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A Role of Energy Efficient System in Textile Industry of India

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ABSTRACT

Textile industry of India alone accountable for 14 percent of the industrial production, 4 percent to the GDP (Gross Domestic Product) and 16 percent to the country's export earnings . According to the report released by Asian Development Bank (ADB) in the year 1998, energy costs in textile production account up to 17 percent of total manufacturing cost. Due to advances in the technology and methods of processing, according to GEDA (Gujarat Energy Development Agency) report in 2010, percentage of the energy share in the production cost has come down to 10.9 percent of the total production cost from 17 percent. This is notable improvement with 35.3 percent reduction in energy cost in production cost. The GEDA Report 2010 also mentioned that there is still potential of saving in energy cost up to 20 to 25 percent. Also, electric energy consumption is expected to continue to rise over time due to increasing automation to reduce the dependency on labor and higher running speeds for machines. This forces Energy cost to consider as a business cost similar to other business costs including raw material and labor, which demands for energy saving. In this review paper author tries to identify the role of energy efficient System in energy saving. Paper also discusses the issues and challenges for energy efficiency technology in textile industry.

KEYWORDS: Energy Efficient System, Energy Saving, Energy Cost, Textile

Introduction:

India is a country where energy in the form of electricity and other are having deficit. Textile industry of India alone accountable for 14 percent of the industrial production, 4 percent to the GDP (Gross Domestic Product) and 16 percent to the country's export earnings . According to the report released by Asian Development Bank (ADB) in the year 1998, energy costs in textile production account up to 17 percent of total manufacturing cost. Due to advances in the technology and methods of processing, according to GEDA (Gujarat Energy Development Agency) report in 2010, percentage of the energy share in the production cost has come down to 10.9 percent of the total production cost from 17 percent. This is notable improvement with 35.3 percent reduction in energy cost in production cost. The GEDA Report 2010 also mentioned that there is still potential of saving in energy cost up to 20 to 25 percent. Also, electric energy consumption is expected to continue to rise over time due to increasing automation to reduce the dependency on labor and higher running speeds for machines. This forces Energy cost to consider as a business cost similar to other business costs including raw material and labor, which demands for energy saving. Energy efficient systems can play a major role for meeting this projected increased demand as well as tap the saving potential and thus contributes for reduces the energy gap of the nation.

Need for Energy Efficiency;

The study of literature states that the most energy-intensive industries and methods by which fuel efficiency can be improved have been identified by G. Anandalingam (1985). He had analyzed the economics of energy conservation using specific case studies drawn from India. It has shown that investing in energy efficiency is more economical Btu per Btu than investing in the enhancement of domestic energy resources. According to P. Balachandra, Darshini Ravindranath, N.H. Ravindranath,(2009) In the recent years, India has emerged as one of the fast growing economies of the world necessitating equally rapid increase in modern energy consumption. With an imminent global climate change threat, India will have difficulties in continuing with this rising energy use levels towards achieving high economic growth. It will have to follow an energy-efficient pathway in attaining this goal. In the current context, an attempt is made to present India's achievements on the energy efficiency front by tracing the evolution of policies and their impacts. The results indicate that India has made substantial progress in improving energy efficiency which is evident from the reductions achieved in energy intensities of GDP to the tune of 88 percent during 1980 to 2007. Similar reductions have been observed both with respect to overall Indian economy and the major sectors of the economy. In terms of energy intensity of GDP, India occupies a relatively high position of nine among the top 30 energy consuming countries of the world.

Scenario of Energy Cost and Potential for Energy Efficiency System

Table 1 shows general shares of cost factors for 20 Tex [i.e. Tex=a measurement unit to measure quality of cotton yarn] combed cotton yarn in several countries. Energy cost is often the third or fourth highest share of total product cost. If we look at distribution of energy cost's portion

Table 1. Share of Manufacturing Cost Factors for 20 Tex Combed Cotton Yarn in Several Countries in 2003 (Koç and Kaplan, 2007)

Cost factors	Brazil	China	India	Italy	Korea	Turkey	USA
Raw material	50%	61%	51%	40%	53%	49%	44%
Waste	7%	11%	7%	6%	8%	8%	6%
Labor	2%	2%	2%	24%	8%	4%	19%
Energy	5%	8%	12%	10%	6%	9%	6%
Auxiliary material	4%	4%	5%	3%	4%	4%	4%
Capital	32%	14%	23%	17%	21%	26%	21%
Total	100%	100%	100%	100%	100%	100%	100%

In total production cost it is found that for 20 tex combed cotton yarn the energy cost is highest in India with 12 % of the production cost and Brazil having lowest energy cost share with 4 % of total production cost . So from above table it is very much clear that if Indian textile has to produce competitively industry required to reduce energy consumption and the potential is reduction of consumption to 8 % if proper energy efficient system and practices are implemented in organization. The achievable potential in energy use reduction in textile manufacturing in India is 20 to 25 % of the existing use based on the research conducted by Gujarat Energy Development Agency in 2009 and is shown below in Table 2.

Table 2: Energy Conservation Potential in Indian Industries

Sr. No.	Industry	Share Of Energy in (%) of Production Cost	Conservation Potential (%)
1	Refineries	1	8-10
2	Sugar	3.4	25-30
3	Ferrous Foundry	10.5	15-20
4	Textile	10.9	20-25
5	Petrochemical	12.7	10-15
6	Chloro-alkali	15	10-15
7	Iron & Steel	15.8	8-10
8	Fertilizers & Pesticides	18.3	10-15
9	Pulp & Paper	22.8	20-25

10	Glass	32.5	15-20
11	Ceramics	33.7	15-20
12	Aluminum	34.2	8-10
13	Cement	34.9	10-15
14	Ferro-alloys	36.5	8-10

Source: Gujarat Energy Development Agency (2009)

Also, the Asian Regional Research Program in Energy, Environment and Climate (ARRPEEC) has been working at assessing the energy saving potential in the Indian textile industry. They assessed average energy use in the textile industry and found that energy consumption varies from 3 to 3.5 kWh of electricity per kilogram of yarn in a modernized spinning mill. In the case of weaving, it varies from 2.9 to 3.1 kWh per meter of fabric. For knitting units, the energy consumption stands at 0.09 to 0.2 kWh per kg of fabric. In the case of dyeing it is 0.04 to 0.15 kWh per kg of fabric. Steam consumption in a fabric dyeing unit may vary from 4 to 9 kg of steam per kg of fabric15 (Swaminathan and Rudramoorthy, 2004).

Measures for improvement in energy efficiency have been adopted by some large-scale mills. However, Small and Medium Industries (SMI), which form the backbone of the Indian economy, continue to use older technologies. The awareness level of energy conservation remains poor among the SMIs. ARRPEEC estimated that SMIs have a potential to save 15 to 20% of their energy consumption.

Issues and Challenges

The effect of energy efficient system's initiatives is reduced due to the technical barriers for energy efficiency and non technical barriers for achieving energy efficiency. The Issues and challenges for energy efficient system or technologies for India are as below;

1. The limitation of technology for energy efficiency, Absence of latest energy efficiency technology
2. Lack of technical skill are the technical barriers for achieving higher energy efficiency,
3. Rigid mind set for adoption of energy efficient practices, ,
4. Attitude, biases of managers or workers for energy efficient system possible perception of threat of losing the job.,
5. Many investments in energy efficiency fail to be made despite their apparent profitability due to some internal hurdles include bounded rationality, principal-agent problems, and moral hazard (Stephen J. De Canio, (1993)).
6. At the level of energy consumers, the barriers to energy-efficiency improvements are due to the ignorant, the poor and/or first-cost-sensitive, the indifferent, the helpless, the uncertain and the inheritors of inefficiency (Amulya K.N. Reddy, (1990)).
7. In the case of end-use equipment manufacturers and providers, barriers arise due to the efficiency-blind and the operating-costs-blind respectively. The barriers at the level of energy-carrier producers and distributors are due to the supply obsessed, the centralization-biased and the supply-monopolists.

Remedies

1. Awareness can improve energy conservation and absence of awareness may lead to low priority to energy conservation by top management and may hamper energy management achievement (Peter G. Sassone, Michael V. Martucci (1984)).
2. Education for energy efficiency scope, its use and practicability among stack holders should be launched to avoid the decision made on bounded rationality and limited information and helps organization to adopt proper fit of energy efficient system and company. Barriers can be overcome by acquiring adequate technical knowledge or technology and is a costly task, while the non technical barriers are mostly the psychological one and required to work with the mind of consumer of energy like removal of biases, change in attitude, increased awareness for improvement in energy efficiency.
3. Training for evaluation of proper energy efficient systems, their selection and adoption of new high efficient systems must be provided to all the concerned stack holders in the company
4. Sometimes even though more energy efficient systems are available but management choose lesser efficient systems due to high cost, in this case proper financial mechanism must be evolved at state level to motivate adoption of high energy efficient system in the organization. So, that bias of first cost can be removed.
5. Attitude, biases of managers or workers for energy efficient system possible perception of threat of loosing the job., these can be removed by creating appropriate conducive environment and right attitude towards energy efficient system designed to attack the wastages or reduction of energy use by changing inefficient pattern of use of energy.
6. There is a large potential for economically justified efficiency improvement in electricity use but obstacles and market imperfections hinder it from being fully realized. Efficiency improvements are mostly group specific and have to be matched with a suitable mix of energy policy instruments realized for private households, Small and medium sized companies (Eberhard Jochem, Edelgard Gruber, (1990)).
7. The three major factors for energy conservation in the textile industry are high capacity utilization, fine tuning of equipment and technology up gradation Energy-efficiency Improvement Options Identified (ADB, 1998; ARRPEEC, 2003) . Based on this for Spinning Unit, Weaving Unit and Wet processing Unit below are the major energy efficiency options to tap the saving potential by technology in textile industry;

Conclusion:

The energy cost is major cost in production cost of textile industry and to be a competent player at global level Indian textile industry required to improve its energy efficiency. These can be done effectively with the help of identifying and installing proper energy efficient system in the industry and one can reduce the energy use up to 25 %. Along with efficiency of technology to make energy efficient system more effective industry also required to deal with mind set of technology purchaser [i.e. manager] as well as user of system[i.e. worker]. For that proper policy formulation and implementation for knowledge management regarding energy efficiency systems and its update as well as training for the same is required. It can be said that energy efficient system has a strategic role to play for Indian textile industry for its international existence as well as growth.

REFERENCES

(1) Ali Hasanbeigi," Energy efficiency Improvement Opportunities for the Textile Industry" Lawrence Barkley National Laboratory, US department of energy, LBNL_3970E (2) Sathaye, J.; Price, L.; de la Rue du Can, S.; Fridley, D., 2005. Assessment of Energy Use and Energy Savings Potential in Selected Industrial Sectors in India. Report No. 57293, Berkeley, CA: Lawrence Berkeley National Laboratory. Available at: http://industrial-energy.lbl.gov/node/130 (3) Palanichamy, C.; Sundar Babu, N., 2005. –Second stage energy conservation experience with a textile industry.—Energy Policy 33 (2005) 603–609 (4) R.Velavan, R.Rudramoorthy,S Balachandran (2009), "CO2 Emission reduction opportunities for smalland medium scale textile sector in India", Journal of Scientific and Industrial Research, Vol:68, July 2009,pp630. (5) Amulya K.N. Reddy,(1990),"Barriers To Improvements In Energy Efficiency—, Second International Workshop on Energy and Global Climate Change, Lawrence Berkeley Laboratory, Berkeley (California) USA, October 4-6, 1990 (6) P. Balachandra, Darshini Ravindranath, N.H. Ravindranath,(2009), " Energy efficiency in India: Assessing the policy regimes and their impacts" Energy Policy, In Press, Corrected Proof, Available online 27 August 2009. (7) R.Rudramoorthy C. P. Sunil Kumar R. Velavan S. Sivasubramaniam, (2000), "Innovative Measures For Energy Management In Tea Industry", © 2000IEEE (8) Asian Development Bank (ADB), 1998, Energy Efficiency and Environmetal Management Options in the Indian Textiles Industry". http://www.beeindia.com/aboutbee/Implementation/Designated%20Consumers/Textile.html. (9) Swaminathan, S. and Rudramoorthy, R., 2004. "New technologies are viable but capital investment could be high" Express Textile 02 September 2004. http://www.expresstextile.com/20040902/lastword01.shtml (10) Barclay, S.; Buckley, C., 2000. Waste Minimization Guide for the Textile Industry. Available at: http://www.c2p2online.com/documents/Wasteminimization-textiles.pdf (11) Energy Conservation Center, Japan (ECCJ), 2007b. Overview of Energy Saving Technologies in Textile Industry. Available at: http://www.aseanenergy.org/download/projects/promeec/2007-2008/industry/eccj/ECCJ_SW03%20Overview%20of%20energy%20saving%20technology_TH.pdf (12) Koç, E.; Kaplan, E., 2007. –An Investigation on Energy Consumption in Yarn Production with Special Reference to Ring Spinning.—FIBRES & TEXTILES in Eastern Europe, 2007, Vol. 15, No. 4 (63). (13) Asian Regional Research Programme in Energy Environment and Climate (ARRPEEC), 2003, Booklet on India from Phase II Dissemination.