



NYISO ICAP Demand Curve Reset: Updates to Gross CONE Inputs



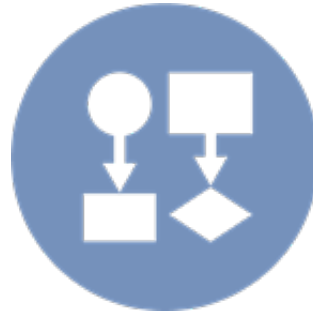
NYISO Installed Capacity Working Group

March 26, 2020

Agenda



Introductions



Gross CONE Feedback and Updated Results



Feedback/Discussion

Introductions



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Technology Selection Review

Aeroderivative Selection Feedback

- ▶ Feedback: BMcD should consider an LMS100 option without selective catalytic reduction (SCR) emissions controls
- ▶ Action: BMcD reviewed capital costs with and without SCR emissions controls
- ▶ Results:
 - Capital costs without SCR emissions controls still favor SGT-A65
 - A de-rate of LMS100 output/heat rate would be expected to achieve 15 ppm NOx
 - Screening level costs and recent installation history in NY favor SGT-A65.
- ▶ BMcD does not propose any change to the recommendation to use the SGT-A65 as the representative aeroderivative technology selection.

UNIT PERFORMANCE UPDATES

Performance Updates

- ▶ Added performance for 7HA.02 at 15ppm NOx
- ▶ Same gas turbine and balance of plant, but the unit is tuned for lower NOx emissions rate
 - 25 ppm = 331 lb/hr
 - 15 ppm = 189 lb/hr
 - Example below provides comparison for zone C; see Appendix A for additional information.

ZONE C PRELIMINARY PERFORMANCE	7HA.02 25 ppm NOx	7HA.02 15 ppm NOx	Percent Difference
Spring-Fall Performance (59 deg / 60% RH)			
Net Plant Output, kW	359,500	340,400	5.6%
Net Plant Heat Rate, Btu/kWh (HHV)	9,340	9,340	0.0%
ICAP Performance (90 deg / 70% RH)			
Net Plant Output, kW	343,700	326,700	5.2%
Net Plant Heat Rate, Btu/kWh (HHV)	9,460	9,490	0.3%

CAPITAL COST ESTIMATE UPDATES

Capital Cost Update: 15ppm 7HA.02

- ▶ Topic: 7HA.02 at 15ppm
- ▶ Provide costs for 15 ppm option
- ▶ Action:
 - BMcD received budgetary cost from OEM, which is unchanged from 25ppm machine
 - BMcD removed SCR from base EPC and Owner's costs for gas-only 15 ppm option
 - No other changes to EPC Costs
 - Owner's costs reductions from contingency and builders risk.
 - No other owner's cost changes
- ▶ Results below. Additional information provided in Appendix B.

7HA.02 Total \$/kW	Zone C	Zone F	Zone G Dutchess	Zone G Rockland	Zone J	Zone K
25 ppm With SCR and Dual Fuel	\$1,030	\$1,030	\$1,040	\$1,080	\$1,320	\$1,140
25 ppm With SCR, Gas Only	\$930	\$940	\$940	\$980	\$1,210	\$1,030
15 ppm NO SCR, Gas Only	\$830	\$840	\$840	\$880	N/A	N/A

Capital Cost Feedback Review

- ▶ Topic: Noise Mitigation Assumptions
- ▶ Feedback: Consider potential need for noise mitigation related costs
- ▶ Action:
 - Reviewed noise assumptions with permitting team
 - For site size assumptions, noise reduction achieved with power island building on all fossil plants (i.e., gas turbines and steam turbines housed indoors)
 - Allowance for sound walls included
 - Low noise fans for air cooled condenser on combined cycle option included
- ▶ Results: Updated costs are provided in Appendix B

Capital Cost Feedback Review (cont.)

- ▶ Topic: Switchyard Assumption for NYC
- ▶ Feedback: Consider the need to assume costs for a gas insulated switchgear (GIS) switchyard design
- ▶ Action:
 - Reviewed feedback and information provided by certain stakeholders
 - Reviewed assumptions and BMcD experience with GIS design in the region
 - Estimated capital costs based on BMcD experience and reasonable judgement
- ▶ BMcD recommends GIS as cost basis in zone J.
- ▶ Comparative cost results (AIS = air insulated switchgear design):

Zone J Switchyard Update	AIS \$MM	GIS \$MM
3-Position Ring Bus	\$10.7	\$50.8
5-Position Ring Bus	\$17.9	\$53.1
4-Position Breaker and a Half	\$19.9	\$61.6

Capital Cost Feedback Review (cont.)

- ▶ Topic: Electric interconnection costs for NYC
- ▶ Feedback: Consider the need to assume costs related to an underground 345 kV line
- ▶ Action:
 - Reviewed overhead assumptions vs. recent projects and information provided by certain stakeholders
 - Reviewed BMcD experience with underground high voltage lines in the region
 - Estimated capital costs based on BMcD experience
- ▶ BMcD recommends matching zone J electrical interconnection costs to the estimating methodology of other zones.

Capital Cost Feedback Review (cont.)

- ▶ Topic: Costs for gas interconnection in NYC
- ▶ Feedback: Consider the assumed cost for a gas interconnection for fossil plant options in zone J
- ▶ Action:
 - Reviewed feedback/information provided by certain stakeholders
 - Reviewed assumptions from last DCR. The general methodology for determining zone J gas interconnection costs matched other zones.
- ▶ BMD proposes matching zone J gas interconnection costs to other zones. Updated allowance is greater than the preliminary zone J costs provided in February.

Capital Cost Feedback Review (cont.)

- ▶ Topic: Battery energy storage system (BESS) cost estimate components
- ▶ Feedback: Provide more detailed breakdown of overbuild assumptions and consider potential for alternative assumptions to meet auxiliary load requirements.
- ▶ Action:
 - Further details regarding assumptions and results provided (see next two slides)
 - Auxiliary load is assumed to be 3%, including battery/control auxiliaries and HVAC
- ▶ Results:
 - See tables on following slides
 - BMcD capital cost estimates include overbuild for auxiliaries loads.
 - BMcD is not proposing any revisions to its initial EPC cost estimates

Capital Cost Feedback Review (cont.)

- ▶ System losses downstream of inverter shown at right
- ▶ Includes battery auxiliaries and HVAC
- ▶ Gross MW is the required installed power to achieve 200 MW at the point of interconnection (POI)

System Losses and Assumptions	
Desired POI Overbuild %	0.0%
POI PF Required	0.95
POI MW	200
Duration (Hours)	4
POI MWh	800
Line Loss % (GSU to POI)	0.05%
GSU Loss %	0.50%
Aux Load (%)	3.0%
Line Loss % (PCS XFMR to GSU)	0.3%
PCS XFMR Loss %	0.73%
Total Losses for Sizing INVERTERS	4.58%
Gross MW Required	209

Capital Cost Feedback Review (cont.)

- ▶ Accounts for battery energy capacity to overcome losses in prior table
- ▶ Accounts for inverter loss, battery roundtrip efficiency loss, and minimum state of charge.
- ▶ Accounts for minimal degradation. Degradation and augmentation are part of O&M costs.
- ▶ Overbuild percentage in this context means Gross MWh / Net MWh

Sizing for Energy	
Gross MW	209
Duration, hours	4
Gross MWh to Cover Power Needs	836
Inverter Loss %	1.60%
Depth of Discharge (SOC Limits)	95.0%
Battery Discharge Loss %	4.0%
Gross MWh Initial Installation	932
Gross MWh Overbuild Percentage	16.5%

O&M COST ESTIMATE UPDATES

O&M Cost Update: 15ppm 7HA.02

- ▶ Topic: 7HA.02 at 15ppm
- ▶ Provide O&M costs for 15 ppm option
- ▶ Action:
 - 15 ppm option assumes no SCR emissions controls for a gas-only design.
 - BMcD recommends further consideration of the 15 ppm option in zones C, F, and G (Dutchess County)
 - All O&M costs related to SCR operation costs are calculated in variable O&M. This includes reagent consumption and catalyst replacement costs.
- ▶ Results:
 - Additional information provided in Appendix C.

Variable O&M 7HA.02 (ZONE C)	7HA.02 25 ppm NOx	7HA.02 15 ppm NOx
Total VOM - Nat Gas, 2020\$/MWh	\$ 1.37	\$ 0.90
Total VOM - Fuel Oil, 2020\$/MWh	\$ 10.88	\$ 10.18

O&M Feedback Review

- ▶ Topic: Prevailing Wages
- ▶ Feedback: Consider the need to assume prevailing wage for employees at generating facilities
- ▶ Action:
 - Reviewed prevailing wage schedules for representative locations 2019-2020
 - Hourly wages + fringe benefits were similar to RS Means data for craft labor that was utilized by BMcD
 - Prevailing wage schedules for operators for steam facilities were in line with current assumptions for plant FTE
- ▶ Results:
 - No updates to capital cost estimates
 - No updates to O&M estimates

O&M Feedback Review (cont.)

▶ Topic: Property Insurance

▶ Feedback: Consider the need to add costs for property insurance

▶ Action:

- Reviewed assumptions from 2016 DCR (0.6% of installed capital costs)
- 2016 assumptions consistent with 2013 DCR assumptions
- Reviewed information from prior BMcD experience in which the \$/kW for insurance costs in NY was similar to calculation results above

▶ Results:

- Propose to replicate assumption used in last two DCRs
- Property insurance cost assumption = 0.6% x EPC capital cost
- See Appendix C for more information

O&M Feedback Review (cont.)

- ▶ Topic: Lease Cost Assumptions for NYC
- ▶ Feedback: Consider preliminary assumed lease costs (\$/acre) for NYC based on feedback/information provided by certain stakeholders
- ▶ Action:
 - Reviewed commercial appraisal for rent pricing at power plant property
 - Site valuation was approximately \$500,000 per acre
 - Subject site valuation was in the middle of the range of 6 recent comparable transactions
 - Preliminary cost assumption was \$270,000 per acre, based on escalating the value assumed from 2016 DCR
- ▶ Results:
 - More recent data indicates that escalating the assumed lease cost in zone J from the last reset may not accurately represent current land value costs in NYC. BMcD is continuing to evaluate this cost component.

O&M Feedback Review (cont.)

- ▶ Operating Personnel
- ▶ Feedback: Consider need to increase full-time equivalent (FTE) personnel for dual fuel plants
- ▶ Action:
 - Reviewed Coast Guard Port Operations Handbook
 - Maritime Security (MARSEC) directives regarding fuel oil transfer from vessel
 - Facility Security Officer (FSO) required at facility during fuel transfers
 - FSO may perform other duties within the Owner's organization
 - Fuel oil is not primary fuel
 - Considered that truck deliveries could be made in most zones.
- ▶ Results:
 - No changes to FTE counts for fixed O&M costs proposed.

O&M Feedback Review (cont.)

- ▶ Variable water usage costs for zone J
- ▶ Feedback: Consider the need to revise the assumed water sourcing for NYC
- ▶ Action:
 - Certain stakeholders indicated reliance on municipal water would better represent the likely sourcing to meet water needs in NYC
 - One stakeholder provided water bills to help identify cost scale for municipal water supply
 - BMcD identified a limited impact to O&M costs to assume reliance on municipal water supply in NYC
- ▶ Results:
 - Updated zone J variable O&M to account for use of municipal water
 - Assumed water cost: \$5 per 1,000 gallons

O&M Update - BESS

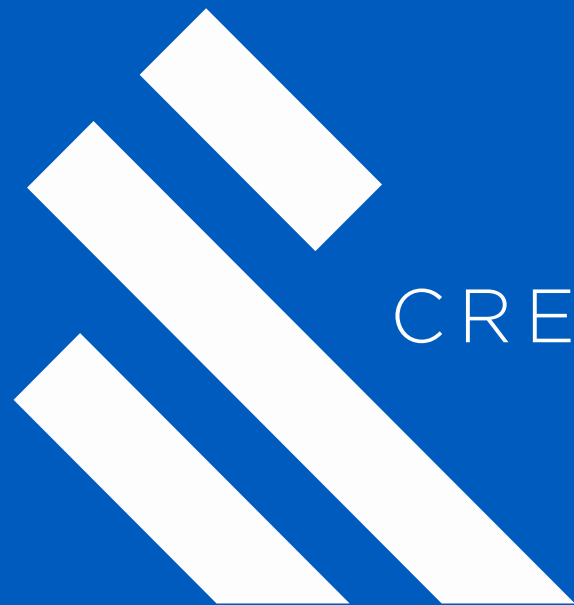
- ▶ Topic: BESS Augmentation and VOM Costs
- ▶ Feedback: Consider potential need to revise augmentation assumptions and related variable O&M cost estimate.
- ▶ Variable O&M
 - Models the augmentation for assumed performance guarantee
 - Levelized cost to account for 2% energy degradation per year
 - Assumes 365 cycles per year
- ▶ Results
 - 2% degradation per year is consistent with market observations for 20-year life, air-cooled NMC chemistry, 4-hour batteries
 - Additional details provided on the next slide



O&M Update - BESS

- ▶ Model identifies four augmentation events
 - Each approx. 13% of year zero MWh
 - Considers publicly available forward pricing curves
 - Considers “learning” by installer
- ▶ Total augmentation cost is levelized over 20 years
- ▶ Escalation is not included
- ▶ BMcD has updated the variable O&M cost to \$12.00/MWh (lower than preliminary \$14.50/MWh value)
 - Preliminary value was based on commercial contract reviews
 - Updated value remains within the range of commercial contracts reviewed

Variable O&M / Augmentation	
Cycles per Year	365
Degradation % per Year	2%
Levelized Cost per Year, \$MM	\$3.5
MWh per Year	292,000
\$/MWh	\$12.00
\$/kWh (Net Installed Year 0)	\$4.40
\$/kW-yr (Net Installed Year 0)	\$17.50



CREATE AMAZING.

APPENDIX A: PRELIMINARY PERFORMANCE
ESTIMATE UPDATES

Preliminary Performance Estimates: 3x SGT-A65

3x Siemens SGT-A65	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
Spring-Fall (ISO) Performance						
Ambient Temperature, °F	59.0	59.0	59.0	59.0	59.0	59.0
Relative Humidity, %	60%	60%	60%	60%	60%	60%
Net Plant Output, kW	184,700	184,700	184,800	184,800	184,900	184,900
Net Plant Heat Rate, Btu/kWh (HHV)	9,430	9,430	9,430	9,430	9,420	9,420
Heat Input, MMBtu/h (HHV)	1,740	1,740	1,740	1,740	1,740	1,740
ICAP Performance						
Ambient Temperature, °F	90.0	90.0	90.0	90.0	90.0	90.0
Relative Humidity, %	70%	70%	70%	70%	70%	70%
Net Plant Output, kW	158,600	158,600	158,700	158,700	158,700	158,700
Net Plant Heat Rate, Btu/kWh (HHV)	9,730	9,730	9,730	9,730	9,720	9,720
Heat Input, MMBtu/h (HHV)	1,540	1,540	1,540	1,540	1,540	1,540

Preliminary Performance Estimates: 1x 7F.05

1x GE 7F.05	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
Spring-Fall (ISO) Performance						
Ambient Temperature, °F	59.0	59.0	59.0	59.0	59.0	59.0
Relative Humidity, %	60%	60%	60%	60%	60%	60%
Net Plant Output, kW	219,800	221,000	221,900	221,900	223,000	223,100
Net Plant Heat Rate, Btu/kWh (HHV)	10,160	10,160	10,160	10,160	10,160	10,160
Heat Input, MMBtu/h (HHV)	2,260	2,270	2,280	2,280	2,300	2,300
ICAP Performance						
Ambient Temperature, °F	90.0	90.0	90.0	90.0	90.0	90.0
Relative Humidity, %	70%	70%	70%	70%	70%	70%
Net Plant Output, kW	207,100	208,200	209,100	209,100	210,200	210,200
Net Plant Heat Rate, Btu/kWh (HHV)	10,360	10,360	10,360	10,360	10,360	10,360
Heat Input, MMBtu/h (HHV)	2,170	2,180	2,190	2,190	2,210	2,210

Preliminary Performance Estimates: 1x 7HA.02 (25 ppm)

1x GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
Spring-Fall (ISO) Performance						
Ambient Temperature, °F	59.0	59.0	59.0	59.0	59.0	59.0
Relative Humidity, %	60%	60%	60%	60%	60%	60%
Net Plant Output, kW	359,500	361,400	362,900	362,900	364,800	364,900
Net Plant Heat Rate, Btu/kWh (HHV)	9,340	9,340	9,340	9,340	9,340	9,340
Heat Input, MMBtu/h (HHV)	3,400	3,420	3,430	3,430	3,450	3,450
ICAP Performance						
Ambient Temperature, °F	90.0	90.0	90.0	90.0	90.0	90.0
Relative Humidity, %	70%	70%	70%	70%	70%	70%
Net Plant Output, kW	343,700	345,600	347,000	347,000	348,800	348,800
Net Plant Heat Rate, Btu/kWh (HHV)	9,460	9,460	9,460	9,460	9,460	9,460
Heat Input, MMBtu/h (HHV)	3,290	3,310	3,320	3,320	3,340	3,340

Preliminary Performance Estimates: 1x 7HA.02 (15 ppm)

1x GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess
Spring-Fall (ISO) Performance			
Ambient Temperature, °F	59.0	59.0	59.0
Relative Humidity, %	60%	60%	60%
Net Plant Output, kW	340,400	342,200	343,500
Net Plant Heat Rate, Btu/kWh (HHV)	9,340	9,230	9,340
Heat Input, MMBtu/h (HHV)	3,180	3,160	3,210
ICAP Performance			
Ambient Temperature, °F	90.0	90.0	90.0
Relative Humidity, %	70%	70%	70%
Net Plant Output, kW	326,700	328,500	329,900
Net Plant Heat Rate, Btu/kWh (HHV)	9,490	9,380	9,490
Heat Input, MMBtu/h (HHV)	3,100	3,080	3,130

Preliminary Performance Estimates: 1x1 7HA.02

1x1 Combined Cycle GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
Spring-Fall (ISO) Performance						
Ambient Temperature, °F	59.0	59.0	59.0	59.0	59.0	59.0
Relative Humidity, %	60%	60%	60%	60%	60%	60%
Net Plant Output, kW	520,400	532,900	535,000	535,000	536,800	537,600
Net Plant Heat Rate, Btu/kWh (HHV)	6,300	6,300	6,300	6,300	6,310	6,300
Heat Input, MMBtu/h (HHV)	3,280	3,360	3,370	3,370	3,390	3,390
Incremental Duct Fired Performance with Evaporative Coolers @ Spring / Fall						
Incremental Duct Fired Output, kW	99,900	100,400	99,400	99,400	99,800	104,400
Incremental Heat Rate, Btu/kWh (HHV)	8,850	8,830	8,830	8,830	8,810	8,860
Incremental Heat Input, MMBtu/h (HHV)	880	890	880	880	880	920
ICAP Performance						
Ambient Temperature, °F	90.0	90.0	90.0	90.0	90.0	90.0
Relative Humidity, %	70%	70%	70%	70%	70%	70%
Net Plant Output, kW	495,100	498,500	500,600	500,600	502,200	502,500
Net Plant Heat Rate, Btu/kWh (HHV)	6,410	6,400	6,400	6,400	6,410	6,410
Heat Input, MMBtu/h (HHV)	3,170	3,190	3,200	3,200	3,220	3,220
Incremental Duct Fired Performance with Evaporative Coolers @ Spring / Fall						
Incremental Duct Fired Output, kW	103,800	104,200	103,200	103,200	102,900	107,700
Incremental Heat Rate, Btu/kWh (HHV)	8,530	8,540	8,550	8,550	8,600	8,530
Incremental Heat Input, MMBtu/h (HHV)	890	890	880	880	880	920

APPENDIX B: PRELIMINARY CAPITAL COST
ESTIMATE UPDATES

Preliminary Capital Cost: 3x SGT-A65

3x Siemens SGT-A65	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
EPC Project Capital Costs, 2020 MM\$	\$225	\$227	\$231	\$239	\$260	\$257
Owner's Costs, 2019 MM\$	\$74	\$75	\$75	\$75	\$116	\$64
Owner's Project Development	\$0.4	\$0.4	\$0.4	\$0.4	\$0.5	\$0.4
Owner's Operational Personnel Prior to COD	\$0.4	\$0.4	\$0.4	\$0.4	\$0.6	\$0.5
Owner's Engineer	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Owner's Project Management	\$1.1	\$1.1	\$1.1	\$1.1	\$1.5	\$1.2
Owner's Legal Costs	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Owner's Start-up Engineering and Commissioning	\$0.3	\$0.3	\$0.3	\$0.3	\$0.4	\$0.3
Construction Power and Water	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Permitting and Licensing Fees	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Switchyard	\$17.1	\$17.1	\$17.1	\$17.1	\$53.1	\$9.3
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0	\$11.0	\$11.0	\$6.5
Gas Interconnection and Reinforcement	\$14.3	\$14.3	\$14.3	\$14.3	\$14.3	\$14.3
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Political Concessions & Area Development Fees	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Startup/Testing (Fuel & Consumables)	\$2.6	\$2.6	\$2.6	\$2.6	\$2.6	\$2.6
Initial Fuel Inventory	\$4.2	\$4.2	\$4.2	\$4.2	\$4.2	\$4.2
Site Security	\$0.6	\$0.6	\$0.6	\$0.6	\$0.8	\$0.6
Operating Spare Parts	\$3.1	\$3.1	\$3.1	\$3.1	\$3.1	\$3.1
Builders Risk Insurance (0.45% of EPC Costs)	\$1.0	\$1.0	\$1.0	\$1.1	\$1.2	\$1.2
Owner's Contingency (5% for Screening)	\$14.3	\$14.4	\$14.6	\$15.1	\$18.0	\$15.4
AFUDC, 2019 MM\$	\$21	\$21	\$21	\$22	\$26	\$22
EPC Portion	\$15.7	\$15.9	\$16.2	\$16.7	\$18.2	\$18.0
Non-EPC Portion	\$5.2	\$5.2	\$5.2	\$5.3	\$8.1	\$4.5
Total Project Costs, 2020 MM\$	\$320	\$323	\$327	\$336	\$402	\$343
CAPITAL COST DEDUCT FOR GAS ONLY						
Capital Costs, 2020 MM\$	(\$11.3)	(\$11.3)	(\$11.3)	(\$11.3)	(\$12.3)	(\$12.3)
Owner's Costs, 2020 MM\$	(\$4.8)	(\$4.8)	(\$4.8)	(\$4.8)	(\$4.9)	(\$4.9)
CAPITAL COST DEDUCT TO REMOVE SCR/CO						
Capital Costs, 2020 MM\$	(\$17.1)	(\$17.1)	(\$17.1)	(\$17.1)	(\$20.4)	(\$20.4)
Owner's Costs, 2020 MM\$	(\$0.9)	(\$0.9)	(\$0.9)	(\$0.9)	(\$1.1)	(\$1.1)

Preliminary Capital Cost: 1x 7F.05

1x GE 7F.05	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
EPC Project Capital Costs, 2020 MM\$	\$181	\$184	\$188	\$199	\$226	\$223
Owner's Costs, 2019 MM\$	\$69	\$69	\$69	\$70	\$116	\$62
Owner's Project Development	\$0.4	\$0.4	\$0.4	\$0.4	\$0.5	\$0.4
Owner's Operational Personnel Prior to COD	\$0.4	\$0.4	\$0.4	\$0.4	\$0.6	\$0.5
Owner's Engineer	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Owner's Project Management	\$1.1	\$1.1	\$1.1	\$1.1	\$1.5	\$1.2
Owner's Legal Costs	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Owner's Start-up Engineering and Commissioning	\$0.3	\$0.3	\$0.3	\$0.3	\$0.4	\$0.3
Construction Power and Water	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Permitting and Licensing Fees	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Switchyard	\$10.3	\$10.3	\$10.3	\$10.3	\$50.8	\$5.6
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0	\$11.0	\$11.0	\$6.5
Gas Interconnection and Reinforcement	\$14.3	\$14.3	\$14.3	\$14.3	\$14.3	\$14.3
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.1	\$0.1	\$0.1	\$0.3	\$0.3	\$0.3
Political Concessions & Area Development Fees	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Startup/Testing (Fuel & Consumables)	\$3.1	\$3.1	\$3.1	\$3.1	\$3.1	\$3.1
Initial Fuel Inventory	\$4.9	\$4.9	\$4.9	\$4.9	\$4.9	\$4.9
Site Security	\$0.6	\$0.6	\$0.6	\$0.6	\$0.8	\$0.6
Operating Spare Parts	\$5.5	\$5.5	\$5.5	\$5.5	\$5.5	\$5.5
Builders Risk Insurance (0.45% of EPC Costs)	\$0.8	\$0.8	\$0.8	\$0.9	\$1.0	\$1.0
Owner's Contingency (5% for Screening)	\$11.9	\$12.0	\$12.2	\$12.8	\$16.3	\$13.6
AFUDC, 2019 MM\$	\$17	\$18	\$18	\$19	\$24	\$20
EPC Portion	\$12.7	\$12.9	\$13.1	\$13.9	\$15.8	\$15.6
Non-EPC Portion	\$4.8	\$4.8	\$4.8	\$4.9	\$8.1	\$4.4
Total Project Costs, 2020 MM\$	\$267	\$270	\$275	\$287	\$366	\$306
CAPITAL COST DEDUCT FOR GAS ONLY						
Capital Costs, 2020 MM\$	(\$16.9)	(\$16.9)	(\$16.9)	(\$16.9)	(\$20.1)	(\$20.1)
Owner's Costs, 2020 MM\$	(\$5.8)	(\$5.8)	(\$5.8)	(\$5.8)	(\$6.0)	(\$6.0)
CAPITAL COST DEDUCT TO REMOVE SCR/CO						
Capital Costs, 2020 MM\$	(\$20.6)	(\$20.6)	(\$20.6)	(\$20.6)	(\$24.0)	(\$24.0)
Owner's Costs, 2020 MM\$	(\$1.1)	(\$1.1)	(\$1.1)	(\$1.1)	(\$1.3)	(\$1.3)

Preliminary Capital Cost: 1x 7HA.02 (25 ppm NOx)

1x GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
EPC Project Capital Costs, 2020 MM\$	\$250	\$253	\$256	\$267	\$301	\$298
Owner's Costs, 2019 MM\$	\$81	\$81	\$82	\$82	\$129	\$75
Owner's Project Development	\$0.4	\$0.4	\$0.4	\$0.4	\$0.5	\$0.4
Owner's Operational Personnel Prior to COD	\$0.4	\$0.4	\$0.4	\$0.4	\$0.6	\$0.5
Owner's Engineer	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Owner's Project Management	\$1.1	\$1.1	\$1.1	\$1.1	\$1.5	\$1.2
Owner's Legal Costs	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Owner's Start-up Engineering and Commissioning	\$0.3	\$0.3	\$0.3	\$0.3	\$0.4	\$0.3
Construction Power and Water	\$0.6	\$0.6	\$0.6	\$0.6	\$0.7	\$0.6
Permitting and Licensing Fees	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Switchyard	\$10.3	\$10.3	\$10.3	\$10.3	\$50.8	\$5.6
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0	\$11.0	\$11.0	\$6.5
Gas Interconnection and Reinforcement	\$17.9	\$17.9	\$17.9	\$17.9	\$17.9	\$17.9
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.1	\$0.1	\$0.1	\$0.4	\$0.4	\$0.4
Political Concessions & Area Development Fees	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Startup/Testing (Fuel & Consumables)	\$4.5	\$4.5	\$4.5	\$4.5	\$4.5	\$4.5
Initial Fuel Inventory	\$7.2	\$7.2	\$7.2	\$7.2	\$7.2	\$7.2
Site Security	\$0.6	\$0.6	\$0.6	\$0.6	\$0.8	\$0.6
Operating Spare Parts	\$6.5	\$6.5	\$6.5	\$6.5	\$6.5	\$6.5
Builders Risk Insurance (0.45% of EPC Costs)	\$1.1	\$1.1	\$1.2	\$1.2	\$1.4	\$1.3
Owner's Contingency (5% for Screening)	\$15.8	\$15.9	\$16.1	\$16.6	\$20.5	\$17.8
AFUDC, 2019 MM\$	\$23	\$23	\$24	\$24	\$30	\$26
EPC Portion	\$17.5	\$17.7	\$18.0	\$18.7	\$21.0	\$20.8
Non-EPC Portion	\$5.7	\$5.7	\$5.7	\$5.8	\$9.0	\$5.3
Total Project Costs, 2020 MM\$	\$354	\$357	\$362	\$374	\$460	\$399
CAPITAL COST DEDUCT FOR GAS ONLY						
Capital Costs, 2020 MM\$	(\$25.4)	(\$25.4)	(\$25.4)	(\$25.4)	(\$30.2)	(\$30.2)
Owner's Costs, 2020 MM\$	(\$8.6)	(\$8.6)	(\$8.6)	(\$8.6)	(\$8.9)	(\$8.9)

Preliminary Capital Cost: 1x 7HA.02 (15 ppm NOx)

1x GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess
EPC Project Capital Costs, 2020 MM\$	\$206	\$209	\$213
Owner's Costs, 2019 MM\$	\$79	\$79	\$79
Owner's Project Development	\$0.4	\$0.4	\$0.4
Owner's Operational Personnel Prior to COD	\$0.4	\$0.4	\$0.4
Owner's Engineer	\$1.0	\$1.0	\$1.0
Owner's Project Management	\$1.1	\$1.1	\$1.1
Owner's Legal Costs	\$1.0	\$1.0	\$1.0
Owner's Start-up Engineering and Commissioning	\$0.3	\$0.3	\$0.3
Construction Power and Water	\$0.6	\$0.6	\$0.6
Permitting and Licensing Fees	\$1.0	\$1.0	\$1.0
Switchyard	\$10.3	\$10.3	\$10.3
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0
Gas Interconnection and Reinforcement	\$17.9	\$17.9	\$17.9
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.1	\$0.1	\$0.1
Political Concessions & Area Development Fees	\$0.5	\$0.5	\$0.5
Startup/Testing (Fuel & Consumables)	\$4.5	\$4.5	\$4.5
Initial Fuel Inventory	\$7.2	\$7.2	\$7.2
Site Security	\$0.6	\$0.6	\$0.6
Operating Spare Parts	\$6.5	\$6.5	\$6.5
Builders Risk Insurance (0.45% of EPC Costs)	\$0.9	\$0.9	\$1.0
Owner's Contingency (5% for Screening)	\$13.6	\$13.7	\$13.9
AFUDC, 2019 MM\$	\$20	\$20	\$20
EPC Portion	\$14.4	\$14.6	\$14.9
Non-EPC Portion	\$5.5	\$5.5	\$5.5
Total Project Costs, 2020 MM\$	\$305	\$308	\$313
CAPITAL COST DEDUCT FOR GAS ONLY			
Capital Costs, 2020 MM\$	(\$25.4)	(\$25.4)	(\$25.4)
Owner's Costs, 2020 MM\$	(\$8.6)	(\$8.6)	(\$8.6)

Preliminary Capital Cost: 1x1 7HA.02 CC

1x1 Combined Cycle GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
EPC Project Capital Costs, 2020 MM\$	\$537	\$550	\$568	\$610	\$693	\$687
Owner's Costs, 2019 MM\$	\$120	\$121	\$122	\$125	\$180	\$131
Owner's Project Development	\$3.5	\$3.5	\$3.5	\$3.5	\$4.6	\$3.9
Owner's Operational Personnel Prior to COD	\$2.4	\$2.4	\$2.4	\$2.4	\$3.1	\$2.6
Owner's Engineer	\$2.6	\$2.6	\$2.6	\$2.6	\$3.4	\$2.9
Owner's Project Management	\$4.8	\$4.8	\$4.8	\$4.8	\$6.2	\$5.3
Owner's Legal Costs	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Owner's Start-up Engineering and Commissioning	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Sales Tax	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Construction Power and Water	\$1.5	\$1.5	\$1.5	\$1.5	\$2.0	\$1.7
Permitting and Licensing Fees	\$1.0	\$1.0	\$1.0	\$1.0	\$1.3	\$1.1
Switchyard	\$18.9	\$18.9	\$18.9	\$18.9	\$61.6	\$18.9
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0	\$11.0	\$11.0	\$11.0
Gas Interconnection and Reinforcement	\$17.9	\$17.9	\$17.9	\$17.9	\$17.9	\$17.9
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.2	\$0.2	\$0.2	\$1.1	\$1.1	\$1.1
Political Concessions & Area Development Fees	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Startup/Testing (Fuel & Consumables)	\$5.5	\$5.5	\$5.5	\$5.5	\$5.5	\$5.5
Initial Fuel Inventory	\$7.2	\$7.2	\$7.2	\$7.2	\$7.2	\$7.2
Site Security	\$1.1	\$1.1	\$1.1	\$1.1	\$1.4	\$1.2
Operating Spare Parts	\$6.5	\$6.5	\$6.5	\$6.5	\$6.5	\$6.5
Builders Risk Insurance (0.45% of EPC Costs)	\$2.4	\$2.5	\$2.6	\$2.8	\$3.1	\$3.1
Owner's Contingency (5% for Screening)	\$31.3	\$31.9	\$32.8	\$35.0	\$41.6	\$39.0
AFUDC, 2019 MM\$	\$46	\$47	\$48	\$51	\$61	\$57
EPC Portion	\$37.6	\$38.5	\$39.7	\$42.7	\$48.5	\$48.1
Non-EPC Portion	\$8.4	\$8.4	\$8.5	\$8.7	\$12.6	\$9.2
Total Project Costs, 2020 MM\$	\$703	\$717	\$737	\$786	\$934	\$875
CAPITAL COST DEDUCT FOR GAS ONLY						
Capital Costs, 2020 MM\$	(\$25.4)	(\$25.4)	(\$25.4)	(\$25.4)	(\$30.2)	(\$30.2)
Owner's Costs, 2020 MM\$	(\$3.8)	(\$3.9)	(\$3.9)	(\$4.1)	(\$4.8)	(\$4.7)

Preliminary Capital Cost: BESS 4-Hour

200 MW BESS (4-Hour)	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
EPC Project Capital Costs, 2020 MM\$	\$251	\$253	\$256	\$265	\$281	\$279
Owner's Costs, 2019 MM\$	\$40	\$40	\$40	\$40	\$87	\$32
Owner's Project Development	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2
Owner's Operational Personnel Prior to COD	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Owner's Engineer	\$0.2	\$0.2	\$0.2	\$0.2	\$0.3	\$0.2
Owner's Project Management	\$0.4	\$0.4	\$0.4	\$0.4	\$0.5	\$0.4
Owner's Legal Costs	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Owner's Start-up Engineering and Commissioning	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Land	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Construction Power and Water	\$0.5	\$0.5	\$0.5	\$0.5	\$0.6	\$0.5
Permitting and Licensing Fees	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3
Switchyard	\$10.3	\$10.3	\$10.3	\$10.3	\$50.8	\$5.6
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0	\$11.0	\$13.0	\$6.5
Gas Interconnection and Reinforcement	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Political Concessions & Area Development Fees	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Startup/Testing (Fuel & Consumables)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Initial Fuel Inventory	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Site Security	\$0.4	\$0.4	\$0.4	\$0.4	\$0.5	\$0.4
Operating Spare Parts	\$0.8	\$0.8	\$0.8	\$0.8	\$0.8	\$0.8
Builders Risk Insurance (0.45% of Construction Costs)	\$1.1	\$1.1	\$1.2	\$1.2	\$1.3	\$1.3
Owner's Contingency (5% for Screening Purposes)	\$13.8	\$14.0	\$14.1	\$14.6	\$17.5	\$14.8
AFUDC, 2019 MM\$	\$20	\$21	\$21	\$21	\$26	\$22
EPC Portion	\$17.6	\$17.7	\$17.9	\$18.6	\$19.7	\$19.6
Non-EPC Portion	\$2.8	\$2.8	\$2.8	\$2.8	\$6.1	\$2.2
Total Project Costs, 2020 MM\$	\$311	\$313	\$316	\$327	\$394	\$333

Preliminary Capital Cost: BESS 6-Hour

200 MW BESS (6-Hour)	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
EPC Project Capital Costs, 2020 MM\$	\$359	\$362	\$366	\$380	\$402	\$400
Owner's Costs, 2019 MM\$	\$46	\$46	\$47	\$47	\$94	\$39
Owner's Project Development	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2
Owner's Operational Personnel Prior to COD	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Owner's Engineer	\$0.2	\$0.2	\$0.2	\$0.2	\$0.3	\$0.3
Owner's Project Management	\$0.4	\$0.4	\$0.4	\$0.4	\$0.5	\$0.5
Owner's Legal Costs	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Owner's Start-up Engineering and Commissioning	\$0.1	\$0.1	\$0.1	\$0.1	\$0.2	\$0.2
Land	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Construction Power and Water	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Permitting and Licensing Fees	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3
Switchyard	\$10.3	\$10.3	\$10.3	\$10.3	\$50.8	\$5.6
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0	\$11.0	\$13.0	\$6.5
Gas Interconnection and Reinforcement	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Political Concessions & Area Development Fees	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Startup/Testing (Fuel & Consumables)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Initial Fuel Inventory	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Site Security	\$0.4	\$0.4	\$0.4	\$0.4	\$0.6	\$0.5
Operating Spare Parts	\$1.1	\$1.1	\$1.1	\$1.1	\$1.1	\$1.1
Builders Risk Insurance (0.45% of Construction Costs)	\$1.6	\$1.6	\$1.7	\$1.7	\$1.8	\$1.8
Owner's Contingency (5% for Screening Purposes)	\$19.3	\$19.5	\$19.6	\$20.3	\$23.6	\$20.9
AFUDC, 2019 MM\$	\$28	\$29	\$29	\$30	\$35	\$31
EPC Portion	\$25.1	\$25.4	\$25.6	\$26.6	\$28.2	\$28.0
Non-EPC Portion	\$3.2	\$3.2	\$3.3	\$3.3	\$6.6	\$2.7
Total Project Costs, 2020 MM\$	\$433	\$437	\$441	\$457	\$531	\$470

Preliminary Capital Cost: BESS 8-Hour

200 MW BESS (8-Hour)	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
EPC Project Capital Costs, 2020 MM\$	\$467	\$471	\$476	\$494	\$524	\$521
Owner's Costs, 2019 MM\$	\$53	\$53	\$53	\$54	\$101	\$46
Owner's Project Development	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2
Owner's Operational Personnel Prior to COD	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Owner's Engineer	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3
Owner's Project Management	\$0.5	\$0.5	\$0.5	\$0.5	\$0.6	\$0.5
Owner's Legal Costs	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Owner's Start-up Engineering and Commissioning	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2
Land	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Construction Power and Water	\$0.6	\$0.6	\$0.6	\$0.6	\$0.7	\$0.6
Permitting and Licensing Fees	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3
Switchyard	\$10.3	\$10.3	\$10.3	\$10.3	\$50.8	\$5.6
Electrical Interconnection and Deliverability	\$11.0	\$11.0	\$11.0	\$11.0	\$13.0	\$6.5
Gas Interconnection and Reinforcement	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
System Deliverability Upgrade Costs	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emission Reduction Credits	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Political Concessions & Area Development Fees	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Startup/Testing (Fuel & Consumables)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Initial Fuel Inventory	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Site Security	\$0.5	\$0.5	\$0.5	\$0.5	\$0.7	\$0.6
Operating Spare Parts	\$1.5	\$1.5	\$1.5	\$1.5	\$1.5	\$1.5
Builders Risk Insurance (0.45% of Construction Costs)	\$2.1	\$2.1	\$2.1	\$2.2	\$2.4	\$2.3
Owner's Contingency (5% for Screening Purposes)	\$24.7	\$25.0	\$25.2	\$26.1	\$29.8	\$27.0
AFUDC, 2019 MM\$	\$36	\$37	\$37	\$38	\$44	\$40
EPC Portion	\$32.7	\$33.0	\$33.3	\$34.6	\$36.6	\$36.4
Non-EPC Portion	\$3.7	\$3.7	\$3.7	\$3.8	\$7.1	\$3.2
Total Project Costs, 2020 MM\$	\$556	\$561	\$566	\$587	\$669	\$607

APPENDIX C: PRELIMINARY O&M ESTIMATE
UPDATES

Preliminary O&M Estimate: 3x SGT-A65

3x Siemens SGT-A65	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
FIXED O&M COSTS						
Fixed O&M Cost - LABOR, 2020\$MM/Yr	\$0.90	\$1.00	\$1.30	\$1.30	\$1.70	\$1.50
Fixed O&M Cost - OTHER, 2020\$MM/Yr	\$1.10	\$1.10	\$1.10	\$1.10	\$1.10	\$1.10
Site Leasing Allowance, 2020\$/MM/Yr	\$0.3	\$0.3	\$0.3	\$0.3	\$4.1	\$0.4
LEVELIZED MAJOR MAINTENANCE COSTS						
Major Maintenance Cost, 2020\$/GT-hr or \$/engine-hr	\$190	\$190	\$190	\$190	\$190	\$190
Major Maintenance Cost, 2020\$/GT-start	N/A	N/A	N/A	N/A	N/A	N/A
Major Maintenance Cost, 2020\$/MWh	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - GAS OPERATION						
Total Variable O&M Cost, 2020\$/MWh	\$10.07	\$9.95	\$9.85	\$9.85	\$10.17	\$9.72
Water Related O&M, \$/MWh	\$8.35	\$8.22	\$8.12	\$8.12	\$8.44	\$7.99
SCR Related Costs, \$/MWh	\$0.82	\$0.83	\$0.83	\$0.83	\$0.83	\$0.83
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - FUEL OIL OPERATION						
Total Variable O&M Cost, 2020\$/MWh	\$10.20	\$10.00	\$9.90	\$9.90	\$10.21	\$9.79
Water Related O&M, \$/MWh	\$8.20	\$8.10	\$8.00	\$8.00	\$8.28	\$7.86
SCR Related Costs, \$/MWh	\$1.00	\$1.00	\$1.00	\$1.00	\$1.03	\$1.03
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90

Preliminary O&M Estimate: 1x 7F.05

1x GE 7F.05	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
FIXED O&M COSTS						
Fixed O&M Cost - LABOR, 2020\$MM/Yr	\$0.90	\$1.00	\$1.30	\$1.30	\$1.70	\$1.50
Fixed O&M Cost - OTHER, 2020\$MM/Yr	\$1.10	\$1.10	\$1.10	\$1.10	\$1.10	\$1.10
Site Leasing Allowance, 2020\$/MM/Yr	\$0.3	\$0.3	\$0.3	\$0.3	\$4.1	\$0.4
LEVELIZED MAJOR MAINTENANCE COSTS						
Major Maintenance Cost, 2020\$/GT-hr or \$/engine-hr	\$350	\$190	\$190	\$190	\$190	\$190
Major Maintenance Cost, 2020\$/GT-start	N/A	N/A	N/A	N/A	N/A	N/A
Major Maintenance Cost, 2020\$/MWh	\$1.50	\$1.50	\$1.50	\$1.50	\$1.50	\$1.50
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - GAS OPERATION						
Total Variable O&M Cost, 2020\$/MWh	\$1.48	\$1.48	\$1.48	\$1.48	\$1.50	\$1.48
Water Related O&M, \$/MWh	\$0.00	\$0.00	\$0.00	\$0.00	\$0.02	\$0.00
SCR Related Costs, \$/MWh	\$0.58	\$0.58	\$0.58	\$0.58	\$0.57	\$0.57
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90	\$0.90	\$0.91	\$0.91
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - FUEL OIL OPERATION						
Total Variable O&M Cost, 2020\$/MWh	\$8.80	\$8.80	\$8.80	\$8.80	\$9.17	\$8.79
Water Related O&M, \$/MWh	\$7.10	\$7.10	\$7.10	\$7.10	\$7.48	\$7.11
SCR Related Costs, \$/MWh	\$0.80	\$0.80	\$0.80	\$0.80	\$0.79	\$0.79
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.89

Preliminary O&M Estimate: 1x 7HA.02 (25 ppm NOx)

1x GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
FIXED O&M COSTS						
Fixed O&M Cost - LABOR, 2020\$MM/Yr	\$0.90	\$1.00	\$1.30	\$1.30	\$1.70	\$1.50
Fixed O&M Cost - OTHER, 2020\$MM/Yr	\$1.50	\$1.50	\$1.50	\$1.50	\$1.50	\$1.50
Site Leasing Allowance, 2020\$/MM/Yr	\$0.3	\$0.3	\$0.3	\$0.3	\$4.1	\$0.4
LEVELIZED MAJOR MAINTENANCE COSTS						
Major Maintenance Cost, 2020\$/GT-hr or \$/engine-hr	\$600	\$190	\$190	\$190	\$190	\$190
Major Maintenance Cost, 2020\$/GT-start	N/A	N/A	N/A	N/A	N/A	N/A
Major Maintenance Cost, 2020\$/MWh	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60	\$1.60
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - GAS OPERATION						
Total Variable O&M Cost, 2020\$/MWh	\$1.37	\$1.27	\$1.27	\$1.27	\$1.39	\$1.27
Water Related O&M, \$/MWh	\$0.00	\$0.00	\$0.00	\$0.00	\$0.02	\$0.00
SCR Related Costs, \$/MWh	\$0.47	\$0.37	\$0.37	\$0.37	\$0.48	\$0.37
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - FUEL OIL OPERATION						
Total Variable O&M Cost, 2020\$/MWh	\$8.80	\$8.80	\$8.80	\$8.80	\$11.44	\$8.80
Water Related O&M, \$/MWh	\$7.10	\$7.10	\$7.10	\$7.10	\$9.83	\$7.10
SCR Related Costs, \$/MWh	\$0.80	\$0.80	\$0.80	\$0.80	\$0.70	\$0.80
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90

Preliminary O&M Estimate: 1x 7HA.02 (15 ppm NOx)

1x GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess
FIXED O&M COSTS			
Fixed O&M Cost - LABOR, 2020\$MM/Yr	\$0.90	\$1.00	\$1.30
Fixed O&M Cost - OTHER, 2020\$MM/Yr	\$1.50	\$1.50	\$1.50
Site Leasing Allowance, 2020\$/MM/Yr	\$0.3	\$0.3	\$0.3
LEVELIZED MAJOR MAINTENANCE COSTS			
Major Maintenance Cost, 2020\$/GT-hr or \$/engine-hr	\$600	\$190	\$190
Major Maintenance Cost, 2020\$/GT-start	N/A	N/A	N/A
Major Maintenance Cost, 2020\$/MWh	\$1.60	\$1.60	\$1.60
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - GAS OPERATION			
Total Variable O&M Cost, 2020\$/MWh	\$0.90	\$0.90	\$0.90
Water Related O&M, \$/MWh	\$0.00	\$0.00	\$0.00
SCR Related Costs, \$/MWh	\$0.00	\$0.00	\$0.00
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - FUEL OIL OPERATION			
Total Variable O&M Cost, 2020\$/MWh	\$10.20	\$10.20	\$10.20
Water Related O&M, \$/MWh	\$9.30	\$9.30	\$9.30
SCR Related Costs, \$/MWh	\$0.00	\$0.00	\$0.00
Other Consumables and Variable O&M, \$/MWh	\$0.90	\$0.90	\$0.90

Preliminary O&M Estimate: 1x1 7HA.02 CC

1x1 Combined Cycle GE 7HA.02	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
FIXED O&M COSTS						
Fixed O&M Cost - LABOR, 2020\$/MM/Yr	\$2.8	\$3.1	\$4.1	\$4.1	\$5.3	\$4.7
Fixed O&M Cost - OTHER, 2020\$/MM/Yr	\$2.1	\$2.1	\$2.1	\$2.1	\$2.1	\$2.1
Site Leasing Allowance, 2020\$/MM/Yr	\$0.7	\$0.7	\$0.7	\$0.7	\$8.1	\$0.8
LEVELIZED CAPITAL MAINTENANCE COSTS						
Major Maintenance Cost, 2019 \$/GT-hr	\$600	\$600	\$600	\$600	\$600	\$600
Major Maintenance Cost, 2019 \$/MWh	\$1.10	\$1.10	\$1.10	\$1.10	\$1.10	\$1.10
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - GAS OPERATION						
Total Variable O&M Cost, 2019 \$/MWh	\$1.55	\$1.55	\$1.55	\$1.55	\$1.57	\$1.54
Water Related O&M (\$/MWh)	\$0.01	\$0.01	\$0.01	\$0.01	\$0.03	\$0.01
SCR Related Costs, \$/MWh	\$0.32	\$0.32	\$0.32	\$0.32	\$0.32	\$0.32
Other Consumables and Variable O&M (\$/MWh)	\$1.22	\$1.22	\$1.22	\$1.22	\$1.22	\$1.21
Incremental Duct Fired Variable O&M, 2019 \$/MWh (excl)	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60
Water Related O&M (\$/MWh)	\$0.05	\$0.05	\$0.05	\$0.05	\$0.06	\$0.03
SCR Reagent, \$/MWh	\$0.13	\$0.13	\$0.13	\$0.13	\$0.13	\$0.13
Other Consumables and Variable O&M (\$/MWh)	\$0.42	\$0.42	\$0.42	\$0.42	\$0.41	\$0.44
NON-FUEL VARIABLE O&M COSTS (EXCLUDES MAJOR MAINTENANCE) - FUEL OIL OPERATION						
Total Variable O&M Cost, 2019 \$/MWh	\$1.70	\$1.70	\$1.70	\$1.70	\$2.09	\$1.73
Water Related O&M (\$/MWh)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.40	\$0.03
SCR Related Costs, \$/MWh	\$0.50	\$0.50	\$0.50	\$0.50	\$0.46	\$0.48
Other Consumables and Variable O&M (\$/MWh)	\$1.20	\$1.20	\$1.20	\$1.20	\$1.23	\$1.22

Preliminary O&M Estimates: BESS (4, 6, and 8 Hour)

200 MW BESS (4-Hour)	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
FIXED O&M COSTS						
Fixed O&M Cost - Assumes LTSA with Integrator/OEM, 2020\$MM/Yr	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0
Site Leasing Allowance, 2020\$/MM/Yr	\$0.2	\$0.2	\$0.2	\$0.2	\$4.5	\$0.2
CAPACITY AUGMENTATION (Modeled as VARIABLE O&M COSTS)						
Capacity Augmentation (via LTSA) for 20 Years Levelized, 2020 \$/MWh	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00

200 MW BESS (6-Hour)	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
FIXED O&M COSTS						
Fixed O&M Cost - Assumes LTSA with Integrator/OEM, 2020\$MM/Yr	\$1.2	\$1.2	\$1.2	\$1.2	\$1.2	\$1.2
Site Leasing Allowance, 2020\$/MM/Yr	\$0.3	\$0.3	\$0.3	\$0.3	\$6.0	\$0.3
CAPACITY AUGMENTATION (Modeled as VARIABLE O&M COSTS)						
Capacity Augmentation (via LTSA) for 20 Years Levelized, 2020 \$/MWh	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00

200 MW BESS (8-Hour)	ZONE C	ZONE F	ZONE G - Dutchess	ZONE G - Rockland	ZONE J	ZONE K
FIXED O&M COSTS						
Fixed O&M Cost - Assumes LTSA with Integrator/OEM, 2020\$MM/Yr	\$1.5	\$1.5	\$1.5	\$1.5	\$1.5	\$1.5
Site Leasing Allowance, 2020\$/MM/Yr	\$0.3	\$0.3	\$0.3	\$0.3	\$7.5	\$0.4
CAPACITY AUGMENTATION (Modeled as VARIABLE O&M COSTS)						
Capacity Augmentation (via LTSA) for 20 Years Levelized, 2020 \$/MWh	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00