

ENERGY EFFICIENCY IN MSME SECTOR

KEY TO BE COMPETITIVE



TIPS FOR BETTER HOUSEKEEPING



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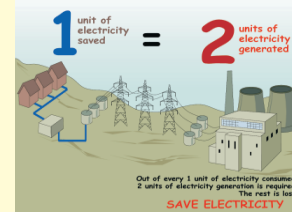


Suggestions

- Undertake regular energy audits - Energy audits indicate the ways in which different forms of energy are being used and quantify energy use according to discrete functions. An energy audit does not provide the final answer to the problem; it identifies where the potential for improvement lies, and therefore, where energy management efforts must be directed. Energy audit is broadly classified as preliminary energy audit and detailed energy audit
- Plug all oil leakage. Leakage of one drop of oil per second amounts to a loss of over 2000 liters/year.
- Incomplete combustion leads to wastage of fuel. Observe the colour of smoke emitted from chimney.
 - ◆ Black smoke – improper combustion and fuel wastage.
 - ◆ White smoke – excess air & hence loss of heat.
 - ◆ Hazy brown smoke – proper combustion.
- Use of Low air pressure “film burners” helps save oil up to 15% in furnaces.
- Make sure that all of the utilities to redundant areas are turned off -- including utilities like compressed air and cooling water.
- Install automatic control to efficiently coordinate multiple air compressors, chillers, cooling tower cells, boilers, etc.
- Meter any unmetered utilities. Know what normal efficient use is. Track down causes of deviations.
- Shut down spare, idling, or unneeded equipment.

General

Energy Conservation



- Schedule your operations to maintain a high load factor.
- Shift loads to off-peak times if possible.
- Stagger start-up times for equipment with large starting currents to minimize load peaking.
- Use standby electric generation equipment for on-peak high load periods.
- Relocate transformers close to main loads.
- Set transformer taps to optimum settings.
- Shut off unnecessary computers, printers, and copiers at night.
- Minimize / maximum demand by tripping loads through a demand controller.

Electrical Distribution System



- Operate pumping near best efficiency point.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Repair seals and packing to minimize water waste.
- Balance the system to minimize flows and reduce pump power requirements.

Pumps



- A continuously running DG set can generate 0.5 Ton/Hr of steam at 10 to 12 bars from the residual heat of the engine exhaust per MW of the generator capacity.
- Measure fuel consumption per KWH of electricity generated regularly. Take corrective action in case this shows a rising trend.
- DG sets require regular and periodic maintenance for efficient running. Carry out the following maintenance once in a month:-
 - ◆ Check the level and appearance of lubricant oil. Top up or change the lubricant oil periodically as per the manufacturer's guidelines.
 - ◆ Clean the radiator fans and heat exchanger.
 - ◆ Optimize the operating frequency of the generator.
- Ensure that the air intake to the generator is cool and free from dust. Warm air can seriously decrease the generator's performance on account of a reduction in volumetric efficiency.
- Clean the air filters regularly.
- Unbalanced loads on A.C. generators lead to an unbalanced set of voltages and additional heating in the generator.
- Insulate exhaust pipes to reduce DG set room temperatures
- Use cheaper heavy fuel oil for capacities more than 1MW

DG Sets



Suggestions

- Reduce excessive illumination levels to standard levels using switching; delamping, etc. (Know the electrical effects before doing delamping.)
- Install efficient alternatives to incandescent lighting, mercury vapor lighting, etc. Efficacy (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapor, incandescent.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts
- Consider daylighting, skylights, etc.
- Consider painting the walls a lighter color and using less lighting fixtures or lower wattages.
- Change exit signs from incandescent to LED.

Lighting



- Seal exterior cracks/openings/gaps with caulk, gasketing, weather stripping, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimize lighting and HVAC costs.

Buildings



- Consider variable speed drive for variable load on positive displacement compressors.
- Use a synthetic lubricant if the compressor manufacturer permits it.
- Ensure that lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- Change the oil filter regularly.
- Periodically inspect compressor intercoolers for proper functioning.
- Use waste heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.

Compressors



- Properly size to the load for optimum efficiency.
- (High efficiency motors offer of 4 - 5% higher efficiency than standard motors)
- Use synchronous motors to improve power factor.
- Check alignment.
- Provide proper ventilation (For every 10°C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)
- Check for under-voltage and over-voltage conditions.
- Always use motors sized according to the requirement of the load. It is a good practice to operate motors between 75 - 100 % of their full load rating because motors run most efficiently near their designed power rating.
- When replacing motors, always buy energy efficient motors instead of conventional motors. The cost of energy consumed by a conventional motor during its life is far greater than the incremental cost of the energy efficient motor.
- If a motor is continuously running below 45% of its designed load, it is better to reconfigure the motor delta to star connection or install delta star converter. This measure will give energy savings of up to 10%.

Motors



Suggestions

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use energy-efficient motors for continuous or near-continuous operation
- Turn blowers off when they are not needed.

Blowers



- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Avoid poor flow distribution at the fan inlet.
- Use energy-efficient motors for continuous or near-continuous operation
- Turn fans off when not needed.

Fans



- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimize flows and reduce pump power requirements.
- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Verify the water meter readings.
- Verify the sewer flows if the sewer bills are based on them.

Water & Wastewater



Sources: - www.beegov.in/www.pcr.org and Energy Efficiency Publications of SIDBI.

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Indian SME Technology Services Ltd (ISTSL)	www.techsmall.com
Indian SME Asset Reconstruction Company Ltd (ISARC)	www.isarc.in

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