



Gas turbine power plants



A global challenge

Apart from other sources of energy such as water, coal and uranium, the use of natural gas and fuel oil is an important factor in assuring a reliable supply of electricity. Both fuel oil and fuel gas can be utilized for generating electricity in gas turbine power plants. When designing such plants ABB pursues two major objectives:

- quick plant start up
- maximum efficiency and minimum environmental impact

Gas turbine power plants have clear economical advantages over other types of plants due to their, low capital investment, short construction times and excellent dynamic response in operation. Typical applications are peak power plants which stabilize power grids. This is even more important in these days when generation from renewable resources is increasing.

ABB has amassed the expertise necessary to offer tailor-made solutions in close cooperation with the gas turbine supplier to satisfy the needs of every power utility.

Experienced plant supplier

ABB is pursuing a 'One Stop Shop Strategy'. ABB implements the project with only a few contractual partners. The number of interfaces is substantially reduced and there is much less coordination work required in terms of project management, engineering and site activities.

This approach helps to assure high project quality and to decrease the overall project execution time. In close cooperation with the gas turbine supplier ABB is able to contribute its special process expertise as an experienced plant supplier.

Plug and operate

ABB and its subcontractors typically deliver preassembled and fully equipped skids that are installed in the buildings designed by ABB. Both ABB and gas turbine manufacturer provide their electrical and C&I equipment installed in container modules.

Following this way it is possible to reduce the number of interfaces, perform extensive functional testing at the factory and minimize the amount of installation and commissioning work. In addition this approach allows a substantial part of the work to be carried out by local manpower.





Typical scope of services

ABB is responsible for

- conceptual and basic design of the entire plant
- plant civil design and general layout
- detailed design and engineering work of the Mechanical Balance of Plant (MBoP) (fuel oil system, fuel gas system, fire fighting system, tank farm, water system, pipes etc.)
- detailed design and engineering work of the Electrical Balance of Plant (EBoP) (HV/MV/LV transformers, HV/MV/LV switchgears, generator breakers and bus ducts, DC power system, earthing and lightning systems, emergency and black start-up systems, cables etc.)
- detailed design and engineering work of control, instrumentation and communication systems
- site management, plant installation and commissioning



Typical scope of deliveries

ABB's scope of supply covers typically

- Fuel oil unloading station, tank farm, fuel oil handling system
- Gas pressure reducing and handling station
- Fire detection, fire-fighting and prevention systems, including hydrants, valves and piping (,fire main')
- Water supply and water treatment systems
- High voltage substation
- Step-up transformers
- Auxiliary and low-voltage transformers
- Generator circuit breakers and bus ducts
- LV and MV switchgears
- HV/MV/LV cables and cable ducts
- Lighting systems
- Lightning protection facilities and power plant earthing network
- Emergency and black start-up systems
- Electrical protection system
- SCADA as a part of the higher-level network control
- Process control system with a modern human-machine interface
- Communication systems (PLC, microwave, PABX, fiber optic, CCTV etc.)

In most cases the investor orders the gas turbines directly by the original equipment manufacturers.

Our financing solutions

In cooperation with banks, we arrange competitive, flexible and customized financing solutions for strategic projects:

Short-term financing

- Trade finance including letters of credit (confirmed, deferred payment etc)
- Forfaiting and others
- Short term ECA-covered export financing
- Structured finance (use of several capital-market instruments as security, in particular mortgages, assignment of receivables, asset backed securities, counter-trade).

Long-term financing

- ECA-covered medium- and longterm export financing
- CIRR-based financing
- Multi-source financing (ECA-covered, combined with co- and re-insurance)
- Tied and untied export-financing
- Export leasing (together with international experienced financial institutions)





Project reference Arbeel Phase I

The power plant has a total of 4 gas turbines of type Frame 9E made by General Electric and is run with natural gas and light fuel-oil. It is located about 20 km south of the Kurdish city Arbeel in Iraq with around 1.5 million residents. Each of the gas turbines generates an electric power output of 125 MW (ISO). With its present setup of 4 units, the power plant gross output is 500 MW.

The overall plant conception has been laid out to allow for a future extension of the power plant with additional gas turbine units and future conversion into a combined-cycle power plant.

The processing of the order for this 'green field plant' started in July 2006 and was completed in November 2008. On November 27, 2008, the last gas turbine was synchronized with the electrical grid. Since that day the residents of 'Erbil' - the Kurdish spelling of Arbeel - have been able to almost continuously enjoy a 24/7 power supply. Before that it was only possible for about 3-5 hours a day.

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