

GreenEdge Sustainability for Manufacturing-An HCL Point of View

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Abstract. Sustainability is an increasingly common theme in the business and trade press, at conferences, and in everyday conversation. This white paper encourages manufacturers to integrate sustainability into their corporate strategy to drive economic value add. It reviews the top environmental issues affecting the manufacturing sector and explains how taking action on sustainability can help mitigate perennial business challenges.

HCL Technologies, (HCL) has designed and developed a comprehensive sustainability framework that caters to the specific needs of manufacturing industries. Our vision is to transform organizations through compliance into economic value add for sustainability. This approach focuses on building carbon footprints of all GHG emissions across the entire manufacturing value chain, energy, waste and water management which will help build better internal control, make reporting easier, accurate and timely, thus, enabling the organizations to achieve their business goals.

Keywords: Sustainability, green, carbon, metrics, abatement, measurement

1. Background

In recent decades, the expansion of economic activity has been accompanied by growing global environmental concerns, such as climate change, energy security and increasing scarcity of resources. In response, manufacturing industries have recently shown more interest in sustainable production and have adopted certain corporate social responsibility (CSR) initiatives. Nevertheless, such efforts fall far short of meeting these pressing challenges. Moreover, improved efficiency in some regions has been offset by increases in consumption and growth in others. The reduction of greenhouse gas (GHG) emissions has been a top priority for governments, and many have adopted long-term frameworks and targets alongside the Kyoto Protocol to tackle global warming.

2. Sustainability As Applied to Manufacturing

The sustainability of a manufacturer is measured by the effect of its operations and its products throughout their lifecycle. "Sustainable manufacturing processes deploy the optimal use of material and human resources for the long term to produce the desired product." This would imply designing products that - consume a minimum of energy in their manufacture and end-use, have minimal carbon footprints in their manufacture and end-use, have prolonged useful lives, and modular parts to extend the useful lives of components, are composed of parts that are recyclable and reusable to the greatest extent possible, consume a minimum of water in their manufacture, are composed of materials that have minimum possible impact on biodiversity, produce minimal, air, water and other pollutants in their manufacture and end-use

IT's role in addressing sustainability objectives is limited to Green IT, or reducing the use of energy in data centers. While the savings can be substantial, the fact is that only 2% of all carbon emissions can be traced to this source. The use of IT lies in addressing the remaining 98% of carbon emissions!

The adoption of more integrated and systematic methods to improve sustainability performance has laid the foundation for new business models or modes of provision which can potentially lead to significant

environmental benefits. Efforts to create closed-loop, circular production systems have particularly focused on revitalizing disposed products into new resources for production, for example by establishing eco-industrial parks where economic and environmental synergies between traditionally unrelated industrial producers can be harnessed.

| | | |
|------------------------|------------|---|
| Pollution Control | Treat | Implementation of non-essential technologies; End-of-pipe solutions |
| Cleaner Production | Prevent | Modify products and production methods; Process optimization; Lower resource input & output; Substitution of materials: non-toxic and renewable |
| Eco-efficiency | Manage | Systematic environmental management; Environmental strategies and monitoring; Environmental management systems |
| Life-cycle thinking | Expand | Extending environmental responsibility; Green supply chain management; Corporate social responsibility |
| Closed-loop production | Revitalize | Restructuring of production methods; Minimising or eliminating virgin materials |
| Industrial ecology | Synergise | Integrate systems of production; Environmental partnerships; Eco-industrial parks |

Fig. 1: The evolution of Sustainable Manufacturing Concepts (Source: Sustainable Manufacturing and Eco-Innovation, OECD)

3. Challenges for Manufacturers to Implement Sustainability Initiatives

Challenges with collecting data and the cost control associated with the economic downturn have emerged as the two most significant obstacles. This is followed closely by issues relating to the choice of methodology to employ, difficulties with product life cycle analysis and a perceived lack of government incentives. Although there are real but resolvable or transient challenges in relation to data collection and cost control during the recession, many of the other major obstacles mentioned are perceived more than actual roadblocks to GHG management specifically or enterprise sustainability generally.

- Penetration into New Markets and Geographies – More and more companies are moving manufacturing operations to low cost destinations and that has an implication in terms of complying to the environmental regulations applicable locally.
- Developing Partnerships and Alliances – Increased partnerships are seen across the mfg value chain from design & dev, mfg, logistics & service. This needs close monitoring and control mechanism to ensure compliance.
- New Revenue Streams – Increase focus is seen in service revenue – Focus is on how to reduce service carbon footprint by doing things like predictive service thru remote equipment monitoring.
- Comply to Regulations – Many regulations have shaped up some global some local, some mandatory and some voluntary
- Cutting Costs by Improving Efficiencies – Reduction in energy, waste and water in mfg process can help in reducing the cost of operation tremendously
- Innovation – Companies are looking at product design to come out with product that
 - consume a minimum of energy, water and waste in their manufacture and end-use
 - have prolonged useful lives, and modular parts to extend the useful lives of components
 - are composed of parts that are recyclable and reusable to the greatest extent possible

4. Sustainability Drivers for Manufacturers

4.1. Corporate Drivers

Businesses define sustainability as ‘Increasing short-term and long-term profitability by holistically managing economic, environmental and social risks and opportunities’. Sustainability and climate change both are emerging to be boardroom topics. Today, there are compelling reasons for businesses to become aware, plan and act on sustainability and climate change.

- **Access to Funds and Markets** – Investors are paying attention to triple bottom line. Buyers/ customers

are looking for sustainability credentials of suppliers in the supply chain.

- **Regulatory Compliance** - The second trend is that the regulatory landscape is evolving fast – there are various mandatory sustainability and carbon reporting regulations being enacted the world over, e.g. EU ETS Carbon Reporting or EPA Mandatory Reporting. This trend is catching up with both developed and developing economies.
- **Competitive Positioning** - The third trend is on impact of sustainability on competitive profile of the company. Suppliers and customers increasingly want to do business with companies with strong sustainability credentials both from a corporate, products and services perspective. Companies who continue to ignore sustainability and carbon management have the risk of losing their competitive advantage.
- **Business Value** - Lastly getting business value thru sustainability initiatives in terms of improving operational efficiency, reducing cost thru waste, water & energy initiatives.

4.2. Manufacturing Drivers

- **Design for Effectiveness** – Design for environment is the systematic consideration during design, of issues associated with environmental safety and health over the product lifecycle. 80% of a products carbon footprint is decided in the design phase itself. DFE can be thought of as the migration of traditional pollution prevention concepts into the development phase of the products before production and use. The goal of DFE is to enable design teams to create eco-efficient products without compromising their cost, quality and schedule constraints.
- **Responsible Supply** – Utilize environment-friendly material, cost reduction benefits from suppliers' improved efficiency.
- **Responsible Manufacturing** – Manufacturers, in their quest to reduce cost and improve efficiency, have been trying to find ways to reduce the demand on critical resources like energy and water. As global demand for energy increases and the impact of carbon-based energy sources continues to increase, managing energy consumption becomes more of a public relations goal. Managing energy consumption is now critical to the bottom line.

These trends directly impact and create a burden on any company's bottom line. Energy Management and sustainability programs are required activities for any company that wishes to stay competitive moving forward. Until now, companies did not have any viable solution to manage IT energy consumption in a manner that allowed automated and centralized control.

5. HCL's Sustainability Framework for Manufacturing Companies

HCL Technologies (HCL) has designed and developed a comprehensive sustainability framework that caters to the specific needs of manufacturing industries. Our vision is to transform organizations through compliance into economic value-add for sustainability. This approach focuses on building carbon footprints of all GHG emissions across the entire manufacturing value chain -- energy, waste and water management -- which will help build better internal control, make reporting easier, accurate and timely, thus, enabling organizations to achieve their business goals.

The HCL Manufacturing Sustainability Framework helps manufacturing organizations to achieve some of these sustainability business objectives through an automation-led approach. The vision and strategy that we follow are:

Vision - To transform organizations through compliance into economic value-add for sustainability.

Mission – Help manufacturing companies to design, manufacture and deliver innovative products and services with reduced environmental impact through effective business processes.

Our solution footprint touches across different functional areas of a manufacturer which are important from sustainability perspective. Our solutions in this space are classified into two categories - **Measurement solutions** (which help in the measurement and reporting of carbon, waste, water, energy) and **abatement**



Fig. 5: HCL's Measurement Solutions Functionality Overview.

6. Business Benefits of Sustainability

The increasing importance of environmental issues to manufacturers poses risks and also offers opportunities. The following section briefly connects the opportunities to the business challenges commonly faced by producers.

6.1. Profitability

- Using less energy in the production process lowers overhead and product costs.
- Using fewer materials also cuts costs.
- Companies that use natural resources wisely and take positive steps to lower their environmental impact are more successful in attracting and retaining loyal customers and staff.
- Manufacturers that take responsibility for their products after point of sale can sometimes create an annuity-based service business.

6.2. Competition

- Sustainability is still a differentiator, but not for long – it is quickly becoming an expected part of doing business in the global economy.
- Customers claim in surveys that they are willing to pay more for a safe, healthy, green product.
- Products that use minimal energy and water during their useful life will cost less to own and operate than less resource-efficient alternatives.

6.3. Compliance and Managing Risk

- Regulatory pressures will continue to increase and expand to cover materials and products whose cumulative environmental impact is deemed unacceptable (such as non-biodegradable plastic).
- Pro-actively reducing the carbon and chemical footprint of a business now can avert or minimize negative regulatory impact later.
- A sustainable approach reduces risks at every stage of business, leaving businesses less exposed to the possibility of material shortages, energy price increases, higher fees for waste disposal and pollution abatement, liability and unwelcome shareholder actions. Products

7. References

- [1] Tomoo Machiba. Sustainable Manufacturing and Eco-Innovation – Synthesis Report. OECD, 2009.