FND PROFILE ON COGENERATION PLANTS

Scope of Services Provides

FND offers a comprehensive range of engineering consultation services in a wide spectrum of electrical & mechanical fields. We serve clients in the commercial, institutional, educational, residential, industrial, hospitality, retail, and cultural market segments. We are one of the largest private sector engineering consultants in Pakistan and regularly undertake projects in many parts of the country. We analyze the specific problems of our clients and suggest optimal state-of-the-art solutions.

FND offers services at all stages of a project, from feasibility studies to project planning to realization and commissioning. In 2010, we completed more than 1200 projects for a diverse roster of satisfied clients: industrialists, commercial firms, building owners and developers, architects, civil engineers, contractors, facility managers and public agencies. These projects range from small tenant improvements, to large new offices and schools, to major industrial and treatment facilities.

- Cogeneration Systems
- Heat Recovery Systems
- Combined Cycle Power Plants
- Gas & Steam Turbines
- Thermal Storage System

1. Project No.: 707
Allied Engineering & Services, Karachi – Office / Work Shop M&P Services and Cogeneration System Design

0.7 MW gas genset cogeneration system, running absorption chillers, as a cogen show case project for Caterpillar Gensets.

The work was completed & commissioned in 1995.

2. Project No.: 851
Pearl Continental Hotel, Lahore – Waste Heat Recovery System for 4x1020 kVA Existing Gensets

PC Lahore has 4 x 1000 kW diesel engines. The waste heat recovery scheme produces hot water for domestic needs from the engine jacket water heating circuit and exhaust gases are used in waste heat recovery steam generator to provide steam for laundry and other areas.

The work was completed & commissioned in 2001.

3. Project No.: 1049
International Industries Ltd., Karachi – 4th Genset for Cogeneration

Heat recovery from a 1Mw gas genset, and running absorption chillers on steam & hot water for process cooling.

The work was completed & commissioned in 2006.

4. Project No.: 1052
International Industries Ltd., Karachi – 18MW CHP Plant for Cold Rolling Mill

6 X 3 MW gas gensets, with heat recovery producing steam at 15.5 bars and operating a steam turbine at rated capacity of 1.25 MW. Hot water recovery operates absorption chillers for process cooling.

The work was completed & commissioned in 2008.

5. Project No.: 1054
Pakistan State Oil Company Ltd., Karachi – Rehabilitation of LMT HVAC & Heat Recovery System

2 MW cogeneration plant. Waste heat of 2 gas engines is used to produce chilled water for the process needs and air conditioning of the Lube Manufacturing terminal at Korangi. During feasibility study, various options were explored and their financial results and other technical details were shared with the client along with clear recommendations. Selected option is based on multi-energy direct exhaust fired absorption chillers. Only one type of chiller is able to handle the exhaust gases and HT circuit water heat of engines. Moreover it has a dual fuel burner to provide chilling via natural gas or diesel in case of non-operation of the gas engines. Day load is about 1040 kW and we are able to get 250-270 TR.

The work was completed & commissioned in 2007.

6. Project No.: 1064
Pakistan Cables Ltd., Karachi – Combined Heat & Power (CHP) Plant

2 X 1 MW GE Jenbacher Gas Engines (Model JMS 320) synchronized with KESC has been installed to produce electricity.

- Power at Engine:1095 kW
- Power at Alternator:1063 kW
- Max Continuous power available at 45°C:1000 kW
- Max Continuous power with combustion air cooling at 34°C:1000 kW

The work was completed & commissioned in 2009.

7. Project No.: 1095
Pak Gulf Construction (Pvt.) Ltd., Islamabad – Feasibility Study for Co-generation of Hotel Building at Centaurus

4 MW co-generation. feasibility study included various combinations of 2Mw turbine + gas gen sets, with heat recovery to operate the air-conditioning system of Centaurus Hotel, having a cooling demand of 2600 TR.

The work was completed & commissioned in 2008.

8. Project No.: 1141
Procter & Gamble Pakistan (Pvt.) Ltd., Karachi – Feasibility Study for Energy Plant for Bin Qasim Factory

16 MW co-generation plant. Feasibility study included various combinations of 3.36 Mw gas turbine + gas gen sets, with heat recovery to produce steam + oil heating + chilled water for process cooling & air-conditioning.

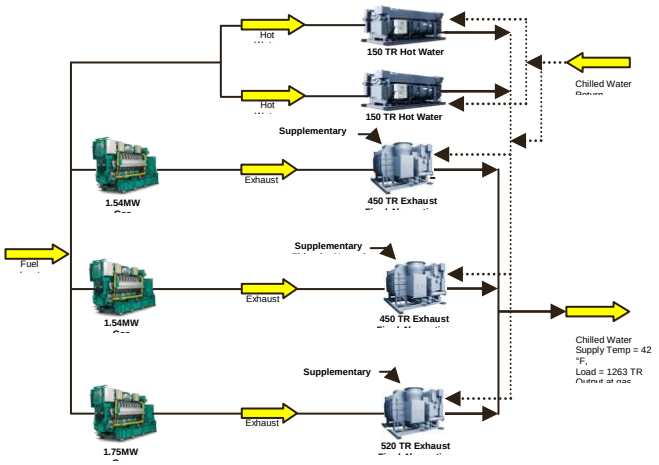
The work was completed & commissioned in 2009.

9. Project No.: 1186

Aga Khan University & Hospital, Karachi – Waste Heat Recovery System for 2 x 1.54 MW + 1.75 MW Gas Gensets

Maximum operating load on gas engines is 4.5 MW. The waste heat of exhaust gases & jacket water (H.T. circuit) is to be used for air conditioning. Feasibility study of the project for selection of waste heat recovery system is in process.

Under Design



10. Project No.: 1195

Novatex Ltd, Karachi – Waste Heat Recovery System for 8 x 1.0 MW Gas Gensets

Average operating load on gas engines is 4.2 MW. At average load condition, 6 gas engines will be operating at 70% load. The waste heat in the form of exhaust gases at 490˚C from the gas engine first pre-heat synthetic oil which is used for heating in the process. Oil enters the waste heat oil heater at a temperature of 291˚C and leaves at about 303˚C. Exhaust gases leaves the oil heater at 360˚C and have enough energy to be further captured. Therefore exhaust gases from oil heater enters in a double effect exhaust fixed absorption chiller to produce 5.6˚C chilled water. H.T circuit heat in the form of hot water at 84/74˚C is used to produce chilled water at 6.7˚C. The following are the bottom recoveries from the waste heat scheme, construction of which is under process.

- 20.5 kg/S heating of synthetic oil from 291˚C to 303˚C in waste heat recovery oil heater.
- 462 TR chilled water at 5.6˚C from the waste exhaust waste heat oil heater.
- 472 TR chilled water at 6.7˚C from the waste heat in the form of hot water from engine H.T circuit.

Installation in progress. Commissioning by July, 2012.

11. Project No.: 1208

Atlas Honda Limited, Karachi – Waste Heat Recovery System on the Self Power Generation Plant at Shaikhupura Factory

Gas gensets were installed to run on full time basis and diesel gensets were stand-by. However, we are informed that the present gas load shedding scenario in Shaikhupura does not allow Atlas Honda to run the gas gensets all the time. Even in summer months, gas is available for 2-3 days per week only, therefore the annual operating hours of diesel gensets are much more than gas gensets.

- 3 X JGS-320 (1000 kW) Jenbacher gas gensets
- 1 X JGS-320 Jenbacher gas genset recently installed
- 3 X KTA-50-G3 (1250 kVA or about 1079 kW) Cummins diesel gensets
- 1 X KTA-50-G8 (1675 kVA or about 1400 kW) Cummins diesel gensets

Feasibility completed. Detailed design in progress.

12. Project No.: 1209
Merck (Pvt.) Ltd., Quetta – Co-Generation / CHP Plant

Gas engine and gas turbine will be evaluated during feasibility study for power generation. Power supply from QESCO will be stand-by, further backed up by existing diesel engines. Waste heat from gas turbine will be in the form of 450 to 500°C exhaust gases whereas that in the case of gas engine will be in the form of 450 to 500°C exhaust gases as well as jacket water heat at 90°C. The waste heat may be used for:

- Air-conditioning from hot water circuit of gas engine using 1-stage hot water absorption chillers. The same circuit may be used for winter heating as well.
- Exhaust gases may be used to produced 10 bar steam in a waste heat steam generator. The produced steam may fulfill the process and (or) air-conditioning demand by using 2 stage steam absorption chiller.
- Electrical power may be produced from exhaust gases using steam turbine running from the steam which is produced from the waste heat.
- Further possible options will be explored during feasibility study.

Feasibility Study completed on May, 2012.