Energy: The Sustaining Need of Indian Steel Industries and its Management

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ABSTRACT
Iron and steel industry is the largest consumer of energy among all industrial sectors. Energy costs represent around 20 to 25% of the total input of steel producers and it becomes one of the most important topics of steel producers. Energy management provides the best or good practices to utilize energy sources more effectively, to recover energy where practical and to develop plans for plant energy intensity reduction. While technological progress is needed to achieve some emission reductions, efficiency gains and deployment of existing low-carbon energy account for most of the savings. Ongoing reductions in energy use by means of technical improvements are discussed for iron, steel making and shaping treating.

Keywords---- Energy Management System, Energy efficiency, steel industry

I. INTRODUCTION
Energy conservation in steel industry is crucial for its competitiveness, sustainability and minimization of environmental impacts including greenhouse gas emissions and better resource management. 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, but the implementations has not been taken yet. Studies show that India is far below the competitors like Japan, Korea, and China. India will have to enhance its energy efficiency which means increasing power consumption. This will lead to adverse environmental effect. And we are left with the energy management system to tackle the situation. Energy management efforts, which aim to reduce energy use, are a must as well as a key element for a steel plant’s energy management programme. Management approach and Technical approach are both desirable and necessary energy management system in steel industries. Energy management provides opportunities to decrease the energy intensity per ton of crude steel, to adopt best or good practices for utilization of energy sources more effectively and for recovery of heat and gas energy wherever practical.

II. ENERGY MANAGEMENT SYSTEM

2.1. Technical Approach
Technical approach is mainly based on on energy management information system which includes near real time operation, monitoring consumption and any affecting factors, data acquisition and aggregation from disparate data source, online energy balance. 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. Use of energy can be optimized in following ways:

a.) Making steel process more energy efficient.
b.) Coordinating alternator, boiler and steam header pressure control.
c.) Maximizing energy recovery from output gases like coke oven gas, blast furnace gas, basic oxygen furnace gas etc.
d.) decreasing energy emission intensity.

2.2. Management Approach
Management approach for energy management contributes to more efficient use of available energy sources to enhanced competitiveness and to reducing greenhouse emissions and other related environmental impacts. It improves its energy performance and demonstrate and conformity of the system to the requirements of the standard. The standard is based on Plan-do-Check-Act (PDCA) continual improvement process and integrates energy management into everyday industrial practices.
Use of energy can be optimized in following ways:

a.) Improving energy efficiency of steel production.
b.) daily review of generating capacity and utilization.
c.) Review of measurement, documentation and reporting, design and procurement practices for equipment, systems, process and personnel that contribute to energy performance.

III. ENERGY UTILISATION IN STEEL PRODUCTION

Indian steel industries consume quite high amount of energy which ranges from 25.5 GJ/tcs to 34.2 GJ/tcs (ton of crude steel). Specific Energy Consumption is around 30 GJ/tcs on an average which is almost double of world’s finest steel plant. The variation of specific energy consumption in different steel plants is mainly because of different technology and production processes, quality of coke, the final product manufactured and energy efficiency. Blast furnace consumes 72% of total energy for production of pig iron. Indian steel production routes have shifted from Basic oxygen furnace process route to Direct Reduction – Electric Arc Furnace route and it has led to decrease in energy consumption. Ingot casting has been replaced by more efficient continuous casting process. Many steel industries sill uses ingot casting method for their final product. Convention coal based operations have been replaced by gas based direct reduced iron production which provides another avenue for reducing energy consumption in this extremely energy intensive sector. There can be many energy efficient methods which must be adopted at various stages of production such as optimization of operations and controls including less electricity to power motor drive system (MDSs). MDSs are needed in pumps, fans, forming and machining, handling equipment and compressors and estimated to use 19% of primary energy in making steel products including downstream manufacturing. Material efficiency makes metal management and recycling more efficient and it can be achieved by reducing the use of input and waste, reducing yield losses and by optimizing product designing for recycling.

Specific energy consumption of Indian steel plant can be compared with that of global plants in the below graph:

IV. ENERGY EFFICIENCY POTENTIAL IN INDIA

According to World Bank’s energy efficiency, it has been concluded that the energy efficiency potential in all sectors of the Indian economy could be as high as 50TWh (terawatt hours) annually. Around 42000 MW power savings is possible. 5crore capital is required to generate 1 MW power plant, so we can save a huge amount of capital. The ratio of energy supply to GDP in purchasing power parity terms indicates how much energy is used to produce one unit of economic power. A lower ratio indicates that lesser energy has been used to produce one unit of power. Between 1990 and 2014 the ratio declined 29% globally.

V. GOVERNMENT INITIATIVES

The energy conservation act created the bureau of energy efficiency. BEE have directed industrial energy consumers to designate a certified manager to take charge of energy efficiency activities, to obtain audits by certified auditors at designated intervals. BEE provides the designated agency energy consumption information and action taken based on the recommendations of the auditor.

VI. CONCLUSION

The energy demand will go on increasing population. Installation of new power plant project in not
the efficient solution as it requires a large capital. It will also have pollution effect apart from Global Cost competition. So we are left only with the implementation of Energy conservation and Energy Management System in all industries. The success of energy management system will result in manufacturing cost reduction. It will result in tackling the power shortage and best business scenario to stay with global market.

REFERENCES