CCPP Hazira, Gujarat - India

Power Station:	Hazira - Combined Cycle Power Plant - 150 MW
Contract Scope:	Full Scope including Consumables and Spares
Contract Date:	March 16, 2001 - December 31, 2010 – COD June 1, 2002
Owner:	GSEG Gujarat State Energy Generation Ltd., Gandhinagar (IPP Co of Gujarat State Petroleum Co, Gail and KRIBHCO Fertilizer Company – Off-taker GEB Gujarat State Electricity Board)
Location:	Hazira, Gujarat
Partner:	STEAG encotec India (Pvt.) Ltd.
Fuel:	Natural Gas
Gas Turbines:	2 x GT 8 C 2 (50 MW each) - Alstom
Emission Control:	Dry Low NOx EV Burners
Steam Generator:	Double pressure drum-type HRSG - Alstom
Steam Turbine:	1 x 50 MW Alstom
Control System:	Advant

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STEAG encotec had won the contract against international competition – among which the OEM and a reputable British IPP company - as the outstanding cost leader in operation and maintenance of thermal power plants. Further key factors were impressive benchmarks in operation and maintenance of thermal power plants, its international O&M network, its independence and the variety of technical expertise.

Site Mobilisation started in early 2001. The scope of work encompasses owner's engineering in suppliers' workshops and during construction and commissioning, expatriate and local O&M staff, consumables and all spares. For the initial 18 months after COD, STEAG also acted as supplier for consumables and spares including refurbishment of first set of major gas turbine spare parts in OEM workshop. Since January 1, 2005 STEAG is only acting as owner's agent, fully responsible for supply chain and materials management.

Mobilisation and initial operation phase were completed on time, with all staff trained, and comprehensive procedures for safety, operation and maintenance, administration, on-shore and off-shore procurement as well as environmental protection implemented. STEAG encotec assisted the client in take over procedure, contract and warranty claim management, trial run and major warranty inspection of the gas turbines. Due to mayor punch list settlements especially on the gas turbines which are serial numbers 4 and 5, plant acceptance was delayed after COD June 1, 2002.

Further focus has been set on coaching the local managers and staff regarding best practise and least cost O&M in private and liberal power generation business. Trainees were sent to other sites of STEAG encotec O&M for hands-on maintenance instruction during major overhauls. In September 2005 the plant management was handed over from expatriate to a local engineer, so that local content is combined with the high performance standards and O&M practise of STEAG Group.

First Major Overhaul of gas turbine Unit 1 was executed prematurely due to high EOH consumption (commissioning problems) in April/ May 2003 with further control system fine tuning derived from initial operating experiences. Gas turbine Unit 2 suffered two breakdowns due to FOD (foreign object damage) and compressor blade failure in 2003. After the repair (May 2004) both units have been running with high reliability and plant load factor.

Hazira project involving the local subsidiary STEAG encotec India Pvt. Ltd. is a model for sustainable know-how transfer in modern technology and development of private business attitude in the growing India power sector. Among India power plants, Hazira is setting highest standards of automation and control and sine May 2004 highest plant load factor.

CCCPP Haldia, West-Bengal - India

Power Station:	Haldia - Combined Cycle Cogeneration Power Plant - 116 MW, 480 t/h
Contract Scope:	Full-scope O&M
Contract Date:	August 1, 2006 – August 31, 2012
Owner:	HPLCL - Haldia Petrochemicals Ltd. Cogeneration Ltd. (51 % L&T Larsen & Toubro, 49% HPL Haldia Petrochemicals Ltd.)
Location:	Haldia, West Bengal
Fuel:	Naphta, Light Oil, Refinery Residues
Gas Turbines:	2 x PG 6551 B – GE Frame 6B (38 MW) – EGT (naphta, diesel)
Steam Generator:	2 x Dual pressure drum-type, horizontal HRSG (L&T) with duct firing, 2 x aux boilers (MBEIPL) 120 t/h, 135 bar, 545°C (residual fuel, cracked liquid stream, hydrogenated pyrolysis gas)
Steam Turbine:	1 x 33 MW ABB condensing ST, 1 x 16.58 MW ABB back-pressure (4.6 bar) ST with two controlled extractions (43 and 22.5 bar)
Control System:	Mark V (GT)

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CCPP ONGC, Gandhar - India

Power Station:	ONGC – Gandhar CC Power Plant – 32 MW
Contract Scope:	O&M Staff, Plant Custody, Operation and Routine Maintenance
Contract Date:	December 5, 2003 - Februar 4, 2007 – COD June 1, 2002
Owner:	ONGC - Oil and Natural Gas Corporation Ltd.
Partner:	OFS Industries Pvt. Ltd. Mumbai Turbo Machinery Technical Services (P) Ltd. Hydrabad
Location:	Gandhar, Bharuch Dist, District Gujarat ONGC‘s Central Processing Facility
Fuel:	Natural Gas
Gas Turbines:	1 x PG 5371 PA – GE Frame 5 (21 MW) – BHEL single pressure drum - type horizontal HRSG (45 bar) - BHEL
Steam Generator:	BHEL make, Type Horizontal, Natural circulation Single stand alone fire in forced draught mode for full ST load.
Steam Turbine:	BHEL NK/40/56/25-3 (11 MW)
Control System:	Mark V

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The O&M services are rendered by STEAG encotec India jointly with OFS Industries Ltd. and Turbo Machinery Technical Services (P) Ltd. Hyderabad in a consortium. The contract is for a period of two years.

The scope of work includes operation, maintenance of plant including BOP and routine gas turbine maintenance. All spares and consumables are to be supplied by the Owner ONGC.

Oil and Natural Gas Corporation Ltd., India's largest oil exploration company has awarded the O&M Contract under competitive bidding to STEAG Consortium.

The deployment of Engineers started in the first week of Dec 2003 and the challenging O&M mobilization phase was finished shortly thereafter. Establishing the plant site organization and implementing the procedures for safety, operation, maintenance and site administration was effectively coordinated in four weeks time.

In 2nd and 3rd quarter 2004, plant load factor could be raised to record of 96.5%.

The contract was awarded to the consortium based on STEAG encotec´s capabilities in Operation and Maintenance of Combined Cycle Power plants and on the reputation and image it built up in India against stiff competition of other contenders. Because of the experience in international contract and risk management as well as in power plant operation, engineering and organization, STEAG encotec could win the contract for the consortium led by OFS.

The plant stated commercial operation in February 1997 and supplies LP steam to the gas processing facility for crude oil heating and LPG separation.

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Commissioning and O&M Services
Goa Energy Private Ltd., Goa, India

In Sesa steel plant near Goa a 30 MW IPP project was set up to recover waste heat of blast furnace gas and coke oven gases. Evonik is providing services during commissioning and operations for this model project of rational use of energy.

General view of the plant

The project

Goa Energy Private Ltd., is in the process of setting up a 30 MW Waste Heat Recovery Plant at Amona near Goa, India. The Plant will use low BTU blast furnace gas and coke oven flue gas from the adjacent steel plant of Sesa Goa. Videocon India Ltd. is the promoter of this independent power plant and has contracted Evonik to support them during commissioning and operation & maintenance. Mayor challenges are the tight time schedule, the vanguard technology and the procurement. As there is no turn-key EPC contractor. Evonik is requested to give strong coordination support. Evonik began work on the project in September 2006. The plant is expected to be commissioned by April 2007.

Evonik Energy Services – Scope of Work

Pre-commissioning

- Review manuals, instructions & schematics
- Evaluation of manpower and development of training
- Reviewing performance evaluation procedures
- Developing commissioning procedures

Commissioning

- Supervision of commissioning activities (11 Evonik experts)
- Impart training to departmental staff
- Supervising start-up, synchronizing and shut down of the Plant during initial operations.
- Supervising conductance of acceptance test
- Prepare punch list for the ultimate abolition of all defects

Post-commissioning and optional

- Mentorship of managers/engineers for 1 to 3 years.
- Providing technical backstopping for up to 5 years.
- Developing computerized maintenance system, procedures, permit system, history & spares management
- Planning and supervision of breakdowns/overhauls.
- Retrofitting schemes for improving availability/ reliability/output/efficiency.

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Key data

Client	Goa Energy Private Ltd., Goa, India
Erection time	Plant operational by April 2007
Measures	Support in commissioning and operations & maintenance

Chronic

September 2006	Mobilisation of Evonik personnel
April 2007	Plant commissioning
April 2007 to September 2011	O&M advisory services

A closer view of the plant

Plant data

Unit capacity	30 MW waste heat recovery plant
Fuel	Blast furnace gas & coke oven gas
HRSG	2 x 64 T/hour at 64 atm (ENMAS)
Coke oven flue gas	10,700 Nm^3 per hour at a temp of 1,040° C
Blast furnace flue gas	27,000 Nm^3 per hour and 650 kcal./Nm^3
Steam turbine	30 MW (Toyo Denhi)

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