

COMPETITIVE ADVANTAGE THROUGH DESIGN FOR ENVIRONMENT

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New environmental requirements demand greater emphasis on all life cycle phases which need to be considered in product design stage. Environmental pollution, global warming, deteriorating life standards warrant holistic approach toward sustainable development. Design for Environment (DfE) is an innovative practice by which firms may effectively manage environmental impacts so as to mitigate environmental threats as well as create competitive advantages. This paper addresses the issue of how organizations can develop innovative eco-efficient product design strategies.

Key words: DfE, Pollution Management, Source Reduction, Waste By-products

INTRODUCTION

Achieving sustainable development presents an enormous challenge to society. It means that within a few decades society will have to learn to become much more efficient in the use of energy and raw materials. According to environmental experts, within the next thirty years the burden on the environment will have to be reduced to an average of one tenth of the current level. In other words, average eco-efficiency achievements will have to increase by a factor of ten by 2040.

Steps have already been taken within the industry to increase the eco-efficiency of products. Most of these efforts focus on incremental environmental improvements of existing working methods, products and services at an operational level.

POLLUTION MANAGEMENT

A dysfunctional organisation pollutes because its component areas are not connected in a logical manner. The result is production of poor products, under valued services, and untold operational inefficiencies. Highly efficient organisations have little or no waste. They understand their customers' needs and have close links between functions. Poorly organised operations waste energy

and resources. They create both physical and psychological wastes. Different levels, different functions within an organisation need to be on the same wavelength to give produceable and profitable results along with prevention of pollution. Environmental management can provide the most comprehensive yardstick on measuring the organisational efficiency or lack there of.

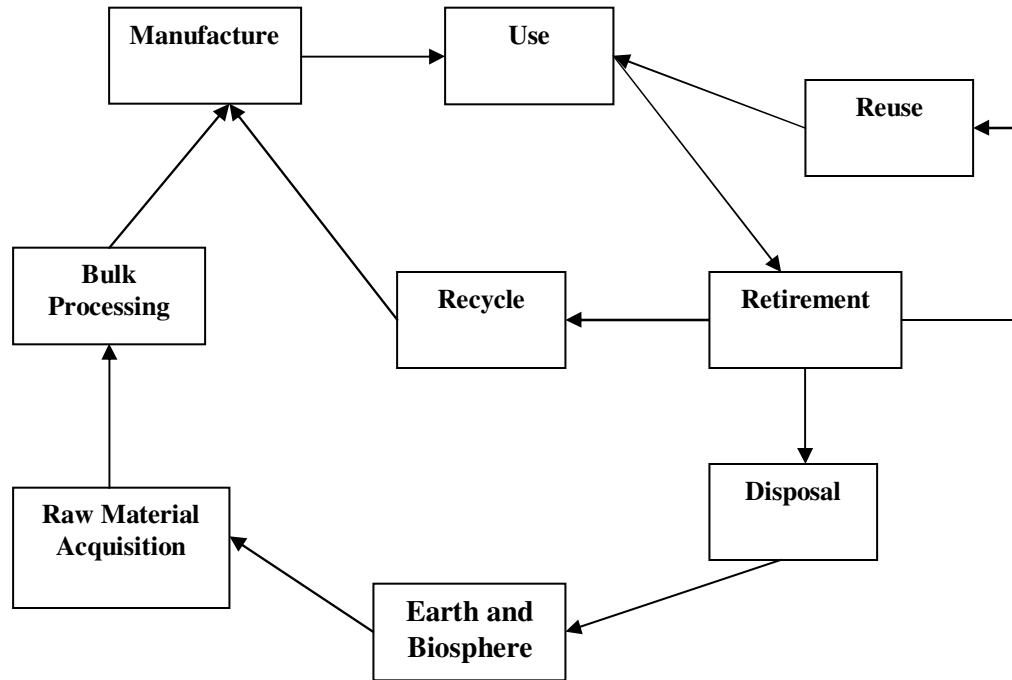
DESIGN for ENVIRONMENT (DfE)

Instead of only focusing on polluting operations, a holistic approach has been developed for management of environment. The first step in this direction is Design for Environment (DfE). It is often called green design, environmentally conscious design, life-cycle design or design for recyclability. Treating environmental concerns as important requirements in the design process began in the 1970s. It was not until the 1990s that it became an important issue in the design community.

DfE provides competitive advantages through

- Reduction of manufacturing costs;
- Reduction of wastes;
- Satisfaction of consumers' environmental demands;
- Lightening of regulatory burden;
- New sources of revenues and profits;
- Creating a culture that encourages change.

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Green Design Life Cycle

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REDUCTION OF MANUFACTURING COSTS

The cost of materials and energy contribute to significant proportion of total manufacturing cost.

DfE lowers the cost of production through

- Weight reduction: minimise amount of material used by avoiding over design;
- Reduction in the amount of potential 'end of life' wastes;
- Selection of materials which can be recycled on a commercial basis (metals, engineering plastics);
- Adapting newer processes which consume less energy;
- Incorporating technology that needs less energy to become operational.

Philips Sound and Vision division has introduced green television which incorporates many environmental benefits like less energy consumption, no use of toxic substances, longer life of products, materials and components which can be recycled easily etc.

REDUCTION OF WASTES

In DfE waste is not scrap, it is an unused resource. There are two approaches for reduction of waste.

- Source reduction: adapt newer processes which generate less waste;
- Convert waste into valuable products.

At Dow Chemical's Free port, Texas plant existing processes were modified to improve the end performance. As a result, the plant was able to eliminate the use of excess ethylene, which was contaminating its hydrogen chloride, there by producing a higher quality hydrochloric acid and improved recovery of other by-products. Savings are estimated at \$2.6 million per year.

How to convert waste into valuable products is well demonstrated by DuPont of USA. The R & D team was able to convert a waste by-product (methylglutaronitrite) from a nylon manufacturing process into a new chemical commodity. What was once a waste by-product is now used for epoxy

coatings for concrete and construction use. It is also highly effective epoxy adhesive used to bond metal to plastic.

The fly ashes produced in coal powered thermal power plants are successfully used with other substances to make bricks and cement for construction works.

SATISFACTION OF CONSUMERS' ENVIRONMENTAL DEMANDS

Increasingly, customers are asking for products and services that do not produce by-products or waste. The reason for this attitude is that many customers, from private to commercial, are faced with the cost and responsibilities of handling and then cleaning up pollutants. As land fill space diminishes, business will have to come up with cleaner products, if they hope to stay in business. The good news is, at least some customers understand they will need to pay more short term cost to reduce long term cost. Customers in our country are willing to pay a premium for goods that are recycled, recyclable or nondamaging to the environment. Many paper products like books, notebooks, cards, envelopes etc. are available from recycled papers.

LIGHTENING OF REGULATORY BURDEN

Unregulated high growth of energy intensive manufacturing plants, exponential growth in automobile usage for personal and public transportation, rampant deforestation, global warming have drastically lowered the quality level of our environment. Many countries have developed stringent environmental management systems like ISO14000. In Germany manufacturers are responsible for all the packaging they create and use. They must collect and recycle it. An organisation implementing DfE has less regulatory burden compared to another organisation which only focuses on pollution control. Since DfE is a holistic approach toward environmental management, therefore each department and every person in an organisation interacts in environment friendly ways.

NEW SOURCES OF REVENUES AND PROFITS

DfE gives unique platform to convert wastes into valuable by-products. Many companies like Dow Chemicals, Du Pont, 3M, Allied Signal, ARCO, Up John, Quad/Graphics etc. are generating additional

revenues from their waste. The organisations like Infosys in India are also earning carbon credits by reducing their energy consumption through innovative approaches.

CREATING A CULTURE THAT ENCOURAGES CHANGE

History speaks about many organisations like Enron, Enfield etc. which failed to change at the right time and disappeared from the business scene. If people leading the organisations develop inertia toward fixed mindsets, then they will face the fate of dinosaurs. DfE encourages people to rethink their attitude toward environmental issues. The two most significant reasons for this change are Cost and Customer.

CONCLUSION

In the future, DfE may evolve to be more fully integrated with both environmental management systems as well as traditional design systems. In this way DfE may provide a bridge for the integration of environmental concerns into the mainstream strategic decision process of the organisations. Increasingly, it will become a critical component of an integrated strategic environmental management system.

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