

For Sale:	Pre-owned 240 MW Combined Cycle Gas Turbine Power Plant
Ref.-No:	GT-CC-045 (short)

Power Plant Description

The GTCC plant entered in operations in March 2001.

Originally the plant had a gross power output of 288 MW at ISO conditions, featured by a 189 MW GT13E2 Alstom gas turbine and a 99 MW AEN steam turbine in a multi- shaft arrangement. The plant was able to burn syngas and to generate power and steam both for site captive consumptions and for power export.

The plant worked regularly with high availability rates (over 90%) under an O&M contract by ABB/Alstom. The maintenance, in compliance with the structure of the project finance operation through which the initiative was implemented, was continually carried out directly by ABB/Alstom based on the contractual scheme.



Picture 1a and 1b – CCGT power plant

Modification and Details of GT Upgrade in 2013/2014

Starting from January 2013 the plant underwent activities aimed at modifying the CCGT section in order to feed the plant with natural gas. The following replacements were carried out:

- New gas turbine blades, with VIGV (Variable Inlet Guide Vane) inlet blading;
- New GT compressor, axial type with 21 compression stages (compression ratio approx. 15);
- New GT rotor;
- New combustion chamber, ring shaped;
- New NG burners, 48 Advanced Environmental Burners (AEB).

The natural gas fed power plant is characterized at ISO conditions by gross power output of 240 MW¹, being 155 MW the gas turbine output and 85 MW the steam turbine output.

Neither the ABB generators (222 MVA and 117 MVA) nor the step-up transformers (15,75 kV to 132 kV) nor the steam cycle (steam turbine, condenser and heat recovery steam generator (HRSG), that is equipped with 3 steam drums at different pressure levels and a DeNOx catalytic system) were modified, with the exception that the HRSG was equipped with a new CO catalyst aimed at lowering the emissions at minimum load. The plant is equipped with sea water cooling system.

The converting interventions ended in 2014 and the plant, having successfully completed the commissioning activities on March 2015, has never entered in commercial operations.

CCGT plant highlights

The following strength points characterize CCGT plant, as modified by the activities carried out in order to feed the gas turbine with natural gas:

- the plant size, in terms of gross power output, represents a non-standard opportunity both for captive consumptions of mid/large size industrial sites and for business activities mainly oriented at power generation;
- the electrical efficiency is performing and the global efficiency can be increased if electrical power generation is integrated with thermal power generation in cogenerating configuration;
- the plant is characterized by limited environmental impacts, that have been further lowered through the recent adoption of a CO catalyst allowing the emissions reduction at minimum load (the daily emission limits are 65 mg/Nm³ for NOx and 50 mg/Nm³ for CO, for a load range from 100% GT relative load down to 50% GT relative load);
- the gas turbine is a new equipment, as well as the rotor and the combustion chamber, that after the conversion to natural gas has never been put in operations;
- the steam cycle equipment, as well the generators and the transformers, has about 10 years of operations, having been regularly and properly maintained.

The power train is a multi-shaft arrangement consisting of:

- one Gas Turbine type GT13E2 (“GT”) with combustion chamber and air compressor with variable inlet guide vanes, mounted on a single shaft (made by Alstom);
- one steam turbine (“STG”) made by Ansaldo;
- two generators made by ABB, one 221.9 MVA of the type WY21Z-092 LLT for the GT and one 117.3 MVA type WX18Z-090 LLT for the STG;
- two step-up transformers 132/15,75 kV (215 MVA for the GT and 120 MVA for the STG);
- one heat recovery steam generator (“HRSG”) with triple pressure natural circulation, producing superheated HP, MP and LP steam. A DeNOx system is installed in the boiler;
- Auxiliary Systems: Water and steam cycle, feed water treatment, sea water intake and cooling system, instrument and air plant distribution, nitrogen distribution, electrical distribution, fire-fighting system.

The plant gross power output at maximum load is 240 MW (155 MW GT + 85 MW STG) at ISO conditions.

The plant gross efficiency at maximum load is equal to 52.5 %.

Scope of Supply

Complete CCGT plant consisting of the foll. main components:

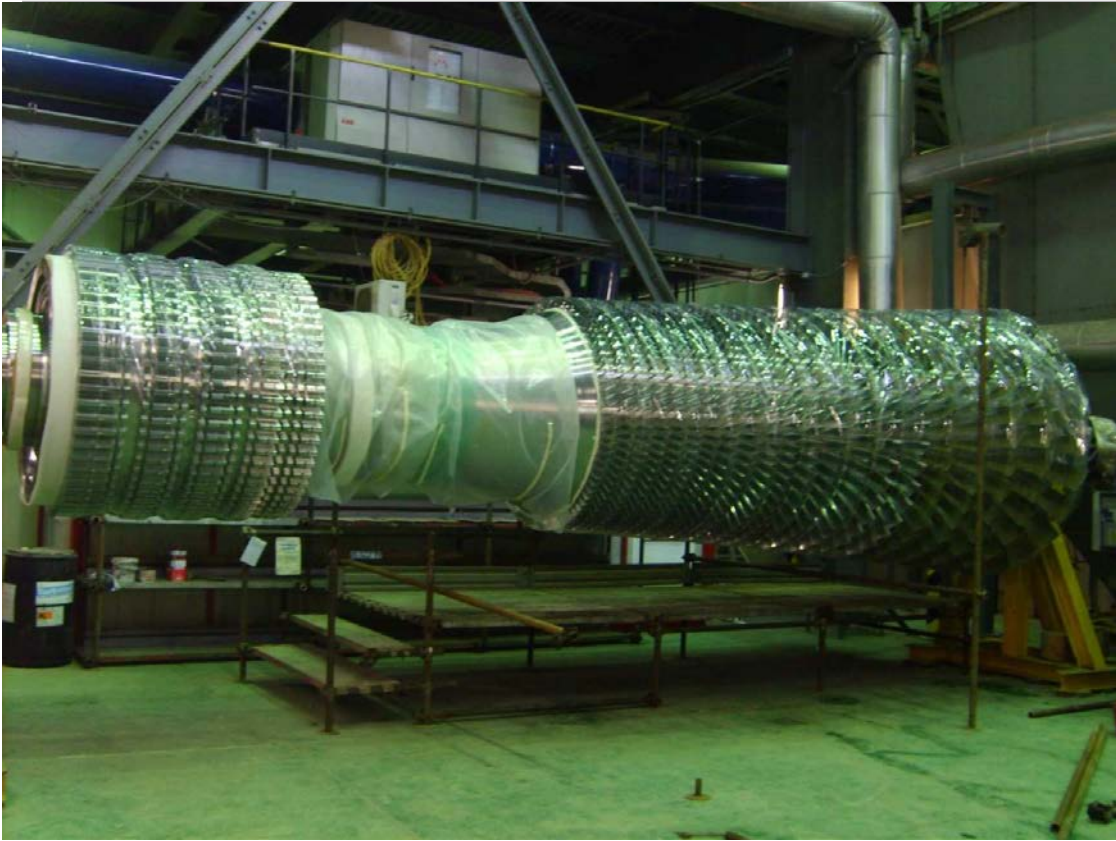
- power generation section: gas turbine, steam turbine, generators and transformers;
- heat recovery steam generator and condenser;
- auxiliaries: 2 pumps for cooling water circulation (18.000 m³/hr and 1 MW each), 1 unit for demineralized water supply (130 tonnes/hr);
- optionally: 1 auxiliary 140 tonnes/hr high pressure steam generator (100 barg and 500 °C).



Heat Recovery Steam Generator (HRSG)



Steam Turbine



New Gas Turbine Rotor



New GT Filtration system



New Fuel Gas treatment station



GT step-up transformer