

## Guidelines For Carrying Out Walk Through Energy Audit for Auditors

- Acknowledgement Page – (to be sealed & signed by energy auditor & sme unit management)
- Executive Summary Page – (Recommendations & Savings at a Glance)

### 1.0 About the Unit

- 1.1 Background about the Company
  - 1.1.1 Year of Establishment
  - 1.1.2 LT/ HT
  - 1.1.3 Manpower details
    - 1.1.3.1 Technical and Non-Technical
- 1.2 List of Products
- 1.3 Production Details – Installed vs. Actual Production
- 1.4 Turnover (ending March, 09)

### 2.0 Energy Scenario

- 2.1 Electrical
  - 2.1.1 Supply Details of Feeders
  - 2.1.2 Substation & Transformer Details
  - 2.1.3 Billing Details

Sr. No.	Particulars	Any one month	Annual
1.	Electrical Units (kWh)		
2.	Power Factor		
3.	kVA Contract Demand		
4.	kVA (Registered Max. Demand)		
5.	Bill Amount		

#### 2.1 4 End User Profile

##### ➤ Motors / Drives

- Name and make
- Year of installation
- Capacity
- Any efficiency test conducted in last three years (Y/N)
- Running hours per day
- Present status (Operation/ Out of service/ standby)

##### ➤ Compressed Air

- Name and make
- Year of installation
- Capacity
- Any efficiency test conducted in last three years (Y/N)
- Running hours per day
- Present status (Operation/ Out of service/ standby)

- **Refrigeration & Air Conditioning**
  - Name and make
  - Year of installation
  - Capacity
  - Any efficiency test conducted in last three years (Y/N)
  - Running hours per day
  - Present status (Operation/ Out of service/ standby)
  
- **Lighting**
  - Number of light points
  - Type of lamps and fixtures used
  - Lamp wattage
  - Running hours per day
  - Name and make
  - Year of installation
  - Present status (Operation/ Out of service/ standby)
  
- **Boilers**
  - Name and make
  - Year of installation
  - Capacity
  - Any efficiency test conducted in last three years (Y/N)
  - Running hours per day
  - Present status (Operation/ Out of service/ standby)
  
- **Thermic Fluid Heaters**
  - Name and make
  - Year of installation
  - Capacity
  - Any efficiency test conducted in last three years (Y/N)
  - Running hours per day
  - Present status (Operation/ Out of service/ standby)
  
- **Furnaces**
  - Name and make
  - Year of installation
  - Capacity
  - Electrically heated/ fuel fired
  - Any efficiency test conducted in last three years (Y/N)
  - Running hours per day
  - Present status (Operation/ Out of service/ standby)
  
- **Pumps**
  - Name and make
  - Year of installation
  - Capacity
  - Any efficiency test conducted in last three years (Y/N)
  - Running hours per day
  - Present status (Operation/ Out of service/ standby)

- **Cooling Towers**
  - Name and make
  - Year of installation
  - Capacity
  - Any efficiency test conducted in last three years (Y/N)
  - Running hours per day
  - Present status (Operation/ Out of service/ standby)
  
- **Machining Centre/ M/c shop**
  - Year of installation
  - Number of machines
  - Running hours per day
  - Present status (Operation/ Out of service/ standby)
  - Avg. daily consumption (kWh)
  
- Energy Cost of each as % of Total Electrical Cost
- kW of each as % of Total Electrical Consumption
- Specific Electricity Consumption w.r.t. product manufactured (Gross)
- Specific fuel consumption w.r.t. product manufactured (Gross)

## **2.2 Thermal**

- 2.2.1 Type of Fuels being used
- 2.2.2 Quantity consumed (per month/ per annum)
- 2.2.3 Consumption of each fuel as % of Total Thermal Consumption
- 2.2.4 Cost of each fuel as a % of Total Thermal Consumption
- 2.2.5 Pie Charts
- 2.2.6 Thermal End use Equipment Types & Details
- 2.2.7 Renewable energy use potential and approach
  - 2.2.7.1 Solar Lights
  - 2.2.7.2 Water heating/ steam
  - 2.2.7.3 Biomass use
  - 2.2.7.4 Bio-fuel

### 2.3 Energy Efficient Technologies Applicability

Sr. No.	Name of EET	Applicability	Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment.	Hours of operation / day	Nos.	Estd Potential for Savings (%) - Order of magnitude of savings margin indicated in brackets
1.	Soft Starter Energy Savers	Applicable / Not Applicable				(3 % of operating kW)
2.	Variable Speed Drives (Hydraulic)	Applicable / Not Applicable				(3-5% of operating kW)
3.	Maximum Demand Controller	Applicable / Not Applicable				(Reduction of Rs. /kVA/month cost only in case of exceeding CMD)
4.	Capacitor and auto capacitor bank (APFC)	Applicable / Not Applicable				(1 % on Energy consumption in terms of distribution loss reduction)
5.	Electronic timers for machineries and lighting	Applicable / Not Applicable				(Direct Savings – Depends on the excess hours of operation above prescribed time of operation)
6.	Variable frequency drive (Electronic)	Applicable / Not Applicable				(5-15 % of operating kW)
7.	Permanent magnet motor for variable speed applications	Applicable / Not Applicable				(10-15 % on average operating kW)
8.	Lighting energy savers (voltage controller)	Applicable / Not Applicable				(15-20 % on operating lighting kW)
9.	Efficient lamps (T5, CFL, Metal Halide, HPSV)	Applicable / Not Applicable				(30-50 % of existing lighting kW )

<b>Sr. No.</b>	<b>Name of EET</b>	<b>Applicability</b>	<b>Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment.</b>	<b>Hours of operation / day</b>	<b>Nos.</b>	<b>Estd Potential for Savings (%) - Order of magnitude of savings margin indicated in brackets</b>
10.	Transparent roofing sheets to reduce lighting load	Applicable / Not Applicable				(Avoids atleast 25 % of existing Shop Floor Day Lighting)
11.	Energy efficient water pumps	Applicable / Not Applicable				(Improvement in existing efficiency upto 75 %)
12.	FRP blades for cooling tower fans	Applicable / Not Applicable				(Being small fans reduction of 5-7 % on existing fan kW drawl)
13.	Efficient spray nozzles in Cooling Towers	Applicable / Not Applicable				(Improves spray in mist form and completely eliminated need for CT – ID fan)
14.	Compressed air ON / OFF controller (Godrej)	Applicable / Not Applicable				(3-5 % Savings in overall existing kWh consumption)
15.	Compressed air Generation pressure reduction	Applicable / Not Applicable				(8% reduction in motor input kW for every 1 kg / cm <sup>2</sup> reduction in discharge pressure)
16.	Compressed air Leakage reduction	Applicable / Not Applicable				(Direct Saving – Leakage based on Trial (or estimated) varies between 10-40%)
17.	Tri-vector Nozzles for end use compressed air cleaning applications	Applicable / Not Applicable				(15 % reduction in compressed air end use for a particular cleaning application)
18.	Compressor Speed reduction based on load and unload cycles	Applicable / Not Applicable				(Depending on ON/OFF cycles compressor capacity can be optimized by speed reduction by pulley modification or VFD)

<b>Sr. No.</b>	<b>Name of EET</b>	<b>Applicability</b>	<b>Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment.</b>	<b>Hours of operation / day</b>	<b>Nos.</b>	<b>Estd Potential for Savings (%) - Order of magnitude of savings margin indicated in brackets</b>
19.	Vapour Absorption Chiller	Applicable / Not Applicable				(Normal existing kW / TR (anywhere between 1-2) will reduce to a meager 0.1 kW/ TR. Feasible only if waste heat is used for VAR)
20.	Steam Traps	Applicable / Not Applicable				(Identification of faulty, leaking traps can save direct steam loss through them (10-40 % on case to case basis)
21.	Condensate Recovery	Applicable / Not Applicable				(Upto 70% recovery is possible – this is direct savings as heat input to the boiler OR Hot Water requirement for the process)
22.	Air Pre-heaters for Waste Heat Recovery in Boiler Exhaust Gas	Applicable / Not Applicable				(Flue Gas temperature can be reduced from existing value to 170°C in case of oil fired and 130° C in case of Coal fired. Minimum T of flue gas should be 40-50° C )
23.	Air Pre – heaters for Waste Heat Recovery in Furnace Exhaust Gas	Applicable / Not Applicable				(Flue Gas temperature can be reduced from existing value to 170° C in case of oil fired and 130° C in case of Coal fired. Here T of flue gas will be huge and WHR potential also huge)

Sr. No.	Name of EET	Applicability	Estimated Energy Consumption / hr (or any relevant energy indicator) by existing Equipment.	Hours of operation / day	Nos.	Estd Potential for Savings (%) - Order of magnitude of savings margin indicated in brackets
24.	Ceramic Insulation for Heat Loss Reduction from Furnace surfaces	Applicable / Not Applicable				(5-7 % existing Surface Heat Loss for temperatures below 200° C and upto 10 % for temperatures between 300 – 500° C)
25	Any other suggestions as per applicability					