ASO Study Customer Kickoff Meeting

December 12, 2019

Westwood, MA

Agenda

- Eversource introductions
- Study types and definitions
- Overview of ASO areas
- Level 3 technical data
- Process and key dates
- Feedback from developers
- Next steps
- Q&A

ASO Overview – Study Types

- Eversource's ASO study announced on October 24th will be referred to as "October 24th ASO"
  - Potential future ASOs after this will be referred to as "2020 ASO" for applicants who have come in from 10/24 onward
- Level 0/1 studies
  - Conduct transfer limit assessment to ensure no degradation of ISO-NE Interface Limits. If adverse impacts found, a Level 3 study will be required.
  - Level 0/1 screenings need to be completed before Level 3 studies start
  - Some Level 0/1's may require more detailed Level 3 studies, pending findings in Level 0/1 analysis
- Level 3 studies
  - Conduct thermal and voltage steady state, short circuit, stability analysis
  - PSCAD analysis will be required
  - Technical data will be requested from projects and is required to start studies

Criteria for ASO Groups and Projects

- ASO Groups
  - Excludes applications with separate ongoing transmission studies
  - Excludes applications with signed ISAs
  - Excludes non-exporting resources
- Project Sizes
  - ≥ 5 MW = Level 3 ASO Study
  - > 1 MW and < 5 MW = Level 3 ASO Study for substation with 20 MW
  - > 1 MW and < 5 MW = Level 0/1 analysis for substations less than 20 MW
  - ≤ 1 MW = No ASO analysis/study (provided not co-located)

Notes: Distribution studies/progress is separate from content in this presentation

ASO Overview – WMA System

Station Capacity (MW)	Level_0/1 Transfer Study	Level_3 Transmission Study	Grand Total
Pittsfield Area Total	109	55	164
AMHERST	21		21
ASHFIELD	9		9
BLANDFORD	15	27	42
CUMBERLAND	5		5
FRENCH KING	21		21
MONTAGUE	5		5
OSWALD	3	3	5
PARTRIDGE		9	9
PLAINFIELD	3	5	8
PODICK	11	7	18
SHELBURNE	7		7
SILVER STREET	10		10
SOUTHWICK		4	4
Springfield Area Total	15	12	28
AGAWAM	5		5
GUNN RD	3		3
LUDLOW	7	6	13
ORCHARD		7	7
Grand Total	124	68	192

Applications (#)	Level_0/1 Transfer Study	Level_3 Transmission Study	Grand Total
Pittsfield Area Total	28	12	40
AMHERST	6		6
ASHFIELD	2		2
BLANDFORD	3	5	8
CUMBERLAND	1		1
FRENCH KING	5		5
MONTAGUE	1		1
OSWALD	1	1	2
PARTRIDGE		2	2
PLAINFIELD	1	1	2
PODICK	4	2	6
SHELBURNE	2		2
SILVER STREET	2		2
SOUTHWICK		1	1
Springfield Area Total	4	2	6
AGAWAM	1		1
GUNN RD	1		1
LUDLOW	2	1	3
ORCHARD		1	1
Grand Total	32	14	46

- 17 substations impacted
- Level 0/1 studies
  - 124 MWs
  - 32 applications
- Level 3 studies
  - 68 MWs
  - 14 applications

ASO Overview – EMA System

Station Capacity (MW)	Level_0/1 Transfer Study	Level_3 Transmission Study	Grand Total
A-Greater Boston	**10**	**28**	**38**
Burlington 391		5	5
Holliston 130		8	8
Hopkinton 126	2	8	10
Maynard 416	3		3
Medway 65		6	6
Sherborn 274	1		1
W. Framingham 455	4		4
B-Upper SEMA	**40**	**365**	**405**
Arsene St 654		7	7
Cross Road 651		15	15
Crystal Spring 646		9	9
Fisher Road 657		37	37
Industrial Park 636		63	63
Rochester 745		48	48
Tremont 713	10	59	68
Bell Rock 661	17	15	32
West Pond 737		59	59
Wing Lane 624		43	43
Canton 470	3		3
Walpole 146	9		9
Brook St 727		12	12
C-Cape	**43**	**94**	**137**
Falmouth 933	3		3
Harwich 968	12	5	17
Hatchville 936	10		10
Mashpee 946	5		5
Orleans 975	3		3
Otis 915		7	7
Sandwich 916	11	21	32
Wareham 714		61	61
Grand Total	**93**	**487**	**580**

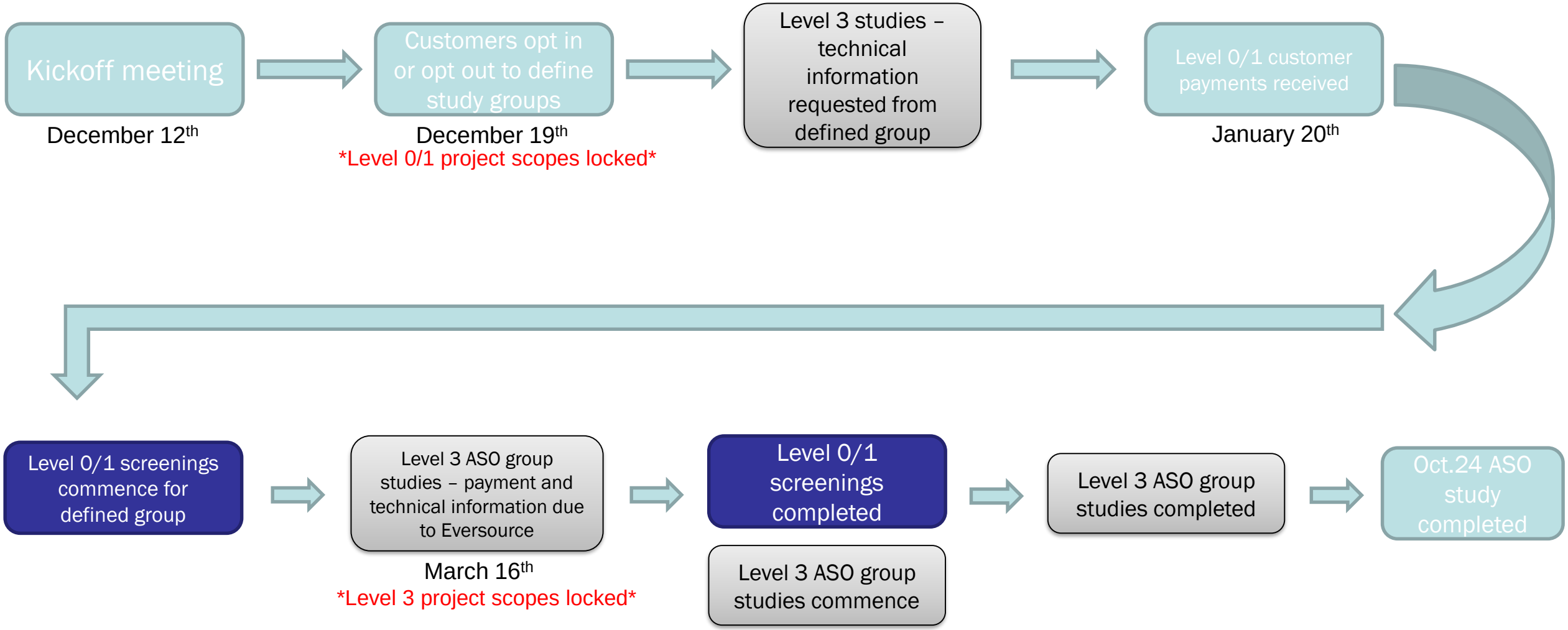
Applications (#)	Level_0/1 Transfer Study	Level_3 Transmission Study	Grand Total
A-Greater Boston	**5**	**4**	**9**
Burlington 391		1	1
Holliston 130		1	1
Hopkinton 126	1	1	2
Maynard 416	2		2
Medway 65		1	1
Sherborn 274	1		1
W. Framingham 455	1		1
B-Upper SEMA	**9**	**87**	**96**
Arsene St 654		2	2
Cross Road 651		3	3
Crystal Spring 646		1	1
Fisher Road 657		9	9
Industrial Park 636		13	13
Rochester 745		13	13
Tremont 713	2	16	18
Bell Rock 661	4	3	7
West Pond 737		15	15
Wing Lane 624		10	10
Canton 470	1		1
Walpole 146	2		2
Brook St 727		2	2
C-Cape	**13**	**26**	**39**
Falmouth 933	1		1
Harwich 968	4	1	5
Hatchville 936	3		3
Mashpee 946	1		1
Orleans 975	1		1
Otis 915		1	1
Sandwich 916	3	12	15
Wareham 714		12	12
Grand Total	**27**	**117**	**144**

- 28 substations impacted
- Level 0/1 studies
  - 93 MWs
  - 27 applications
- Level 3 studies
  - 487 MWs
  - 117 applications

Level 3 Studies - Technical Data Needed

- Conductor types and distance
  - Between Project and inverters/GSUs
  - Project's tie line to the point of interconnection (POI)
- Generator step-up (GSU) transformer size (MVA), impedance (%Z), and X/R ratio
- GSU transformer number of taps and per unit size of each (typical is +/-2 steps, each at 2.5% or, 0.95, 0.975, 1.0,1.025, 1.05 per unit)
- Stamped project one line (must include inverters)
- Project inverter modeling information (>1MW and <5MW)
  - Eversource to use WECC inverter stability models
  - Developers to provide parameters
- Project inverter modeling information (>=5MW)
  - Datasheet and manual
  - Reactive capability curve and/or data tables necessary to create the capability curve when the project output is a maximum (Pmax)
  - Stability model in PSS/E standard library format. **Note ISO-NE does not accept user developed models.**
- All projects' inverter modeling information
  - Protective voltage and frequency trip set points
    - Ride through capabilities need to meet ISO-NE SRD requirements.
  - PSCAD models for a potential frequency response study

Process & Key Dates



Feedback from Stakeholders

- Quarterly update meetings on progress, at a minimum, in 2020
- Study payment turnaround time to Eversource
- Payment amount
  - Collection of payments will reflect queue attrition

Next Steps

- Look for an email from ASOStudyInquiry@eversource.com requesting that you opt in or out of the study by December 19th
  - To opt in, please respond in writing via email
  - No response by December 19th will indicate an “opt out”

- Level 0/1’s submit payment by January 20th

- Level 3 projects: begin to lock scope and gather technical data to meet the March 16th deadline

- Look for an invitation for the Oct. 24 ASO quarterly meeting update in Q1 2020

OPEN Q&A