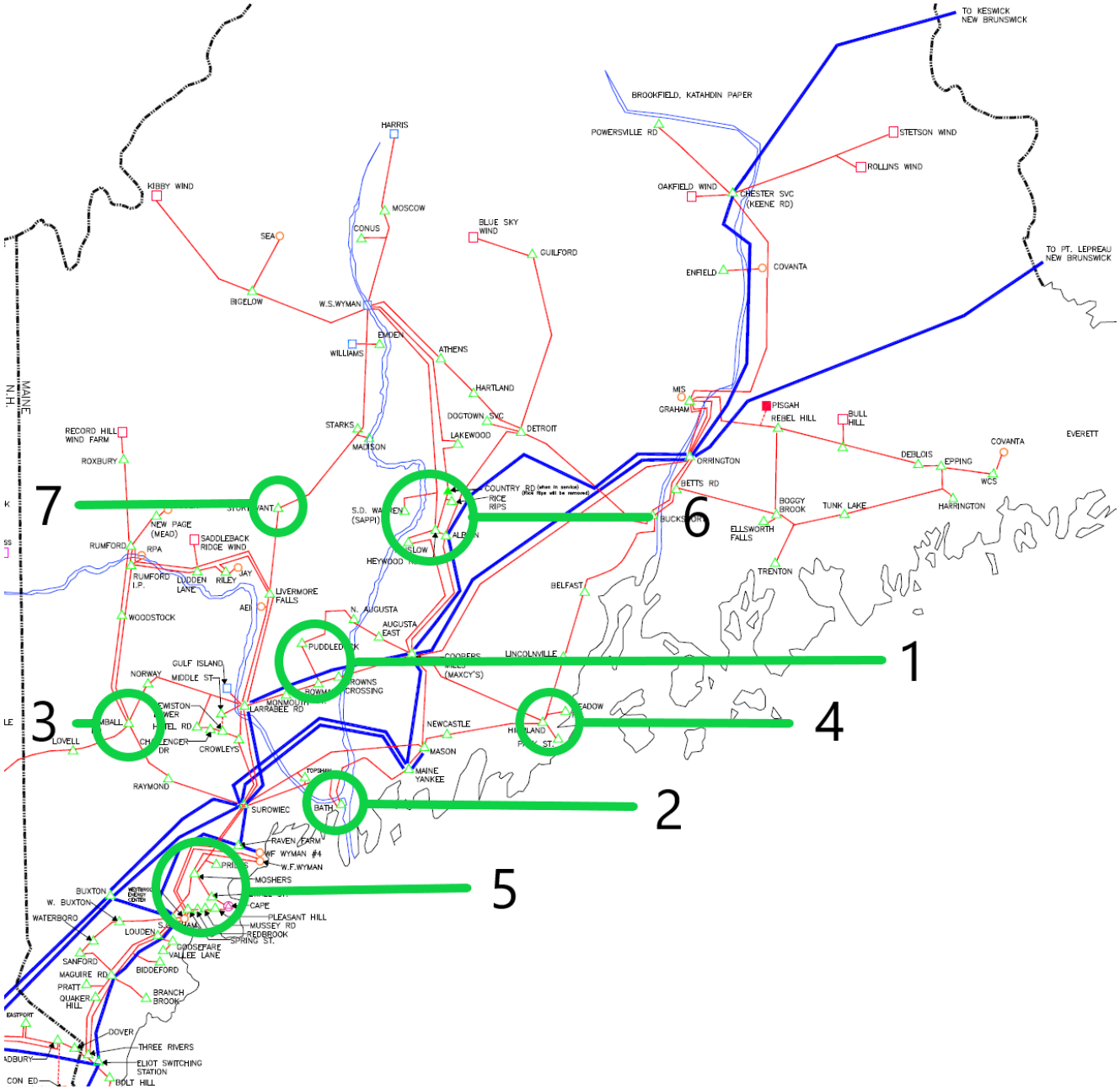
Characteristics of UI's Transmission System

Typical UI 115/13.8 kV Substation



- There are no radial 115 kV transmission lines on UI's system
- Nearly all of UI's transmission facilities are classified as PTF
- The only non-PTF on UI's system are the 115 kV taps to 115/13.8 kV transformers

CMP's Local System Plan



1. Augusta
2. Brunswick & Topsham
3. Lakes Region
4. Midcoast
5. Portland
6. Waterville & Winslow
7. Farmington

LSP Projects – Augusta Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Augusta Area Reliability Study	Bowman Street	Install a 115 kV Bus-Tie Breaker at Bowman Street. Add a third 115/34.5 kV Transformer	N-1 Voltage Collapse	2021	Planned
	Puddledock 115 kV Breaker Additions	Expand Puddledock Road Substation to accommodate four 115 kV Breakers	N-1 Voltage Collapse	2023	Planned
	Puddledock 115/34.5kV Transformer	Add a second 115/34.5 kV Transformer at Puddledock	N-1-1 Low Voltage	2023	On Hold – Pending NWA Analysis
	South China Capacitor Banks	Add 2 x 2.7 MVAR Capacitor Banks	N-1-1 Low Voltage	2023	On Hold – Pending NWA Analysis

LSP Projects – Brunswick/Topsham Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Brunswick - Topsham Area Reliability Study	Line work	Re-rate 34.5 kV Section 76	Overloaded under single element contingency conditions	2024	Proposed
	Woolwich Substation	Upgrade Woolwich T1 34.5/12.47 kV transformer	Overloaded under normal operating conditions	2021	Cancelled
	Topsham Substation	Upgrade Topsham T2 34.5/12.47 kV transformer	Overloaded under normal operating conditions	2024	Proposed
	Section 11 Rebuild	Rebuild 34.5 kV line between Topsham 115 kV and Bath 115 KV	Overloaded under single element contingency conditions	2021	Cancelled
	Section 77 Rebuild	Rebuild 34.5 kV line between Mason and Bath 115 kV	Overloaded under single element contingency conditions	2021	Cancelled

LSP Projects – Brunswick/Topsham Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Brunswick – Topsham Area Reliability Study (Cont.)	Topsham 115 kV Substation	Rebuild the Topsham Substation to a 115 kV six breaker ring bus configuration. Upgrade Topsham 115 kV T1 and T3 115/34.5 kV transformers	Voltage collapse conditions, T1 and T3 overloaded under single element contingency conditions	2024	Proposed
	Bath 115 kV Substation	Add a 5.4 MVAR 34.5 kV capacitor bank	Low voltage	2023	Proposed
Distribution Reliability	Cooks Corner Substation	Rebuild the existing Cooks Corner Substation to a new green field location.	N-1 violations of Distribution Planning Criteria	2022	Concept

LSP Projects – Lakes Region Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Lakes Region Area Reliability Study	Northern Sub-Area Upgrades	New (9.5 mile) 34.5 kV line from Bridgton to Kimball Road (Section 98)	Voltage collapse under contingent system conditions	2025	Proposed
		Install a 115/34.5 kV 30/56 MVA transformer at Kimball Road		2025	On Hold – Pending North Waterford
		Remove voltage supervision for the reverse power relaying on Lovell T1	Back feeding NH under post-contingent conditions creates voltage and thermal violations	2025	On Hold – Pending N.H. needs assessment study

LSP Projects – Lakes Region Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Lakes Region Area Reliability Study (Cont.)	Eastern Sub-Area Upgrades	New 115/34.5 kV S/S at New Gloucester with a four breaker ring bus and 115/34.5 kV transformer and (8 mile) 115 kV transmission line to Surowiec (Section 282)	Voltage collapse and thermal violations under contingent system conditions	2025	Proposed
		Relocate Raymond 34.5 kV S/S and rename to Webbs Mills S/S, install two 5.4 MVAR capacitor banks	Room needed for expansion	2025	Proposed
		New (8 mile) 34.5 kV line from New Gloucester to Webbs Mills	Voltage collapse and thermal violations under contingent system conditions	2025	Proposed

LSP Projects – Lakes Region Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Lakes Region Area Reliability Study (Cont.)	Western Sub-Area Upgrades	Add two 34.5 kV breakers and two 5.4 MVAR capacitor banks at the North Limington Substation	Voltage collapse under contingent system conditions	2020	Planned
Lakes Region/Asset Condition	North Waterford Substation	Add new 115/34.5 kV Waterford Substation and rebuild 1 mile 34.5 kV transmission line to Papoose Pond	The project addresses 34.5 kV transmission asset condition concerns (i.e. retiring Section 78), in addition to mitigating marginal post-contingent low voltage violations in the area.	2025	Proposed

LSP Projects – Midcoast

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Midcoast Area NTA Analysis	Newcastle Substation Upgrades	Construct a 4-breaker 115 kV ring bus and install a 34.5 kV bus-tie breaker. Also relocate Section 18 onto bus 3	Voltage collapse under contingent system conditions	2020	Cancelled

LSP Projects – Portland Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Portland Area Reliability Study	Raven Farm Expansion (115/34.5 kV)	New 115 kV bus with four breaker, breaker-and-a-half configuration. Also, install a 115/34.5 kV transformer and 34.5 kV line to Elm Street	Voltage collapse thermal violations under contingent system conditions	2024	Concept
	Line work	Rebuild 34.5 kV Section 181	Overloaded under single element contingency conditions	2023	Concept
		Rebuild a portion of 34.5 kV Section 180	Overloaded under single element contingency conditions	2023	Concept
	Red Brook	Upgrade Red Brook 115/34.5 kV T1 to a 30/56 MVA	Transformer overloaded under contingent system conditions	2023	Concept

LSP Projects – Portland North Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Portland North Area Reliability Study	Line work	Re-rate/rebuild portions of 34.5 kV line Section 180A	Thermal violations under normal operating and contingent system conditions	2022	Proposed
	Freeport Substation	Add two 2.7 MVAR 34.5 kV capacitor banks	Voltage violations under contingent system conditions	2023	Proposed
	Elm Street Substation	Bring S164 in/out of Elm St, re-rate S164A	Thermal violations under contingent system conditions (Not needed if Raven Farms 115 kV is built)	2024	Concept
	Prides Corner Substation	Add an additional 5.4 MVAR 34.5 kV capacitor bank	Voltage violations under contingent system conditions	2023	Concept

LSP Projects – Portland North Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Portland North Area Reliability Study (Cont.)	Falmouth Substation	Add two 34.5 kV breakers	Voltage and 25 MW loss of load criteria violations under contingent system	2024	Concept
	East Deering Substation	115/34.5 kV substation with 115 kV line from Raven Farm.	Voltage collapse, additional source needed in the area	2024	Proposed
	North Yarmouth Substation	New 115/34.5 kV S/S tapped from Sect. 166, and 14.8 mi 34.5 kV line to Gray & Freeport with breakers	Voltage violations under contingent system conditions	2024	Proposed

LSP Projects – Waterville/Winslow Area

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Waterville - Winslow Area Reliability Study	County Road Substation	Bring Section 241 in/out of new County Road S/S by constructing 7 miles of new 115 kV Transmission. Construct a 4-breaker ring bus with a second 115/34.5 kV transformer. The existing Rice Rips Substation will be replaced.	Voltage collapse and thermal violations under contingent system conditions	May 2020	Under-Construction
	Line work	Re-conductor a portion of 34.5 kV line Section 56.	Overloaded under single element contingency conditions	May 2020	Under-Construction

LSP Projects – Asset Condition

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Asset Condition	Butlers Corner 34.5 kV Substation	Construction of a new Butlers Corner Substation at a new location	Asset condition, several safety concerns	2023	Concept
	Deer Rips 34.5 kV Substation	Complete Rebuild of Deer Rips Substation	Asset condition, problems with joint ownership of facilities within hydro station	2023	Concept
	Spring Street	Replace five 34.5 kV breakers, new control house and relay upgrades	Aging oil filled breakers being replaced with new SF-6 units	2021	Proposed

LSP Projects – Asset Condition

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Asset Condition	Forest Ave 34.5 kV Substation	Construction of a new Forest Ave Substation at the same location	Asset condition, maintenance, reliability, and safety concerns	2021	Planned
	Searsport 34.5 kV Substation	Construction of a new Searsport Substation	Asset condition, reliability and safety concerns	December 2019	Under Construction
	Dunstan 34.5 kV Substation	Construction of a new Dunstan Substation at a new location	Asset condition, several safety concerns	2020	Planned
	South Berwick 34.5 kV Substation	Construction of a new South Berwick Substation at a new location	Asset condition, reliability and safety concerns	2021	Planned
	Warren 34.5 kV Substation	Construction of a new Warren Substation at a new location	Asset condition, maintenance, reliability, and safety concerns	2021	Planned

LSP Projects – Asset Condition

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Asset Condition	East Wilton 34.5 kV Substation	Construction of a new East Wilton Substation at a new location	Asset condition, reliability and safety concerns	2020	Planned
	Fryeburg 34.5 kV Substation	Construction of a new Fryeburg Substation at a new location	Asset condition, reliability concerns	2023	Concept
	Great Falls 34.5 kV Substation	Complete Rebuild of Great Falls Substation	Asset condition, reliability and maintenance concerns	2023	Concept
	North Anson 34.5 kV Substation	Construction of a new North Anson Substation at a new location	Asset condition, several safety concerns	2023	Concept

LSP Projects – Asset Condition

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Asset Condition	Partial Section 1 Rebuild	34.5 kV Rebuild from Augusta Eastside to McCoy's	Asset condition, several safety concerns	2020	Planned
	Section 31 Rebuild	34.5 kV Rebuild from Topsham to Brunswick Westside	Asset condition, several safety concerns	2020	Planned
	Section 49 Rebuild	34.5 kV Rebuild from Cooper's Mills to Meadow Road	Asset condition, several safety concerns	2020	Proposed

LSP Projects – Other

Project Origin	Major Project	Project Description	Needs Assessment	In-Service Date	Status
Distribution Reliability	Goosefare Substation	New 115/12.47 kV Transformer and Distribution bay	Upgrade needed to support load growth	2021	Proposed
	Biddeford Pump	New greenfield 34.5/12.47 kV Substation	N-0 distribution overload	2021	Planned
Farmington Area Reliability Analysis	New 115/34.5/12.47 kV Substation	New four breaker 115 kV ring bus with two new transformers (115/34.5 kV and 115/12.47 kV) segmenting Section 278	Violation of CMP's local loss of load criteria; Distribution Planning, N-1 contingency Criteria;	2023	Concept
	Sturtevant Substation	Replace 115/34.5 kV non PTF transformer foundations	Asset Condition	2023	Concept

LSP Projects – Other

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Upper Kennebec Area Reliability Study	Moxie Falls Substation	New Moxie Falls 115/34.5 kV Substation	Inadequate voltage regulation, low voltage violations during all lines in conditions	2024	Cancelled
Distribution Reliability	Bath-Washington Street	New 34.5/12.47 kV Transformer, Flood control and mitigation measures will be implemented	Asset condition, reliability and safety concerns	2022	Proposed

In-Service LSP Projects – CMP

Project Origin	Major Project	Project Description	Needs Assessment	Projected In-Service Date	Status
Lakes Region Area Reliability Study	Eastern Sub-Area Upgrades	Shaw Mills Substation Upgrades; add two 5.4 MVAR capacitor banks and three 34.5 kV breakers	Voltage violations under contingent system conditions	July 2019	In-Service
Asset Condition	Line work	Rebuild River Crossing of Section 77/207 double circuit towers	Towers are in poor condition and need to be rebuilt to improve reliability	Dec 2018	In-Service

Discussion / Q&A