Initiatives for Green Manufacturing in India

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Abstract

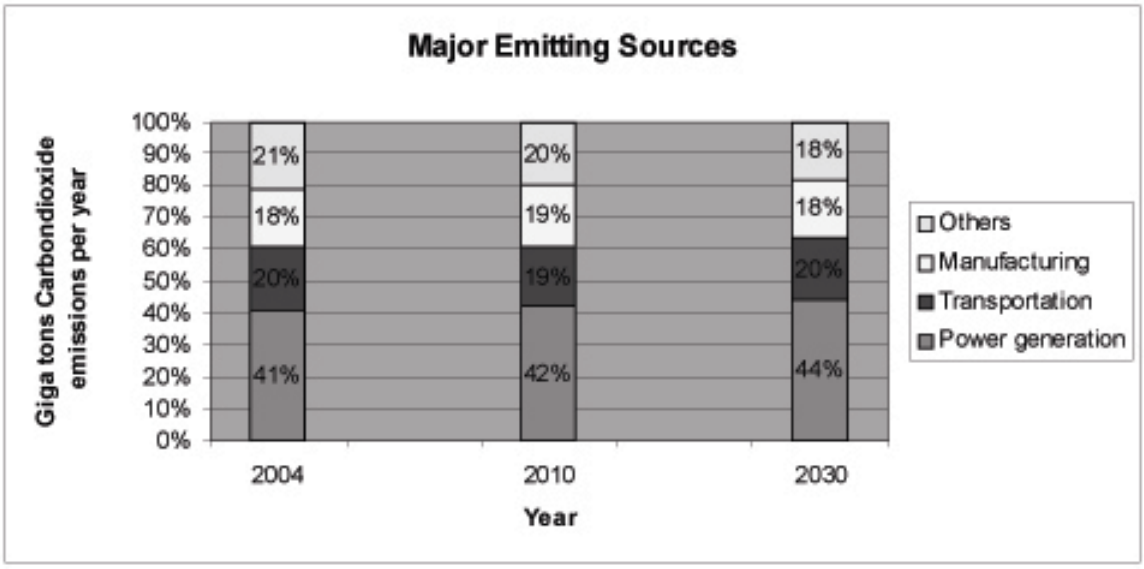
With increasing concern over environmental issues such as global warming arising out of environmental degradation and climate change, Indian companies are pursuing a conscious strategy to align their businesses to serve a larger societal purpose. A number of initiatives are being taken by companies in the large scale and the small and medium scale sector in India in the areas of regulation and reduction of greenhouse gases, discharge of pollutants and emissions, hazardous waste management, and energy conservation to pave the way for a cleaner and greener environment for sustainable development.

Key words: *Green manufacturing, GHG emissions, Carbon Footprint, Dynamic Energy Saver (DES) Technology*

1. Introduction

Traditionally, manufacturers were concerned only about the forward movement of goods from the factory to the market and did not feel responsible for their goods after customer use. Consequently, the majority of used products were incinerated with considerable damage to the environment. Breaking this conventional idea of the unidirectional flow of goods in a manufacturing environment is the closed-loop logistics system brought forward by 'Green manufacturing' or remanufacturing. Green manufacturing not only comprises the forward channel of moving goods from industry to market but also collecting them back from the market and redirecting them to the industry, where these used products are transformed to serviceable ones.

Green manufacturing organizations manufacture products using materials and processes that minimize negative environmental impact, help in the reduction of greenhouse gases(GHGs), conserve energy and natural resources, improve safety for consumers, communities and employees and at the same time increase profitability of their organizations as a whole.



2. The need for green manufacturing The manufacturing sector is one of the three largest sources of carbon dioxide emissions in the world, the other two being the power generation and the transportation sectors. With global concern over environmental issues, various countries have formed stringent laws on disposal of goods and take-back policies are made mandatory for companies. Disposal cost has drastically increased several times. Consumers too demand for a 'green' image of the company. The best option available for a company to overcome such pressures from the government and customers is 'Green manufacturing'. It is not only economically profitable but also ecologically beneficial.

Source: International Energy Agency

There are a number of reasons to pursue green, sustainable manufacturing. First, companies may be compelled to do so by a country's federal, state and local laws. Manufacturers may also be attracted to the cost savings ushered in by the increased efficiencies inherent in sustainable methods. Additionally, organizations may be feeling pressure from consumers as they become more environmentally conscious in their purchasing habits. Businesses are also required to conform to government rules that may come into direct play for manufacturers on hazardous waste management, discharge of pollutants, emissions, the sale of hazardous products, the use of pesticides, and regulation and reduction of greenhouse gases.

3. Green manufacturing around the globe

'Green manufacturing' is successfully operating in countries like the US and Europe. Several companies like Xerox, IBM, and Kodak have adopted it for their products. There are estimated to be in excess of 73000 firms engaged in remanufacturing in USA directly employing over 3,50,000 people with total sales accounting for $ 53 billion per year.

Many advanced nations have come forward and offered incentives to individuals too. During the height of the recessionary period, Government incentives to buy green vehicles in Europe and Japan helped boost business of the automobile sector to some extent. Japan's auto market recovery is said to be partly stimulated by tax cuts or rebates for consumers to scrap their old cars and buy ecological vehicles. The German

government's stimulus involves paying consumers 2,500 euros for scrapping old cars to buy new, environmentally cleaner vehicles. China also plans to subsidize purchases of energy efficient cars and home appliances to replace older models.

Rio Declaration

A significant step toward green manufacturing was taken through the Rio Declaration at the United Nations Conference on Environment and Development, at Rio de Janeiro, Brazil in 1992, which highlighted the need for green manufacturing and designed an action plan to regulate Greenhouse Gas (GHG) emissions which have a direct impact on climate change. Under the Kyoto Protocol(an international agreement linked to the United Nations Framework Convention on Climate Change), signatory countries are required to reduce their combined GHG emissions by 5% from 1990 levels between 2008 and 2012. India signed and ratified the Kyoto Protocol in 2002. Though India is exempted from the framework of the treaty, it is supposed to gain from the treaty in the form of transfer of technology and other investment measures. Today, our country's per capita emissions are only a fraction of those in developed countries. India maintains that the major responsibility to curb the emissions rests with developed countries, which have accumulated emissions over a period of time.

4. Initiatives for green manufacturing taken by some large companies in India:

4.1. Dr. Reddy's Laboratories ltd.: Efforts to reduce Carbon Footprint

Carbon footprint is the total set of greenhouse gas emissions caused by an organization expressed in tons of carbon dioxide. As part of the efforts of Dr. Reddy's Laboratories ltd. to reduce carbon footprint, a Zero Liquid Discharge Plant was commissioned in Biologics development centre of the company. The entire effluent generated is treated and is recycled to be reused as make-up in cooling towers or as feed water in boilers. Most of the distilled solvents are either reused internally thus ensuring resource conservation as well as cost reduction. The company continues to upgrade & install modern equipment like Peristaltic Pumps for safe handling of corrosive, flammable & lachrymatic substances and Dry Screw Vacuum Pumps for handling low boiling solvents to reduce fugitive emissions and personal exposure.

The company makes persistent efforts to find alternative environmental friendly methods to dispose organic residue. During 2008-09, nearly 275 tons of organic residue was sent to a cement industry for use as an auxiliary fuel. It is estimated that almost 40% of the company's organic residue generation can be made available to the cement industry for use as an auxiliary fuel as against incineration.Comprehensive energy audits were conducted in twelve of the company's locations by TERI(an Organization promoting energy efficiency practices for Indian industries) and 182 energy saving projects with saving potential of 67.32 INR million / year were identified. The company is making a detailed assessment of the projects for implementation. Various opportunities to utilize solar energy in the company like solar thermal energy in Canteens, AHU(Air Handling Unit) water heating, solar power for office lighting, UPS(uninterrupted power supply) battery charging, etc are being explored.

4.2. ITC : Aligning business toward sustainable development

ITC is one of India's premier private limited groups with over 97 years of experience and

having a large and established distribution network. Having market capitalization of US $ 15 billion, and an annual turnover of US $ 4.75 billion, it is one of the few Indian Companies to feature in 'Forbes A-list'. The Company, foreseeing the unprecedented threat to sustainable development as a consequence of societal challenges arising out of poverty, environmental degradation and climate change, has vigorously pursued a conscious strategy to align its businesses to serve a larger societal purpose. Unique business models have been crafted to synergistically deliver economic, environmental and social value. The Company continues to sustain its unique position as the only company in the world to be 'carbon positive', 'water positive' and 'solid waste recycling positive'.

ITC's recycling initiative - christened 'Wealth Out of Waste' (WOW) - has been internationally recognized by Bureau of International Recycling. WOW reaches out to schools, institutions and homes through awareness building and source segregation of waste. There are over 100 corporates supporting WOW and more than three lakh households across southern India participating in the initiative. In order to inculcate the habit of source segregation among young children, WOW is spreading the idea of recycling in schools and the immediate plan is to cover at least two lakh school children during the year 2010-11 across southern India. ITC has initiated commemorating 1st July as National Recycling Day to create larger awareness of the importance of recycling.

4.3. Tata Motors' environment-sensitive technologies

Tata Motors has been implementing several environmentally sensitive technologies in its manufacturing processes and uses some of the world's most advanced equipment for emission checking and control. Tata Motors has led the Indian automobile industry's anti-pollution efforts through a series of initiatives in effluent and emission control. The company introduced emission control engines in its vehicles in India before the norm was made statutory. All its products meet required emission standards in the relevant geographies. Modern effluent treatment facilities, soil and water conservation programmes and tree plantation drives at its plant locations contribute to the protection of the environment and the creation of green belts.

The Jamshedpur plant and the car plant at Pune received the Union Ministry of Power's National Energy Conservation Award, for the significant initiatives taken to reduce energy intensity and improve energy efficiency. The Jamshedpur plant won the award for the fourth year in a row. The Commercial Vehicle Business Unit and the Passenger Car Business Unit also received the CII's National Award for excellence in energy management. The Foundry Division at the Pune plant received the Gargi Huttenes Albertus Green Foundry of the Year Award.

4.4. HCL: Efforts toward GHG emissions reduction

By foreseeing the level of industrial growth in the near future, HCL strongly advocates that India needs energy efficiency regulations for future industrial and economic growth. On account of global warming and the acute energy shortage faced by the nation, HCL has committed itself towards improving energy efficiency and reducing carbon footprint. Presently HCL is developing a consolidated plan to account for its Greenhouse Gas emissions across all units and operations under HCL Infosystems. The company strongly supports all the initiatives of the Indian Government in favour of GHG emission reduction. HCL has initiated a process of GHG

accounting throughout its business operations and is pro-actively identifying opportunities for GHG mitigation and reduction in carbon foot print. This process will lead to setting of internal emission reduction targets and also enable structuring of projects under the CDM (Clean Development Mechanism) of the Kyoto Protocol.

Energy conservation at HCL

HCL monitors power consumption daily to detect any abnormal increase in the consumption, practices switching off power consuming equipment when not required,

uses natural light for general lighting during daytime, uses energy efficient metal halide, CFL(compact fluorescent lamps) lamps and electronic ballast for all lights which reduces power consumption and uses spot air conditioning as per requirement instead of continuous, complete air-conditioning. The company has installed hot air exhaust systems in its Reliability Testing area, and under deck insulation in its production hall to reduce the AC requirement. The company has also installed sun films on window glasses to

reduce the heat load. Also, steps are in place to increase the use of solar power at factory locations. HCL Infosystems follows two steps for improving the energy efficiency of its green PC models:

1. Choosing the right hardware for a green PC (e.g. using motherboards with Dynamic Energy Saver (DES) technology), and using more efficient power supplies (ES 4.0 and ES 5.0)

2. Setting the right tuning of the software to support green computing.

These methods have resulted in energy conservation of 20 to 33 % for its green PC models (depending on the model) and 75 % for the monitors.

4.5. Hindustan Unilever Ltd.(HUL): Environment-friendly initiatives

HUL's sustainability agenda seeks to address issues of hygiene, nutrition, enhancement of livelihoods, reduction of greenhouse gases and water footprint. These social, environmental and economic agenda are integrated and well woven into the brands, people and the business of the company.. Rainwater harvesting and soil conservation projects around its factories in Khamgaon, Maharashtra and Silvassa, Dadra & Nagar Haveli, have made a significant impact in these regions.

The company has made substantial progress on the environment front over the past few years. HUL has reduced water usage per tonne by more than 26% in its manufacturing operations since 2004. The Company aims to become water positive across all its operations by 2015. The energy consumption per unit of production since 2004 has also come down by 34%. HUL exceeded the target of 25% reduction in CO2 (Green House gases) in manufacturing operations per tonne of production against a baseline of 2004.

4.6. Dabur India Ltd.: Techniques for energy conservation

Dabur India Limited is India's leading FMCG company with interests in health care, personal care and foods. Dabur which was set up in 1884 has a history of more than 100 years and the company has carved a niche for itself in the field of Ayurvedic medicines.

Dabur has successfully initiated and implemented various energy conservation projects and techniques. Consequently, the energy bill got reduced by 8% on absolute basis

(Rs 33 cr to Rs 31 cr) between 2008-09 and 2009-10. This was despite a 10% volume

increase in manufacturing. In the existing manufacturing units, various initiatives were undertaken to conserve/reduce environmental impact, by adapting to green manufacturing and by adapting to the concept of "Reduce, Reuse and Recycle", such as replacement of boiling pans with the herbal extractors to reduce steam consumption, use of bio-gas generated from ETP(effluent treatment plants) in Boiler and Canteen, and replacing energy inefficient equipments with new energy efficient technologies. For example, old shrink tunnels of 12 KW were replaced by new 5 KW ones, high-pressure jet pump was installed to reduce the water consumption, higher tonnage boiler was replaced by lower tonnage boiler to save fuel, which resulted in saving of 10% of Furnace Oil. Other initiatives include replacement of conventional bulb with CFL(compact fluorescent lamps) to save energy and AC plant Electric panels with obsolete switchgears were modified in-house to save energy.

Apart from the above, many more energy conservation measures were taken by Dabur during the year which resulted in a saving of approximately Rs.205 lakhs and lowered the cost of production. These measures have also led to better pollution control, reduced maintenance time and cost, improved hygienic conditions, consistency in quality and improved productivity.

5. Green manufacturing initiatives in the SME sector in India

Various technological hardships have constantly hindered the growth of the Indian SME sector. Growing awareness of the advantages associated with the adoption of green practices is encouraging majority of SMEs in India to increasingly take to eco-friendly technologies. However, it is not only environmental concerns but also several other factors that are prompting small companies to go green.

Benefits of adopting green technologies

The perception about going green is gradually changing among small businesses which earlier considered it as just a passing fad. Given that adopting environment-friendly modes of production carry real benefits of helping an organisation to reduce overhead costs, increase efficiency and reduce waste, SMEs are willingly adopting green manufacturing technologies. Installing clean and energy-saving equipment can help SMEs cut overheads, reduce fuel consumption for lighting and heating and also enable them to cut down on waste, says Ankur Gupta, Director of Navjyoti, a small-sized power equipment firm in Jaipur through his experience.

An increasing number of small enterprises are going green not only because it is turning

out to be a more cost-effective measure but also to fulfill their corporate social responsibility (CSR) and enhance their business reputation. Companies that make investments in green technologies and support environmental issues can publicize their

efforts and gain a marketing advantage as well as build relationships with other green

companies and clients by sharing their internal green computing practices, says

S. Thakkar, proprietor of K Shah and Brothers, a small-sized engineering firm in Ahmedabad.

Recognizing the importance of the sector and the various constraints faced by the sector, a high level Task Force has been constituted by the Government of India under the chairmanship of the Principal Secretary to the Hon'ble Prime Minister to consider various issues raised by

various MSME associations and draw up an agenda for action.

6. Measures taken by the government to promote green manufacturing

The country organized its 1st Green Manufacturing Summit on the 7th of October, 2010, at New Delhi aiming at promoting green manufacturing in India and creating better awareness about the same in the Indian industry. It also aimed at give an insight of what is happening across the globe in the area of green manufacturing. The summit not only focussed on products which are environment-friendly but also processes and the complete value chain that will be sustainable- in other words 'green'.

The Indian government is already focusing on green technology and green manufacturing as indicative from a recent discussion paper on 'National Manufacturing Policy' prepared by DIPP(Department of Industrial Policy & promotion, Ministry of Commerce & Industry, Government of India).

The Government of India is also considering the setting up of a National Equity Fund to help green field projects and new generation entrepreneurs to tide over difficulties faced in start-up finance. The Indian government has already initiated a number of schemes to encourage sustainability such as the Indian Renewable Energy Development Agency (IREDA) schemes for subsidizing capital for installation of solar water heaters, encouragement of energy audits and management schemes, mandatory use of fly ash-based construction material, groundwater and rain water harvesting and most importantly increased monitoring of air and water pollution.

The government of India has also instituted 'Bharat Stage Emissions Standards to regulate the output of air pollutants by companies in the country. The government has also announced incentives for manufacturing solar cells and panels with the objective of meeting 10 per cent of the country's power needs through renewable energy by 2012.

A long way to go

Still there is a long way to go, both in terms of offering incentives and creating awareness in the field of green manufacturing in India. Incentives and awareness for recycling of materials is a major area which needs attention. Manufacturers also need to meet the challenge of uncertainty relating to timing, quality and quantity of supply of used products. The reverse logistics network is also a complex domain of 'green manufacturing' due to uncertainty both in supply of returns and demand for remanufactured products.

Conclusions

As a scientific field, 'Green manufacturing' is still young. However, the inherent scarcity in natural and environment resources is creating the necessity to make it a field of active research and an efficient business proposition in the years to come. Today, sustainability in areas such as energy, demands increasingly precise elements and components being precision-manufactured. Machine tools that use less energy, materials and space will effect a long-term improvement in operations efficiency. The goal is to allow manufacturers to balance environmental concerns with profitability. Attractive incentives to individuals and industries and measures for clean technologies by the government is probably the only way to foster a vibrant green Indian economy.

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