



# eco-efficiency

creating more value with less impact





# foreword

In 1991, we in the then Business Council for Sustainable Development were looking for a single concept, perhaps a single word, to sum up the business end of sustainable development.

Finding no such concept on the lexicographer's shelf, we decided we would have to launch an expression. After a contest and much agonizing, we came up with *eco-efficiency*. In simplest terms, it means creating more goods and services with ever less use of resources, waste and pollution.

After only a decade, eco-efficiency is everywhere. I just now did a web search on one search engine, which offered me 6,149 more web sites about eco-efficiency. Today, universities teach it; consulting companies charge you to tell you how to do it; organizations like UNEP and the OECD hold conferences about it. This shows that the world very much needs the concept of eco-efficiency. And I am pleased that it is an open, expanding, evolving concept.

Also, it is right and satisfactory that much of the opening up of the concept has been at the hands of the World Business Council for Sustainable Development (WBCSD). This report, in an admirably few pages (in other words extremely eco-efficiently) wraps up a decade of Council work on the topic. It shows how what began as a concept has become a sharp tool for better business performance. It is the *eco-efficiency metrics* approach – putting numbers on the concept – that makes it useful to business. In a year-long pilot test of eco-efficiency indicators in 23 companies, it has passed the acid test of business practicality.

Now eco-efficiency needs more government attention. The concept is so obvious you would think every company in the world would seize it and milk it. Use less of the things you must buy – like resources – and produce less of the things you may get fined or sued for – like pollution – and you must make more money! Correct? Not always. Not when those resources are perversely subsidized or that pollution goes unpunished. Thus governments need to encourage companies towards eco-efficiency – largely by making it even more profitable.

Those of us who have developed the concept and developed and tested its metrics and found it profitable now have a great opportunity to push governments to clamp down harder on waste and pollution and to cut harmful subsidies. This will make any sloppy competitors we may have less competitive. The concept of 'win-win' may be trite, but it still feels good when it happens to you.



Stephan Schmidheiny  
Chairman, Anova AG  
Vice-chairman, WBCSD

August 2000

# introduction

With this publication, the WBCSD is releasing a new state-of-the-art declaration on eco-efficiency. It summarizes the evolution of the concept and presents eco-efficiency's achievements, both inside and outside business. Together with our recently released report, *Measuring Eco-efficiency*, this paper supersedes earlier WBCSD literature on eco-efficiency.

Already, the member companies of the WBCSD are applying the eco-efficiency concept in their business and many of the national BCSDs are running eco-efficiency programs for their constituencies. We hope this report will help spread and promote the eco-efficiency brand even more widely.

People from many different countries and business sectors have contributed to the ideas you will find in these pages. Continuous discussions, the sharing of learning, and the reporting of case histories all help to advance our understanding on eco-efficiency. Two WBCSD programs – Eco-efficiency Metrics & Reporting and the European Eco-efficiency Initiative (EEEI) – have been especially influential in shaping our thinking over the last few years.

The EEEI is a program which the WBCSD conducts jointly with European Partners for the Environment (EPE) in Brussels. EEEI became possible through financial support offered by Directorate General Enterprise of the European Commission and also benefited from participation and substantial input from more than 20 EEEI partner organizations across Europe. They, along with the many other participants at our various events and workshops, have contributed to the development of our thinking on eco-efficiency.

A team of champions from our member companies and from our local BCSDs and regional network partners reviewed the concept and drafts for this report. We should like to thank them for their feedback and suggestions for improvement.

Finally my thanks go to Markus Lehni, who conceptualized and wrote this report. For the last four years, he has been the brand manager for eco-efficiency at the WBCSD and has led our work programs on Eco-efficiency Metrics & Reporting, the EEEI, and Sustainability through the Market, as well as several other of the WBCSD's activities related to environmental management issues, such as Sustainability Reporting and Stakeholder Dialogue. He has actively disseminated our messages on eco-efficiency to many constituencies and made it possible that a growing number of companies have now adopted eco-efficiency and also that it is becoming seen as a valuable policy tool in many parts of the globe. We wish him well as he leaves the WBCSD.

I hope that you enjoy reading this report and that you are able to make good use of the ideas and suggestions it contains, so helping to bring about further much-needed progress toward sustainable development.



Björn Stigson  
President, WBCSD

October 2000

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# executive summary

## KEY ELEMENTS OF THE ECO-EFFICIENCY CONCEPT

Eco-efficiency is a management philosophy which encourages business to search for environmental improvements that yield parallel economic benefits. It focuses on business opportunities and allows companies to become more environmentally responsible and more profitable. It fosters innovation and therefore growth and competitiveness.

As defined by the WBCSD: Eco-efficiency is achieved 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. In short, it is concerned with creating more value with less impact.

It is important to understand that eco-efficiency is not limited simply to making incremental efficiency improvements in existing practices and habits. That is much too narrow a view. On the contrary, eco-efficiency should stimulate creativity and innovation in the search for

new ways of doing things. Nor is eco-efficiency limited to areas within a company's boundaries, such as in manufacturing and plant management. It is also valid for activities upstream and downstream of a manufacturer's plant and involves the supply and product value-chains. Consequently, it can be a great challenge to development engineers, purchasers, product portfolio managers, marketing specialists and even finance and control. Eco-efficiency opportunities can emerge at any point in the entire life-cycle of a product.

However, eco-efficiency is not sufficient by itself because it integrates only two of sustainability's three elements, economics and ecology, while leaving the third, social progress, outside its embrace. The role of business is to satisfy human needs and it expects to be rewarded with profits for doing so. But responsible businesses also aim to improve quality of life and this is very much part of what it means to become more sustainable. The challenge is to do this without increasing the overall use of resources and having an adverse effect on the environment.

## THE BUSINESS AGENDA FOR ECO-EFFICIENCY

Eco-efficiency is primarily a business concept because it talks the language of business. Put simply, it says that becoming more efficient makes good business sense. Eco-efficiency calls for businesses to achieve more value from lower inputs of materials and energy and with reduced emissions. It applies throughout a company – to marketing and product development as much as to manufacturing or distribution. It is concerned with three broad objectives:

- ➊ Reducing the consumption of resources: This includes minimizing the use of energy, materials, water and land, enhancing recyclability and product durability, and closing material loops.
- ➋ Reducing the impact on nature: This includes minimizing air emissions, water discharges, waste disposal and the dispersion of toxic substances, as well as fostering the sustainable use of renewable resources.
- ➌ Increasing product or service value: This means providing more benefits to customers through product functionality, flexibility and modularity, providing additional services and focusing on selling the functional needs that customers actually want. This raises the possibility of the customer receiving the same functional need with fewer materials and less resources.

Many companies have a fourth objective, namely implementing an Environmental or Sustainability Management System that is integrated with their existing business management systems in order to drive the eco-efficiency approach. An Environmental Management System (EMS) is a means of ensuring that all the risks and opportunities relating to sustainability are properly identified and efficiently managed.

Implementing eco-efficiency in a company's business processes is first and foremost about navigating for opportunities. Such opportunities for more eco-efficiency can be found in four areas:

First, companies can re-engineer their processes to reduce the consumption of resources, reduce pollution and avoid risks, while at the same time saving costs. Second, by cooperating with other companies, many businesses have found creative ways to re-valorize their by-products. In striving for zero-waste or 100%-product targets, they have found that the so-called waste from their processes can have value for another company. Thirdly, companies can become more eco-efficient by re-designing their products. Fourth, some innovative companies not only re-design a product, they find new ways of meeting customer needs. They work with customers or other stakeholder groups to re-think their markets and re-shape demand and supply completely. Too many customers needs today are met in a material- and energy-intensive way. There are different, and better, ways of satisfying those needs.

Eco-efficiency works not just in large transnational companies, as many of the WBCSD member companies are, but also in small and medium-size enterprises (SMEs). Likewise, it is as applicable in developing countries and emerging economies as it is in the industrialized nations.

The five examples described in this report illustrate the three dimensions of eco-efficiency objectives and the four strands of eco-efficient opportunities. They also show the effect of management systems that support eco-efficient improvements.

The WBCSD has also explored ways of measuring and reporting the overall eco-efficiency performance of a company using eco-efficiency ratios. Ways of placing a measuring rod against eco-efficiency are detailed in a separate WBCSD report, *Measuring Eco-efficiency*, in which the WBCSD puts forward a framework which can be used to measure progress toward economic and environmental sustainability. The framework is flexible enough to be widely applied and easily interpreted across the business spectrum while providing a common set of definitions, principles and indicators.

## THE POLITICAL AGENDA FOR ECO-EFFICIENCY

Business cannot achieve eco-efficiency alone. Progress requires going beyond the internal actions of individual companies; it requires close cooperation among the stakeholders. It needs society to create an enabling framework which allows individual companies and whole markets to become more eco-efficient. Governments have an important role to play in creating these conditions.

Already, several countries and regions have enacted national and regional action plans aimed at fostering a more eco-efficient and sustainable society. Arriving at a broad consensus on headline indicators for eco-efficiency and setting appropriate targets are among the crucial elements that will help the transition to an eco-efficient economy.

Governments can implement a policy which fosters economic growth and favors a reduction in resource use and the avoidance of pollution with incentives for eco-innovation. Such policy measures to leverage business initiatives for more eco-efficiency can include elements such as:

Identifying and eliminating perverse subsidies

Internalizing environmental costs

Shifting tax from labor and profit to resource use and pollution

Developing and implementing economic instruments

Promoting voluntary initiatives and negotiated agreements

The WBCSD, in co-operation with various multi-stakeholder organizations and governmental bodies, is implementing several projects to develop eco-efficiency further as a policy concept.

With European Partners for the Environment (EPE), supported from the European Commission Directorate General for Enterprises, the WBCSD launched the European Eco-efficiency Initiative (EEEI) in 1998. In its first two years, the initiative has promoted the understanding and use of eco-efficiency throughout Europe and supported and facilitated national initiatives, as well as the creation of eco-efficiency action plans. There is a focus made on Central and Eastern European Countries (CEEC), several of which are in the process of accession to the European Union.

The WBCSD also has a long tradition of cooperating with business organizations in developing countries and emerging economies – in particular through its Regional Network of 24 national BCSDs and partner organizations with a total membership of over 800 companies in Latin America, Southern Africa, East and Southeast Asia and Eastern Europe.

Governments can quantify eco-efficiency as well and they can use it to drive the sustainability performance of the entire economy. Factors 4 and 10 are eco-efficiency targets for the economy. By calling for increased welfare and reduced use of nature and for environmental space to be more equally distributed, one is really setting macro-economic eco-efficiency objectives. Companies can, and must, contribute to attaining these objectives but they cannot do so alone.

The European Environment Agency (EEA) has adopted eco-efficiency ratio indicators for countries, asking for an absolute and relative de-linking of growth of welfare from the use of nature. It intends to measure and compare economic sectors and countries with each other according to their eco-efficiency status and improvements. The agency has announced a set of Headline Indicators with the intention of developing a data basis for European countries and economic sectors. Both the EEA and the WBCSD are working toward matching headline indicators for nations and generally applicable indicators for corporate reporting.

Governments can use various incentives to promote action toward progress and support initiatives to advance eco-efficiency – rewarding the leading-edge companies and putting pressure on the laggards. Incentives to reward eco-efficiency will guide innovation in the right direction and create new products and services. Eco-efficiency leads to more value from fewer resources, through redesign of products and services and through new solutions. The more successful companies will be those that set themselves tough environmental targets and meet them with new technologies and practices.

## THE WAY FORWARD TO AN ECO-EFFICIENT ECONOMY

Eco-efficiency can serve companies as a means for developing and successfully implementing a business strategy toward sustainability. Such a strategy will have a strong focus on technological and social innovation, accountability and transparency, as well as on cooperation with other parts of society with a view to achieving the set objectives.

Similar to the way it serves the private sector, eco-efficiency can support governments in deriving a national strategy for sustainable development. Establishing framework conditions which foster innovation and transparency and which allow sharing responsibility among stakeholders will amplify eco-efficiency for the entire economy and deliver progress toward sustainability. The economy, together with the quality of life, will continue to grow, while the use of resources and pollution will go down.

All parts of society share the responsibility for progress. Business has an important part to play and accepts the challenge. But similarly there is also a need for governments and civil society to play their part. In this report, the WBCSD proposes 12 action points which, if adopted by the various stakeholder groups, will help move the world forward toward an eco-efficient future.



# embracing eco-efficiency

## A visionary idea is becoming mainstream

Eco-efficiency is a management philosophy that encourages business to search for environmental improvements which yield parallel economic benefits. It focuses on business opportunities and allows companies to become more environmentally responsible *and* more profitable. It fosters innovation and therefore growth and competitiveness.

Eco-efficiency is also a goal for society at large. It is recommended by intergovernmental organizations and adopted by various countries as their most promising policy concept for moving toward sustainable development.

In this chapter, we explain how the WBCSD and other opinion leaders have shaped eco-efficiency, how it fits into the broader context, and how it relates to other approaches which work for progress toward sustainability.

Companies adopting eco-efficiency are most often among the leaders in their sector. As their success inevitably and constantly provokes many others to follow, eco-efficiency will finally grow into the mainstream.

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FOUNDER OF THE WBCSD ECO-EFFICIENCY  
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## WHAT DOES ECO-EFFICIENCY MEAN?

Before the 1992 Earth Summit in Rio de Janeiro, business was asked to develop its contribution, both in word and deed, to sustainable development. Business responded in *Changing Course*, written by Stephan Schmidheiny with the Business Council for Sustainable Development (BCSD). The book's aim was to change the perception of industry as being part of the problem of environmental degradation to the reality of its becoming part – a key part – of the solution for sustainability and global development.

The book sought to develop a concept that, by marrying environmental and economic improvements, would make a business out of the challenge of sustainability. That concept was eco-efficiency. Since then, eco-efficiency has been further shaped and developed by the WBCSD and by many other organizations too. Importantly, it has also been demonstrated, through hundreds of case examples, to work for companies of all sizes, in all industrial sectors and in all regions.

*Changing Course* defined eco-efficient companies as those which create ever more useful products and services – in other words, which add more value – while continuously reducing their consumption of resources and their pollution.

At the first multi-stakeholder workshop on eco-efficiency in 1993 participants agreed on the following working definition:

Eco-efficiency is achieved 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.

Many business leaders, inside and outside the WBCSD, often express eco-efficiency as **creating more value with less impact** or **doing more with less**. Academic experts and practitioners term eco-efficiency the synthesis of **economic and environmental efficiency in parallel**, where the prefix *eco* stands for both economy and ecology.

The OECD, has called eco-efficiency **the efficiency with which ecological resources are used to meet human needs** and defines it as a ratio of an output (the value of products and services produced by a firm, sector or economy as a whole) divided by the input (the sum of environmental pressures generated by the firm, the sector or the economy). The European Environment Agency (EEA), which intends to use eco-efficiency indicators to quantify progress toward sustainability on the macro-level, defines eco-efficiency as **more welfare from less nature** and says it comes through decoupling resource use and pollutant release from economic development.

However, eco-efficiency is not limited simply to making incremental efficiency improvements in existing practices and habits. That is much too narrow a view. On the contrary, eco-efficiency should stimulate creativity and innovation in the search for new ways of doing things. Nor is eco-efficiency limited to areas within a company's boundaries, such as in manufacturing and plant management. It is also valid for activities upstream and downstream of a manufacturer's plant and involves the

supply and product value-chains. Consequently, it can be a great challenge to development engineers, purchasers, product portfolio managers, marketing specialists and even finance and control. Eco-efficiency opportunities can emerge at any point in the entire life-cycle of a product.

Companies can use eco-efficiency as an integral cultural element in their policy or mission statements. They can also set eco-efficiency objectives for their environmental or integrated management systems. And it is a useful tool for monitoring and reporting performance, and for helping the firm's communication and dialogue with its stakeholders.

Eco-efficiency opportunities are not limited to big or international companies. Small and medium-size

enterprises (SMEs) and micro-businesses can also find and gain from eco-efficient solutions. Similarly, service organizations can apply the concept to the way they provide their services and, in doing so, help their clients to become more eco-efficient as well.

Through the work of the OECD, the US President's Council for Sustainable Development (PCSD), the European Commission (EC) and other governmental institutions, eco-efficiency has now become established as a concept for policy on the macro-level for industrialized countries as well as for developing, emerging and transitional economies.

Improving eco-efficiency does not, however, lead automatically to sustainability. Simply improving in relative terms (value per impact) may

still mean an overall increase in an activity's impact and create unacceptable harm or irreversible damage. The EEA points out that absolute reductions in the use of nature, and associated environmental pressure, may be necessary to get within the earth's carrying capacities, so that both absolute and relative de-linking between growth of welfare and use of nature are needed .

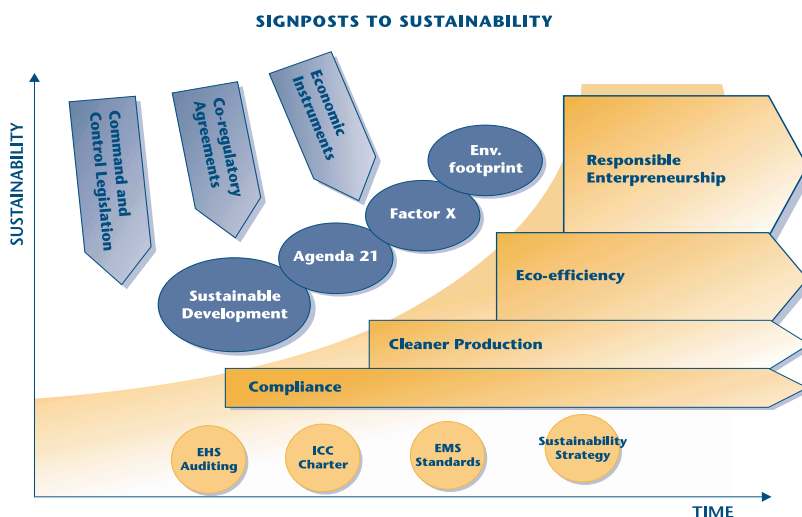
The WBCSD and its member companies are continuing to work on developing the eco-efficiency concept and are actively encouraging more business leaders to implement it in their organizations and more policy makers to adopt it too. Eco-efficiency is, in fact, work in progress and will continue to be so because it is in essence a dynamic rather than a static process.

SIGNPOSTS TO SUSTAINABILITY

As the horizontal arrows in the signpost diagram show, companies initially dealt with pollution problems through Compliance Management. Next, they moved toward proactively preventing pollution via Cleaner

Production. Eco-efficiency then began to contribute because, for the first time, it established the link between environmental improvements and economic benefits. The next step is Responsible Entrepreneurship through

which the private sector aims to balance all three pillars of sustainability (social justice, economic prosperity and ecological balance). A comprehensive approach to sustainability management by business should encompass all four of the above.



Business has used a number of tools to implement these concepts (see bullets), including Environment Health & Safety (EHS) auditing, the Business Charter for Sustainable Development of the International Chamber of Commerce (ICC), and the Environmental Management System (EMS) standards, which originate from an idea of the WBCSD. Today, management's focus is on developing and implementing a business strategy which embraces the imperative of sustainability.

Meanwhile, there has been major progress on the policy agenda as well. First was the idea of Sustainable Development (see first oval in the diagram), which then became a more concrete action program with Agenda 21. Next we could list the so-called Factor X concept, asking for

quantified targets in improving eco-efficiency and reducing impact across the entire economy. A fourth step may be the notion of the Environmental Footprint which argues that the space available for human activity is limited and that it should be distributed more equitably.

After the days of Command and Control Legislation, policy makers have responded in a number of ways, notably by introducing more effective Co-regulatory Agreements and Economic Incentives to complement, or even replace, their former reliance on legislation (see vertical arrows).

## HOW THE IDEA GREW

In 1991, when the BCSD first used the term *eco-efficiency*, it was hard to foresee how important the concept would become. Yet, in less than ten years, it has moved into the mainstream and migrated from corporate boardrooms to policy arenas.

The term *eco-efficiency* was actually first used by the Basel based researchers Schaltegger and Sturm in 1990. But the idea that preventing pollution and avoiding waste pays off financially predated this by at least 15 years. The US-based consumer goods manufacturer, 3M, initiated its Pollution Prevention Pays (3P) program in 1975, achieving more than US\$ 800 million in cumulative first-year savings from more than 4,000 3P projects and Dow Chemicals not less successfully followed with Waste Reduction Always Pays (WRAP).

Through *Changing Course*, Stephan Schmidheiny and the BCSD took up this concept and launched it as *eco-efficiency* worldwide. The WBCSD has since marketed *eco-efficiency* as its central business concept for bringing about corporate progress toward sustainability and has helped it become adopted by numerous companies, firstly in Europe and in North and Latin America, then on other continents.

Initially, the BCSD invited leading business people and experts from stakeholders,

academia and governments to develop the concept in a series of *eco-efficiency* workshops. The major drivers in that early phase were forward-looking managers and thinkers in 3M and Dow. Additional companies then contributed case studies describing the practical application of *eco-efficiency* and their achievements. It was the constant efforts of a team of leaders within Dow Chemicals and 3M that made *eco-efficiency* achieve a break-through from a brilliant idea to a workable concept. Only a few years after the successful launch of the concept, the WBCSD was able to present all the achievements business had made so far in *Eco-efficiency – The business link to sustainable development*, a full *eco-efficiency* textbook authored by Livio De Simone and Frank Popoff, as well as in *Signals of Change* the progress report to the UN's Rio+5 conference.

In the meantime, the focus has moved from the operational aspects of *eco-efficiency* toward *eco-innovation* and *design for environment*, spearheaded by *Driving Eco-innovation* from Claude Fussler of Dow Europe. This has opened up even bigger opportunities for companies to advance their *eco-efficiency* performance. For many companies, the main effects on the environment actually occurred outside their fence-lines – either upstream in the raw material generation and supplier processing phases, or down-stream in the product use or disposal phases.

The WBCSD has also directed its message at the financial markets, pressing them to become more aware of the value of *eco-efficiency*. The results of the WBCSD's work making the linkage between environmental performance and the bottom line were published in 1997 in its report *Environmental Performance and Shareholder Value*.

Guided by the business edict: *Only what's measured actually gets done*, WBCSD has explored a framework for measuring *eco-efficiency*. It has developed the elements for a common approach to reporting corporate performance, a list of generally applicable value and environmental indicators and a way of expressing the performance with *eco-efficiency* ratios. With this work the WBCSD has compiled, for the first time, specific practical guidance to companies on how to implement *eco-efficiency* in practice by presenting a tool for measuring *eco-efficiency* and reporting performance. The results of this work were published in the report *Measuring Eco-efficiency* in June 2000.

The WBCSD also concluded that the hitherto neglected consumption side of the coin needed more attention. It has therefore been working, through its *Sustainability through the Market (STM)* program, towards the adoption of a business-based approach to sustainable consumption. WBCSD member

companies are aiming to make markets eco-efficient, for example by offering less resource-intensive service solutions instead of bulky products; by entering into alliances with stakeholder groups; or by providing the information consumers need to help them buy more responsibly.

Business has also pushed eco-efficiency as a policy concept and has met with some success. For example, urged by its private sector members, the US President's Council for Sustainable Development (PCSD) first recommended eco-efficiency as a useful approach for government

action. The OECD's Committee on Sustainable Development, again led by business leaders, adopted eco-efficiency as the most promising concept for progress toward sustainability and has engaged in a major work program on the topic. Or again, the Canadian National Round Table on the Environment and the Economy (NRTEE), an institutionalized multi-stakeholder organization sponsored by the Canadian government, has been involved in several projects on eco-efficiency indicators and fiscal reform. For its part, the European Commission (EC) refers to eco-efficiency

in its policy process, while the European Environment Agency (EEA) is using the concept for defining and reporting on macro-economic indicators.

Overall, the WBCSD sees eco-efficiency as moving from what could be called a proprietary brand to something akin to a common property. A growing number of companies, organizations and governments are using and interpreting it for their own projects and benefit. This, we believe, will put eco-efficiency firmly into the corporate and political mainstream.

## ANSWERING THE SKEPTICS

But eco-efficiency has not yet won everyone over.

Some claim that a relative increase in company eco-efficiency is not enough. Instead they demand an absolute cutback in resource consumption. This misses a key point about eco-efficiency – it is not limited to achieving relative improvements in a company's use of resources and its prevention of pollution. It is much more about innovation and the need for change toward functional needs and service intensity, to contribute to de-coupling growth from resources.

Others call for eco-effectiveness rather than efficiency, stressing the importance of innovation. We believe they are right to focus on going beyond simply improving existing processes. It does this by changing industrial processes, creating new products and changing and influencing markets with new ideas and with new rules.

There is also the claim that using fewer resources per unit of production fails to deliver progress toward sustainability if the number of units continues to increase faster than the gains in

resource productivity. Critics maintain that incremental improvements in efficiency distract attention from the innovation needed to achieve real improvements and changes in behavior. Arguing that the environmental footprint of the rich is too big, they demand sufficiency instead of efficiency. The WBCSD accepts the need to reduce pollution and resource depletion but does not agree that reducing living standards will achieve a better-balanced world. In our view, it is more important to opt for a different way of living that can offer a better quality of life and more welfare for all, while limiting the use of resource and pollution to acceptable levels.

It is also claimed that eco-efficiency will not work in poor economies because preventing pollution is too costly and requires legal enforcement and substantial financial help. The WBCSD has demonstrated that this view is mistaken. We have shown that eco-efficiency does work in developing countries and countries in transition. In particular, companies can achieve big improvements in areas where resources were previously not used efficiently.

However, profits from resource efficiency are limited. Only when externalities are internalized, and when resources and pollution are priced properly, will efficiency improvements provide a full pay-off. Governments must therefore ensure that the external costs of resource use are internalized into the respective prices, that perverse subsidies are eliminated and that those who avoid pollution are rewarded.

### What eco-efficiency is not

Eco-efficiency has never been meant to be an all-inclusive panacea. Indeed, it is important to remember that eco-efficiency is...

- Not a take-it-or-leave-it approach
- Not an either-or (but much more a both-and-and) approach
- Not a solution to all the problems on the way to sustainability
- Not a rigid framework
- Not anyone's single strategy
- Not a management system
- Not a certifiable standard
- Not a reporting format
- Not a cook-book with recipes
- Not something one can buy off the shelf
- Not an assurance against failure

## ECO-EFFICIENCY IN THE BROADER CONTEXT

Eco-efficiency is a key concept for helping companies, individuals, governments and other organizations to become more sustainable. As we have seen earlier, it brings together the essential ingredients – economic and ecological progress – necessary for economic prosperity while using resources more efficiently and reducing emissions of environmentally harmful substances. Eco-efficiency was called the shear zone between the economic and environmental bottom lines.

However, eco-efficiency is not sufficient by itself because it integrates only two of sustainability's three elements, economy and ecology, while leaving the third, social progress, outside its embrace. The role of business is to satisfy human needs: it expects to be rewarded with profits for doing so. But responsible businesses also aim to improve quality of life and this is very much part of what it means to become more sustainable. The challenge is to do this without increasing the overall use of resources and having an adverse effect on the environment.

Sustainability will only be achieved by business working together with governments and external stakeholders such as suppliers, customers, neighbors and NGO, sharing the responsibility. Governments, for example, can contribute by formulating economic and industrial policies which encourage eco-efficiency in business as well as reduce energy and resource use throughout the economy.

Business cannot, by itself, ensure equal opportunities for society as a whole, nor ensure that the use of natural resources is in line with the earth's carrying capacity. But it can contribute to these goals through eco-efficiency and responsible entrepreneurship.

As a macro-level concept, eco-efficiency embraces the critical issues upfront. The targets Factor 4 and Factor 10 are eco-efficiency targets. Factor 4 means Doubling income with divided resource use means more value with reduced impact for the entire economy, in other words: eco-efficiency. Factor 10 means a tenfold increase in resource efficiency in the developed economies, while reducing the total use of natural resources globally to keep within the limits of the carrying capacity. Factor 10 is asking for an absolute – not simply a relative – de-linking of economic growth and the use of natural resources.

For many, eco-efficiency is one among many approaches with a similar objective: that of making business and the economy more sustainable. Yet eco-efficiency has a number of unique characteristics which differentiate it from, and add value to, other concepts.

For example, businesses implementing Environmental Management Systems (EMSs) will benefit from applying the proactive and opportunity-based mindset which is central to adopting eco-efficiency. By looking for more bottom-line gains they will ensure that their EMSs really do lead to continuous

improvement. EMS standards such as EMAS and ISO 14000ff, which WBCSD helped to create, can play an important role supporting companies toward eco-efficiency and sustainability but must be seen as a means to an end, not the end itself. EMSs can ensure that risks and opportunities are identified and managed systematically and efficiently, and they offer organizations – businesses and others – the tools and instruments to manage and communicate effectively their performance and achievements.

UNEP's Cleaner Production Programme has much in common with eco-efficiency. Both concepts were shaped more or less in parallel and continue to be further developed through the exchange of know-how and experience. Far from being in conflict, they are mutually reinforcing. Indeed, the WBCSD has a close partnership with UNEP, cooperating with it in various fields and co-publishing with it two reports on Cleaner Production and Eco-efficiency.

In summary, eco-efficiency is a concept with much to offer for many. It can be used for a variety of purposes and applied on various levels.



# creating more value with less impact

How companies turn the challenge of sustainability into business opportunities

Eco-efficiency is primarily a business concept because it talks the language of business. Put simply, it says that becoming more efficient makes good business sense.

Eco-efficiency has moved from being concerned with making resource savings and preventing pollution in manufacturing industries to becoming a driver for innovation and competitiveness in *all* types of companies. Financial markets also start recognizing the value of eco-efficiency because there is growing evidence that eco-efficient companies produce a better performance financially.

In this chapter we explain what companies can do to make themselves more eco-efficient – where they can find the opportunities to improve. Successful case examples from several different areas show how eco-efficiency works in practice. The way companies measure and report their overall performance in eco-efficiency completes the picture.

Bearing in mind the nature of our businesses, we founded the long-term performance strategy for Suez Lyonnaise des Eaux on eco-efficiency. This concept links competitiveness and value creation to protecting the world's equilibrium and enhancing our understanding of environmental challenges. Sustainable growth must thus be part of business strategy, integrated in all decision-making processes, and demonstrated through concrete action.

THIERRY CHAMBOLLE  
SENIOR VICE PRESIDENT ENVIRONMENT  
AND TECHNOLOGY, SUEZ LYONNAISE DES EAUX

Our experience shows that sustainability does not require sacrifice or deprivation. Rather it means exploiting the latest technologies, reducing waste, reusing resources, adopting lean production and better logistics practices and making sound investments in efficient productive capacity. In fact, eco-efficiency and sustainability are not free; for a market leader they are actually more than free because they provide a real competitive advantage.

PASQUALE PISTORIO,  
PRESIDENT AND CHIEF EXECUTIVE OFFICER,  
STMICROELECTRONICS

Our business challenge is to deliver competitive economic value, and at the same time operate in an environmentally sound and socially responsible manner. I strongly believe that excellence in environmental approach and solutions, in social responsibility and in economic performance are complementary, and not conflicting. In periods with substantial and rapid business restructuring, the need to provide practical proof of this complementarity is becoming increasingly important.

EGIL MYKLEBUST  
PRESIDENT AND CEO, NORSK HYDRO

## WHY ECO-EFFICIENCY? THE BUSINESS RATIONALE

The business rationale for eco-efficiency is straightforward: it makes good business sense. Being efficient is always a high priority for every company. But if it includes creating economic value and reducing environmental impact and resource use at the same time, the value added becomes even more significant.

The business case for eco-efficiency applies to every area of activity within a company – from eliminating risks and finding additional savings through to identifying opportunities and realizing them in the marketplace.

Financial markets have also started to look at these aspects of business performance.

Forward-looking analysts are selecting the sustainability pioneers and leaders because they know that the companies that have developed a sustainability strategy and have implemented eco-efficiency as a business concept out-perform their competitors significantly.

The WBCSD has led the way in making more visible the link between eco-efficiency excellence and the value of a company for its stakeholders. Its 1997 report, Environmental Performance and Shareholder Value, deals comprehensively with this subject. That work has been reinforced by more recent approaches such as the Dow Jones Sustainability Group Index (DJSI).

## WHAT CAN COMPANIES DO TO IMPROVE?

Eco-efficiency calls for businesses to achieve more value from lower inputs of materials and energy and with reduced emissions. It applies throughout a company, to marketing and product development as much as to manufacturing or distribution.

The WBCSD has identified seven elements that businesses can use to improve their eco-efficiency:

- Reduce material intensity
- Reduce energy intensity
- Reduce dispersion of toxic substances
- Enhance recyclability
- Maximize use of renewables
- Extend product durability
- Increase service intensity

These seven elements may be thought of as being concerned with three broad objectives:

- 1) Reducing the consumption of resources: This includes minimizing the use of energy, materials, water and land, enhancing recyclability and product durability, and closing material loops.
- 2) Reducing the impact on nature: This includes minimizing air emissions, water discharges, waste disposal and the dispersion of toxic substances, as well as fostering the sustainable use of renewable resources.
- 3) Increasing product or service value: This means providing more benefits to customers through product functionality, flexibility and modularity, providing additional services (such as maintenance, upgrading and exchange services) and focusing on selling the functional needs that customers actually

want. Selling a service instead of the product itself raises the possibility of the customer receiving the same functional need with fewer materials and less resources. It also improves the prospects of closing material loops because responsibility and ownership, and therefore concern for efficient use, remain with the service provider.

Many companies have a fourth objective, namely implementing an Environmental or Sustainability Management System that is integrated with their existing business management systems in order to drive the eco-efficiency approach. An Environmental Management System (EMS) is a

means of ensuring that all the risks and opportunities relating to sustainability are properly identified and efficiently managed. ISO 14000ff and EMAS are both state-of-the-art approaches to achieving this. Other strategic tools, such as Balanced Scorecard and Value Based Management, can also be used.

### NAVIGATING FOR ECO-EFFICIENT OPPORTUNITIES

The diagram below is a view map for eco-efficiency. It can help companies to identify where the opportunities can be found and who, inside and outside the company, will be involved in exploiting them. It suggests that there are four areas that provide opportunities for more eco-efficiency:

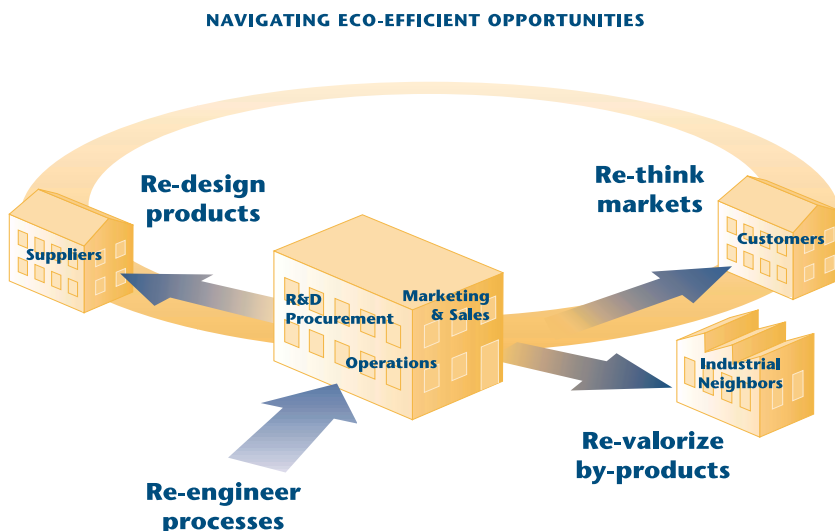
First, companies can re-engineer their processes to reduce the consumption of resources, reduce pollution and avoid risks, while at the same time saving costs. Experience shows there are manifold possibilities, some straight-forward, some less obvious. Invariably, the whole workforce has to be involved in identifying opportunities and in making the changes necessary to seize them. Process changes may also be related to delivery or to supplier

operations, as well as to distribution, customer use or disposal.

Second, by cooperating with other companies, many businesses have found creative ways to re-value their by-products. In striving for zero-waste or 100%-product targets, they have found that the so-called waste from their processes can have value for another company. Sometimes, in the chemical industry for example, by-products have even become a real cash-generating product of a production process. Zero-waste targets and by-product synergies lead to the more effective use of the resources in a process and create an additional cash benefit. In short, they are eco-efficient because they allow creating more value with fewer resources.

Product designers and procurement managers play a key role in a company. Their influence is not only crucial to product functionality and price but also has a big effect on costs and the environmental impact in production, product maintenance and disposal. This therefore suggests the third area for eco-efficiency opportunities: companies can become more eco-efficient by re-designing their products. Products designed to ecological design rules are frequently cheaper to produce and use. They are smaller and simpler in their design. They include a smaller variety of materials and are easier to disassemble for recycling. Often, too, they encompass higher functionality, better serviceability and easier upgradeability. Because they can provide a higher value for their users, while the environmental influence related to their use is minimized, they are eco-efficient products.

Fourth, some innovative companies not only re-design a product, they find new ways of meeting customer needs. They work with customers or other stakeholder groups to re-think their markets and re-shape demand and supply completely. Too many customers needs today are met in a material- and energy-intensive way. There are different, and better, ways of satisfying those needs. For example, it is possible that by providing a service



instead of selling the product, the overall material or energy intensity may be reduced. This also opens up opportunities for new economic growth and higher profitability.

As the diagram makes clear, all departments within a company can contribute to increasing eco-efficiency: operations, procurement, R&D, sales, marketing and management all have their part to play. Many companies,

recognizing this, have made eco-efficiency part of their overall business strategy. They have realized that key eco-efficient opportunities lie not just in their manufacturing but also along the entire supply chain as well as in the use of their product and services. Eco-efficiency for them has become a major driver of innovation and progress, a vehicle that helps them meet the economic and environmental targets they had set.

The WBCSD believes that it is of vital importance that top management buys into the concept of eco-efficiency. Those corporations where eco-efficiency has entered into the CEO's agenda become able to make real progress. Their performance path is not limited to some incremental improvements in specified aspects. Instead, they begin to leapfrog eco-efficiency with innovative products, new services and a changed business strategy toward sustainability.

## COMPANIES SHOW THEIR SUCCESSES

Eco-efficiency works not only in large transnational companies, as many of the WBCSD member companies are, but also in small and medium-size enterprises (SMEs), as well as in developing countries, emerging economies and the industrialized nations alike.

In this section we present five examples of how eco-efficiency works in practice. Space limitations mean that only brief summaries can be provided. More detailed cases, together with the criteria for what makes a good eco-efficiency case study, can be found in the collection of eco-efficiency case studies on the WBCSD website ([www.wbcd.org](http://www.wbcd.org)).

The examples illustrate the three dimensions of eco-efficiency objectives and the four strands of eco-efficient opportunities. They also show the effect of management systems that support eco-efficient improvements.

### Volkswagen Lupo, Germany: Designed for eco-efficiency

The only thing not re-invented is the wheel. That's how Volkswagen headlines its report on the Lupo 3L TDI passenger car. A completely new car, the Lupo was brought to market in 1999, with a fuel consumption of less than 3 liters per 100 kilometers. It was designed for eco-efficiency and embodies many technical innovations. Indeed, VW says that its performance is optimized throughout its entire life-cycle.

It is not just that the Lupo's engine has low-emissions and low fuel consumption; the cars themselves are built from recycled materials using production methods which minimize waste and emissions. And when the car reaches the end of its useful life, the Lupo's design also supports the segregation of materials in the dismantling and recycling processes. Moreover, says VW, the car can deliver what customers demand: good driving performance at a remarkably low price.

Source: Christiane von Finckenstein, Volkswagen AG, Wolfsburg and Volkswagen Environmental Report, [www.volkswagen.de](http://www.volkswagen.de), 1999

### Lura, Croatia: By-products yield business value

Lura Group, member of BCSD Croatia, is the leading dairy company in Croatia. In 1997, its management decided to tackle waste-water from the company's Sirela production plant which was discharged into the town's sewer system and treated together with municipal waste-water. Lura set up a project to purify the wastewater in a closed-circle system, then treat the sludge and, rather than pay to dispose of it, turn it into commercial compost. The purification process now produces about seven tons of sludge a day. The high-quality compost is a mixture of the residual sludge, unripe manure, bark and sawdust.

The investment in eco-efficiency turned out to be good business. The benefits are a significantly improved environmental performance of the plant, yearly savings on waste-water pollution fees that paid back the investments in equipment within 18 months, and an expansion of the business. The end result? New earnings, new partnerships and new employment possibilities.

Source: Damir Brlek at Lura d.d. Zagreb and WBCSD; Eco-efficiency case study collection, [www.wbcd.org](http://www.wbcd.org), 1998

**Parmalat, Portugal:**  
Eco-efficiency measures with excellent saving

The Italian dairy producer, Parmalat, is the market leader for milk of UHT quality on a global level. In Setúbal, Southern Portugal, Parmalat is a local producer and distributor of various milk products and fruit juices. The facility has recently certified its quality and environmental management system according to ISO 9002 and 14001.

Parmalat participated – together with nine other companies from the Setúbal area – in a local eco-efficiency program that was conducted by INETI/CENDES as part of the WBCSD's European Eco-efficiency Initiative (EEI). Parmalat, such as the other participating companies, systematically analyzed eco-efficiency opportunities in its operations and implemented measures for water management, wastewater reduction and raw material and energy losses with great success. More than 80 opportunities for cleaner production in production, maintenance and quality control were identified, leading to 58 concrete measures for adapting its processes and changing its operating practices.

Parmalat Portugal could reduce the quantity of raw material lost from 2 percent to 1 percent. It has also cut the amount of water used by 4 cubic meters per cubic meter of product processed, and the amount of wastewater by 2.5 m<sup>3</sup>/m<sup>3</sup>. The annual savings have exceeded the investment by more than three times.

The overall program in the ten companies (Parmalat Portugal, ABB Alstom Power, Tintas HEMPEL, Merloni Electrodomésticos, Moinhos de Trigo de Setúbal, Refrige, Rieter, Salus, SECIL Betão, SECIL Prêbetão) has clearly demonstrated the usefulness of the eco-efficiency concept, not only for the companies themselves (micro level) but also as a contribution to local sustainable development (meso level).

Source: Constança Peneda (constanca.peneda@mail.ineti.pt), INETI/CENDES Lisboa, 1999

**Car sharing in Switzerland:**  
A customer service with higher resource efficiency in mind

Since 1997, the Swiss Federal Railways (SBB) has successfully cooperated with the car-sharing company Mobility. Car-sharing is an innovative service offered to people who frequently want to use a car without buying their own. Mobility cars are parked at pre-defined places, ready for use by registered clients for a pre-announced period of time. The sharing concept allows people to benefit from using a car in a more efficient way than they would by owning a car themselves. Furthermore, Mobility clients can always get the right car at the right size and for the purpose they need.

Mobility has more than 1,300 cars in 330 communities throughout Switzerland, 250 of them at railway stations. The combined offer with SBB is a step forward in eco-efficient service value. It allows railway passengers to get dedicated mobility options at the arrival point of their journey almost everywhere in Switzerland. SBB offers this combined mobility services at attractive tariffs and provides financial incentives to its customers to use the car-sharing service.

Car-sharing members measurably change their travel behavior. More than two-thirds of their travel is by public transport. Per car-sharing client, the percentage of rail travel grows on average by more than 2,000 km. Active car-sharers consume less than half the amount of fuel than they did when they drove their own car, and the overall distance they travel declines.

Mobility today has more than 34,000 clients, of whom more than 12,000 are frequent customers of SBB and benefit from the priority conditions of the alliance.

Source: Séverine Wermelle, SBB AG Bern and SBB AG Environmental Report, 1999

Carvajal, Colombia:  
Impact reduction with  
remarkable benefits

Carvajal S.A. in Cali, Colombia, member of BCSD Columbia, is engaged in several main business areas in partnership with independent companies, among them printing services. For decades, the graphic arts industry has used diverse solvents and cleaning agents. Although they have excellent cleansing properties, they are also injurious to health, detrimental to the environment and highly flammable or even explosive.

For several years, Carvajal has worked successfully on substituting these traditional solvents with others that are equally effective but less dangerous and environmentally harmful. Today, the company has practically eliminated toxic solvents from its printing processes. At the same time, it has cut back significantly on spending on cleaning agents – total consumption has been reduced by roughly 60 percent water-based solvents, used instead of the former flammable agents, have reduced environmental impact of toxic by-products by 75 percent. That's equivalent to releasing up to 130 tons fewer pollutants annually.

Carvajal has shown that environmentally benign solutions do not necessarily conflict with cost effectiveness and that it is possible to reduce a company's environmental impact while also cutting its costs and improving its operating efficiency.

Source: Carmen Elena Orozco, Carvajal, Cali and WBCSD Eco-efficiency case study collection, www.wbcscd.org, 1998

A GUIDE TO MEASURING ECO-EFFICIENCY

Illuminating though the above examples are, at the end of the day they are no more than that – examples. While they illustrate how eco-efficiency works, they can give only a limited picture of the performance of an organization or a business.

This is why the WBCSD has explored ways of measuring and reporting the overall eco-efficiency performance of a company with eco-efficiency ratios. Ways of placing a measuring rod against eco-efficiency are detailed in a separate WBCSD report, *Measuring Eco-efficiency – A guide to reporting company performance*, published in June 2000. We therefore provide only a brief summary of its recommendations here.

In that report, the WBCSD puts forward a framework which can be used to measure progress toward economic and environmental sustainability. The framework is flexible enough to be widely used and easily interpreted across the business spectrum while providing a common set of definitions, principles and indicators.

The concept defines two types of indicator to help companies keep their reporting system flexible. This permits more efficient decision-making internally and fulfills stakeholder requirements. First, a small number of indicators were identified as being valid for virtually all businesses. These were called generally applicable indicators. They are widely relevant and subject to a common measurement approach. However, they may not be of equal value or importance to all companies. For each one, there must be general international agreement that: the indicator is related to a global environmental concern or business value; it is relevant and meaningful to

virtually all businesses; and there are methods for measurement established and definitions accepted globally.

But many indicators are not applicable to all companies. So a second group of indicators was devised to be used by individual companies to fit their particular context. These are termed business specific indicators. Each company must therefore evaluate its own business to determine what business specific indicators should apply to it and would be useful to management and external stakeholders, in addition of course to the generally applicable indicators.

Various efforts are also being made to harmonize sectoral indicators. The European Chemicals Manufacturers Association (CEFIC) has taken a leadership role in asking its members for harmonized reports using agreed indicators. In other sectors, such as banking, Swiss and German firms are working on defining indicators to measure the eco-efficiency performance of banking services. Other sectors are following suit. The WBCSD, which has started sectoral projects for the mining, cement and transportation industries, wants those projects to work towards defining eco-efficiency indicators that are relevant to each sector.

Eco-efficiency brings together the two eco-dimensions of economy and ecology to relate product or service value to environmental influence. Eco-efficiency may be represented by the following ratio:

$$\frac{\text{Product or service value}}{\text{Environmental influence}}$$

There are numerous ways by which eco-efficiency can be calculated using this basic ratio. Both product or service value and environmental influence include many different indicators that cannot be merged into one single number. Companies will need to choose eco-efficiency ratios that best serve their process for communication and decision-making. Specific calculations will depend upon the needs of individual decision-makers. Value and environmental

influence can also be measured for different entities, such as production lines, manufacturing sites, or entire corporations, as well as for single products, market segments or entire economies. In the same way, eco-efficiency ratios can be calculated and used for many of these entities. The same indicator may not be suitable for each one.

The WBCSD recommends companies integrate eco-efficiency information into

their overall decision-making and communications processes. Internally, it should be part of routine management systems. Externally, eco-efficiency indicators could be provided in corporate environment or sustainability reports as one of the integrating elements between the three pillars of sustainability. They could also be included in existing financial reports as an extension to pure financial reporting.

## HOW COMPANIES CAN REPORT THEIR PERFORMANCE

Reporting, both internally to management and externally to stakeholders, is a key element of an effective management system. Performance reports on the key relevant aspects – financial, environmental or social – facilitate management decision-making. Preparing a report for the public can have the further benefit of screening performance assessment and data collection procedures and it often triggers a company to set improvement targets. The WBCSD has largely been involved with stakeholders in developing guidance on sustainability performance reporting and continues working on the subject. A new project on Sustainability Reporting was just recently initiated.

The Sustainability Reporting Guidelines, published in June 2000 by the Global Reporting Initiative (GRI), reflect the status of that work in progress. The guidelines ask organizations to report on their environmental, economic and social performance. They also ask for a statement by top management and for information to be provided on the reporting organization, its vision, strategy, policies, organizational structures and management systems with respect to sustainability. A GRI

report is not meant to be the sum of three independent reports on the environmental, economic and social elements of sustainability. Instead, it asks for information that includes crosscutting indicators that build a bridge between the three elements as well as systemic indicators that make the link between micro-level company performance and macro-level objectives and biophysical limits.

By bridging the gap between environmental and economic sustainability, eco-efficiency forms a core element of performance reporting on sustainability. Eco-efficiency ratio indicators allow companies to characterize this important shear zone more effectively and to assess their performance relative to it. This makes it important that companies provide their eco-efficiency indicators together with

### Five elements for corporate eco-efficiency reports

The WBCSD proposes the following five elements for inclusion in any report on a company's eco-efficiency:

**Organization profile** This will provide a context for the eco-efficiency information. It should include the number of employees; the business segments involved, primary products and major changes in the structure of the company.

**Value profile** Indicators from the value portion of the WBCSD framework, including financial information, the quantity of products, or functional indicators for specific products.

**Environmental profile** This will include

generally applicable indicators of environmental influence as well as business-specific indicators relating to product/service creation and use.

**Eco-efficiency ratios** In addition to providing the basic numerator and denominator data for estimating eco-efficiency, companies may also wish to provide calculations of the eco-efficiency indicators that they consider most relevant and meaningful for their business.

**Methodological information** This will describe the approach used to select indicators, data collection methodologies and any limitations on use of the data.

absolute value and environmental influence data. Users of the data can then assess the company's performance and progress in relation to other players, as well as estimate the relevance of value and impact in relation to the company's overall impact.

Twenty-three WBCSD member companies have taken part in practical pilot exercises using eco-efficiency indicators and performance reporting. Some of them involved their marketing, financial, product development and production people in the pilot activities. After the end of the pilot phase, participating companies continue to use eco-efficiency indicators in their procedures and include eco-efficiency profiles in their reports. Some have expanded the test approach from the particular pilot site or business unit to

the entire corporation. Overall, the results of the pilot studies show that the concept is valid for all company types and sizes. They also show that the generally applicable indicators, which the group had selected, as well as the reporting profile and use of eco-efficiency ratios, are appropriate across a wide range of business and geographical sectors.

The WBCSD presents on its website a Performance Platform that contains examples of eco-efficiency profiles. These profiles describe company performances with key value and environmental indicators, and eco-efficiency ratios. The profiles are built from a uniformly structured set of data points of a company's actual performance and they also include selected trend graphs of historical data and some targets.

The WBCSD collection provides companies with a platform to present their eco-efficiency performance in an easily understandable, clearly structured way. With the direct link to corporate environmental or sustainability reports and company websites, it is a portal to more detailed data and contact information. Its aim is to show how companies can report their environmental and economic performance, and how to inter-relate the two. Users can obtain a brief overview of a company's eco-efficiency scorecard. Using the same indicators repeatedly allows them to develop a better feeling for their meaning and to interpret performance results. The platform also allows users to compare similar companies and develop sectoral average values.



# increasing quality of life without depleting our natural capital

## How governments can make eco-efficiency work for society

Business cannot achieve eco-efficiency alone. Progress requires going beyond internal actions of individual companies; it requires close cooperation among societal stakeholders. Progress also needs society to create an enabling framework that allows individual companies and whole markets to become more eco-efficient. Governments have an important role to play in creating those conditions.

Already, several countries and regions have enacted national and regional action plans aimed at fostering a more eco-efficient and sustainable society. Arriving at a broad consensus on headline indicators for eco-efficiency and setting appropriate targets are among the crucial elements that will help the transition to an eco-efficient economy.

This chapter summarizes the key elements of the political agenda for eco-efficiency, describes the way governments can develop and implement action plans for eco-efficiency and explains how eco-efficiency can be quantified on the macro-level.

Progress toward sustainability and improved environmental quality will come mostly from better economic policies, as influenced by environmental objectives. Eco-efficiency is the concept that allows us to create the type of information that governments need to help integrate environmental objectives into economic policies in order to achieve de-coupling of the use of nature from economic growth, thereby contributing to more sustainable development.

DOMINGO JIMÉNEZ-BELTRÁN  
EXECUTIVE DIRECTOR,  
EUROPEAN ENVIRONMENT AGENCY,  
COPENHAGEN

### WHY ECO-EFFICIENCY? ITS MACRO-LEVEL RATIONALE

The government rationale for eco-efficiency is this. Environmental improvement and economic prosperity are both high priorities in many countries in all parts of the world: eco-efficiency offers the opportunity to complement, not contradict, these two objectives.

Eco-efficiency also offers benefits to civil society – increasingly so as more and more people aim to get more value for their money in the marketplace while also enjoying a better environment. If governments create the framework conditions which reward sustainability, more consumers would buy eco-efficient products and eventually contribute to a more sustainable economy.

### ECONOMY AND QUALITY OF LIFE UP – RESOURCE USE AND POLLUTION DOWN

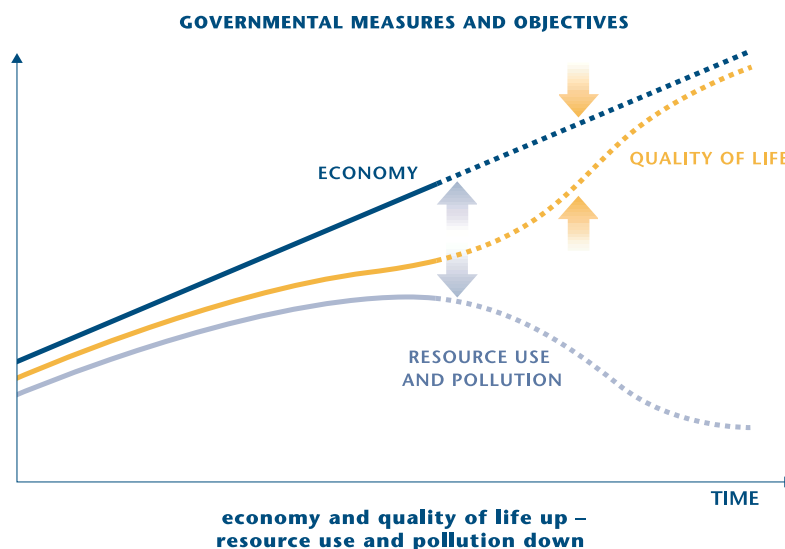
The above title could indeed become the news headline for an eco-efficient economy.

and cause it to climb more steeply than it would otherwise have done.

The solid lines in the below graph show where we are today. As economic growth has taken place, quality of life has also risen, but so too has resource use and pollution. Our argument is that, by adopting eco-efficient practices, it is possible to decouple these trends so that, as the dotted lines show, the economy and quality of life continue to rise while resource use and pollution fall away. Indeed, by reducing the pressure on natural resources and the environment we will actually magnify the improvement in the quality of life

For example, sulfur dioxide emissions and the related acid rain could in many areas be reduced to acceptable levels with the help of advanced technologies. Or again, total energy consumption and its resulting carbon dioxide emissions might in some countries grow less rapidly than the economy if eco-efficiency really takes hold.

Set against this, however, in some regions the overall quality of life will grow more slowly than the economy or may even tend to decline because of increasing environmental and social



pressures. Newly developed quality of life (QoL) indices, which try to quantify and measure this relationship, clearly show this unsatisfactory trend.

For the future, governments need to maintain or improve quality of life, allowing it to grow closely coupled with economic prosperity, while resource use and pollution must become de-coupled

from the economy. There is a need to find ways of preventing further increases in the pressure on the environment or even make them retreat to a level that nature can digest and regenerate. Of course, the two things are closely inter-related. Reducing pressure on nature will also reduce the downward pressure on quality of life.

Ultimately, what is needed is an improving quality of life for all parts of society along with an intact and balanced natural environment. A healthy and eco-efficient economy could be a useful way of achieving both together.

### THE POLICY AGENDA FOR ECO-EFFICIENCY

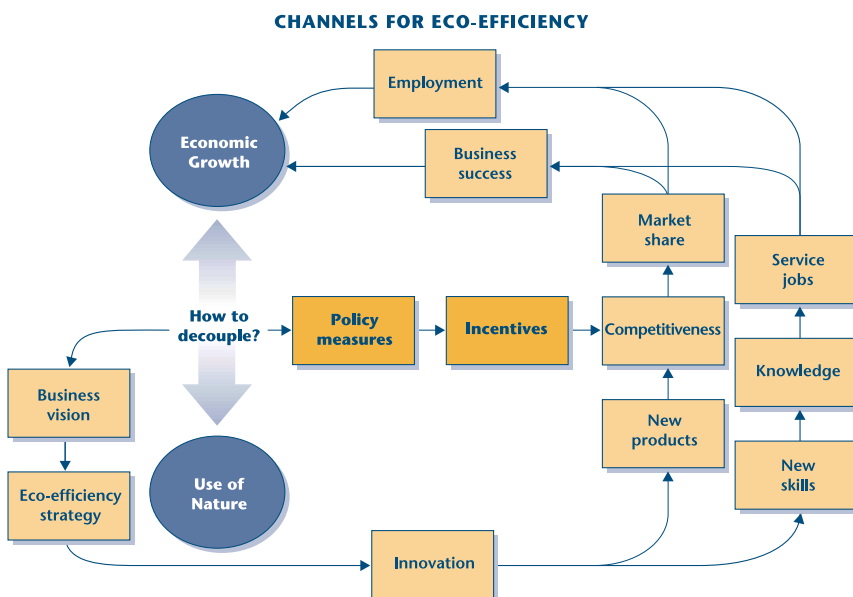
In chapter 2 we set out the business agenda for eco-efficiency. Business undoubtedly has many opportunities to increase its eco-efficient performance and thereby to help de-couple use of nature from overall economic growth. However, the potential could be really amplified through political measures that reinforce the eco-efficient opportunities business already has. Such a political agenda is driven by forces outside business and is concerned with the framework conditions and policies set by society for business.

The graph below describes the channels along which a business strategy for eco-efficiency can help de-coupling between use of nature and growth in an economy. It also shows how policy measures can amplify the effectiveness of these channels.

With a vision for a more sustainable future, entrepreneurs can implement an eco-efficiency strategy that has innovation as a major driver. Innovation creates new products and new skills. While new products can lead to higher competitiveness and therewith to

increased market shares, new skills can lead to increased knowledge and to additional service jobs. Both lead then to more employment and to entrepreneurial success, finally ensuring economic prosperity and social betterment.

Governments – on their part – can implement a policy that fosters economic growth and favors reduction of resource use and avoidance of pollution with incentives for eco-innovation. Such policy measures to leverage business initiatives for more eco-efficiency can include the following:



Identifying and eliminating perverse subsidies: In many countries, unsustainable behavior is still supported with subsidies. These should be reduced and eventually removed.

Internalizing environmental costs: In several economic sectors, considerable costs caused by environmental pollution and social damage are still not included in the price of goods and services. Until this is changed, the market will continue to send wrong signals and polluters will have no incentive to change and adapt the performance of their products and processes.

Shifting tax from labor and profit to resource use and pollution: To avoid destructive economic effects, tax shifts should be implemented in a predictable way, avoiding any increase in the overall tax burden.

Developing and implementing economic instruments: These include emissions trading as an

incentive for companies to implement eco-efficiency measures.

Promoting voluntary initiatives and negotiated agreements: Governments should negotiate agreements and support voluntary initiatives designed to promote sustainability in particular sectors or market areas.

Governments could also develop national plans to make their economies more eco-efficient. These plans should include measures and programs which involve all sectors of society.

## NATIONAL ACTION PLANS FOR ECO-EFFICIENCY

Several countries and regions have already developed national and regional action plans and made dramatic progress as a result. We list here just a few examples, knowing that many more countries have started to think about eco-efficiency.

In its 1996 report, *Sustainable America: A New Consensus*, the President's Council for Sustainable Development (PCSD) made several recommendations for building a new framework. Among them were performance-based management systems, an extended product policy, a shift in tax policies, subsidy reform and the use of market incentives.

Also in 1996, OECD environment ministers observed that a strategy to improve eco-efficiency might enable industry, governments and households to decouple pollutant release and resource use from economic activity. The OECD investigated the potential of the eco-efficiency concept in the light of studies suggesting that factor-of-ten efficiency improvement are both necessary and possible in the next 30 years. The results were published in the 1998 OECD report on eco-efficiency, which recommended the development

and use of eco-efficiency ratios as macro-level indicators. The OECD identified innovation as the key driver for improving eco-efficiency and said that it was best stimulated by strong competition, high factor prizes and regulatory incentives, an effective process of disseminating best practice and the presence of a good climate for innovation.

Eco-efficiency has become an important strategic element of the EU's policy toward sustainable economic development. The EU Council has called for the integration of environmental (as well as social) aspects into the EU's economic and industrial policies of the Union. The European Environment Agency (EEA) is using eco-efficiency as the leading concept for defining national performance indicators and setting respective targets.

Several European countries, particularly in the Nordic region, have already created a framework within their economic and industrial policies to provide more support for higher resource productivity and environmental and social improvements. And EU member states, as well as countries in other parts of the globe, have started to

explore ways of using eco-efficiency as a policy concept.

The WBCSD, in co-operation with various multi-stakeholder organizations and governmental bodies, is implementing several projects to develop eco-efficiency further as a policy concept:

Under the leadership of the Canadian National Round Table on the Environment and the Economy (NRTEE) together with WBCSD, first attempts were made to develop eco-efficiency indicators for business in various sectors.

With European Partners for the Environment (EPE), supported from the European Commission Directorate General for Enterprises (formerly DG III), the WBCSD launched the European Eco-efficiency Initiative (EEEI) in 1998. In its first two years, the initiative has achieved its objectives of promoting the understanding and use of eco-efficiency throughout Europe and supporting and facilitating national initiatives, as well as the creation of eco-efficiency action plans.

The WBCSD's eco-efficiency work in Europe focuses on Central and Eastern European Countries (CEEC), several of which are in the process of accession to the European Union. Under the auspices of the Aarhus Business and Environment Initiative (ABEI), and in concert with the Regional Environmental Center

(REC) in Budapest, the WBCSD is working to make eco-efficiency more widely understood and implemented by CEEC businesses and governments.

The WBCSD also has a long tradition of cooperating with business organizations in developing countries and

emerging economies – in particular through its Regional Network of 30 national BCSDs and partner organizations with a total membership of over 800 companies in Latin America, Southern Africa, East and Southeast Asia and Eastern Europe.

## HOW GOVERNMENTS CAN MEASURE ECO-EFFICIENCY

What works for business can also work for national economies.

Quantifying problems, setting targets and measuring progress toward achieving them are very effective management tools for governments, too. Quantitative figures and indicators can tell what needs to be changed and by how much. Such indicators are important for measuring the progress in linking governmental and business actions.

Together, business and governments can set the right targets and formulate their strategies for meeting them. Governments can stimulate progress by enacting legislative, financial and technical measures to create the right incentives to encourage and reward innovation and change in performance.

Factors 4 and 10 are eco-efficiency targets for the economy at large. By

calling for increased welfare and reduced use of nature and for environmental space to be more equally distributed one is really setting macro-economic eco-efficiency objectives. Companies can and must contribute to attaining these objectives but cannot do so alone.

The OECD lists trends and targets of eco-efficiency ratio indicators, formulated as GDP per environmental influence, and relates them to the goals of Factors 4 and 10. While GDP (the ratio numerator) is growing in most OECD countries, some environmental influence figures (the ratio denominator) are decreasing. Other environmental aspects are also increasing, some with a slower rate than GDP, others higher.

The EEA has adopted productivity or eco-efficiency ratio indicators for countries, asking for an absolute and relative de-linking of growth of welfare

from the use of nature. It intends to measure and compare economic sectors and countries with each other according to their eco-efficiency status and improvements. The agency has announced a set of Headline Indicators with the intention of developing a data basis for European countries and economic sectors. Both EEA and WBCSD are working toward matching headline indicators for nations and generally applicable indicators for corporate reporting.

Formulating targets is the key to progress. The WBCSD has proposed setting macro-economic targets as sustainability conversion criteria in the form of eco-efficiency ratio indicators. Such conversion criteria should, we believe, include targets for dematerialization, energy and water efficiency, greenhouse gas emission reduction, job creation and poverty alleviation.

## ECO-EFFICIENCY AND MACRO-ECONOMIC DEVELOPMENT

Eco-efficiency is not a model for maintaining the status quo. It is a leadership practice aimed at those intending to stay ahead of the curve and meet the future needs of society, natural resource availability and public perceptions. By creating competitive advantage, it appeals to those who want a competitive and innovative economy.

Eco-efficiency is not a model for maintaining the status quo.

Quantifying eco-efficiency with macro-level headline indicators gives governments the ability to measure progress on national and supranational eco-efficiency targets. Macro-performance will be measured by the performance data of the various sectors (industry, households, agriculture, etc.) and of individual companies.

Assessing performance against targets allows governments to develop and enact the policy measures that will accelerate progress towards those targets. The indicators and programs to support such measures form the key elements of a policy framework that promotes eco-efficiency and sustainability.

Governments can use various incentives to promote action toward progress and support initiatives to advance eco-efficiency – rewarding the leading-edge companies and putting pressure on the laggards. Incentives to reward eco-efficiency will guide innovation in the right direction and create new products and services. Eco-efficiency leads to more value from fewer resources, through redesign of products and services and through new solutions. The more successful companies set themselves tough environmental targets and meet them with new technologies and practices.

Eco-efficiency fosters the application of new knowledge to the design of complex systems and value chains. There is a unique opportunity for nations to leverage, network and enhance the many centers of excellence that have already emerged in many organizations. Education, research & development will create a new breed of designers, system specialists and entrepreneurs able to meet the world's development goals.

Eco-efficiency will also create new jobs provided that conditions that support investments, entrepreneurial skills and friendly markets are met. Eco-efficiency targets and negotiated agreements will encourage businesses to embark on an eco-efficiency course. Public procurement initiatives which integrate eco-efficiency criteria will accelerate demand and provide clear market signals. Consumer information, energy and water standards in key activities such as housing, agriculture, transport or tourism will create a demand for service providers of eco-efficient solutions.

Eco-efficiency will also create new jobs provided that conditions that support investments, entrepreneurial skills and friendly markets are met.

Eco-efficiency will create a competitive advantage for enterprises and foster a competitive economy. What is more, putting it at the heart of the policy framework and strategy for sustainable development will catalyze the efforts of all stakeholders.



# with creativity and shared responsibility

## Onward to an eco-efficient economy

Eco-efficiency can serve companies as a means for developing and successfully implementing a business strategy toward sustainability. Such a strategy will have a strong focus on technological and social innovation, accountability and transparency, as well as on cooperation with other parts of society with a view to achieving the set objectives.

In the same way as it serves private companies, eco-efficiency can support governments in deriving a national strategy for sustainable development. Setting framework conditions which foster innovation and transparency, and which allow sharing responsibility among stakeholders, will amplify eco-efficiency for the entire economy and deliver progress toward sustainability. The economy, together with quality of life, will continue to grow while the use of resources and pollution will go down.

In this, the final chapter, we list action points for the various players involved. If they are adopted by all concerned, we are confident that we will arrive at more eco-efficient performance by business, a growing world economy and a more sustainable future for the planet.

We can expect that eco-efficiency will become the leading economic principle for the first quarter of the 21st century. In 2030, about 8 billion people will live on this planet, 3 billion of them at the standard which Europeans enjoy today. This will mean a four-times increase in goods and services overall. Without dramatically increased eco-efficiency this would surely be the ruin of the planet. A factor 4 increase in eco-efficiency within a generation is therefore the very modest objective we can call for to ensure the planet's ability to survive and lead into a sustainable future.

If business and academia use all their potential for creativity and innovation, civil society will emotionally follow. Then governments will also adopt the framework and finally reward those that are courageous and more efficient. Eco-efficiency and Factor 4 are our trademarks for that vision.

ERNST ULRICH VON WEIZSÄCKER,  
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MEMBER OF THE GERMAN BUNDESTAG

## TWELVE KEY ACTION POINTS FOR AN ECO-EFFICIENT FUTURE

All parts of society share the responsibility for progress. Business has an important part to play and accepts the challenges. But governments and civil society must also play their part.

The WBCSD proposes 12 action points which, if adopted by the various stakeholder groups, will help move the world forward toward an eco-efficient future. We believe each group should do the following:

### Governmental leaders and civil servants

1. Set macro-economic eco-efficiency targets and conversion criteria for sustainable development
2. Integrate policy measures to strengthen eco-efficiency (by, for example, eliminating subsidies, internalizing externalities and effecting shifts in tax policy)
3. Work toward changing international policy rules and systems for trade, financial transactions, etc, to support higher resource productivity and emissions reduction, as well as improvements for the underprivileged

### Civil society leaders and consumers

4. Encourage consumers to prefer eco-efficient, more sustainable products and services
5. Support political measures to create the framework conditions which reward eco-efficiency

### Educators

6. Include eco-efficiency and sustainability in high school and university curricula and build it into research and development programs

### Financial analysts and investors

7. Recognize and reward eco-efficiency and sustainability as investment criteria
8. Help eco-efficient companies and sustainability leaders to communicate their progress and related business benefits to financial markets
9. Promote and use assessment tools and sustainability ratings to support the markets and to help widen understanding of eco-efficiency's benefits

### Business leaders

10. Integrate eco-efficiency into their business strategy, including their operational, product innovation and marketing strategies
11. Report company eco-efficiency and sustainability performance openly to stakeholders
12. Support policy measures which reward eco-efficiency

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# about the WBCSD

The World Business Council for Sustainable Development (WBCSD) is a coalition of about 150 international companies united by a shared commitment to environmental protection, social equity and economic growth, in other words, to sustainable development. Members are drawn from more than 30 countries and 20 major industrial sectors. The WBCSD also benefits from a thriving global network of national and regional business councils and partner organizations.

In broad terms, the WBCSD aims to develop closer co-operation between business, government and all other organizations concerned with the environment and sustainable development. We also seek to encourage high standards of environmental management in business itself. More specifically, our objectives are:

**Business leadership:** To be the leading business advocate on issues connected with the environment and sustainable development

**Policy development:** To participate in policy development in order to create a framework that allows business to contribute effectively to sustainable development

**Best practice:** To demonstrate progress in environmental and resource management in business and to share leading edge practices among our members

**Global outreach:** To contribute through our global network to a sustainable future for developing nations and nations in transition.

## Disclaimer

This report is released in the name of the WBCSD. Like other WBCSD reports, it is the result of a collaborative effort by members of the secretariat and executives from several member companies. Drafts were reviewed by a wide range of members, so ensuring that the document broadly represents the majority view of the WBCSD membership. It does not mean, however, that every member company agrees with every word.

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