

Review of Approach and Assumptions Levelized Cost of New Entrant Peaking Unit

Presentation to NYISO Installed Capacity Working Group

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Topics

- Tariff Requirements
- Technology Choice
- Review of Key Parameters for
 - *Peaking Unit Characteristics*
 - *Capital Cost*
 - *O&M Costs*
 - *Levelized Cost Analysis*

Tariff Requirements

- This review assesses the current localized levelized cost of a peaking unit in ROS, NYC and LI
- Peaking unit defined as having the lowest fixed costs and highest variable costs among all other units' technology that are economically viable

Technology Choice

- Examined 7EA, 7FA, LM6000 and LMS100 for 2007 review
 - *7FA used for ROS*
 - *LM6000 and LMS1000 evaluated for NYC and LI*
- Eleven LMS100 PAs now operating with 15,000 cumulative hours as of August 2009
 - *11 more to be commissioned in 2009 and 14 in 2010*
 - *35,000 hours by end of 2009 and 115,000 hours by end of 2010*
- Plan to compare cost and performance of both GE and Siemens models for this review
 - *Key driver is emissions requirements for each location*

Review of Peaking Unit Characteristics

- Dual fuel (NYC only)
- Inlet Air Evaporative Cooling (no inlet air chillers)
- Natural Gas Compression (local pressure 200 psig)
- Interconnection Costs
- Land Requirements
- Water Use (no dry cooling)
- Emissions Controls (SCR, no CO catalyst)
- Heat Rate
- Switchyard Voltage (230 kV)
- Greenfield site
- Two unit installation

Capital Cost Estimates for Peaking Units

- Equipment cost trends
 - *No inventory of machines from cancelled orders despite economic slowdown*
 - *CT orders way down in 2009*
 - *1054 in 2008 and 916 in 2007 (all vendors all sizes)*
 - *Developers not ordering large numbers of machines except in Middle East*
 - *Vendors adding capacity and features, and charging more*
 - *7FA.05: 200 MWs, 9ppm NOx, quick start in CC applications*
 - *Used 7FA.03 last time*
 - *LMS100 PB has dry low emissions combustors*
 - *Used LMS100 PA last time*
 - *LM6000 PG and PH models have low emissions combustors, more output*
 - *Used LM6000 PC Sprint last time*
 - *Budget pricing now tied to delivery dates*

Capital Cost Estimates for Peaking Units

- Labor cost trends
 - *Unit prices never go down*
 - *Potentially some savings in subsistence and incentive payments*
- Materials cost trends
 - *Coming back strong*
 - *E.g., copper fell from \$4/lb to \$1.5/lb, but is back to \$3/lb*
- Pricing is difficult in a market that is not very active
 - *Recent HRSG example demonstrates uncertainty*
 - *Experience is that plant costs escalate over time*

O&M Cost Estimates for Peaking Units

- Fixed O&M—used in levelized cost analysis
 - *Number of staff*
 - *Materials and Contract Services*
 - *A&G*
 - *Site Leasing cost*
 - *Property Taxes*
 - *Industrial and Commercial Incentive Program in NYC has expired*
 - *Insurance*

O&M Cost Estimates for Peaking Units

- Variable O&M—used in net energy and ancillary service revenue estimates
 - *Overhauls:*
 - *Aeroderivatives: 50,000 factored hours*
 - *Frame units: 48,000 hours or 2,400 factored starts, whichever occurs first*
 - *Fuel costs*
 - *Texas Eastern Transmission Market Area 3 or Transco Zone 6 price*
 - *Fuel transportation costs based on ConEd and Keyspan tariffs*
 - *Firm service is not commonly provided due to prohibitive costs*

Review of Financial Parameters for Real Levelized Carrying Charges

- Cost of capital assumptions (NERA will provide)
- Tax and insurance rates
- Separate amortization period for each location per NERA methodology
- Depreciation schedule 15-year MACRS
- Inflation 2.7%