International Journal of Mechanical Engineering and Technology (IJMET)
Volume 7, Issue 2, March-April 2016, pp. 282–287, Article ID: IJMET_07_02_030
Available online at
http://www.iaeme.com/IJMET/issues.asp?JType=IJMET&VType=7&IType=2
Journal Impact Factor (2016): 9.2286 (Calculated by GISI) www.jifactor.com
ISSN Print: 0976-6340 and ISSN Online: 0976-6359

TOTAL EFFECTIVE ENERGY MANAGEMENT: THE MUST NEED FOR INDIAN INDUSTRY

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ABSTRACT

Today, in world of highly competitive Manufacturing environment ,India has lot to improve on manufacturing cost to remain in the world market and for business continuity .Apart from raw material and other input cost , the major cost driver is energy cost especially for energy intensive sectors like steel ,aluminum ,fertilizer ,cement ,pulp paper, sugar ,textile ,petrochemicals etc, .Reduction of input energy cost will bring and efficiency improvement and will have many benefits as by-product

Key words: Energy Management, Efficiency, Energy intensive sector, Input Cost Reduction, Business continuity, Efficiency improvement

Cite this Article Sumant Deshpande and Dr Mohan Buke, Total Effective Energy Management: The Must Need For Indian Industry. *International Journal of Mechanical Engineering and Technology*, 7(2), 2016, pp. 282–287.
http://www.iaeme.com/currentissue.asp?JType=IJMET&VType=7&IType=2

1. INTRODUCTION

Energy is one of the most important resources to sustain the industries and our lives as well. At one end ,Indian industry is continuously struggling to become price competitive in world market, on the other hand the industry has a shortfall of power and energy in India .These challenges may create a devastating situation if we remain un acted in this direction. The population of India continued to be running un-breaking, demanding power, energy and creating unemployment as the industrial growth is challenged by many issues. The key to overcome these problem lies with combined efforts in direction to improve manufacturing efficiency by reducing the energy input cost along with creating new power generation plants.

India is clearly lagging in the efforts in direction of energy conservation, even though the government of India has taken many steps in this direction, the implementation is not yet being taken. it is evident from many case studies(discussed later part of this dissertation)that the manufacturing efficiency of India is far below the competitors like Japan ,Korea ,china[1] .An engineer has to adopt a systematic approach towards energy effectiveness ,This project is an effort to make a practical implementable approach to address the energy efficiency and associated issues .

In India, especially in the energy intensive like steel, cement, fertilizer, aluminum industrial sector we are lagging in the manufacturing cost per unit compared to the best of the world[1] . China and other under developed countries like Korea, Japan. We need to become most efficient manufacturer to remain in the competition. This clearly brings us the first bold action and that is energy efficiency in each aspect of manufacturing. At the same time we must not forgot adverse environmental effects of increasing power. Generation and thereby producing more carbon dioxide which in turn invites global warming and climate change. The easiest option remains with energy efficiency again

2. PROPOSED SYSTEM DESCRIPTION

The proposed Total Energy Effective Management (TEEM)consist blend of TQM and TPM principals have a separate long history each, starting from the different field, respectively the quality and maintenance. However the both methods continued development to cover wider fields and now deal with the extensive fields of organizational activities, with a lot of overlapping each other. At present both TQM and TPM aim at solving management issues, and can be used and applied in the various fields of company activities – manufacturing, maintenance, sales, administration, etc. Energy conservation activity can be merged as integral part of it.

3 .DETERMINING ENERGY POLICY

Objectives of an energy policy can be expressed as the desired outcome of a specific policy commitment. Targets have to be realistic, meaningful and achievable under normal operating circumstances. Generally World's Best specific Energy Consumption Data can be Bench Marked Once the policy statement has been issued, sets of objectives and targets need to be drawn up for each part of the organization, to deliver the policy commitments. When you first start preparing a policy, there are four crucial questions you need to ask.

1. What format should your policy documents take?
2. What should they contain?
3. How should this be decided?
4. Who should be involved in making these decisions?

While the relevance of the first two questions may seem obvious, the importance of the last two is often not so evident. If your policy is to be adopted by your organization, as well as implemented effectively, then all four need to be given serious thought. There is little point in possessing: • a well-implemented policy which suffers from being poorly conceived

- A clear and cogent policy which is not adopted because it does not win backing from above
- A well-presented policy, endorsed from above, which is not applied in practice because it does not win sufficient support from the rest of your organization. The time spent in thinking about how to avoid these pitfalls will not be wasted

4. BARRIERS

Barriers

The main barriers to the use of energy management information are:

Managerial

- Energy Management Is Marginalized As A Technical Specialty Line Management Is Inadequate
- There Is Insufficient Interest and Driving Force From Above
- There Is Little Incentive For Departmental Managers And General Staff To save energy

Technical

- Getting accurate data on time is a key problem in almost all industries
- Monitoring and targeting is not integrated with financial accounting output is not reported to either users or senior managers in a form they can readily understand and use.

Getting the most out of your system

The key things you need to keep in mind when developing an effective energy management information system are:

- Decide who will use the information and involve them in making realistic assessment of their needs.
- Keep data input and analysis as simple as possible compatible with achieving your aims.
- Ensure that the output motivates people to use energy efficiently.
- Justify the expense of running the system to senior management.

5. CASE STUDY OF STEEL MANUFACTURING

The specific energy consumption in Indian Steel plants is quite high. It ranges between 25.5 GJ/ tcs to 34.2 GJ/ tcs (ton of crude steel). On an average, the SEC (Specific Energy Consumption) is 30 GJ/ tcs in India [2], which is almost double of the World's best plants. There is variation of specific energy consumption in different steel plants. This is mainly because of different processes, quality of coal, types products produced & energy efficiency measures Iron and steel is largest consumer of energy and power .The primary source is primary coal ,non cloaking coal ,liquid hydrocarbon and electricity .The process of making iron in blast consumes around70 % of energy .

The differences in energy use across various steel plants in India arises from different technology and production processes used, types of products manufactured, quality of raw material used, scale of operation, size of the plant used, and difference in the installation of energy saving systems. However, over the years Indian steel industry has shifted to energy efficient methods of production. The shift from the Blast Furnace (BF) - Oxygen Blown Converters (OBC) route to Direct Reduction (DR) - Electric Furnace (EAF) route would significantly reduce the energy consumption in the Indian steel industry. Casting and shaping of the steel products follow the steelmaking process. Ingot casting is the classical process and is rapidly being replaced by more energy efficient, continuous casting processes (Kim and

Worrell 2002).Fuel switching from coal-based to gas-based direct reduced iron production provides another avenue for reducing energy consumption in this extremely energy intensive sector. Recovery and use of waste energy presents a huge potential for future energy savings in this sector. Adopting energy efficient measures at various stages of production such as improvement in ladle design to reduce heat loss, reduction of air leakage and enhanced insulation of furnace are some other means of saving energy consumption in this sector**.** Steel plays an important role for the development of infrastructure in the growing economy

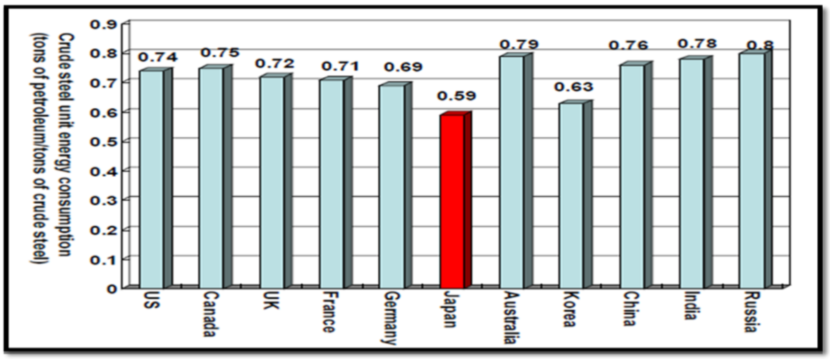


Figure 1 Specific Energy consumption: World Data comparision[3]

6. SHORTAGE AND POTENTIAL OF ENERGY CONSERVATION

The World Bank's study of energy efficiency financing in Brazil, China and India provides a comprehensive estimate of the efficiency potential within the Indian economy. The report drew upon data from 2003 and 2004 and concluded that the energy-efficiency potential in all sectors of the Indian economy could be as high as 50 TWh (terawatt hours) annually. Table shows the aggregate energy savings potential along with the investment potential of India's industrial, commercial, municipal, agricultural and lighting sectors.

In india now the power is the biggest issue .The govt is clearly incapable to supply the demand .No political wish is seen in this matter .The 2011 ended in a shortfall of 11%.GDP loss on this account is high .Foreign investors are worried about power position in india .Also 5 cr capital is required for 1 mw power plant as new .Considering 7%GDP around 2500mw shortfall will be in 2017.

Particulars	Energy (Mu)	Peak (Mw)
Requirement	933,741	136,193
Availability	837,374	118,676
Surplus/shortage	-96,367	-17,517
Surplus/shortage (%)	-10.30	-12.90

Able 1: Power deficit 2011-2012

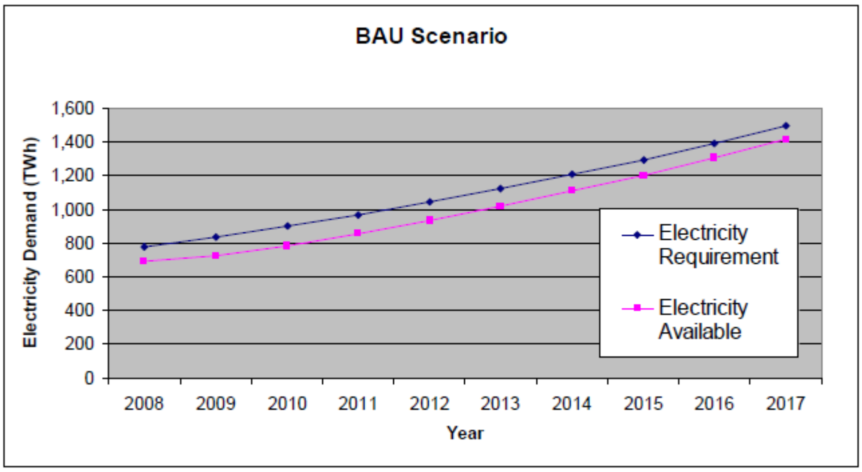
Around 40000 MW power savings are possible [34]. .As we know 1MW new power project the capital required is 50 million INR hence clearly a huge saving in capital which otherwise in absence of energy saving, is possible .This would suffice a add on power requirement for near future

MARKET TYPE	INVESTMENT POTENTIAL (INR CRORE)	ENERGY SAVINGS (BILLION kWh)	ENERGY SAVINGS (MW)
INDUSTRIAL: GENERIC EE* MEASURES	4,200	23.8	34,000
INDUSTRIAL: GENERIC EE MEASURES	7,900	25.2	3,600
COMMERCIAL	660	0.8	290
MUNICIPAL	1,300	3.7	1,688
AGRICULTURE	15,000	60.0	-
LIGHTING	4,000	70.0	-
TOTAL	**33,060**	**183.5**	-

Table 2 potential Energy saving

7. BUSINESS AS USUAL SCENARIO

Figure illustrates the BAU supply scenario in which peak power supply falls short of demand, and Figure 2.12 illustrates the SEE scenario with efficiency improvements so that not only does supply match and, over time, exceed demand but the quantity of supply is less than in the BAU scenario. The net result is that the total electricity supply and hence investment in the SEE scenario is less than in the BAU scenario. The SEE scenario also leads to higher business activity as businesses that face electricity shortages in the BAU scenario have electricity supply that is adequate to increase their output.



8. CONCLUSION

The energy demand will go on increasing The Regular way of increasing capacity by new power project is not a correct option as it requires a large capital and also has pollution effects apart from Global Cost competition There is no other option then to implement the energy conservation in each industry .It will fruit resulting in manufacturing cost reduction and tackle the power shortage and best business scenario to stay with Global competition.

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