

Effective Energy Conservation Through Energy Management

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Abstract

Our aim to write this paper is to expose how much energy is useful to the society, how it is being wasted and how we can conserve it if we make efforts towards saving the energy utilizing various energy management techniques. The power requirement for both industrial and agricultural growth is so high that it seems impossible to cope up with it. One answer to this problem is the energy conservation. Energy conservation means to find out increased exploitation of energy sources other than fossil fuel, to get economy in their use and an optimal pattern for using and replenishing the energy resources. A developing country needs progressively increasing amount of energy so as to move forward to prosperity of modernization. With industrial development, energy consumption has been rising much more rapidly than the rate of discovering new resources. So, optimum utilization of the energy through the use of energy conservation has become a necessity for survival. Energy management is a combined technological and management function which includes engineering, economics, operation research and computer programming as well as day to day management of fuels, equipment and modes of energy flow.

1. Introduction

Energy resources in the world are enormous. They comprise human and cattle power, animal dung, forest fuel, coal & lignite, crude oil & its derivatives, water & geothermal energy, hydal & thermal power, nuclear power, solar, wind & tidal power. The problems that we find are of long term and short term. The long term is that energy based on the fossil fuel is finite. We consume too much power every year and the short term is that escalation of crude prices has made that form of energy uneconomical. Our need for early nuclear energy break through has not been realized and we are still groping around with regard to renewable energy sources as solar, wind and tidal. The power requirement

for both industrial and agricultural growth is so high that it seems impossible to cope up with it. One answer to this problem is the energy conservation. Energy conservation means to find out increased exploitation of energy sources other than fossil fuel, to get economy in their use and an optimal pattern for using and replenishing the energy resources.

2. Energy Conservation

Energy conservation and improvement in operational efficiency of existing installation through proper energy management are most important thrust areas which if given greater attention could yield encouraging results through implementation of time bound action plans and help in reducing the anticipated power storage. In the present global scenario, the energy lost is rising rapidly because of better life requirement and increase population. The energy sources used are limited in magnitude and will be exhausted in near future. Even if the present rate of demand is continued, these energy resources can be utilized for a longer period of time if effective energy management carries out proper methods of energy conservation.

3. Areas of Energy Saving

Avoiding waste, decreasing demand and improvement in technology can conserve the energy. In view of limited resources and ever-increasing demand of energy, it is essential to find out major areas for use of energy so that capability of energy conservation in various fields can be analyzed and inefficient energy conservation can be minimized. Energy conservation is the single step, which can effectively contribute towards the reduction of shortages.

The prospect of depleting fossil fuel supply and progressive degradation of the environment has turned world attention to various aspects of energy use. In the process of upgrading living standards more and more energy is consumed to satisfy material wants. Coupled with the degradation of forestlands, ever increasing

consumption of commercial energy sources has been contributing towards the pollution of air, water and soil.

4. Need of Energy for Development

Energy being a major requirement of modern society, its development and management carries a lot of significance in the economic development. Energy is required for domestic use, agriculture, industry, commerce, and transport and in almost every sphere of life. A developing country needs progressively increasing amount of energy so as to move forward to prosperity of modernization. With industrial development, energy consumption has been rising much more rapidly than the rate of discovering new resources. So, optimum utilization of the energy through the use of energy consumption, technologies becomes a compulsion for survival and to maintain a quality of life.

On close examination of the problems, we find that we are on the path of diminishing returns in the use of most energy resources, larger capital and energy expenditure, costly research and developmental goals and the prospect of greater environment deterioration. Energy must be used in efficient ways so that they last longer and the pollution is reduced. Presently we are at the crossroads where the energy choices we make now will determine what kind of natural heritage we leave behind to future generation. Energy consumption is essential and economical to prolong our existing resources and indirectly save the ecology from its damage.

5. Energy Management

Energy management and energy conservation are the two sides of one coin. The very important purpose of the energy management is to conserve energy. Management techniques should be applied to use the existing sources for its optimum output with economical way. Energy management is a combined technological and management function which includes engineering, economics, operation research and computer programming as well as day to day management of fuels, equipment and modes of energy flow. The energy management has to look after material consumption, waste reduction, and control of pollution and disposal of waste together with recycling possibilities for economical output. In view of constraints involved in developing additional power sources, it has become clear that the only immediate solution to the energy supply lies in energy

conservation by using proper management techniques. Energy management is a combined technological and management function which includes engineering, economics, operation research and computer programming as well as day to day management of fuels, equipment and modes of energy flow. The energy management has to look after material consumption, waste reduction, and control of pollution and disposal of waste together with recycling possibilities for economical output.

6. Energy Management Techniques

As we know the energy management is one of the solutions of problems, which we are facing now a days about the conservation of energy, we should utilize it with its maximum efficiency to gain as much as, benefits possible. Various energy management techniques have been planned to take care of conservation of energy.

6.1 Analysis of Inputs

It is the normal practice that the industries are used to prepare profitability projections based on the costs of raw material, labour and supervision, plant and machines and interest and insurance. Here we can add energy cost. Energy analysis seeks to account for the consumption of energy at each stage in the production. Thus the total energy cost represents cost of energy utilized from raw material to finished product as well as cost of energy utilized in transport, communication and support services.

6.2 Recycling

Almost every discarded commodity may be reused, recycled or reclaimed. Technologies for this purpose are available. Proper utilization of waste can be carried out in effective way. From proper utilization of solid waste, recovery of energy in the form of electricity can be gained easily.

6.3 Energy Education

Serious efforts are needed to develop the altitudes, which are functional to the conservation and judicious use of the resources and respect to the environment. Education about resources, uses, misuses and crises of energy is now must to give the people so that they must know how to use the energy reducing the waste and in economic way.

6.4 Conservation of Energy

Conservation of energy is now must, as we know the sources will not help us long. Effective ways of conservation of energy should be utilized to save energy at any cost. Efficient consumption of fuel with minimum excess air to burn the fuel completely is essential. Both air and fuel should be mixed properly and supplied to the combustion chamber at the correct temperature and pressure for efficient combustion. Recovery and utilization of all waste heat should be done with technical feasibility and economical viability. With proper thermal insulation losses of heat can be prevented. Economical thickness of insulation and cost of it should be kept in mind. Energy can be saved by proper heat distribution system. Use of condensate is very much helpful. Reducing the leakage in steam and steam trapping by improving maintenance standard can save energy. Energy of electricity can be conserved by use of proper motor for proper application. This energy can also be saved by effective load management and by improving the power factor by proper motor loading. Excessive lighting should be eliminated. Energy can also be saved by proper operation of control systems as well as by maintaining the equipment properly with regular periodic checking. Oversize of the equipment should be eliminated.

6.5 Energy Audit

The main purpose of the energy audit is to establish quickly and reliably, the basic relative costs of the various forms of energy purchased, their main uses and to identify the principle locations where losses, wastage or inefficiency occurs. First of all a comprehensive energy management policy should be laid down fixing the target. Then identifying all forms of energy being used and to carry out an audit should carry out a detailed energy audit for each type of energy used. An energy audit identifies the cost of energy and where and how it is used. It will identify the amount of energy expended in a process with the help of mass and energy balance for each process. Then the energy flow diagram is prepared showing the quantity, form, source and quality of the energy required for various processes. Next is to make a critical analysis for energy used and energy wanted and then it is followed by identification of potential areas for energy conservation. All these informations are filled in the printed form available for the record and reference.

The efficiency of energy utilization varies with the specific industrial operations, the materials produced and nature of manufacturing operations. An effective energy program is to be undertaken. Energy consumption even can be reduced if the problem is tackled in a scientific and methodical manner. A positive plan of action should be undertaken after analysis and then detail design work is to be carried out to draw up the specifications for practical modifications of the existing processes.

A pilot scale project should be undertaken to establish their technical feasibility. Proper measurement and control systems are to be incorporated to monitor the performance of equipment used for energy conservation. Review of all parameters responsible for the energy conservation should be conducted to ensure that the program is progressing in the right direction.

7. Conclusion

Energy conservation and energy management should be given higher attention and high priority to mitigate the anticipated power shortages. The implementation of time bound action plan of energy management can yield encouraging results if they are given greater attention and proper care and determined efforts made in implementation of its techniques.

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