

Chapter 5

Energy Conservation & Fire Safety

ENERGY CONSERVATION

Introduction:

The ever-increasing cost of energy (i.e. Electrical power & diesel) has contributed immensely to the operating expenses of BSNL. The solution for controlling this operating expense lies in conserving energy by effective Energy Management. This chapter deals with Energy management objectives, system, benefits of energy conservation and duties and responsibilities of Energy Manager.

Learning objective:

After undergoing this chapter, the participants will be able to :

- Understand Energy Conservation, Energy Management System & objective
- Significance of Energy conservation

Energy Management & its objectives:

“Energy Management is the judicious and effective use of energy to maximize profits (minimizing costs) and enhance competitive positions”. **The objective of energy management is to achieve and maintain optimum energy procurement and utilization throughout the organization and**

- **to minimize energy cost/waste without affecting production and quality.**
- **to minimize environmental effect.**

Business can benefit significantly by moving towards energy management practices. Effective energy management can drive whole business to improved performance through its effect on production. Operations, maintenance and environmental issues.

Energy management can be incorporated in to existing business system to provide to provide an intergraded approach to business sustainability. Energy management can be incorporated in to safety, quality (ISO 9000) or environmental management system. (ISO 14001)

There are four vital requirements for a successful energy management. Any successful energy management programme within an organisation needs the **total support of top**

management. Hence, top management support is the key requirement for success. Top management should give energy efficiency equal importance in their corporate objectives as manpower, raw materials, production and sales. The other important requirements are a **well charted strategy plan, an effective monitoring system** and **adequate technical ability** for analysing and implementing energy saving options.

Energy Management System:

Organizations seeking financial returns from superior energy management continuously strive to improve their energy performance. Their success is based on regularly assessing energy performance, planning and implementing action plans to improve energy efficiency. Hence a sound energy management system is a prerequisite for identifying and implementing energy conservation measures, sustaining the momentum and for effecting improvements on a continuous basis. The various steps for energy action planning are shown in Figure 1.



Figure 1 Steps in Energy Action Planning

Energy Conservation and its Importance:

Coal and other fossil fuels, which have taken three million years to form, are likely to deplete soon. In the last two hundred years, we have consumed 60% of all resources. For sustainable development, we need to adopt energy efficiency measures.

Today, 85% of primary energy comes from non-renewable, and fossil sources (coal, oil, etc.). These reserves are continually diminishing with increasing consumption and will not exist for future generations

What is Energy Conservation?

Energy Conservation and Energy Efficiency are separate, but related concepts. Energy conservation is achieved when growth of energy consumption is reduced, measured in physical terms. Energy Conservation can, therefore, be the result of several processes or developments, such as productivity increase or technological progress. On the other hand Energy efficiency is achieved when energy intensity in a specific product, process or area of production or consumption is reduced without affecting output, consumption or comfort levels. Promotion of energy efficiency will contribute to energy conservation and is therefore an integral part of energy conservation promotional policies.

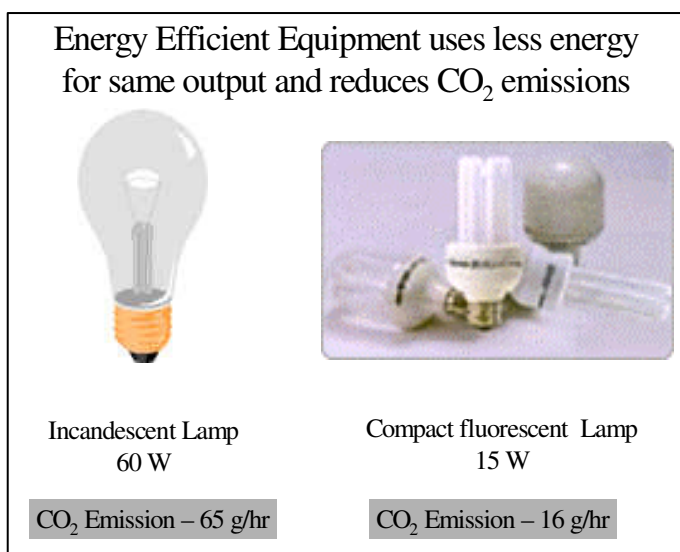


Figure 2


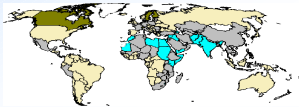

Energy efficiency is often viewed as a resource option like coal, oil or natural gas. It provides additional economic value by preserving the resource base and reducing pollution. For example, replacing traditional light bulbs with Compact Fluorescent Lamps (CFLs) means you will use only 1/4th of the energy to light a room. Pollution levels also reduce by the same amount (refer Figure 2).

Nature sets some basic limits on

how efficiently energy can be used, but in most cases our products and manufacturing processes are still a long way from operating at this theoretical limit. Very simply, energy efficiency means using less energy to perform the same function.

Although, energy efficiency has been in practice ever since the first oil crisis in 1973, it has today assumed even more importance because of being the most cost-effective and reliable means of mitigating the global climatic change. Recognition of that potential has led to high expectations for the control of future CO₂ emissions through even more energy efficiency improvements than have occurred in the past. The industrial sector accounts for some 41 per cent of global primary energy demand and approximately the same share of CO₂ emissions. The benefits of Energy conservation for various players are shown below.

Summary:

Energy Efficiency Benefits		
Industry 	Nation 	Globe 
<ul style="list-style-type: none"> • Reduced energy bills • Increased Competitiveness • Increased productivity • Improved quality • Increased profits ! 	<ul style="list-style-type: none"> • Reduced energy imports • Avoided costs can be used for poverty reduction • Conservation of limited resources • Improved energy security 	<ul style="list-style-type: none"> • Reduced GHG and other emissions • Maintains a sustainable environment

The energy management can be effectively used by BSNL to reduce its operating expense and increasing profitability. Energy conservation is not only useful for the organization, but also for the protection of the global environment.

Fire Safety

Introduction:

A telecom installation with high concentrations of cables and electronics switching equipment within relatively small areas constitutes a HIGH RISK installation. We have to prevent fire before everything is afire. This chapter deals with Fire Safety measures in telecom installations.

Learning objective:

After undergoing this chapter, the participants will be able to :

- Understand Active & Passive approach of Fire Protection
- Understand types of Fire & suitable fire extinguishers for quenching it.

Fire Protection:

Fire protection measures in telecom building can be classified in two parts :

(a) PASSIVE FIRE PROTECTION

Passive fire protection measures are those which are adopted at the planning stage of the building or facility such as :

- i. Provision of adequate fire resistance of the structure.
- ii. Provision of proper FAR, open spaces.
- iii. Provision of adequate access to sufficient and readily available water supply etc. for fire brigade.**

(b) ACTIVE FIRE PROTECTION MEASURES

Active fire protection measures are those which operate (manual/Automatic) in the event of out break of fire such as:-

- i. Provision of suitable and adequate Fire detection system with audio visual alarm.
- ii. Wet riser & fire Extinguishers.

PASSIVE FIRE PROTECTION MEASURES:

Telephone exchange buildings have been classified as E4 business buildings in the “National Building-Code of India”. As such building Material(s) of suitable fire retardant ability as mentioned therein shall only be provided.

ACTIVE FIRE PROTECTION MEASURES:**FIRE DETECTION AND ALARM**

If outbreak of fire is detected promptly in its incipient stage and simultaneously, a correct fire fighting media is applied, losses from fire can be minimized. Thus philosophy of fire detection and alarm system is to provide an audio visual signal for alerting the building occupants.

MANUAL FIRE ALARM

All buildings excepting manual local exchange and MAX III, shall have a manual fire alarm system. In multistoried buildings, each floor shall constitute one or more zone depending on the area of floor. Fire alarm switches shall be mounted at conventional locations in the zones. The call boxes shall be accessible to all occupants without having to travel more than 22.5 mtr and shall be mounted at a height of 1.2 mtr from floor level. It shall be colored red.

AUTOMATIC FIRE DETECTION SYSTEM

All buildings above 15 m high and all Digital Electronic exchanges and all the exchanges of 1K or above shall be provided with an automatic fire detection system, in addition to manual fire alarm system. In case of E-10 B exchanges, false floor plenum and false ceiling shall constitute separate zones.

The detectors shall be of rate of rise of temperature type and smoke type. Wherever smoke detectors are provided, a mixture of photoelectric and ionization type will be used.

A control indication panel to which detection circuits in all the zones are connected, shall be installed in the fire control room or in the main entrance lobby on the ground floor of the building. Light indications on the panels shall enable the fire to identify the fire site.

The alarm system shall provide both alert system and evacuation alarm with different distinctive tones.

The alarm system shall have a battery back up so that in case of mains failure, the back up batteries take over and feed the power to the system.

A non exchange direct fire emergency magneto telephone shall be provided in the equipment room to all Telecom buildings for direct communication with the fire brigade. One of the extensions of the non exchanges line shall also be available at the ground floor hi the sentry cabin or at the reception. The fire telephone shall be tested daily.

FIRE FIGHTING APPLIANCES:

- Sufficient number of fire Extinguishers (portable type) shall be brought or kept in shelves or mounted on wheels at conspicuous places (but not too close to the equipment). The operating instructions shall be clearly printed on the body of extinguishers.
- Sufficient quality of refills for the extinguishers shall be stored.
- For buildings above 15 mt. In height one wet riser for every 1000 sq. mtr or part therefore of floor area shall be provided. The hydrant shall be so located that it is not father than 30 mt. from any point in the area covered.
- In data centers, automatic flooding system is provided keeping in view the importance and fire risk involved.
- Two water buckets and too sand buckets shall be provided at each floor.
- All fire fighting appliances shall be maintained in working condition.
- For more details the latest “Fire protection manual” of the department can be referred.

Classes of Fire and Fire Extinguishers:

The Nation Fire Protection Association (NFPA) extinguisher standard classifies fire into four types.

CLASS A

Fire in ordinary combustible materials (like wood, cloth, paper, rubber, etc.)

CLASS B

Fire inflammable liquids, gasses etc.

CLASS C

Fire in live electrical equipment.

CLASS D

Fire in reactive metals (Like Mg, Ti, Na, K, etc.).

CLASS OF FIRE**SUITABLE FIRE EXTINGUISHER.**

CLASS	A	WATER, FOAM.
CLASS	B	FOAM, CO ₂ , DRY POWDER.
CLASS	C	CO ₂ , HALON.
CLASS	D	SPECIAL DRY CHEMICAL POWDER.

Summary:

The Fire Safety is very important for any organization as fire may result in to damage to property and loss to human lives. Suitable measures should be adopted to prevent the occurrence of Fire. Fire can be extinguished by detection in early stage and application of suitable fire extinguishing media.

QUESTIONS

1. What is Energy Management?
2. Write down the objective of Energy Management and why is it important in context of BSNL?
3. Write four vital requirement for successful Energy Management.
4. What is Energy Conservation and how is related to Energy Efficiency?
5. Explain Energy Mangement System Cycle.
6. What is understood by active and passive fire protection approach?
7. Write down the active and passive fire protection measures.
8. Write notes on
 - (a) automatic Fire Detection system
 - (b) Manual Fire Detection System
9. State the class of fires with suitable examples.
- 10.State different type of Fire Extinguishers and their suitability to the type of Fire.

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