

## Case Study: **Cogeneration Audit: Steam Turbine**

# SENERGY Consultants (P) Ltd

### **Background:**

While conducting energy audit of the cogeneration system for a chemical industry; the isentropic efficiency was observed to be considerably lower than the design value.

### **Scenario:**

The system comprised of

- Coal fired boiler producing steam at 65 kg/cm<sup>2</sup> pressure and 515 °C
- The steam was fed to back pressure cum extraction turbine to generate power, while the steam was utilized for process heating applications.
- The surplus power was exported to sister company through the common grid
- The isentropic efficiency of the turbine was observed to be low.
- The temperature of exhaust steam were observed to be higher for both the stages.

### **Observations:**

- The pressure of extracted steam was observed to be 20% more than design pressure, which also lead to higher steam temperature.
- The pressure of back pressure steam was observed to be 10% more than design pressure, which also lead to higher steam temperature.

### **Improvement Measures:**

The above concerns and issues were addressed by taking the following measures.

- Re-routing the steam pipe line to reduce overall pipe length by 30%.
- Modifying the steam piping
- Laying additional pipe line for one of three of the major consumers

### **Outcome:**

- An additional power generation of 15% was achieved through above modifications

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