

PSEG LONG ISLAND

South Fork RFP – Phase II Status Report

APRIL 5, 2016

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Agenda

- Evaluation Process Overview
- Proposal Evaluation Status
- Cost Effectiveness of Solutions
- 2017 Shortfall
- Schedule

Evaluation Process Overview

- ❑ Phase I - categorize, summarize and check proposal contents – disqualify non-responsive proposals - complete
 - 19 moved to Phase II; 2 disqualified (Landis + Gyr, Solar City)

- ❑ Phase II – initial evaluation – determines which proposals advance to Phase III – complete
 - 13 moved to Phase III; 6 of 12 battery proposals did not proceed
 - Qualitative Criteria – rates each proposal for such things as
 - Proposer’s experience including that of contractors and subcontractors
 - Development and schedule risk
 - Price certainty and risk of price increases
 - Financing plan
 - Site control
 - Fuel supply plan, if applicable
 - Quantitative Criteria
 - Levelized cost analysis

- ❑ Phase III – detailed analysis – results used to select a portfolio of proposals – in progress

South Fork RFP: Response

- Resource size ranges from 0.75 MW to 60 MW
- Various is a mix of Demand Response, battery storage, conventional generation, solar power characterized by the developer as a micro-grid. However the proposal does not technically meet our definition of a micro-grid since it cannot operate in islanded mode.
- Some Proposals provide multiple options for connecting at different levels or choosing between different resource types.
- Issue of competing proposals not addressed in this table (discussed later)
- A key to success of this RFP is whether a sufficient number of non-competing resources can be distributed in time to meet the needs in each part of the South Fork

RESPONSE DISTRIBUTION

Technology		Submitted		After Phase I		After Phase II	
		Count	MW	Count	MW	Count	MW
Trans.	Wind	1	33.30	1	33.30	1	33.30
	Storage	0.5	30.00	0.5	16.50	0.5	16.50
	Aero CT	0.5	15.00	0.5	11.09	0.5	11.09
	Total	2	78.30	2	60.89	2	60.89
Distribution	Storage	9.5	119.55	9.5	87.44	4.5	55.20
	Aero CT	0.5	5.60	0.5	4.49	0.5	4.49
	Fuel Cell	1	9.30	1	9.30	1	9.30
	Various	1	25.00	1	25.65	1	25.65
	Total	12	159.45	12	126.88	7	94.63
Customer	Storage	2	5.00	2	3.73	1	0.53
	Direct Load	3	23.10	2	12.38	2	12.38
	Solar	1	3.20	0	0.00	0	0.00
	Therm. Stor.	1	10.00	1	5.34	1	5.34
	Total	7	41.30	5	21.45	4	18.25
Grand Total		21	279.05	19	209.22	13	173.77

Notes:

- Largest MW size presented when multiple sizes are proposed
- Ratings updated between Submitted and Phase I (net loss 47.5 MW)
- Red shows where proposals dropped from previous phase
- Half proposals have alternatives for distribution or transmission delivery



Proposal Evaluation Status

- ❑ Two Proposals totaling 15.4 MW did not move from Phase I to Phase II
 - Solar City Corporation (3.2 MW) – Customer sited rooftop solar
 - Did not provide submittal fee check
 - Rejected PSEG LI PPA and did not provide an alternative PPA or a description of an alternative
 - Landis and Gyr (12.2 MW)– Smart Grid technologies (Voltage Sensors, HVAC Load control, Volt/VAR Optimization)
 - Did not provide a firm price
 - Did not propose a full service contract
- ❑ Phase II complete
 - Six battery proposals totaling 35.5 MW did not move from Phase II to Phase III
 - Key reasons for not moving proposals forward
 - Lack of management experience
 - Lack of Site Control
 - Project Site Zoned Residential
 - Located in wetlands and/or tidal floodplains
 - Negative Community Impacts
 - Higher cost than other proposals of the same technology
 - Offsetting reasons for moving project forward
 - Cost effective option
 - Unique technology (among submitted proposals)

South Fork RFP: Cost Effectiveness of Solutions

Phase II cost effectiveness is measured on a prorated stand-alone basis

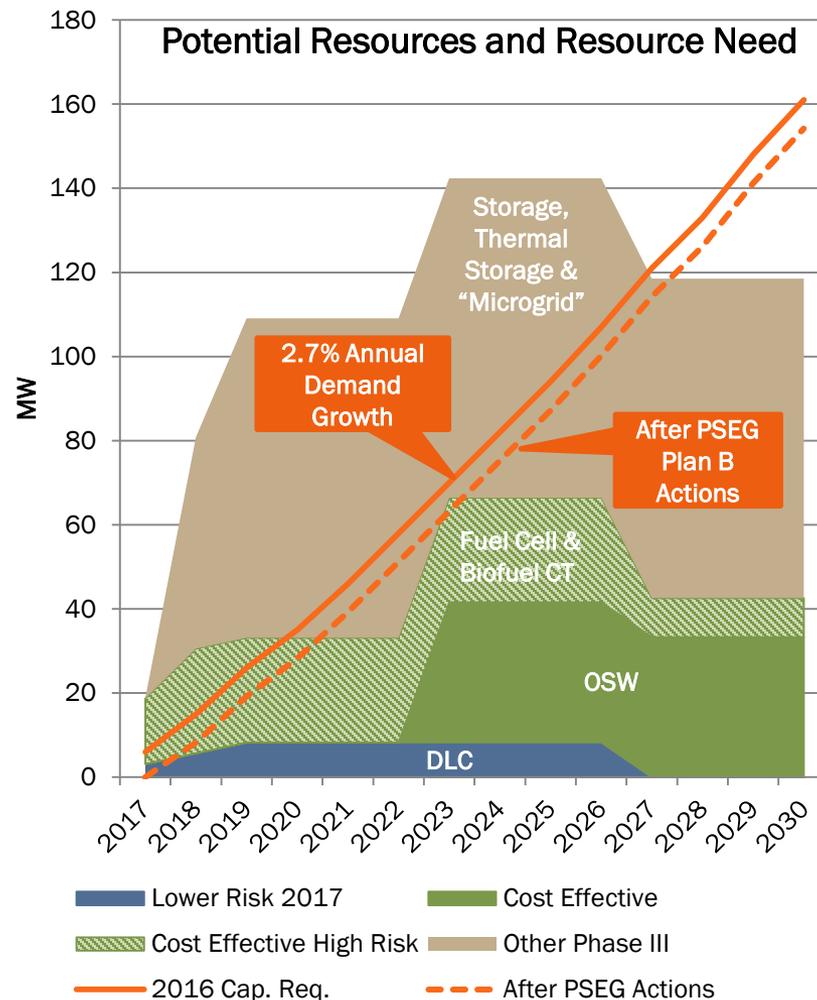
- Phase III will be evaluated on an integrated portfolio basis

Screening analysis of the 19 Proposals received shows 5 proposals are cost effective compared to the transmission alternative

- Projects show savings of 21 to 48 percent compared to transmission alternative
- Some proposals compete with each other for transmission access or customer base
- All 5 proposals have progressed to Phase III
- Cost effective proposals are not sufficient to meet the needs of the RFP

Remaining 14 proposals are more expensive

- 8 of the 14 proposals moving to Phase III
 - The proposals are 52 to 233 percent more expensive than the transmission alternative
 - Combined with cost effective proposals, total mix is sufficient to meet projected needs
 - Certain timeframes and areas pose challenges





2017 Shortfall - Summary

Resource Need: By the summer of 2017, a total of 8 MW is required with at least 1 MW in the Montauk Area and at least 4 MW located at Buell/E. Hampton or east. (By 2018 the need increases to 18 MW total with 1 MW at Montauk and 8 MW at Buell/E. Hampton or east)

Conclusions:

1. Need to take additional actions outside of the RFP to address 2017 need
2. While 21.7 MW of proposals claim to be available for 2017, most cannot be built in time
3. If high risk and double counted options are eliminated, a total of 3.1 could be available before the summer of 2017
4. The lower risk 2017 proposals have not identified the locational distribution of the programs

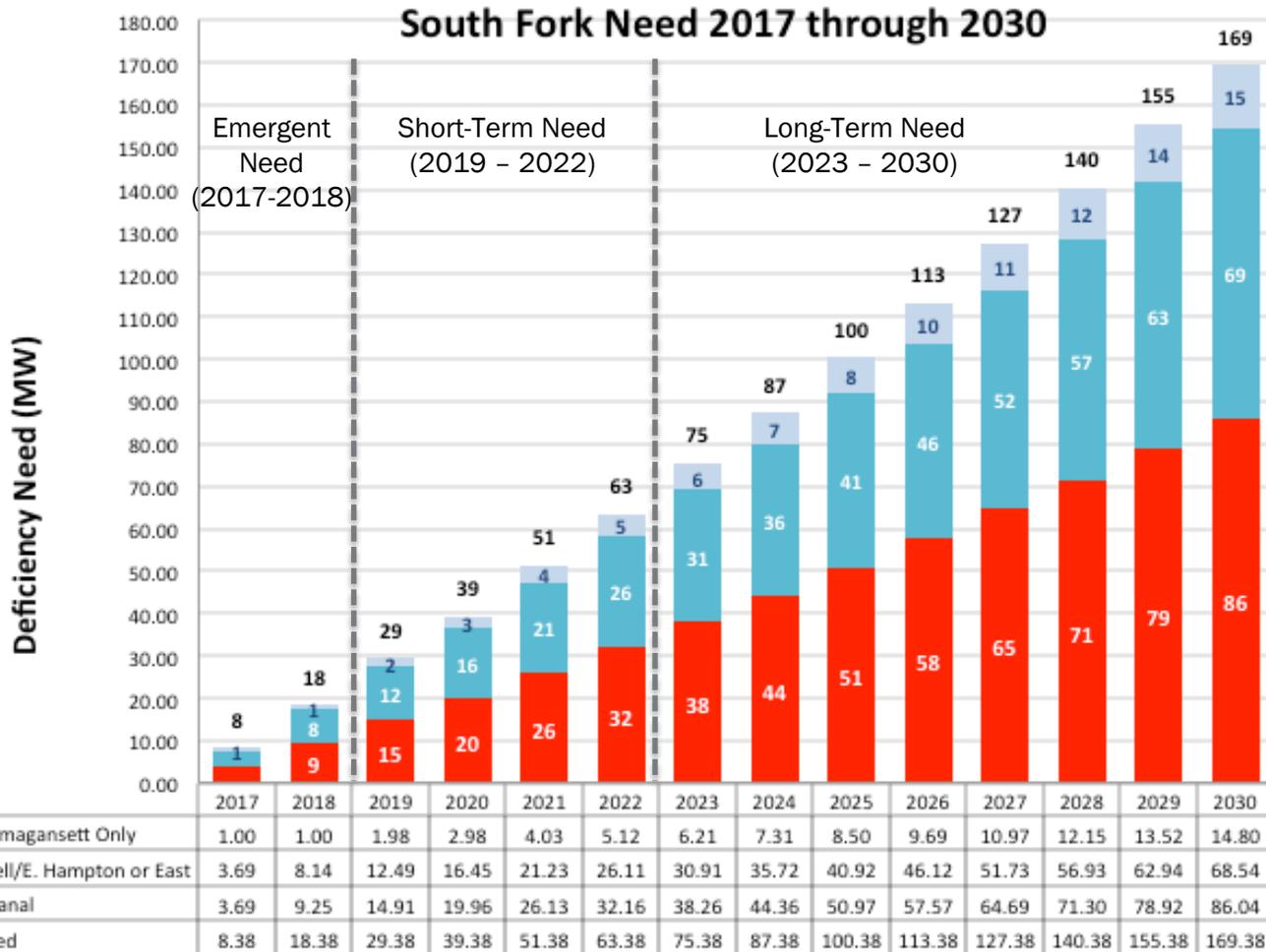
Plan B discussed in more detail in next section

Schedule

Milestone	Schedule	Actual/Expected Completion Date
Phase I Complete	January 2016	January 2016
Phase II Complete	March 2016	March 2016
Phase III Complete	May 2016	May 2016
Board Action on Recommended Projects	June or July 2016	May 2016, if ready
Contract Negotiations Start	Summer 2016	
Execution of Contract(s) (planned)	4 th Quarter 2016 to 3 rd Quarter 2017	
Firm Pricing Expires	September 30, 2017	
First Projected COD (8 MW Required)	May 1, 2017	
Latest COD (planned)	May 1, 2019	

Plan B Review

South Fork: Resource Need Summary



South Fork Need: Emergent (2017 – 2018)

2017 South Fork Resource Need Assessment (MW)

	East of Amagan.	Buell/ E. Hampton or east	East of Canal
Original Load Forecast (Increment. Need)	1	3.7	3.7
Load Forecast Reduction (2016)	-0.3	-1.1	-1.4
Revised Forecast Need	0.7	2.6	2.3
Options to Meet 2017 Resource Shortfall			
Load Transfers		-1.8	-4.5
2017 Direct Load Control (2015 SF RFP) ^{1,3}	-0.4	-1.1	-1.6
Enhanced PSEG LI DSM Efforts ^{2,3}	-0.5	0	0
Shortfall (After Load Transfers+ DSM)	-	-	-
Notes:			
1. DLC potential by area is based on Proposer's estimates allocated by # of customers.			
2. Preliminary. Still under development			
3. May not be completely additive due to some overlap in energy efficiency efforts of PSEG Long Island and RFP Service Providers.			

- 2017 need is met
- Solution reflects implementation of non-generation options
 - Direct load control
 - Enhanced DSM efforts

South Fork Need: Emergent (2017 – 2018)

2018 South Fork Resource Need Assessment (MW)

	East of Amagan.	Buell/ E. Hampton or east	East of Canal
Original Load Forecast (Increment. Need)	1	8.1	9.3
Load Forecast Reduction (2016)	-0.3	-1.4	-1.8
Revised Forecast Need	0.7	6.7	7.5
Options to Meet 2018 Resource Shortfall			
Load Transfers (from 2017)		-1.8	-4.5
Options from 2017	-0.9	-1.1	-1.6
2018 Direct Load Control (2015 SF RFP) ¹	-0.3	-0.9	-1.3
Shortfall (After Load Transfers+ DSM)²	-	2.9	0.1
Notes:			
1. DLC potential by area is based on Proposer's estimates allocated by # of customers.			
2. RFP proposals may be able to fill these shortfalls in a timely manner. Perhaps at a higher cost than a transmission alternative would have cost. There is no longer time for the transmission alternative to be implemented.			

- 2018 need is met East of Amagansett
- Shortfall East of Buell
- Minor shortfall East of Canal
- These shortfalls may be met by proposals from the RFP.

South Fork Need: Short-term (2019 – 2022)

Options for Addressing Resource Need

- ❑ Select economic resource projects and “out of money” non-traditional resources, as necessary, from SF RFP
 - Cents per Kwh - TBD
- ❑ All transmission projects shown on pages 16-17 excluding Canal to Wainscott
 - Cents per Kwh - TBD

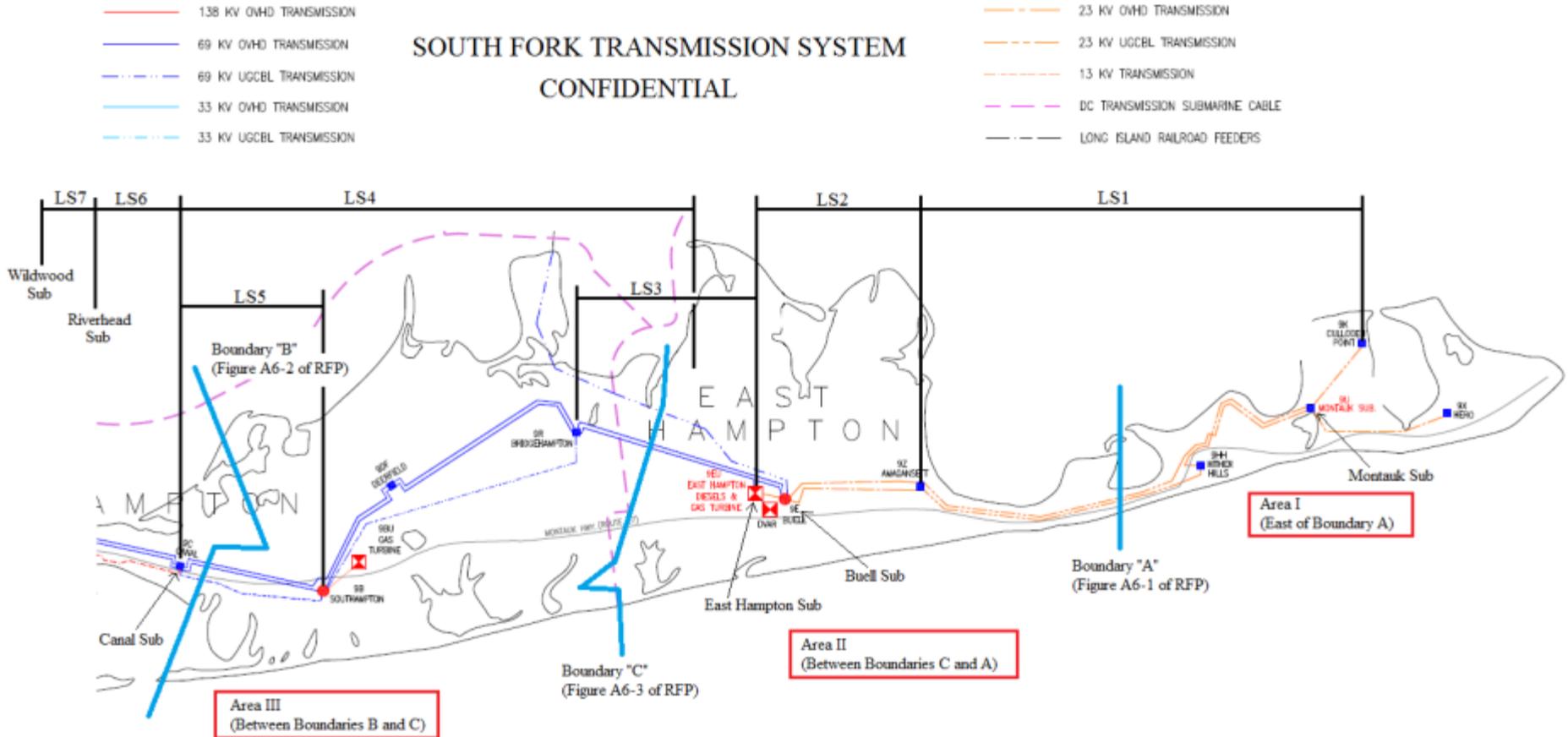
South Fork Need: Long-Term (2023 – 2030)

Options for Addressing Resource Need

- ❑ Selected transmission solutions (detailed on pages 16-17)
 - 7 separate line segments for 10 projects; in-service 2023
 - Cents per Kwh – TBD / Impact on average residential bill
- ❑ Wind Turbines off Montauk: 210 – 280 MWs (effective capacity equals 84 MWs – 112 MWs) with associated system upgrades
 - In-service date: 2023
 - Cents per Kwh – TBD / Impact on average residential bill
- ❑ Submarine transmission cable from Canal to East Hampton to Montauk
 - In-service date: 2023
 - Cents per Kwh – TBD / Impact on average residential bill

South Fork RFP – Appendix

Location of Areas and Deferred Transmission Projects



South Fork RFP Transmission Alternatives

Year	Project	New/ Upgrade	Overhead/ Underground	Voltage	Length	Cost (\$M) 2015 \$	Line Segment
2017	Canal - Southampton Cable	New	Underground	69 kV	5 miles	\$37.6 to 56.4	5
2017	Wildwood - Riverhead circuit	Upgrade	Overhead	69 kV to 138 kV	10 miles	\$7.7 to \$11.6	7
2017	2 nd Riverhead - Canal cable with Step-down Bank at Canal	New	Underground	138 kV	16 miles	\$136.8 to \$205.2	6
2017	Amagansett Conversion	Upgrade	Substation	23 kV to 33 kV		\$8.0 to \$12	1
2017	East Hampton Conversion	Upgrade	Substation	23 kV to 33 kV		\$3.2 to \$4.8	2
2017	Buell Conversion	Upgrade	Substation	23 kV to 33 kV		\$3.7 to \$5.6	2
2018	Hither Hills Conversion	Upgrade	Substation	23 kV to 33 kV		\$4.8 to \$7.2	1
2019	Culoden Pt Conversion	Upgrade	Substation	23 kV to 33 kV		\$2.8 to \$4.2	1
2020	Bridgehampton - Buell Cable	New	Underground	69 kV	5 miles	\$33.2 to \$49.8	3
2022	Canal - Wainscott Cable	New	Underground	138 kV	19 miles	\$275.5 to \$413.3	4

Phase III Semi-Finalist Project Locations

- Number of sites exceeds number of Semi-Finalists because some Proposals have facilities at more than one site location.

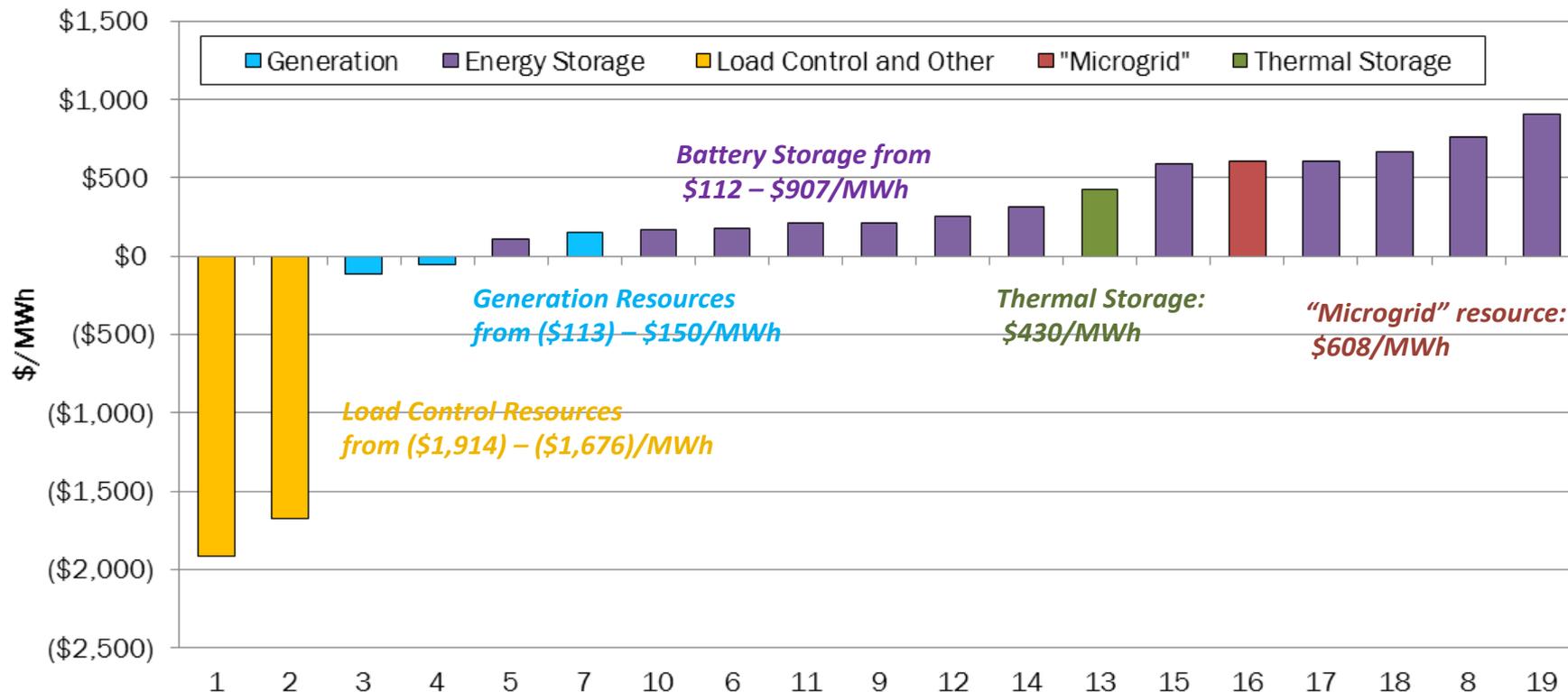


Google Earth Pro



Phase II Quantitative Analysis – All-in Levelized Cost*

South Fork RFP Phase II Results- \$/MWh All-in Levelized Cost

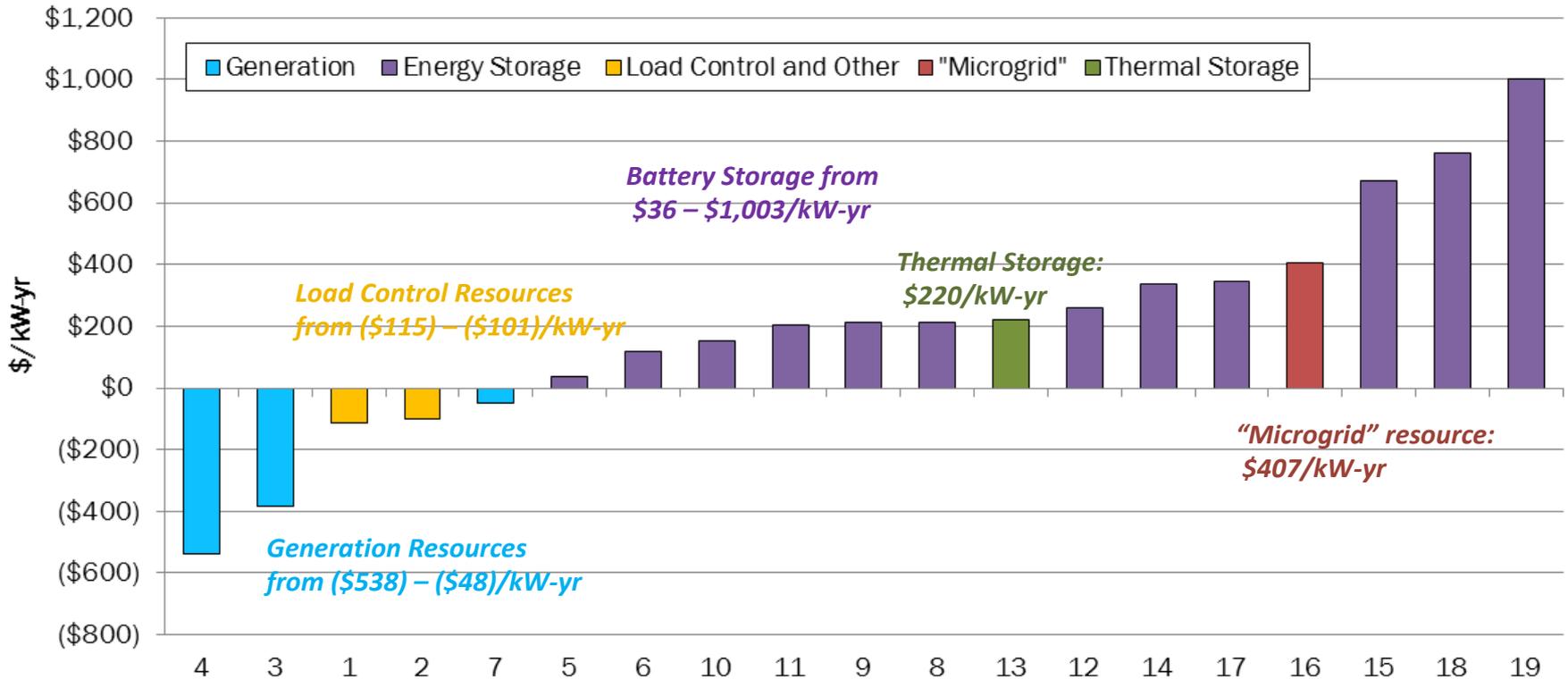


	1	2	3	4	5	7	10	6	11	9	12	14	13	15	16	17	18	8	19	
Phase II Qual.	Green	Green	Yellow	Red	Red	Red	Green	Red	Green	Green	Green	Green	Green	Green	Yellow	Yellow	Yellow	Red	Green	Red
Semi Finalist?	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	No

* All-in Levelized Cost equals present value of costs paid to proposer plus transmission interconnection costs, less avoided costs for energy, capacity, transmission upgrades, and renewable energy credits divided by the present value of the projected annual energy output.

Phase II Quantitative Analysis – Levelized Capacity Cost

South Fork RFP Phase II Results - \$/kW-yr Levelized Capacity Cost



Phase II Qual.	Red	Yellow	Green	Green	Red	Red	Red	Green	Yellow	Yellow	Yellow	Red	Red							
Semi Finalist?	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No							

* Levelized Capacity Cost equals present value of fixed costs paid to proposer plus transmission interconnection costs, less avoided costs of capacity and transmission upgrades divided by the present value of the annual net capacity ratings.

Proposals Advancing to Phase III

Key	Respondent	Technology Configuration	POI*	COD	Area 1 Capacity (MW)	Area 2 Capacity (MW)	Area 3 Capacity (MW)**	Total Capacity (MW)	Capacity Levelized Price \$/kW-yr	All-In Levelized Price \$/MWh	Overall Qualitative Rating
4	FuelCell Energy, Inc.	Fuel Cell	D	2018	-	-	9.30	9.30	(538)	(65)	
3	Deepwater Wind	Offshore Wind	T	2022	-	33.30	-	33.30	(385)	(124)	
7	Halmar International	Aeroderivative CTs	D, T	2017	4.49	11.09	-	15.58	(57)	142	
Total					4.49	44.39	9.30	58.18			

16	Anbaric Microgrid II	DR, Battery, Solar w/Genset	D+C	2019	5.13	10.26	10.26	25.65	407	605	
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9	LI Energy Storage System	Battery Storage (Deerfield)	D	2018	-	-	9.23	9.23	181	191	
10	LI Energy Storage System	Battery Storage (East Hampton)	D, T	2018	-	33.00	-	33.00	200	206	
11	LI Energy Storage System	Battery Storage (Southampton)	D	2018	-	-	9.23	9.23	204	209	
12	LI Energy Storage System	Battery Storage (Montauk)	D	2018	5.13	-	-	5.13	259	254	
14	AES Generation Development	Battery Storage	D	2018	5.13	5.13	5.13	15.00	337	316	
Total					10.26	38.13	23.60	71.60			

1	EnergyHub	Direct Load Control	C	2017	-	-	4.10	4.10	(115)	(1,914)	
2	Applied Energy Group	Direct Load Control	C	2017	0.99	2.73	4.54	8.27	(101)	(1,676)	
8	Green Charge Networks	Battery Storage	C	2017	-	-	0.53	0.53	32	142	
Total					0.99	2.73	9.17	12.90			

13	NextEra Energy	Thermal Storage	C	2018	0.67	1.20	3.47	5.34	168	311	
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Overall	21.54	96.71	55.80	173.77
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*POI=point of interconnect; T=transmission; D=distribution; C=customer

** Area 3 is assigned if proposal does not specify area

Background and Objectives

□ Background

- Acquire sufficient local resources to defer the need for new transmission until at least 2022 in the South Fork, and 2030 in Area 1
 - Area 1 (E/O Amagansett) – Minimum of 5 MW (15 MW by 2030)
 - Area 2 (Buell/E. Hampton or East to Area 1) – Minimum of 26 MW
 - Area 1/2/3 (South Fork E/O Canal) – Total of 63 MW
- Ten transmission projects with a total cost of \$513 million (2015 dollars) can potentially be deferred
- Resources can be load reduction and/or power production connected to substations or distribution feeders
- In-service date – preferred dates of May 1, 2017, May 1, 2018, and May 1, 2019
- PPA Term – 10, 15, or 20 year contract term

□ Objectives

- Supports the REV initiative via the PSEG Long Island Utility 2.0 East End Infrastructure Deferment program.
- Acquire additional local Power Production and/or Load Reduction resources in the South Fork to meet projected load growth and thereby defer the need for new transmission.
- Support load demand in the South Fork to the degree necessary to avoid overload of existing transmission assets during transmission outages that limit transmission capacity to the South Fork load area.
- Support system voltage in the South Fork to avoid voltage collapse during a transmission outage.
- Renewable resources procured in this RFP count toward the 400 MW renewable goal.

3 Proposals with Multiple Technologies

Key	Respondent	Size (MW)	Technology	Earliest COD	Phase II Status	Transmission, Distribution, or Customer Side
16	Anbaric Microgrid	25.65	Demand Response, battery storage, conventional generation, solar power	1-May-19	Semi-Finalist	Distribution & Customer Side
--	Landis + Gyr	11.0	Smart Grid, Voltage Sensors, HVAC Load control, Volt/VAR Optimization	1-May-17	Disqualified	Customer Side
--	SolarCity Corporation	3.2	Rooftop solar, battery storage, electric water heaters, smart thermostats, Controllable Pool Pumps, Smart Invertors	1-May-18	Disqualified	Customer Side

Landis+Gyr was determined to be non-responsive because it did not provide a firm price and did not propose a full service contract

SolarCity Corporation was determined to be non-responsive because of a late proposal fee and the omission of a redlined PPA.

12 Battery Storage Proposals

Key	Respondent	Size (MW)	Technology	Earliest COD	Phase II Status	Transmission, Distribution, or Customer Side
14	AES Generation	15.00	Battery Storage	1-May-18	Semi-Finalist	Transmission
19	Baseload Power Corp.	0.77	Battery Storage	1-May-17	Not Selected for Phase III	Distribution
5	Convergent Energy + Power	20.52	Battery Storage	1-May-17	Not Selected for Phase III	Distribution
15	Deepwater Wind	4.92	Battery Storage	1-May-18	Not Selected for Phase III	Transmission
17	Deepwater Wind	5.13	Battery Storage	1-May-18	Not Selected for Phase III	Transmission
8	Green Charge Networks	0.53	Battery Storage	1-May-17	Semi-Finalist	Customer Side

12 Battery Storage Proposals cont.

Key	Respondent	Size (MW)	Technology	Earliest COD	Phase II Status	Transmission, Distribution, or Customer Side
12	LI Energy Storage	5.13	Battery Storage	1-May-18	Semi-Finalist	Distribution
9	LI Energy Storage	9.23	Battery Storage	1-May-18	Semi-Finalist	Distribution
11	LI Energy Storage	9.23	Battery Storage	1-May-18	Semi-Finalist	Distribution
10	LI Energy Storage	33	Battery Storage	1-May-18	Semi-Finalist	Transmission or Distribution
18	RES America	1	Battery Storage	1-May-17	Not Selected for Phase III	Transmission or Distribution
6	Stem, Inc.	3.2	Battery Storage	1-May-17	Not Selected for Phase III	Customer Side

6 “Other” Proposals

Key	Respondent	Size (MW)	Technology	Earliest COD	Phase II Status	Transmission, Distribution, or Customer Side
2	Applied Energy Group	8.27	Direct load control and demand response platform	1-May-19	Semi-Finalist	Customer Side
1	EnergyHub, Inc.	4.1	Direct load control and demand response platform	1-May-17	Semi-Finalist	Customer Side
4	FuelCell Energy, Inc.	9.3	Fuel Cell	1-May-18	Semi-Finalist	Transmission or Distribution
7	Halmar	15.58	Aeroderivative Combustion Turbine	1-May-17	Semi-Finalist	Transmission
3	Deepwater Wind	33.3	Offshore Wind	1-Dec-22	Semi-Finalist	Transmission
13	NextEra Energy	5.34	Thermal Energy Storage	1-May-19	Semi-Finalist	Customer Side