

Improving Environment through Green Manufacturing

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ABSTRACT

India is the 4th largest crude steel producer of steel in the world and it is the largest producer of sponge iron in the world with the coal based route accounting for 76% of total sponge iron production in the country. The production of steel accounts for approximately 5% of total CO₂ emissions. It is the largest industrial emitter and a prime focus for governments.

Keywords: Green Manufacturing, green house gasses, emissions,

INTRODUCTION

Corporate social responsibility for Iron Industry should contain the duty for environmental protection, resources protection and rational utilization. Some researches show that two advantages of practicing green manufacturing can be presented. On one hand, sustainable development strategy could be guaranteed. On the other hand, considerable economic benefits could be gained for enterprises.

Green Manufacturing

The term “green” manufacturing can be looked at in two ways: the manufacturing of “green” products, particularly those used in renewable energy systems and clean technology equipment of all kinds, and the “greening” of manufacturing—reducing pollution and waste by minimizing natural resource use, recycling and reusing what was considered waste, and reducing emissions.

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One notable aspect of applying this systematic way of viewing and analyzing manufacturing operations and processes has led to the concept of cradle-to-cradle product design and production. Simply put, cradle-to-cradle manufacturing calls for products to be designed and produced with an eye towards minimizing, or even eliminating, resource use, waste, and pollution — factoring in how a product will be disposed of into the manufacturing process. The process goes from initial product design right on through to production, distribution, disposal, and perhaps reuse (or rebirth).

The drive to reduce fossil fuel use, carbon dioxide emissions, and other greenhouse gas emissions has been at the forefront of this movement, though similar initiatives spanning use of water, forest, and mineral resources are also having an impact on the way business is being done across economic and industrial sectors.

The Government of India would like the manufacturing sector to play a bigger role in the country’s economy. The Ministry of Commerce and Industry, in its discussion paper on the growth strategy for

manufacturing, has set a target to increase the sector's contribution to the GDP to 25 percent, from the current level of about 16 percent. While this growth is necessary, the country's environmental concerns need to be mitigated — the manufacturing sector must use energy and resources efficiently, and minimize generation of waste. It is estimated that even if every factory, power plant, car and aeroplane is shut down, the average global temperature would still increase by 0.6°C in this century. 'Green Manufacturing' or sustainable industrial activity is now the need of the hour and no more an empty slogan. Green manufacturing involves transformation of industrial operations in three ways: (1) using Green energy, (2) developing and selling Green products and (3) employing Green processes in business operations. Manufacturing companies that adopt Green practices benefit not only through long-term cost savings, but equally importantly, from brand enhancement with customers, better regulatory traction, greater ability to attract talent and higher investor interest. However, these benefits require a long term commitment and making tradeoffs against short term objectives, as the economics of Green manufacturing is still evolving and not well understood as yet. The motivation for adopting Green has varied across sectors. Some take it up owing to regulatory compulsions (example: power), while others see it as an opportunity to build a stronger brand with consumers (example: retail). Steel manufacturers have adopted Green initiatives to stabilise rising energy costs, while automobile companies have seen it as an opportunity to launch electric and hybrid cars to meet increasingly stringent emission regulations. The impact of Green initiatives also varies by the industry sector. For example, Green initiatives in the power sector have the maximum impact on reducing CO₂ emissions followed by transportation and then the industrial sector. Consumers are increasingly adopting Green products and habits. However, the survey has revealed that there is still a huge gap in consumer awareness that Green companies must strive to bridge.

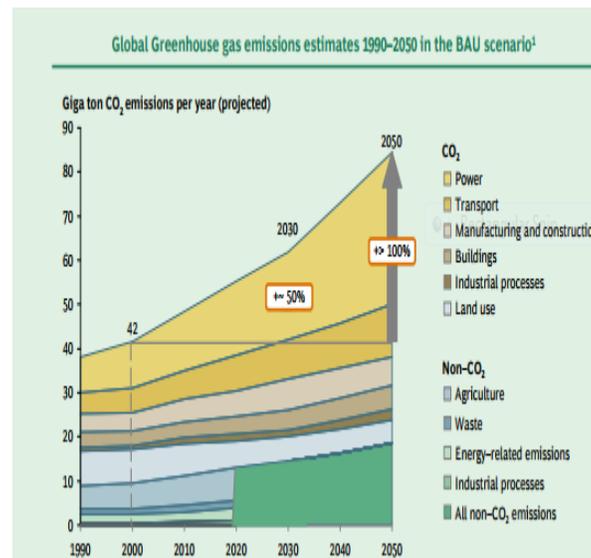


Figure 1: Global greenhouse gas emission estimate 1999-2050

Source: Stern Review

A number of companies have started adopting Green initiatives as an integral part of their operations. These initiatives are driven by five factors: Rising energy and input costs Growing consumer pull for Green products Increasing regulatory pressures as policy makers introduce new and stricter environmental and waste management laws Technological advances which open up new attractive business opportunities. The need to enhance competitive differentiation, particularly for first movers or those who are able to break the compromise between short-term higher costs and numerous benefits (example: brand premium, new customer segments) Green has moved from being perceived as a 'necessary evil' to being seen as 'good business'. Companies that undertake Green initiatives stand to be

advantaged on brand enhancement, political traction and regulatory compliance, greater ability to attract and retain talent, enhanced customer retention and potential cost savings. However, these benefits require a long term commitment and making tradeoffs against short term objectives, as the economics of Green manufacturing are not well understood yet.

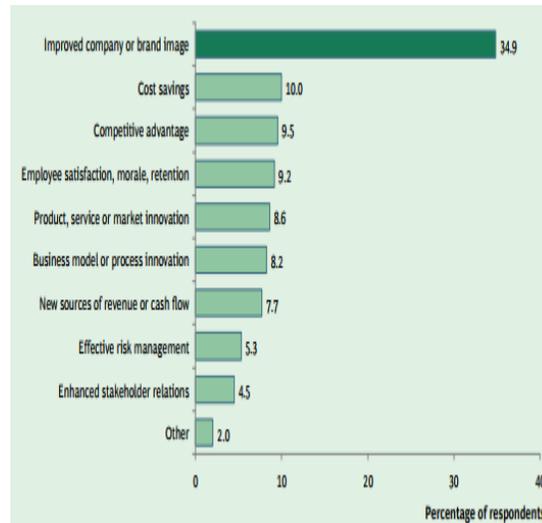


Figure 2 Top concerns driving green manufacturing

Source: The Sustainability initiative 2009 survey, BCG and MIT Sloan Management Review

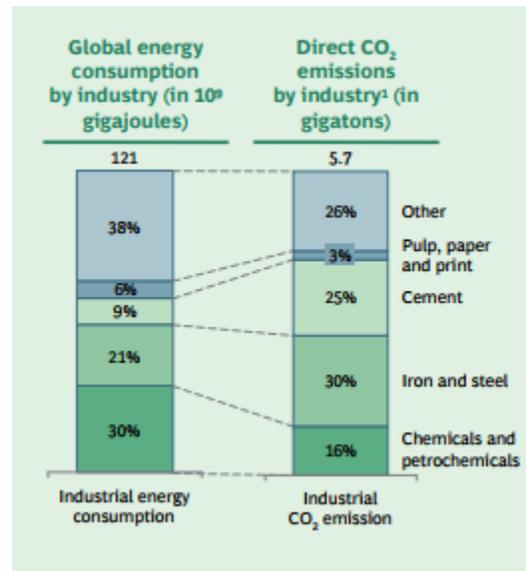


Figure 3 Global CO₂ emissions

Source: International Energy Agency, BCG Analysis

Technologies for Green Manufacturing

Today, there is a plethora of new and emerging technologies that aid in both, making the traditional businesses Greener, as well as creating completely new ones. For example, technologies for reducing GHG can be classified into five broad categories:

- 1) **Carbon sinks** This category consists of emergent technologies related to Carbon Capture and Storage (CCS) being developed for use in power plants that are fired by fossil fuels such as coal. These technologies enable capturing and storing CO₂ in ways such that it does not enter the atmosphere. For example, CO₂ from fossil fuels is trapped and stored in underground wells under intense pressure which keeps it in liquefied form
- 2) **Efficient fuels** This category encompasses a class of technologies that use cleaner fuels for generating power. Examples include biomass, hydro power, Integrated Gas Combined Cycle (IGCC), etc.
- 3) **Consumer Green** This involves using clean and efficient fuels at the user end and solutions covering demand side management. For example, off-grid solar power applications like solar water heating and building insulation are included in this category.
- 4) **Green transportation** Electric vehicles, fuel cells, and bio-diesel are some examples of this category.
- 5) **Industry efficiency** This category refers to the use of Green production methods and technologies in traditional industries such as iron and steel, cement, refining, chemicals, etc. Multiple such technologies are emerging in each of these industries.

The manufacturing companies are Green pioneers. Green manufacturing is core to their competitive strategies. The transformation journey to Green manufacturing has just started. While there are a few early adopters, the industry at large needs to develop comprehensive plans to address all three areas — Green energy, Green products and Green processes.

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