

ENERGY MANAGEMENT SERVICES **(ENERGY AUDIT)**

WHEN YOU NEED TO BE SURE



ABOUT POWER SECTOR

- In May 2018, India ranked 4th in the Asia Pacific region out of 25 nations on an index that measures their overall power. **India is 3rd largest producer and 3rd largest consumer of electricity in the world. India has 5th largest installed capacity in the world.**
- **Total installed capacity of power stations in India stood at 346.05 Gigawatt (GW) as of October 2018.**
- The government targets capacity addition of around 100 GW under the 13th Five-Year Plan (2017-22)
- Between April 2000 and June 2018, the industry attracted US\$ 14.18 billion in Foreign Direct Investment (FDI), accounting for 3.64 per cent of total FDI inflows in India. In FY17 it was 1.11 bn US\$, FY18-1.62 bn US\$ and in FY19 till June '18 it was bn 0.97 US\$.

- The Government of India has released its roadmap to achieve 175 GW capacity in renewable energy by 2022, which includes 100 GW of solar power and 60 GW of wind power.
- The Union Government of India is preparing a 'rent a roof' policy for supporting its target of generating 40 gigawatts (GW) of power through solar rooftop projects by 2022.
- Coal-based power generation capacity in India, which currently stands at 196.10*GW (*Up to October 2018) is expected to reach 243.86 GW by 2022.
- Gas based power capacity measures about 24.94 GW as on October 2018, expecting an addition of 0.41 GW by 2022.
- India could become the world's first country to use LEDs for all lighting needs by 2019, thereby saving Rs 40,000 crore (US\$ 6.23 billion) on an annual basis.

OBJECTIVE:

- The Objective of Energy Management is to achieve & maintain optimum Energy procurement & utilization, throughout the organization &
- **To minimize Energy costs / waste without affecting production & quality**
- **To minimize Environmental effects.**
- Energy Audit is the first step in identifying opportunities to **Reduce Energy Expense & Carbon Footprint.**

DEFINITION:

As per the Energy Conservation Act,

Energy Audit is defined as

“The verification, monitoring and analysis of use of energy including submission of Technical report containing **Recommendations for improving Energy Efficiency** with cost benefit analysis and an **Action Plan to reduce Energy consumption**”.

Types of Energy Audit:

- Preliminary Audit
- Detailed Audit

- Detailed Energy Auditing is carried out in three phases: Phase I, II and III.
- Phase I - Pre Audit Phase
- Phase II - Audit Phase
- Phase III - Post Audit Phase
- Bureau of Energy Efficiency (BEE) has defined star rating for Energy Efficiency (**3-Star/4-Star/5-Star**) to reduce Energy loss, which in turns reduce energy consumption & reduces Energy bill.
- For Residential Equipments like CFL replaced by LED Lights, Chokes replaced by Electronic Ballasts, AC or Refrigerators now available with Star Ratings defined by BEE, which are of Higher Efficiency to reduce Energy Bills.

- All Mechanical Joints like welded joints, valves, etc. from where leakages possible are considered for area of improvement for Energy Conservation.
- To Reduce these losses, periodic Maintenance to be carried out to ensure minimum possible leakages in Joints of Pipe Lines.
- All Electrical Connections where Loose Connections or Loose Contacts, there Resistance will be High, which in turn consume more Power, which shall be considered as area to be focused considering Energy Conservation.
- HT/LT Capacitors not in working condition reduces PF, which in turn increases Energy Bill & Heavy Penalty on not maintaining the PF.

- To Reduce these Electrical Losses, periodic maintenance to be carried out to ensure there shall be no loose Electrical Connections & all Capacitors shall be in Working Condition.
- Thermography of Electrical Connections in 66kV Sub station shall be done every year to ensure there is no leakage, also Outdoor Electrical Connections especially Joints shall be Cleaned properly to reduce Contact Resistance & increase Efficiency.

■ Identification of Energy Conservation Opportunities:**1. Fuel substitution:**

- Identify the appropriate fuel for Efficient Energy conversion.

Example:

- Earlier Big Thermal Power Plants were based upon Coal with Lower Efficiency & Heavy Pollution, they are replaced now by Gas based Power Plants to improve Efficiency & reduce Pollution.

2. Energy Generation:

- Identify Efficiency opportunities in energy conversion equipment/utility such as Captive Power Generation.

- Combined Cycle Co-generation Captive Power Plants, with Heat Recovery Steam Generators (HRSG), which use Process Steam to Run Steam Turbine.
 - Green Energy Generation opportunities as per feasibility for Solar Power, Wind Power, Hydro Power, etc. which in turn reduces Carbon Foot Print.
- 3. Energy Distribution:**
- Identify Efficiency opportunities network such as transformers, cables, switchgears and power factor improvement in Electrical Systems.

■ TYPES & PRIORITY OF ENERGY SAVING MEASURES:**1) TYPE:A: No Investment (Immediate)**

- Operational Improvement
- Housekeeping

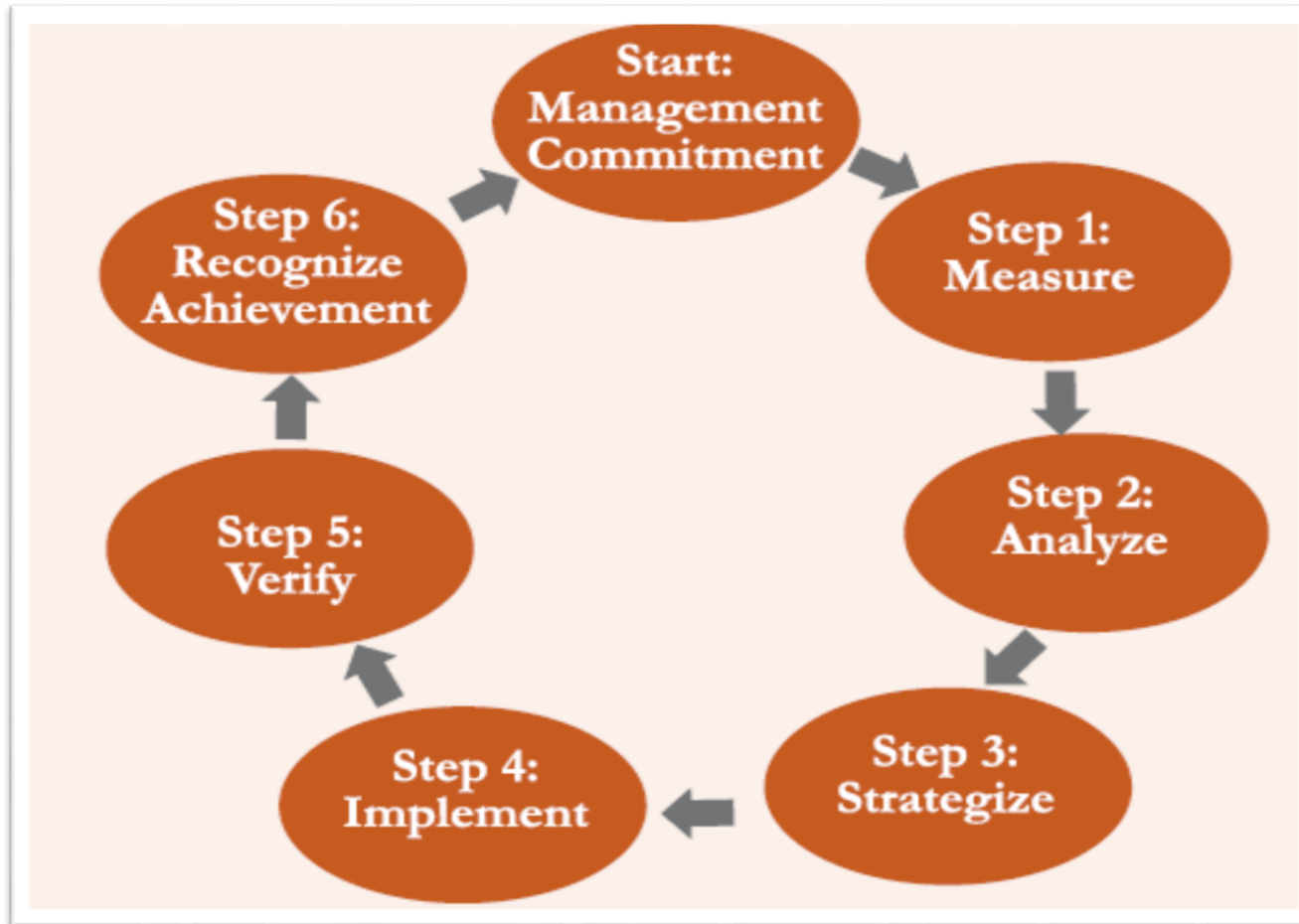
2) TYPE:B: Low Investment (Short to Medium Term)

- Controls Equipment Modification
- Process Change

3) TYPE:C: High Investment (Long Term)

- Energy Efficient Devices
- Product modification
- Technology Change

ENERGY EFFICIENCY – ACTION PLAN



ENERGY AUDIT - METHODOLOGY



■ ENERGY AUDIT ASSESSMENT AND REPORTING:

S.No.	Energy Saving Recommendations	Annual Energy (Fuel & Electricity) Savings	Annual Savings (Rs. In lakhs)	Capital investment (Rs. In lakhs)	Simple Payback Period

Benefits of Energy Audit:

- Reduction in Energy consumption results in energy costs reduction - improvement in bottom line.
- Reduction in energy costs results in production cost reduction – larger market share / improvement in top line.
- Contribution towards improving National energy security, reducing fresh power generation capacity addition & reducing Global Warming.
- Industries / organizations has energy saving potential from 7% to 25% of annual energy bills, about 20% to 30% from no / low cost energy saving initiatives.

WHY SGS?

- Reputation for independence, integrity, professionalism & expertise
- Stringent policy not to Engage in any Manufacturing, Trading & Financial activities which might compromise its independence & Neutrality
- Significant track record in delivering services for a variety of industrial sectors
- Global network of experts within SGS group
- Technical knowledge
- Financial solidity
- Local presence and market knowledge (culture, business practices, regulations, legislation, etc.)

ENERGY EFFICIENCY SERVICES - INSTRUMENTS

Equipment Name	Purpose	Nos.	Calibration Status
Power Analyzer	3 - phase power measurement	8	√
Power Meter	1 - phase power measurement	4	√
Ultrasonic Flow-meter	Liquid flow rate measurement	3	√
Anemometer (Digital)	Air flow velocity measurement	4	√
Thermometer (Digital)	Temp. measurement	2	√
Thermometer (Infrared)	Temp. measurement	2	√
Lux Meter	Lighting illuminance measurement	4	√
Tachometer (Digital)	Rotational speed measurement	1	√
Hygrometer	Temp. & humidity measurement	4	√
Ultrasonic leak detector	Compressed air leak detection	1	√
Temp. Data Loggers	Temp. data logging	4	√

THANK YOU

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