EFFECTIVE ENERGY CONSERVATION TECHNIQUES IN INDUSTRIES

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ABSTRACT

The rising oil import bill has been the focus of serious concerns due to the pressure it has placed on scarce foreign exchange resources and is also largely responsible for energy supply shortages. The sub-optimal consumption of commercial energy adversely affects the productive sectors, which in turn hampers economic growth. This paper highlights the impact of energy conservation techniques in minimizing the energy losses in industries. This paper is the part of work of Ph.D. and deals with SSI units in Amravati region.

INTRODUCTION

Indian industry has not paid much attention to energy savings. The high-energy consumption in the Indian industries is due to three main reasons:
- Most of the manufacturing units still depend on old machinery
- The relatively high cost of capital as compared to European / U.S. Standards
- Uncertainty about the long-term growth of the particular industrial sector.

Energy conservation and efficiency improvement in the Indian power sector requires special attention since the sector has been suffering from a chronic supply shortage, lack of capital investment for new capacity addition and environmental problems associated with coal-based power plants. High auxiliary consumption and transmission and distribution loss further aggravate the problem.

Key words: Energy efficiency, T&D losses, renewable energy sources
SIGNIFICANCE OF THE TOPIC

The United States Energy Association (USEA), with funding from the United States Agency for International Development (USAID) is forging strong relationships in the Indian Power Sector. USEA has established a system of matching the Indian utilities, State Electricity Boards (SEB) and State Electricity Regulatory Commissions (SERC) with various U.S. utilities and regulatory commissions. The primary goal of these partnerships is to assist Indian utilities, SEBs and SERCs in promoting more efficient, environmentally sound supply and utilization of energy by introducing commercially viable, market-oriented approaches.

India is currently the fourth largest oil consumer in the Asian-Pacific region after Japan, China and South Korea. The total demand of oil is expected to reach about 368 million metric tons (MMT) by the year 2025, assuming the base case with GDP projected to grow at 6.5 percent per annum until 2025. Further in line with international trends, it is estimated that the share of middle distillates would increase from a current level of 59-60 percent to about 65 percent by 2025. Therefore the estimated refining capacity and crude requirement by the year 2025 shall have to be in the range of 355-360 MMT.

SPECIFIC OBJECTIVES OF THE STUDY

** Optimum utilization of existing assets
** Improving efficiency in production systems & reduction in distribution losses
** Promoting R&D, transfer and use of technologies and practices for environmentally sound energy systems, including new and renewable energy sources
** Improving energy infrastructure
** Promoting of energy efficiency and emission standards

SCOPE OF THE PROPOSED RESEARCH

The future choice of technology for power generation crucially depends on current and future trends of environmental regulations, availability of low-cost fuel on a long-term basis, plant efficiency and costs of the technology. 71% of India’s power generation comes from coal and it is expected that coal will continue to dominate in the future of power generation. However, the burning of coal creates a host of serious environmental problems requiring emissions control and waste disposal.

Since India cannot live without coal, one of the solutions is to adopt clean coal technologies for power generation, which would not only reduce pollution, but also achieve higher thermodynamic efficiencies. Technologies for coal gasification, IGCC, CO₂ capture. Quality of power supply requires special attention in India. In the United States, losses due to poor quality energy supply are estimated at $150 million. Anti-theft legislation with stringent provisions and support of government in tackling law and order problems for curbing the widespread theft of electricity would be helpful in India.

The industries implementing cost control initiatives in other areas of their enterprise can successfully extend that business intelligence to electricity utilization and conservation
activities. Within the new framework of volatile electricity supply conditions; industries can exert greater control over their electricity expenditures by evaluating and deploying conservation strategies within a control of cost opportunities & business cycle realities. Reducing T & D losses from 34% to 17-18% as compared to 7% in China is another focus of the present study for implementation.

LITERATURE REVIEW

Energy is the prime mover of economic growth and is vital to the sustenance of a modern economy. Future economic growth crucially depends on the long-term availability of energy from sources that are affordable, accessible and environmentally friendly. India ranks sixth in the world in total energy consumption and needs to accelerate the development of the sector to meet its growth aspirations. The country, though rich in coal and abundantly endowed with renewable energy in the form of solar, wind, hydro and bio-energy has very small hydrocarbon reserves (0.4% of the world’s reserve). India, like many other developing countries, is a net importer of energy, more than 25% of primary energy needs being met through imports mainly in the form of crude oil and natural gas.

In the power generation front, nearly 62% of power generation is from coal fired thermal power plants and 70% of the coal produced every year in India has been used for thermal generation. About 70% of the total hydro potential is located in the Northern and Northeastern regions, whereas the Eastern region accounts for nearly 70% of the total coal reserves in the country. The Southern region, which has only 6% of the total coal reserves and 10% of the total hydro potential, has most of the lignite deposits occurring in the country.

On the consumption front, the industrial sector in India is a major energy user accounting for about 52% of commercial energy consumption. Per capita energy consumption in India is one of the lowest in the world. But, energy intensity, which is energy consumption per unit of GDP, is one of the highest in comparison to other developed and developing countries. For example, it is 3.7 times that of Japan, 1.55 times that of the United States, 1.47 times that of Asia and 1.5 times that of the world average. Thus, there is a huge scope for energy conservation in the country.

RESEARCH METHODOLOGY

Various types of questionnaire have been supplied to different task groups namely industrialists, MIDC officials, MSEB officials and their feedback is obtained. In Amravati city area more than 100 respondents have been contacted and their feedback related to study is analyzed. To have proper picture of the problem, the data is collected in a manner that almost all types of industries are approached and their relationship with different mathematical and statistical models is analyzed.

EXPECTED OUTCOMES

It has been estimated that nearly 30,000 MW could be saved through the implementation of energy conservation programs. Studies and experience have indicated that most of India's megawatt potential can be captured at substantially lower costs compared to
the cost of capacity additions, which currently stands at over US$1 million per MW. However, in spite of good returns and short payback periods for energy efficiency investments, most of India’s end-use energy efficiency potential remains largely untapped.

For successful implementation of energy conservation opportunities, following strategies and techniques can be adopted:

- Top management commitment towards energy conservation
- Well defined programs and responsibilities of every stakeholder
- Availability of sufficient resources for planning and implementation of policies and strategies
- Utilization of latest techniques for operation and maintenance of machines and motors
- Pay back calculations and return on investment savings calculations
- Close interaction between top management, operating staff and maintenance staff

The proposed work is specialty selected considering the acute power shortage in India. Moreover, there is no any professional approach to energy conservation and energy saving opportunities in small and medium scale industries. Hence, this research work is to explore the potential losses in energy motors in industries and provide them consultancy and other professional services so that these industries can save a marginal amount of energy. Organizing specialized training for efficient use of energy and its conservation initiatives and strengthening consultancy services in the field of energy conservation are the novelty contribution to the research area.

CONCLUSIONS

The per capita energy consumption is too low for India as compared to developed countries. It is just 4% of USA and 20% of the world average. The per capita consumption is likely to grow in India with growth in economy thus increasing the energy demand. Energy intensity is energy consumption per unit of GDP. Energy intensity indicates the development stage of the country. India's energy intensity is 3.7 times of Japan, 1.55 times of USA, 1.47 times of Asia and 1.5 times of World average.

The energy sector holds the key in accelerating the economic growth of India. The challenge is especially significant given the Honorable Prime Minister’s cherished goal of reaching 8% growth rates from the current threshold of around 5 to 6%. However, the development of the Indian energy sector has been constrained by capital, technology, environment and security issues. The power sector needs special attention to foster development aspirations. Despite significant growth in terms of technological sophistication and capacity addition, the power sector suffers from financial weakness and supply constraints. Bringing the availability of energy up to the global average will require huge additions to the energy infrastructure in India.
REFERENCES


