Electrical Interconnection and System Deliverability Upgrade Costs Peaking Unit and Combined Cycle Technologies

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New York Independent System Operator

Installed Capacity Working Group

Agenda

1. Overview
2. Electrical Interconnection Cost Development
3. System Deliverability Upgrades
4. Electrical Interconnection Costs











Overview

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- Electrical interconnection cost is based on conceptual designs from recent interconnection agreements
- System Deliverability Upgrade (SDU) studies performed by the NYISO conclude that SDUs are only needed for Long Island (Load Zone K)
- SDU cost included in capital cost as a separate Owner's cost






Electrical Interconnection Cost Development

Electrical Interconnection Costs Components

- Minimum Interconnection Standard (MIS) Costs include:
  - Developer attachment facilities (DAF), from high side bushing of generator step-up transformer (GSU) to point of interconnect (POI)
  - Connecting transmission owner attachment facilities (CTO-AF)
  - System upgrade facilities (SUF) at POI; POI is a substation
  - SUFs beyond POI

Cost Estimating Approach

- Reviewed recent project interconnection agreements
- Developed conceptual one-lines from plant generator(s) to POI
- Budget pricing for major electrical components
- Factors for labor, bulk materials and indirect costs
- 20% contingency applied to DAF and SUF at POI

Electrical Interconnection Conceptual Design Assumptions

- Transmission line from plant to POI is 1 mile long in Load Zone J and 3 miles long in the other Load Zones
- SUF at POI is expansion of existing substation, adding a 3 breaker ring bus with gas insulated switchgear (GIS); control equipment installed in existing control building at POI
- Transmission voltages are (138 kV used for Load Zone J):

Zone C	Zone F	Zone G	Zone J		Zone K
345 kV	230 kV	345 kV	345 kV	138 kV	138 kV

System Deliverability Upgrades

System Deliverability Upgrade Basis

- SDU studies completed by NYISO
- SDUs only required in Load Zone K (Long Island)
- SDU preliminary cost estimates developed by PSEG Long Island (Lummus is reviewing the SDU costs)

System Deliverability Upgrades in Load Zone K

- All peaking unit technologies will require re-conductoring of Elwood-Pulaski 69 kV line at an estimated cost of $15.5 million, based on the cost estimate provided by PSEG Long Island
- In addition to the Elwood- Pulaski 69 kV line re-conductoring described above, the informational combined cycle technologies (1x1x1 Siemens 5000F and 1x1x1 Siemens 8000H); and the informational simple cycle 1x0 GE 7HA.02will require new or re-conductoring of Barrett-Valley Stream or Barrett-EGC138 kV lines at estimated costs of $64.6 million, $129 million or $191 million depending on plant location , based on the cost estimates provided by PSEG Long Island

System Deliverability Upgrades in Load Zone K

- 138 kV interconnection for Load Zone K
- Since site location is generic , the 138 kV re-conductoring SDU cost is an average of the costs for the three locations assessed in NYISO's deliverability assessment
- SDU cost included as a separate Owner's Cost
- 20% contingency applied to SDU costs

Electrical Interconnection Costs
(Including SDU Costs for Load Zone K)

Electrical Interconnection Assumptions

Electrical Interconnection Cost Estimate Assumptions

- Cost of plant generator breaker(s) and step up transformers were already included in equipment cost portion of the engineering, procurement, construction (EPC) cost
- MIS cost was estimated based on conceptual one-lines except for CTO-AF and other SUFs, which were based on estimates in recent interconnection agreements

Costs for 2x0 LMS100 Aero CT & 1x0 5000F Frame CT Plants

	Syracuse Zone C 345 kV	Albany Zone F 230 kV	Rockland Zone G 345 kV	Dutchess Zone G 345 kV	NYC Zone J 138 kV	Suffolk Zone K 138 kV
PLANT SWITCHYARD	**3,687,962**	**1,931,053**	**3,789,084**	**3,774,350**	**1,509,007**	**1,483,441**
Other MIS						
Plant Switchyard to POI	8,387,303	3,528,000	9,602,436	9,427,159	1,796,548	5,160,602
CTO AF	1,300,000	1,300,000	1,300,000	1,300,000	1,500,000	1,300,000
SUF at POI	11,063,885	5,152,896	11,367,251	11,323,049	4,527,021	4,450,322
SUF	1,000,000	1,000,000	1,000,000	1,000,000	1,200,000	1,000,000
TOTAL MIS	**21,751,188**	**10,980,896**	**23,269,687**	**23,050,208**	**9,023,568**	**11,910,925**
SDU						**18,480,000**

Costs for 12 x 18V50 Reciprocating Engine Plant

	Syracuse Zone C 345 kV	Albany Zone F 230 kV	Rockland Zone G 345 kV	Dutchess Zone G 345 kV	NYC Zone J 138 kV	Suffolk Zone K 138 kV
PLANT SWITCHYARD	**7,375,923**	**3,862,105**	**7,578,167**	**7,548,699**	**3,018,014**	**2,966,882**
Other MIS						
Plant Switchyard to POI	8,387,303	3,528,000	9,602,436	9,427,159	1,796,548	5,160,602
CTO AF	1,300,000	1,300,000	1,300,000	1,300,000	1,500,000	1,300,000
SUF at POI	11,063,885	5,152,896	11,367,251	11,323,049	4,527,021	4,450,322
SUF	1,000,000	1,000,000	1,000,000	1,000,000	1,200,000	1,000,000
TOTAL Other MIS	**21,751,188**	**10,980,896**	**23,269,687**	**23,050,208**	**9,023,568**	**11,910,925**
SDU						**18,480,000**

Electrical Interconnection Costs

Costs for 1x 0 7HA.02 Frame CT, 1x1 5000F5 CC and 1x1 8000H CC Plants

	Syracuse Zone C 345 kV	Albany Zone F 230 kV	Rockland Zone G 345 kV	Dutchess Zone G 345 kV	NYC Zone J 138 kV	Suffolk Zone K 138 kV
PLANT SWITCHYARD	**3,687,962**	**1,931,053**	**3,789,084**	**3,774,350**	**1,509,007**	**1,483,441**
Other MIS						
Plant Switchyard to POI	8,387,303	3,528,000	9,602,436	9,427,159	1,796,548	5,160,602
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SUF	1,000,000	1,000,000	1,000,000	1,000,000	1,200,000	1,000,000
TOTAL MIS	**21,751,188**	**10,980,896**	**23,269,687**	**23,050,208**	**9,023,568**	**11,910,925**
SDU						**174,000,000**

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