

## **SCOPE OF WORK FOR EFFICIENCY EVALUATION OF BOILER:**

The scope of assignment includes all the major important parameters with a view to conduct a detailed efficiency evaluation.

The scope of study will include measurement of electrical, thermal and other related parameters of all the major equipments associated with boiler to work out the efficiencies at the operating loads. Analysis and study of the loading patterns of the existing equipments/facilities and compare with the bench marked efficiencies for the similar equipments/facilities available. We shall also workout the gap in efficiency levels, if any, existing at client. Details of various study is given below.

### **1. ELECTRIC MOTORS & DRIVES:-**

- a. The study covers loading conditions on motors, loading analysis, drive matching by using power analyzer. Operating parameters such as KW, KVA, PF, Voltage, Current and Frequency are to be measured.

### **2. COMBUSTION BLOWERS: -**

- a. Determination of operating efficiency by measurement of flow, head and power deploying suitable measuring instruments.
- b. Study of system as a whole, including flow control method, redundant circulation, excessive pressure drops etc.
- c. Identification of saving potential through operational improvements, replacement of equipments and installation of energy saving devices.

### **3. BOILER:-**

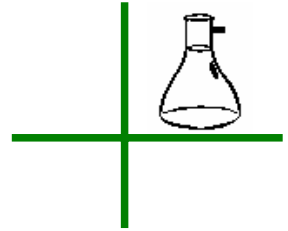
- a. Evaluation of combustion efficiency for boilers by flue gas analysis.
- b. Measurement of fuel consumption, feed water consumption, steam generation and various temperature studies during operation of the boiler.
- c. Measurement of various parameters for minimum 8 hours to maximum 24 hours based on boiler operation condition.
- d. Other parameter may be checked which are mentioned below.
  - i. Insulation study by I.R. Thermography deploying infra-red thermometer.
  - ii. Study of steam distribution network and condensate recovery system for possible improvements.
  - iii. Identification of areas for possible Waste Heat Recovery.
  - iv. **Steam System Scoping**
    1. This software is designed to help steam system energy managers and operations personnel to perform initial self-assessments of their steam systems. This software will profile and grade steam system operations and
    - 2.

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3. management. This software will help you to evaluate your steam system operations against best practices.

v. **Steam System Assessment**

1. This software allows steam analysts to develop approximate models of real steam systems. Using these models, you can apply software to quantify the magnitude—energy, cost, and emissions-savings—of key potential steam improvement opportunities. The enhanced and improved version includes features such as a steam demand savings project; a user-defined fuel model; a boiler stack

vi. **Insulation Assessment for Hot and Cold Surface**

1. The program calculates the most economical thickness of industrial insulation for user input operating conditions. We can make calculations using the built-in thermal performance relationships of generic insulation materials or supply conductivity data for other materials.

4. **Other prerequisites:**

- a. The client will appoint a coordinator (preferably a person familiar with electrical layout, PCC, MCC etc) for the entire duration of the assignment, who shall be with the team and also help them in introducing the concerned functional persons of the various plants, load centers when the specific energy consumption studies for each of the machine and its out-put are being worked out. He shall also help in electrical measurements and familiarize us with the operations and the layouts.
- b. The plant should provide us all the necessary information about the equipments, Catalogues, Drawings, rated loads, name plate details, designed loads and operating parameters, drawings, test, installation & efficiency certificates etc., if any required for the purpose of energy conservation assignments. We shall use appropriate instrumentation for quantifying the energy loads and consumption patterns.
- c. The data will be analyzed by our team to evolve various energy saving proposals. These proposals will be discussed and evaluated techno-commercially to identify the most feasible ones. The proposals will be classified in Short, medium and long-term categories from the implementation point of view.

5. **REPORT**

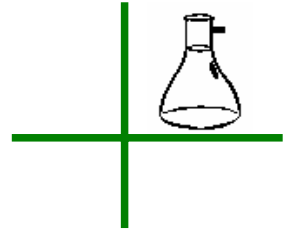
- a. Report contains following important information
  - i. Present installed details of boiler including rated details of boiler system.
  - ii. Present operating condition.

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- iii. Efficiency evaluation of boiler as a whole system as well as efficiency levels of various parts of the boiler like blowers etc.
- iv. Complete analysis report for flue gas.
- v. Suggestion to enhance the boiler efficiency if it found low with respect to rated efficiency.

**SECURITY CLAUSE:**

We agree to keep all the data and information provided to us strictly confidential. We shall not divulge any of the data and information given to us for the purpose of audit to any one. We shall return all the documents, drawings and the details after the completion of the assignment.

**TIME FRAME:**

The assignment will commence with in a week of the confirmation letter received along with the advance. The assignment may take about 30 days to study all the loads, effects and any cyclic patterns and all the electrical loads. We shall submit the final report with in 4 weeks after the completion of the on-site measurements, study and discussions.

**COAST:** On request

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