CHAPTER NO. 13

EFFICIENT USE AND CONSERVATION ELECTRIC POWER

13.1 General

MEPCO shall take steps towards improving the quality and reliability of electric service to maximize the value of the energy that is used and to increase the sale of power.

Electricity adds to the quality of life, hence it makes good sense to use it wisely. Consumer are advised to be “energy smarts”

ENERGY EFFICIENCY AND ENERGY SAVINGS

The use of present day technology boots the efficiency of energy systems – such as the super efficient compact fluorescent lamps. This revolutionary yet reliable bulb yields the same pleasing light as a conventional incandescent while consuming less electricity.

There are many other proven ways to maintain and operate energy system to same energy costs all the time, many of which are at low or no cost.

a) Many of quickest and easiest ways to same energy also cost little or nothing. In fact, a lot of energy savings can be achieved by doing the following:

- i) Turn off lights when not needed.
- ii) Remove unneeded light bulbs.
- iii) When replacing bulbs, use low wattage or more efficient ones.
- iv) Reduce air conditioning thermostat setting.
- v) Reduce air conditioning during unoccupied hours.
- vi) Reduce air conditioning before the end of operating hours.
- vii) Have the ventilating and air conditioning systems serviced and adjusted.
- viii) Turn off machines and equipment when not needed.
- ix) Make sure all automatic controls are in good working condition and are set properly.
- x) Ensure all motive machinery is properly lubricated and maintained.

b) The following steps may be read carefully:

- i) **Find out last year’s energy use and cost.** Twenty to thirty percent savings may be possible with little effort.
- ii) **Do an energy “audit”.** Take a good look at how and where you use – and waste – energy.
- **iii) Get some expert help with the audit if needed.**
- iv) **Ask friends for their ideas and listen to their concerns about health and comfort**. They should be fully involved in energy management efforts.
- v) **Decide the top priority things to do.** Include them in energy action plan.

vi) **Do them – with outside help if needed.** The sooner a start is made, the better savings are made.

vii) **Keep a record of savings.** See if what has been done is working and how much being saved.

13.3 LIGHTING

Lighting energy can be wasted in several ways, such as;

a) **Inefficient light sources** – when the lamp or fixture is inefficient in converting electricity to light, using more watts (units of electric power) than necessary to produce the lumens (units of light output):

b) **Illumination losses** – when dirt or some other obstruction blocks some of the light; or when the light source is too far away from what you want illuminated;

c) **Over lighting** – when more light is used than is needed; when a "free" source such as day light is not used; and when lights are on, for no reason (e.g. when no one is present).

d) **Three major ways to save.**

i) Turning lights off when they are not needed.

ii) Reducing light levels wherever you have more light than you need;

iii) Installing more efficient lighting or controls.

13.4 INFORMATION ABOUT BENEFITS OF SAVING ELECTRIC POWER

MEPCO shall provide sufficient information to the consumers to make them aware of the benefit of efficient use and saving of electric power which in turn would result in savings to the utility. **MEPCO** shall publish pamphlets or make advertisements or issue handbills from time to time for the education of consumers with regard to efficient use and saving of electric power.

MEPCO shall inform consumers about energy efficiency opportunities by way of "information inserts" included in monthly bills.

13.5 MONITORING USE OF ENERGY

The consumer shall be educated and encouraged to prepare the figures of months energy bills for the last calendar year and this year by collecting from the monthly bills and recording in the table given below. Comparison of these figures on monthly basis shall give the "baseline" for making efforts for potential savings. In this way, keeping in view all the suggestions for saving and keeping a strict watch on the energy consumption, some fruitful results are achievable and it will be observed that energy management efforts actually do pay off.

TABLE FOR CONSUMPTION OF ELECTRICITY

MONTH	ELECTRICITY USE			ELECTRICITY COST		
	LAST YEAR	THIS YEAR	% DIFF-ERENCE	LAST YEAR	THIS YEAR	% DIFF-ERENCE
January						
February						

March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Total						

13.6 GENERAL TIPS-INDUSTRIAL OPERATIONS

2) Saving energy makes good business sense

Many companies think of energy as a fixed overhead but saving energy is actually one of the easiest ways to reduce costs and improve your reputation.

a) Save money

Simply by switching machines off after use , or turning the cooling / heating down as per weather requirement, you can make real savings on your energy bill. And just reducing it by 20% could add the same amount to your profits as a 5% increase in sales.

b) Office better value to your customers

Cutting your overheads means production costs will go down making your products and services more competitive.

c) Here are some tips specifically for manufacturing / or industrial processes, to help you save energy in key areas:

(i) <u>Motors</u>

Keep you motor maintained / extend your motors operating life.

If motor is not working at its most efficient, it can add 5% or more to your energy costs. So make sure your motors are always well maintained. Also check that voltage is balanced on all phases.

Use high efficiency motors

When you next change your motor, replace it with a Higher Efficiency Motor. Also consider the induction of Variable Speed Drive if favorable.

Don’t keep motors running with an empty load

Always check that motors are switched off when don’t need them, as even an empty motor uses 40% of the full load power.

(ii) **<u>Compressed air</u>**

Find and fix leaks

Most business using compressed air can save upto 30% simply by fixing any leaks.

Try to lower the operating pressure
Reducing it by just 1 bar (15psi) will save about 7% the energy.

Ensure there is a good supply of cool air around the compressor
This will ensure it does' get overheated and use more energy than necessary.

iii) Refrigeration

Keep freezer doors closed
On an average, it will cost you Rs.1/= every day a freezer door stays open.

Ensure your system is at the right temperature
If it's even 1°C lower than needed, your costs could rise by 2 to 4%

Don't let the condensers get overheated
Make sure they are located in a place with sufficient airflow

Don't put too much refrigerant charge in
If it leaks it can increase your energy costs by over 10%

iv) Improve heating operation systems

By checking burner air to fuel ratios and the heat transfer surfaces.

v) Improve pumping operation systems

By matching the pumps to system requirements.

13. SUGGESTION AND RECOMMENDATIONS

a) Form an Energy Team

Energy teams in manufacturing facilities track and report energy use, identify energy saving opportunities, develop an energy plan, and implement cost-saving measures. Energy teams typically include members from plant and process engineering, maintenance engineering, procurement and production. Any energy team will enjoy greater success with support and involvement from senior mangers, who can remove barriers and commit resources to projects.

b) Objective of energy team:

Performing a formal energy assessment is one of the best ways that your team can develop a cost-effective plan to lower plant energy costs.

The energy assessment team (which sometimes include experts in energy management and troubleshooting) works both during and after the assessment process to

i) Evaluate all of the industrial systems to calculate how and where your plant uses energy
ii) Help find opportunities to increaser efficiency,

iii) Determine potential upgrades and emerging technologies that might work or your plan, and
iv) Implement cost-saving measures.

c) Employee Involvement

Emphasis will be given on the employee's involvement by educating and encouraging them to follow the tips like:

i) Turn off lights, when leaving work areas
ii) Report leaking faucets, lavatory fixtures, piping etc.
iii) Keep windows and outside doors closed, if air conditions are in use.
iv) Leave thermostats at a constant setting to avoid forcing the system OFF on ON.
v) Turn off all tools and portable appliances when not in use,
vi) Assign responsibility for turning off designate items to specific employees

d) RECOMMENDATIONS

i) Install power factor correction capacitors
ii) Turn OFF equipment when not in use
iii) Begin a practice of monitoring electric demand
iv) Repair compressed air leaks
v) Redirect air compressor intake to use outside air
vi) Lower air pressure in compressors
vii) Repair steam valve leakages
viii) Install water cooled chillers instead of replacing air cooled chillers
ix) Installed Speed controllers on twisting machines
x) Replace standard fluorescent lighting with energy efficient tubes
xi) Reduce luminance to minimum required levels via delamping.
xii) Install timers on lighting systems, where necessary