

Preliminary - For
Discussion Purposes Only

Updated Results: Capital Investment Costs for New Entrant Peaking Unit

Presentation to NYISO ICAP Working Group

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- Zone J – 2 unit LMS100 PA
 - *Assumes 6.0-6.5 ac. site available for a two unit installation*
- Zone J – 2 unit RR Trent 60 WLE in New Jersey
 - *Connected via underwater generator leads to NYC substation*
- Zone J – 2x2x1 Combined Cycle Plant
 - *GE 7FA.05 turbines*
 - *SCR and Oxidation Catalyst*
 - *Site requirements: 10 ac. for power block; 10 ac. for cooling tow and switchyard; typical layout is 25-35 ac.*
 - *Provided for comparison to simple cycle cases*

Updated Assumptions

- Social Justice and spare parts costs as presented at April 22nd ICAP working group meeting
- Wet low NOx combustors on all dual fuel technologies (Zone J)
- RR Trent 60 WLE instead of DLE in Zones G, J and K
- Oxidation catalyst on LM6000 in Zones G, J and K
- Piles in Zone G foundation

Other Comments

- Final numbers in draft report will include updated electrical and gas interconnection costs, cost of emissions reduction credits (if needed), and updated financial assumptions
- Detail breakdown of costs will be provided in appendix to draft report
 - *Handouts for this meeting show breakdown for lowest cost technologies in Zones F, J and K as examples*
 - *Can be provided in spreadsheet format if desired*

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| 2010 Demand Curve Reset - Capital Investment Costs (2010\$) - updated 5/5/2010 | | | | |
|--|----------------------|----------------------|----------------------|-----------------|
| | Zone C - Syracuse | Zone C - Syracuse | Zone C - Syracuse | |
| | 2 x LM6000 PH Sprint | 2 x LMS100 PA | 2 x 7FA.05 (SC) | |
| | No SCR | No SCR | No SCR | |
| Direct Costs | 111,736,000 | 192,816,000 | 254,007,000 | |
| Owner's Costs | 13,296,000 | 22,943,000 | 30,226,000 | |
| Financing Costs During Construction | 5,689,000 | 9,817,000 | 12,932,000 | |
| Working Capital and Inventories | 2,235,000 | 3,856,000 | 5,080,000 | |
| Total | 132,956,000 | 229,432,000 | 302,245,000 | |
| Net Degraded ICAP MW | 86.2 | 181.32 | 376.43 | |
| Net Degraded ICAP Heat Rate (Btu/kWh) | 9,742 | 9,210 | 10,411 | |
| \$/kW | \$1,542 | \$1,265 | \$803 | |
| | Zone F - Albany | Zone F - Albany | Zone F - Albany | Zone F - Albany |
| | 2 x LM6000 PH Sprint | 2 x LMS100 PA | 2 x 7FA.05 (SC) | 2 x 7FA.05 (CC) |
| | No SCR | No SCR | No SCR | With SCR |
| Direct Costs | 112,753,000 | 194,383,000 | 256,048,000 | 606,380,000 |
| Owner's Costs | 13,419,000 | 23,132,000 | 30,468,000 | 72,160,000 |
| Financing Costs During Construction | 5,741,000 | 9,897,000 | 13,036,000 | 30,873,000 |
| Working Capital and Inventories | 2,255,000 | 3,888,000 | 5,121,000 | 12,128,000 |
| Total | 134,168,000 | 231,300,000 | 304,673,000 | 721,541,000 |
| Net Degraded ICAP MW | 86.68 | 182.42 | 378.39 | 542.44 |
| Net Degraded ICAP Heat Rate (Btu/kWh) | 9,742 | 9,208 | 10,411 | 7,200 |
| \$/kW | \$1,548 | \$1,268 | \$805 | \$1,330 |
| | Zone G - HV | Zone G - HV | Zone G - HV | |
| | 2 x LM6000 PH Sprint | 2 x LMS100 PA | 2 X RR Trent 60 WLE | |
| | With SCR | With SCR | With SCR | |
| Direct Costs | 138,110,000 | 225,753,000 | 135,810,000 | |
| Owner's Costs | 16,433,000 | 26,864,000 | 16,162,000 | |
| Financing Costs During Construction | 7,032,000 | 11,494,000 | 6,914,000 | |
| Working Capital and Inventories | 2,762,000 | 4,515,000 | 2,716,000 | |
| Total | 164,337,000 | 268,626,000 | 161,602,000 | |
| Net Degraded ICAP MW | 87.04 | 183.24 | 106.68 | |
| Net Degraded ICAP Heat Rate (Btu/kWh) | 9,736 | 9,208 | 9,678 | |
| \$/kW | \$1,888 | \$1,466 | \$1,515 | |
| | Zone J - NYC | Zone J - NYC | Zone J - NYC | Zone J - NYC |
| | 2 x LM6000 PH Sprint | 2 x LMS100 PA | 2 X RR Trent 60 WLE | 2 x 7FA.05 (CC) |
| | With SCR | With SCR | With SCR | With SCR |
| Direct Costs | 162,075,000 | 264,735,000 | 166,102,000 | 792,222,000 |
| Owner's Costs | 19,288,000 | 31,505,000 | 19,765,000 | 94,275,000 |
| Financing Costs During Construction | 8,252,000 | 13,478,000 | 8,457,000 | 40,336,000 |
| Working Capital and Inventories | 3,242,000 | 5,295,000 | 3,322,000 | 15,844,000 |
| Total | 192,857,000 | 315,013,000 | 197,646,000 | 942,677,000 |
| Net Degraded ICAP MW | 86.92 | 183.28 | 106.68 | 547.14 |
| Net Degraded ICAP Heat Rate (Btu/kWh) | 9,809 | 9,259 | 9,721 | 7,202 |
| \$/kW | \$2,219 | \$1,719 | \$1,853 | \$1,723 |
| | | Zone J - NYC | Zone J - NYC (NJ) | |
| | | 1 x LMS100 PA | 2 X RR Trent 60 WLE | |
| | | With SCR | With SCR | |
| Direct Costs | | 156,314,000 | 216,879,000 | |
| Owner's Costs | | 18,601,000 | 17,677,000 | |
| Financing Costs During Construction | | 7,958,000 | 7,564,000 | |
| Working Capital and Inventories | | 3,126,000 | 2,971,000 | |
| Total | | 185,999,000 | 245,091,000 | |
| Net Degraded ICAP MW | | 91.64 | 106.68 | |
| Net Degraded ICAP Heat Rate (Btu/kWh) | | 9,259 | 9,721 | |
| \$/kW | | \$2,030 | \$2,297 | |
| | Zone K - Long Island | Zone K - Long Island | Zone K - Long Island | |
| | 2 x LM6000 PH Sprint | 2 x LMS100 PA | 2 X RR Trent 60 WLE | |
| | With SCR | With SCR | With SCR | |
| Direct Costs | 154,473,000 | 251,256,000 | 152,609,000 | |
| Owner's Costs | 18,380,000 | 29,899,000 | 18,161,000 | |
| Financing Costs During Construction | 7,865,000 | 12,792,000 | 7,770,000 | |
| Working Capital and Inventories | 3,089,000 | 5,025,000 | 3,052,000 | |
| Total | 183,807,000 | 298,972,000 | 181,592,000 | |
| Net Degraded ICAP MW | 86.94 | 183.28 | 106.7 | |
| Net Degraded ICAP Heat Rate (Btu/kWh) | 9,806 | 9,259 | 9,721 | |
| \$/kW | \$2,114 | \$1,631 | \$1,702 | |

Preliminary - For Discussion Purposes

| New York Independent System Operator Demand Curve Review - Cost of New Entrant Peaking Unit Case 05 - 2x GE 7FA.05 Simple Cycle Station Without SCR's, Zone F (Capital) Conceptual EPC Cost Estimate - 5/5/2010 | | | | | |
|--|--|-------------------------------------|---------------------|---------------------------------------|----------------------|
| Description | Scope Definition | Total Equipment or Material Cost | Total Man- hours | Total Construction & Erection Cost | Total Projected Cost |
| Combustion Turbines w/ Accessories | GE 7FA.05 | 115,400,000 | 68,200 | 6,026,000 | 121,426,000 |
| Simple Cycle Exhaust Stack | | 3,200,000 | 3,740 | 330,000 | 3,530,000 |
| Aqueous Ammonia Storage & Forwarding | Not Required | 0 | 0 | 0 | 0 |
| Inlet Air Chillers | Not Included | 0 | 0 | 0 | 0 |
| Pumps | | 652,000 | 1,430 | 127,000 | 779,000 |
| Field Erected Tanks | Turnkey Subcontracts | 700,000 | 0 | 0 | 700,000 |
| Shop Fabricated Tanks | | 70,000 | 210 | 19,000 | 89,000 |
| Cranes & Hoists | Allowance for Misc. Hoists Only Not Included - Assume 450 psi | 15,000 | 170 | 15,000 | 30,000 |
| Fuel Gas Compressors | Supply Pressure Gas Interconnection and Metering Station Assumed by Fuel Gas Supplier | 0 | 0 | 0 | 0 |
| Fuel Gas Supply & Metering | | 0 | 0 | 0 | 0 |
| Fuel Gas Conditioning | | 1,700,000 | 1,210 | 107,000 | 1,807,000 |
| Bulk Gas Storage Provisions | | 10,000 | 150 | 14,000 | 24,000 |
| Air Compressors & Dryers | | 290,000 | 750 | 66,000 | 356,000 |
| Water Treating | Not Included | 0 | 0 | 0 | 0 |
| Fire Protection | Turnkey Subcontract | 500,000 | 0 | 0 | 500,000 |
| B.O.P. Mechanical (Miscellaneous) | | 125,000 | 560 | 50,000 | 175,000 |
| BOP Piping | Shop Fab LB and Field Fab SB. Includes all Hangers & Insulation | 1,473,000 | 43,920 | 4,072,000 | 5,545,000 |
| Valves & Specialties | | 523,000 | 1,500 | 146,000 | 669,000 |
| Electrical Major Equipment | | 11,580,000 | 16,120 | 1,260,000 | 12,840,000 |
| Electrical BOP | | 2,354,000 | 62,660 | 5,256,000 | 7,610,000 |
| Instrumentation & Controls | | 1,180,000 | 5,410 | 445,000 | 1,625,000 |
| Switchyard | Allowance - Based on 345kV 4- Breaker Ring Bus | 2,800,000 | 25,470 | 2,021,000 | 4,821,000 |
| Steel | Excluding Building Framing Includes Buildings, HVAC, & Interior Finishes | 212,000 | 1,840 | 193,000 | 405,000 |
| Buildings | Includes Excavation. Piles Not Included | 220,000 | 3,190 | 282,000 | 502,000 |
| Foundations | None | 752,000 | 19,300 | 1,565,000 | 2,317,000 |
| Demolition & Mods to Existing Structures | | 0 | 0 | 0 | 0 |
| Site Preparation, Drainage, & Yard Work | | 1,555,000 | 14,550 | 1,504,000 | 3,059,000 |
| Heavy Haul Subcontracts | | 0 | 0 | 950,000 | 950,000 |
| Indirect and Startup Craft Support | | 0 | 59,870 | 512,000 | 512,000 |
| Allowances to Attract Labor | | 0 | 28,720 | 6,106,000 | 6,106,000 |
| Erection Contractors G&A and Profit | | 0 | 0 | 8,877,000 | 8,877,000 |
| Total Equipment, Material and Labor Costs | | <u>145,311,000</u> | <u>358,960</u> | <u>39,944,000</u> | <u>185,254,000</u> |
| Consumables | | | | | 727,000 |
| Freight, Duties, Taxes, Etc. | Freight Only | | | | 1,409,000 |
| Spare Parts Cost | | | | | 1,061,000 |
| Electrical System Upgrades | | | | | 500,000 |
| Gas Interconnect & Reinforcement | | | | | 4,000,000 |
| Total Direct Project Costs | | | | | <u>192,951,000</u> |
| Indirect Project Costs | | | | | 40,326,000 |
| Contingency & Escalation | Contingency Only | | | | 22,772,000 |
| Total EPC Project Cost | | | | | <u>256,049,000</u> |

Preliminary - For Discussion Purposes

| New York Independent System Operator Demand Curve Review - Cost of New Entrant Peaking Unit 2x GE LMS100-PA Simple Cycle Station w/ SCR's, Zone J (New York City) Conceptual EPC Cost Estimate - 5/5/2010 | | | | | |
|--|--------------------------------------|-------------------------------------|---------------------|---------------------------------------|----------------------|
| Description | Scope Definition | Total Equipment or Material Cost | Total Man- hours | Total Construction & Erection Cost | Total Projected Cost |
| Combustion Turbines w/ Accessories | GE LMS100-PA | 85,900,000 | 43,400 | 6,586,000 | 92,486,000 |
| SCR w/ Exhaust Stack | | 12,000,000 | 34,080 | 5,171,000 | 17,171,000 |
| Aqueous Ammonia Storage & Forwarding | | 280,000 | 980 | 149,000 | 429,000 |
| Inlet Air Chillers | Not Included | 0 | 0 | 0 | 0 |
| Pumps | | 763,000 | 2,650 | 406,000 | 1,169,000 |
| Field Erected Tanks | Turnkey Subcontracts | 1,820,000 | 0 | 0 | 1,820,000 |
| Shop Fabricated Tanks | | 82,000 | 320 | 49,000 | 131,000 |
| Cranes & Hoists | Allowance for Misc. Hoists Only | 15,000 | 210 | 32,000 | 47,000 |
| Fuel Gas Compressors | 2x100% | 3,600,000 | 4,200 | 637,000 | 4,237,000 |
| | Gas Interconnection and Metering | | | | |
| | Station Assumed by Fuel Gas | | | | |
| Fuel Gas Supply & Metering | Supplier | 0 | 0 | 0 | 0 |
| Fuel Gas Conditioning | | 1,050,000 | 1,060 | 161,000 | 1,211,000 |
| Bulk Gas Storage Provisions | | 10,000 | 200 | 30,000 | 40,000 |
| Air Compressors & Dryers | | 184,000 | 390 | 59,000 | 243,000 |
| Water Treating | Not Included | 0 | 0 | 0 | 0 |
| Fire Protection | Turnkey Subcontract | 450,000 | 0 | 0 | 450,000 |
| B.O.P. Mechanical (Miscellaneous) | | 100,000 | 560 | 85,000 | 185,000 |
| | Shop Fab LB and Field Fab SB. | | | | |
| | Includes all Hangers & Insulation | | | | |
| BOP Piping | | 1,106,000 | 43,620 | 6,646,000 | 7,752,000 |
| Valves & Specialties | | 477,000 | 1,710 | 270,000 | 748,000 |
| Electrical Major Equipment | | 6,295,000 | 16,450 | 2,175,000 | 8,470,000 |
| Electrical BOP | | 1,850,000 | 62,550 | 8,602,000 | 10,452,000 |
| Instrumentation & Controls | | 1,185,000 | 6,370 | 891,000 | 2,076,000 |
| | Allowance - Based on 138kV 4- | | | | |
| | Breaker GIS | 3,850,000 | 14,930 | 1,902,000 | 5,752,000 |
| Steel | Excluding Building Framing | 185,000 | 1,890 | 308,000 | 493,000 |
| | Includes Buildings, HVAC, & Interior | | | | |
| Buildings | Finishes | 936,000 | 14,250 | 2,162,000 | 3,098,000 |
| | Includes Excavation and Foundation | | | | |
| Foundations | Pile Allowance | 2,158,000 | 26,960 | 3,640,000 | 5,798,000 |
| Demolition & Mods to Existing Structures | None | 0 | 0 | 0 | 0 |
| Site Preparation, Drainage, & Yard Work | | 1,281,000 | 16,960 | 2,672,000 | 3,953,000 |
| Heavy Haul Subcontracts | | 0 | 0 | 800,000 | 800,000 |
| Indirect and Startup Craft Support | | 0 | 62,150 | 516,000 | 516,000 |
| Allowances to Attract Labor | | 0 | 30,950 | 8,790,000 | 8,790,000 |
| Erection Contractors G&A and Profit | | 0 | 0 | 12,782,000 | 12,782,000 |
| Total Equipment, Material and Labor Costs | | <u>125,578,000</u> | <u>386,830</u> | <u>65,519,000</u> | <u>191,097,000</u> |
| Consumables | | | | | 628,000 |
| Freight, Duties, Taxes, Etc. | Freight Only | | | | 2,164,000 |
| Spare Parts Cost | | | | | 1,061,000 |
| Electrical System Upgrades | | | | | 500,000 |
| Gas Interconnect & Reinforcement | | | | | 4,000,000 |
| Total Direct Project Costs | | | | | <u>199,450,000</u> |
| Indirect Project Costs | | | | | 41,724,000 |
| Contingency & Escalation | Contingency Only | | | | 23,561,000 |
| Total EPC Project Cost | | | | | <u>264,735,000</u> |

Preliminary - For Discussion Purposes

| New York Independent System Operator Demand Curve Review - Cost of New Entrant Peaking Unit Case 13 - 2x GE LMS100-PA Simple Cycle Station w/ SCR's, Zone K (Long Island) Conceptual EPC Cost Estimate - 5/5/2010 | | | | | |
|--|--------------------------------------|-------------------------------------|---------------------|---------------------------------------|----------------------|
| Description | Scope Definition | Total Equipment or Material Cost | Total Man- hours | Total Construction & Erection Cost | Total Projected Cost |
| Combustion Turbines w/ Accessories | GE LMS100-PA | 84,400,000 | 41,580 | 6,266,000 | 90,666,000 |
| SCR w/ Exhaust Stack | | 11,500,000 | 32,400 | 4,882,000 | 16,382,000 |
| Aqueous Ammonia Storage & Forwarding | | 280,000 | 950 | 142,000 | 422,000 |
| Inlet Air Chillers | Not Included | 0 | 0 | 0 | 0 |
| Pumps | | 688,000 | 2,020 | 306,000 | 994,000 |
| Field Erected Tanks | Turnkey Subcontracts | 700,000 | 0 | 0 | 700,000 |
| Shop Fabricated Tanks | | 70,000 | 260 | 38,000 | 108,000 |
| Cranes & Hoists | Allowance for Misc. Hoists Only | 15,000 | 200 | 31,000 | 46,000 |
| Fuel Gas Compressors | 2x100% | 2,300,000 | 2,970 | 448,000 | 2,748,000 |
| | Gas Interconnection and Metering | | | | |
| | Station Assumed by Fuel Gas | | | | |
| | Supplier | 0 | 0 | 0 | 0 |
| Fuel Gas Supply & Metering | | 1,050,000 | 1,030 | 155,000 | 1,205,000 |
| Fuel Gas Conditioning | | 10,000 | 190 | 28,000 | 38,000 |
| Bulk Gas Storage Provisions | | 184,000 | 380 | 57,000 | 241,000 |
| Air Compressors & Dryers | | 0 | 0 | 0 | 0 |
| Water Treating | Not Included | 0 | 0 | 0 | 0 |
| Fire Protection | Turnkey Subcontract | 350,000 | 0 | 0 | 350,000 |
| B.O.P. Mechanical (Miscellaneous) | | 100,000 | 540 | 81,000 | 181,000 |
| | Shop Fab LB and Field Fab SB. | | | | |
| BOP Piping | Includes all Hangers & Insulation | 1,071,000 | 40,520 | 6,008,000 | 7,080,000 |
| Valves & Specialties | | 437,000 | 1,510 | 232,000 | 670,000 |
| Electrical Major Equipment | | 7,195,000 | 15,860 | 1,988,000 | 9,183,000 |
| Electrical BOP | | 1,777,000 | 59,770 | 7,509,000 | 9,286,000 |
| Instrumentation & Controls | | 1,185,000 | 6,140 | 795,000 | 1,980,000 |
| | Allowance - Based on 345kV 4- | | | | |
| Switchyard | Breaker Ring Bus | 2,800,000 | 31,250 | 3,795,000 | 6,595,000 |
| Steel | Excluding Building Framing | 171,000 | 1,820 | 294,000 | 465,000 |
| | Includes Buildings, HVAC, & Interior | | | | |
| Buildings | Finishes | 669,000 | 9,810 | 1,479,000 | 2,147,000 |
| | Includes Excavation and Foundation | | | | |
| Foundations | Pile Allowance | 1,789,000 | 23,550 | 2,979,000 | 4,767,000 |
| Demolition & Mods to Existing Structures | None | 0 | 0 | 0 | 0 |
| Site Preparation, Drainage, & Yard Work | | 1,201,000 | 15,060 | 2,189,000 | 3,390,000 |
| Heavy Haul Subcontracts | | 0 | 0 | 800,000 | 800,000 |
| Indirect and Startup Craft Support | | 0 | 60,960 | 512,000 | 512,000 |
| Allowances to Attract Labor | | 0 | 30,330 | 8,347,000 | 8,347,000 |
| Erection Contractors G&A and Profit | | 0 | 0 | 11,925,000 | 11,925,000 |
| Total Equipment, Material and Labor Costs | | <u>119,942,000</u> | <u>379,110</u> | <u>61,286,000</u> | <u>181,228,000</u> |
| Consumables | | | | | 600,000 |
| Freight, Duties, Taxes, Etc. | Freight Only | | | | 1,977,000 |
| Spare Parts Cost | | | | | 1,061,000 |
| Electrical System Upgrades | | | | | 500,000 |
| Gas Interconnect & Reinforcement | | | | | 4,000,000 |
| Total Direct Project Costs | | | | | <u>189,366,000</u> |
| Indirect Project Costs | | | | | 39,554,000 |
| Contingency & Escalation | Contingency Only | | | | 22,336,000 |
| Total EPC Project Cost | | | | | <u>251,256,000</u> |