



World Business Council  
for Sustainable Development



# Eco-efficient Leadership

for Improved Economic  
and Environmental Performance

*Eco-Efficiency is the fundamental concept underlying the activities of the WBCSD. This paper outlines the main elements of this developing concept and provides examples of how it has improved the economic and environmental performance of companies.*

*The information contained in this paper is a composite of the ongoing discussions of the WBCSD Working Group on Eco-Efficiency and the proceedings of three expert meetings held in Europe (Antwerp 1, November 1993, and Antwerp 2, March 1995) and the United States (Washington DC, November 1995). The Working Group was sponsored by Frank Popoff, Chairman, The Dow Chemical Company, and Livio D. DeSimone, Chairman of the Board and Chief Executive Officer, 3M.*

*The list of the WBCSD Working Group on Eco-Efficiency and the list of participants who attended the three workshops are contained in the back pages of this booklet.*

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## Business as part of the solution

The 1992 'Earth Summit' in Rio endorsed eco-efficiency as the way forward for companies individually, and business collectively to contribute towards sustainable development. The concept of eco-efficiency was first coined by the Business Council for Sustainable Development (BCSD) in its report, *Changing Course*, which the UN requested as a business input to the Rio process.

The Rio conference was a watershed event. In the words of UN Secretary-General Boutros Boutros-Ghali, it was "an important milestone in awakening the world to the need for a development process that does not jeopardize future generations".

Over 150 heads of state and government signed off on Agenda 21 and other commitments to promote fundamental political, social, economic and industrial change towards sustainable development. Agenda 21, a far-reaching action program, specifically identified the role of business and challenged business, long seen as the cause of the problem, to reform its practices.

Following Rio, the two major business organizations involved with the environment, the BCSD and the World Industry Council for the Environment (WICE), took the responsibility to become a major part of the solution. With their members, major corporations from around the world, they showed the way, through eco-efficient leadership, by translating the vision of eco-efficiency into action and thus beginning the process of transforming organizations and people.

The World Business Council for Sustainable Development (WBCSD), formed in January 1995 through the merger between the BCSD and WICE, has since put eco-efficiency at the center of its work program.

# What is eco-efficiency?

*Eco-efficiency is a management philosophy. It encourages businesses to become more competitive, more innovative and more environmentally responsible.*

The pursuit of eco-efficiency does not require companies to abandon all their current practices and systems. It calls for them to adapt these in order to achieve higher levels of economic and environmental performance through continuous improvement. This means a significant change from 'business as usual'.

Eco-efficiency is the primary way in which business can contribute to the concept of sustainable development - a concept recognized by more than 80 per cent of the industrialized world's multinationals, according to a UN survey. The notion essentially means forms of development or progress that meet the needs of the present without compromising the ability of future generations to meet their own needs.

Eco-efficiency links the goals of business excellence and environmental excellence, by creating the bridge through which corporate behavior can support sustainable development.

Therefore, it offers high rewards. Governments are changing market frameworks so that both resources and pollution become more expensive. Consumers are demanding higher environmental standards from companies, and those which understand and adapt these trends will be rewarded.

## *Producing more from less*

Although it is a new and still evolving concept, the vision of eco-efficiency is simply to 'produce more from less'. Reducing waste and pollution, and using fewer energy and raw material resources is obviously good for the environment. It is also self-evidently good for business because it cuts companies' costs.

Resource productivity is fundamental in the eco-efficiency approach. The potential for step-by-step improvements in resource productivity, to match the increases in labor productivity in recent years, is greater than often perceived.

Eco-efficiency embraces other concepts, such as 'pollution prevention', 'source reduction', 'waste reduction', 'waste minimization' and 'clean (or cleaner) production'. It captures the idea of *pollution reduction through process change*, as opposed to earlier end-of-pipe approaches to tackling the problem of pollution.

Changing course defined  
eco-efficient companies

**as those which produce ever more useful goods and services - in other words, add value - while continuously reducing their consumption of resources and pollution.**

At the first Antwerp Workshop on Eco-Efficiency, organized by the BCSD in November 1993, participants agreed the following working definition:

*"Eco-efficiency is reached by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the earth's estimated carrying capacity".*

This definition was accepted by subsequent workshops, organized by the WBCSD in Antwerp in March 1995, and Washington D.C. in October 1995.

It shares characteristics with the emerging concept of 'design for environment' (DFE) by including *product design* among the technological options for reducing material and energy intensiveness in production, as well as facilitating reuse through remanufacturing and recycling.

Eco-efficiency also features a *life cycle perspective*, which follows products from the raw material through to final disposal stages.

It is a logical extension of the *Total Quality Management* (TQM) process, which the best companies practice to reduce (sometimes eliminate) process and product failures, and achieve higher quality at lower cost. Eco-efficiency is the means for companies to improve their environmental performance and save money by reducing resource use throughout the process. Increasingly, it will become an important yardstick against which managers and customers will measure a company's performance.

### *Value creation*

A key feature of eco-efficiency is that it harnesses the business concept of creating value and links it with environmental concerns. The goal is to create value for society, and for the company, by doing more with less over a life cycle.

To achieve long-term success, companies must create value for their shareholders and customers. Over time, customers will increasingly demand more than a product that simply performs a function. They will demand that its production, use and disposal is as beneficial to them, and as harmless to the environment as possible. This will further cause companies to think in terms of creating value for society as a whole.

By promoting change towards *sustainable* growth, eco-efficiency enables a company's business to grow in a qualitative way (by adding value), while reducing adverse environmental impact. It also signals a significant shift in focus to concentrate on real customer needs.

This emphasis on creating and adding value is clearly to society's benefit. Further, it matches the changing dynamics of the marketplace. Consumers want higher quality and increased value at lower cost. This trend is likely to develop and companies which report annually on their environmental performance will be rewarded in the marketplace.

### *Some companies are acting already*

Many companies are already adopting eco-efficiency principles and practices. Some examples may include:

- building environmental stewardship and excellence into their corporate philosophy and fabric;
- setting targets for improved performance, and introducing systems to track, measure and enforce those targets;
- taking responsibility for their products throughout their life cycles;
- being innovative in developing new processes and products;
- putting the priority on preventing pollution, rather than paying for clean-up.

Xerox Corporation for instance, has set the goal of waste-free products from waste-free factories, fixing clear targets for reducing solid wastes, air emissions, hazardous wastes, wastewater discharges, lower energy usage and the inclusion of 25 percent post-consumer recycled materials in parts and packaging.

3M has been running its 3P (Pollution Prevention Pays) program since 1975. Over that period, the company has progressively raised its environmental performance goals (the target for 2000 is to reduce process air emissions by 90% and waste by 50% from 1990 figures), met or exceeded them every time through new, cleaner production processes, and has saved more than \$750 million.

These and other companies committed to eco-efficiency are demonstrating it is technically feasible, and brings significant performance

improvements, to cut costs, boost competitiveness, and benefit the bottom line. In other words, eco-efficiency is good business.

The WBCSD has identified  
7 elements of eco-efficiency

1. Reduce the **material** intensity of goods and services
2. Reduce the **energy intensity** of goods and services
3. Reduce **toxic** dispersion
4. Enhance material **recyclability**
5. Maximize sustainable use of **renewable** resources
6. Extend product **durability**
7. Increase the **service intensity** of goods and services

## Why business needs eco-efficiency

*Society expects business to contribute to economic development and social progress, and to reduce environmental impact through improved environmental performance.*

But business must remain successful to create more wealth. Continued economic development is needed to improve quality of life throughout the world. Zero growth is not an option.

Sustainable development is the way to balance further economic growth and social progress while protecting the environment from further damage by using the earth's resources sensibly. Agenda 21 placed on business a clear duty to respond to this challenge.

The environment is not going to disappear as an issue for business. Companies are, and will remain under pressure from *customers, investors, employees, legislators* and, increasingly, from *banks and insurance companies* to be eco-efficient.

### *Anticipating the challenge*

If companies act only when forced to do so under pressure, they will miss important market opportunities.

For example, companies that introduce new technology to improve environmental performance before mandated to do so by regulations will avoid delays and higher costs later. Similarly, firms which give priority to resource productivity, process change and product innovation will achieve significant performance gains at lower cost. Companies are already demonstrating this through voluntary initiatives.

As the world becomes increasingly crowded and acceptable sinks for wastes and pollution more difficult to find, and as valuable resources become scarcer and ever more expensive, companies which manage their resources more efficiently will gain a competitive advantage.

In addition, business will be challenged on the actual value it provides. Consumers will ask whether the function is really needed; and if it is, whether particular products and services are the right answer to that function, or whether there are alternatives.

There will also be huge new business opportunities from meeting the continuing need for added-value products and services.

The pursuit of eco-efficiency allows business to cope successfully with both the immediate and longer-term challenges. Companies cannot afford not to adopt it. The challenge is not in changing course, but in pursuing business as usual.

# How to become eco-efficient

*An eco-efficient company understands and seeks to minimize the environmental impacts of its products throughout their life cycle. The transition to eco-efficiency is a step-by-step process. It will not happen overnight. Like building a jigsaw, it is a matter of fitting the right pieces into the right places.*

Top management should start the process of reform with a *business vision* of eco-efficiency, to set the framework for creating a corporate *culture* of eco-efficiency.

Employees at every level should understand that for their company to become eco-efficient:

- they should contribute to the process by promoting eco-efficiency to suppliers and customers;
- the company should take full responsibility for all of its products;
- the whole life cycle of a product should be considered in all decisions, at all levels;
- willingness to consider new ideas, from whatever source, will add value, and reduce resource input and environmental impact.

The following actions are also fundamental for moving towards eco-efficiency.

## *Reconnaissance*

In identifying risks and opportunities that may affect their business, managers must understand that the earth is finite, its capacity for recovery from excessive resource use limited, and that pressures to modify business behavior will increase. These constraints will remain a fact of business life. Environmental issues must influence production and design. Eco-efficiency criteria should be applied to all business decisions, particularly those concerning product design changes and production. The life cycle implications of changes must be taken into account. Key environmental impacts such as material flows and energy use must be especially assessed.

## Four success factors for eco-efficiency

### **1. An emphasis on customer service**

By focusing on what services to provide, not just what products to supply, companies open up opportunities to deliver less eco-intensive, higher-value applications.

Dow Chemical's Eco-Fitness Analysis (EFA) profiles each system or product according to energy and material intensity, resource conservation, eco-toxicity, and durability and functionality, helping its businesses develop and market environmentally-superior products, while increasing their value.

### **2. An emphasis on quality of life**

Companies' performance and success will be judged increasingly on how their products or services meet real needs, not perceived wants.

### **3. A life cycle view**

Companies will add value from their activities by monitoring and assessing their impact at every stage. A life cycle approach can lead to decisions to redesign processes and products to minimize impact, maximize efficiency and measure the value added.

### **4. The eco-capacity imperative**

Eco-efficiency's 'bottom line' is to enable business to add ever more value within the realities of the earth's carrying capacity (for example, its ability to absorb more wastes), through a continuous process of improvement, reflecting the philosophy 'we can continually do more with less'.

Monsanto has established numerical goals on toxic emissions which include working towards zero effect through continuous improvement, finding new technologies, using renewable resources at a regenerable rate and replenishing non-renewable resources, and allowing the environment to assimilate releases.



### *Management tools*

There are a number of management tools to help identify and select opportunities:

- formal risk and environmental assessments;
- life cycle approach (LC) to products;
- procedural standards such as EMAS and ISO 14000;
- environmental accounts/audits;
- financial accounting methods that reflect 'hidden' costs and potential benefits;
- formal eco-efficiency assessments;
- environmental reporting and benchmarking to provide feedback to management.

### *R&D for eco-efficiency*

Companies should focus harder on reducing the material intensity of goods and services. R&D directed to process change and product improvement can lead to higher-value products and reduced environmental impacts.

### *Design for environment*

Designers, mostly concerned with product performance and aesthetics, must take into account the effect of design details on energy/materials requirements for manufacturing, use and secondary use (repairability, remanufacturability and recyclability).

Sony is making more environmentally-acceptable TV sets by using recyclable materials, reducing the type and variety of plastics, making the sets lighter, using halogen-free flame retardant materials, and eliminating hazardous substances during production.

### *Production and eco-efficiency*

Companies should pay closer attention to energy use and emissions. Major improvements in energy efficiency can often be achieved at little or no cost, even with net savings, through the use of targeted programs.

### *Purchasing and marketing for eco-efficiency*

By focusing on increased value, companies can influence customer attitudes. Adopting specific procurement/purchasing policies requiring suppliers to apply sustainable development practices to their products and services, will avoid companies buying-in waste and subsequent pollution problems.

B&Q, Europe's biggest-do-it-yourself supplier, insists on knowing how the products it sells are manufactured and where they come from, and grades its suppliers on their production methods and resource use.

### *After sales service*

Most companies recognize their responsibility - and potential liability - does not end with a sale. Some use after sales service as a means of adding extra value.

The growing trend towards rental or leasing, rather than buying, will almost certainly accelerate, and is clearly consistent with increasing eco-efficiency.

### *Closing the loop*

For some types of products, an eco-efficient company will be able to design the product, make it, own it through its lifetime and take it back for remanufacturing, recycling or disposal. In effect, the company sells a service, not a product.

This end point is still far enough away that many companies do not realize it is coming, but it is.

In some countries, it is recognized that product liability law reform must occur in order to enable companies to adopt the policy and practice of extended product responsibility.

## Dow Chemical has developed a 6-point eco-efficiency compass

### **1. Dematerialize**

Evaluate the total of raw materials, fuels and utilities used in the system during the life cycle to deliver the desired product function. The opportunity is to significantly reduce these 'mass burdens' and dematerialize the way the system provides benefits to the market chain.

### **2. Increase energy efficiency**

This applies both to the energy needed to assemble and use raw materials and the energy used or saved during the consumption and disposal stages. The opportunity is to identify the parts of the system and the life cycle which use the highest energy intensity, and redesign the product or its use to make significant energy reductions.

### **3. Eliminate negative environmental impacts**

Any toxic elements introduced at one end of the system will move through in various forms, causing negative environmental and health impacts in those cases where exposure is at, or accumulates to a level beyond that generally considered to cause risk. The opportunity is to significantly reduce and control their dispersal.

### **4. Close the loop**

Material utilization is improved by reuse in the same or another system. Designing for recyclability is important: recycling effectively and efficiently is even more important. Recycling is unproductive when the amount of energy, materials and pollution used in collecting, preparing and processing the recycle exceeds the impact of the system which delivers the primary materials.

Through Safechem, a Dow affiliated environmental services company, all of the used coolants from cars serviced at BMW and Peugeot garages in Germany are collected, recycled and ultimately resold. This experimental closed-loop system has proved to be an environmental and economic success. Safechem recovers approximately 1000 tonnes of spent coolants each year and expects a steady increase in volume.

### **5. Borrow from natural cycles**

Another opportunity is to design the system as part of a larger natural cycle. Materials are borrowed from and returned to nature without negatively affecting the balance of the cycle. Renewable materials could have advantages from a total cradle-to-grave perspective.

### **6. Extend service, enhance function**

Extending the durability and service life of any part of a system, especially at the usage phase, can improve eco-efficiency.

# Accelerating eco-efficiency: the framework conditions

*Eco-efficiency starts in the workplace, and it is now up to business to begin to change. However, other players, notably governments, have a key role in accelerating this process.*

The existing framework conditions in which business operates do not encourage the wiser use of resources, a shift from labor to resource productivity, or the search for new, innovative and eco-efficient methods of production, products or services. Indeed, some as agricultural and energy subsidies encourage the misuse of resources, while others penalize eco-efficiency initiatives.

## *Getting the price right*

*Changing Course* argued that “the prices of goods and services must increasingly recognize and reflect the environmental costs of their production, use, recycling and disposal”.

This means paying for the use of environmental resources, both as a source of raw materials and as a sink for wastes. At Rio, governments committed themselves to action to internalize environmental costs.

Those costs need to be internalized into business, so that business can move them into the marketplace by applying them to processes and products.

Companies should identify existing environmental costs and allocate them to processes and products, as well as anticipate and plan for future environmental costs through a life cycle approach.

## *Economic instruments*

Market-based instruments are more cost-effective than command-and-control regulation, give companies more flexibility over how they achieve resource productivity and prevent pollution, and

provide continuous incentive to producers to conserve resources, prevent pollution and step up technological and organizational innovation.

They are also the most direct means of changing producer and consumer behavior towards more efficient resource use. Paying for environmental resources will make businesses and consumers use them more carefully.

Companies will look for ways to cut the costs associated with their use, and design new systems, processes and products to reduce environmental impacts and add value for consumers.

It is essential however that economic instruments are revenue neutral, and that their tax-raising effects are offset by compensating tax reductions elsewhere.

An increased use of economic instruments will lead to a review of the tax system, to consider a reduction of taxes on labor combined with the introduction of taxes on raw materials and fuel.

Governments should also adopt eco-efficient procurement policies, and make their decisions on benefit-cost calculations that include environmental benefits and costs. Support for small and medium-sized enterprises (SMEs) with eco-efficient new products and services could be helpful too.

## *The financial markets*

The role and involvement of the financial markets will become increasingly important to accelerating eco-efficiency in business. Investors and lenders could encourage more firms to adopt more sustainable practices.

At the moment however, they remain largely indifferent to companies' efforts, mainly because there are few indicators to enable them to take environmental performance and other considerations into account when determining a company's financial worth.

The WBCSD has a Working Group examining the whole issue of Environmental Shareholder Value (ESV), to demonstrate the close link between the financial markets and eco-efficiency.

### *Public awareness*

Society can play a key part in moving business faster towards eco-efficiency. Sustainable consumption and sustainable production are sides

of the same coin. An informed public can make informed choices about eco-efficient products and services, contributing to change through pressure in the marketplace.

Business can help move the needle of public awareness, directly through the education process and by working with environmental NGOs. Cooperation between business and NGOs is a more productive way forward than confrontation.

## The new competitive reality

*Eco-efficiency is the business norm for many companies, who are showing it works for them, and can work for every company in every business sector.*

Constantly adding value through increasing *service intensity*, reducing *material* and *energy intensity*, extending *product durability*, enhancing *materials recyclability* and maximizing *renewable resources* is sound business sense, as well as good for the environment.

The success of the post-Rio agenda is critical to industry's own future, as well as society's. However, long-term global sustainability will demand major reductions in resource consumption, pollution and society's claim on the environment.

The Factor 10 Club, a group of leading international figures in environment and development,

says that meeting the Agenda 21 goals will require a *tenfold increase* in the average resource productivity of the industrialized countries, through a process of industrial dematerialization based on:

- a life cycle approach;
- changes in the way products are made, packaged, transported, sold, used, reused, recycled and disposed of;
- the development of entirely new products and services.

This is achievable if business continually improves its economic and environmental performance, to produce more from less, and add ever-increasing value. Companies who manage this will also gain new opportunities, rewards and market advantages.

The challenge is unavoidable, and so is this new competitive reality.

**"D**uring the next quarter century, the most significant net contribution to a greener world will be made by industry. The green economies and lifestyles of the 21st century can only be actualized by industrial corporations.

Industry has a next-century vision of integrated environmental performance. Not every company is there yet, but most are trying. Those that aren't trying won't be a problem simply because they won't be around long term."

*Edgar S. Woolard, Jr., Chairman, DuPont*

## WBCSD Working Group members

### Chairmen

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