PROJECT SUMMARY

600 MW COMBINED CYCLE DETAILED FEASIBILITY STUDY

PROJECT SUMMARY

Bridgestone Associates was contracted to prepare a detailed feasibility study for a 300 – 600 MW combined cycle facility to be located in Gloucester City, New Jersey, USA. The project developers were interested in determining optimum size based on plant efficiency, capital cost, and ability to compete in the PJM wholesale power markets.

Bridgestone completed a detailed evaluation including preliminary equipment selection, preparation of heat balances, preparation of capital and operating cost estimates, and development of a detailed economic and technical analysis model. The plant evaluated was based around a General Electric Frame 7H.02 combustion turbine with a 554 MW net output in single shaft combined cycle configuration. The output of the Frame 7 was subsequently increased by GE to give a 600 MW single shaft combined cycle plant.

PROJECT STATISTICS

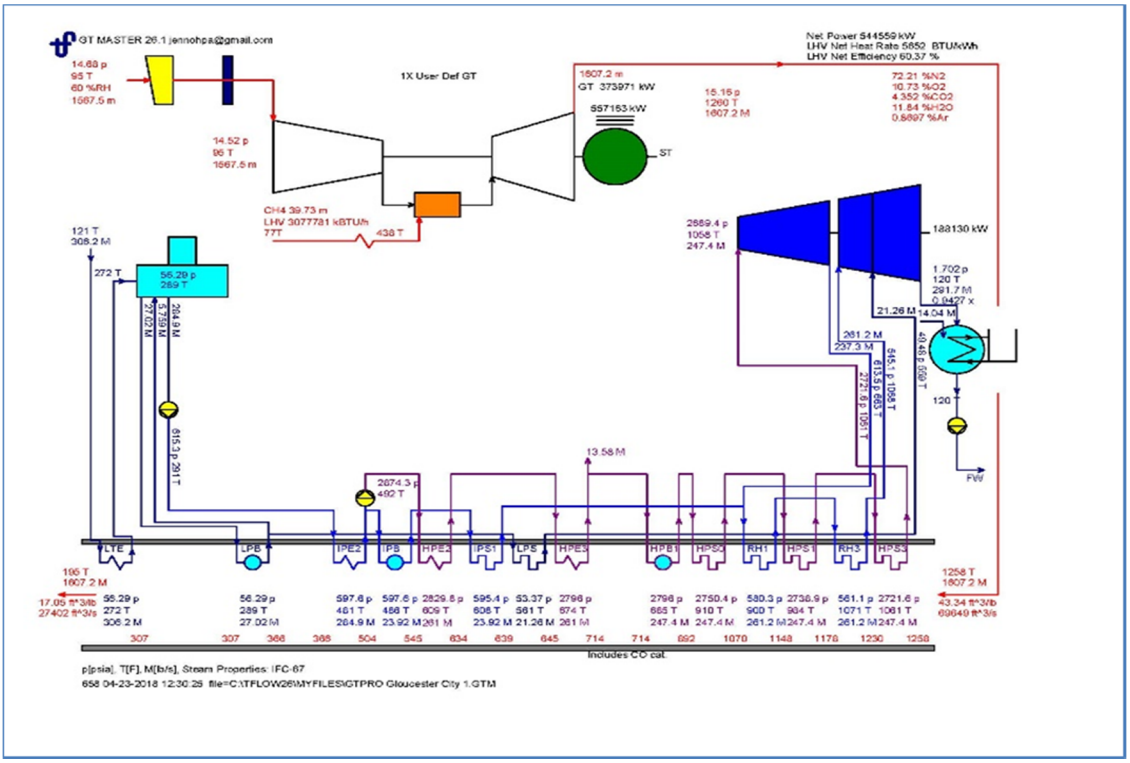
Client:	Confidential
Year:	2018
Project Type:	Natural gas fired combined cycle independent power plant (IPP)
Size:	600 MW
Estimated Project Cost:	US$468 million
Plant Location:	Gloucester City, NJ, USA
Plant Site:	145 acres adjacent to Delaware River
Plant Elevation:	10 feet above sea level
Interconnection Voltage:	230 kV
Primary Fuel:	Natural gas
Back-up Fuel:	None
Fuel Input:	3,416 MMBtu/hr
Combustion Turbine:	1 x General Electric Frame 7H.02 Single Shaft
Operations:	Dispatchable – intermediate load plant
Efficiency:	63.3%
Heat Rate:	5,585 Btu/kWh LHV Summer

PROJECT DESCRIPTION

Bridgestone Associates was engaged by an independent power plant (IPP) developer to conduct an initial evaluation and assessment of a 300 – 600 MW IPP project to be constructed on land in Gloucester City, New Jersey. Based on this initial evaluation Bridgestone then prepared a detailed feasibility study for use by the Developer to evaluate and promote the project.

It was determined from the initial evaluation and assessment that to be competitive as a merchant power plant in the wholesale electric market in New Jersey and the PJM (Pennsylvania-Jersey-Maryland) Interconnection system, a high efficiency combined cycle plant would be necessary. It was also confirmed that the size of current combined cycle plants had a bearing on the overall generation efficiency, with larger plants having higher efficiency and therefore lower per kilowatthour fuel costs. Based on this, it was determined that combined cycle plants at the higher end of the target size range would most likely be the most cost effective for the client.

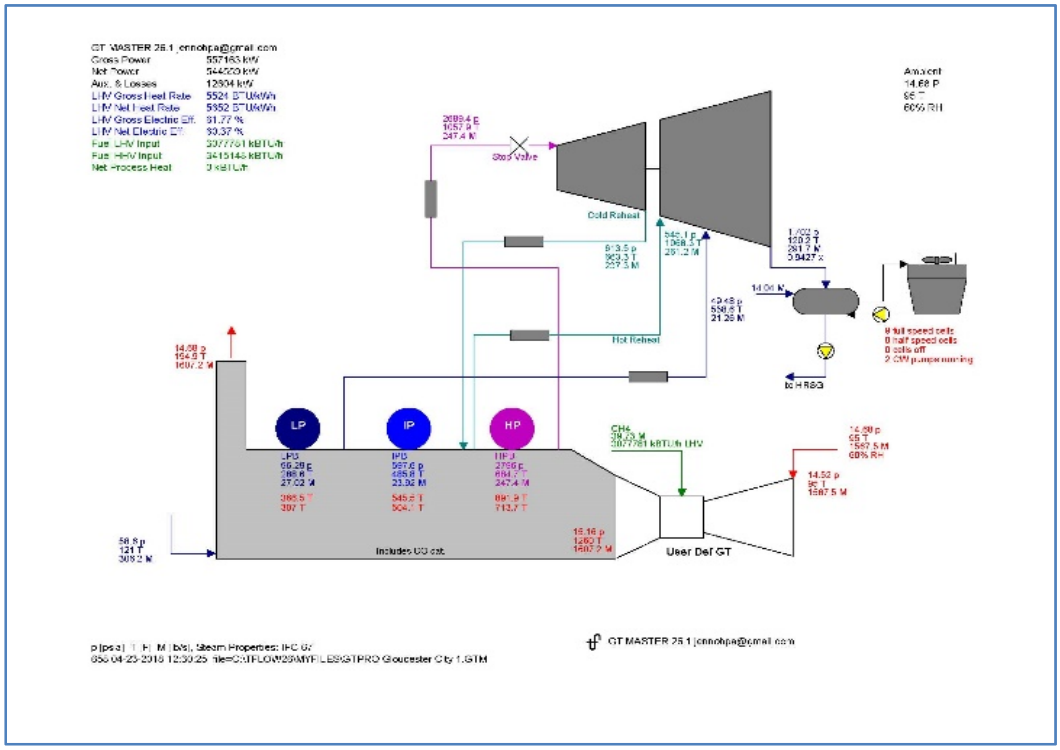
Using Thermoflow's GT-PRO and GT-MASTER combined cycle modeling software, Bridgestone developed detailed heat balances for a number of large combined cycle plants. These were based around General Electric, Siemens and Mitsubishi natural gas fired combustion turbines. These manufacturers were contacted and preliminary budget costs and detailed performance specifications obtained. The detailed performance specifications were then used to modify the GT-PRO/GT-MASTER assumptions and built-in performance data. Once that was completed, seasonal heat balances for each combined cycle configuration were developed using the GT-PRO/GT-MASTER software. These heat balances provided the fuel use efficiency (i.e. heat rate) on a seasonal basis as an input to Bridgestone's proprietary detailed IPP evaluation model.



Bridgestone developed a capital cost estimate for each combined cycle alternative. These estimates included assumptions on costs for grid interconnection and associated upgrades, natural gas pipeline connection, site works and development, and all associated costs with site development and plant construction. Assumptions were also developed for operating and maintenance costs and other costs that would be incurred during plant operations including fuel costs, O&M and plant management labour costs, property taxes, insurance, financing costs, equipment degradation, etc. All of these assumptions and estimates were used as input data into Bridgestone's proprietary IPP evaluation model.

A detailed analysis was developed of the past and projected market for energy (MWh) and capacity (MW) within the PJM Interconnection and specifically within the PSEG region. These data were also used as input data into Bridgestone's proprietary IPP evaluation model.

The Bridgestone IPP evaluation model was then used to compare between alternative equipment and equipment configurations. Based on the model results, the GE 7H.02 single shaft combined cycle configuration was selected for further analysis. This analysis included a detailed sensitivity analysis to multiple variables including fuel costs, capital costs, financing costs, and power markets pricing.



Bridgestone prepared a detailed written report on the work performed and the results obtained. This included the detailed analysis of power market pricing and all of the assumptions made. The report included before and after tax 20-year pro-forma results including income statement, cashflow analysis, IRR and NPV results. The sensitivity to changes in the input assumptions was also documented in detail.

Since completion of the detailed feasibility study report, Bridgestone's client has continued with the detailed development of the project which is expected to start construction in 2020.