ECO-DESIGN

production without destruction

For several decades, consumer society has made profitability its credo, producing and consuming more and always at the lowest price. This tendency translates into overexploited natural resources, the intensification of air and water pollution, disappearing plant and animal species, and the proliferation of waste. Breaking this chain means taking urgent action to "produce more with less." In other words, to satisfy global demand for goods and services while limiting waste and avoiding excess and pollution. Companies have now adopted this approach and have taken sustainable development onboard in their strategies. It has become a political issue too. In 2000 in Malmö (Sweden), world governments launched an appeal in favour of sustainable production and consumption, "to improve finished products and services while diminishing impacts on the environment and health." In a word, to herald the era of eco-design.

IMPACTS

All consumer goods, even "green" ones, have negative repercussions on the environment. They are manufactured using raw materials, energy and water. Then they must be packaged and transported to their place of use, before finishing up as waste. Eco-design is a means of minimizing these impacts throughout a product's lifecycle for the same degree of efficiency and utility.
www.howproductsimpact.net

SOME OF THE WAYS ECO-DESIGN CAN MINIMIZE IMPACTS

1st stage: raw materials. Manufacturing a product means first exploiting raw materials. Extracting and processing these constituent parts consumes natural resources, uses energy and is a source of pollution.
Solutions: reduce quantities, choose the most appropriate materials, transform waste into raw materials, prefer renewable materials and products that use only one type.

2nd stage: production. Manufacturing tends to consume large amounts of energy because of the complex processes it involves.
Solutions: optimize production processes, assemble products so they are easy to separate into their different components for repair or recycling.

3rd stage: packaging. Bottles, boxes, cans and other packaging currently account for over half the volume of household waste in developed countries.
Solutions: concentrate products, reduce the amount and volume of packaging to make savings along the chain, from manufacturing to waste disposal.

4th stage: transportation. Delocated production, cost-cutting and liberalized markets all add up to one thing: products travel thousands of kilometres before being used.
Solutions: choose manufacturing sites according to the products' final destination, use combined transport and alternative fuels, optimize loads.

5th stage: use. Using products, operating appliances and maintaining them in working order requires more or less energy, water, etc. Usually designed to be frequently replaced, goods today are increasingly fragile and hard to repair, which encourages wastefulness and generates waste.
Solutions: design functional, energy-saving or autonomous products that are lasting, safe and easy to maintain or repair.

6th stage: disposal and recycling. Worn-out or damaged products are more or less easy to recycle. The multiple components, alloys and other combinations of materials from which they are made render disassembling and processing a complex and costly procedure.
Solutions: develop reusable or recyclable products and components.

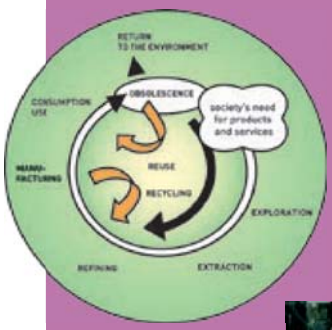
→ **560 kg**
of solid waste are produced per capita each year in the industrialized countries: 3 times more than in 1984

IN THE SPACE OF A FEW YEARS, GOVERNMENT AND INDUSTRY HAVE REVIEWED THEIR POSITION ON ENVIRONMENTAL ISSUES. FROM AFTER-THE-EVENT DAMAGE REPAIR, RISKS ARE NOW CONSIDERED AT THE EARLIEST STAGE. SUSTAINABLE DEVELOPMENT IS BECOMING AN INTEGRAL PART OF THE COMPANIES' DEVELOPMENT STRATEGY.

ECO-DESIGN

An international concept, developed by the World Business Council for Sustainable Development (WBCSD) at the Rio summit, eco-design is the culmination of a holistic, conscious and proactive approach. It consists in designing a product -or service- so as to minimize its impacts on the environment. Eco-design applies at every stage in a product's life: raw material extraction, production, packaging, distribution, use, recovery, recycling, incineration, etc.
www.wbcsd.ch
www.ecodesign.at/information/einfuehrung/index.en.html
http://europa.eu.int/comm/enterprise/eco_design
www.uneptie.org/pc/sustain/design/design.htm

A PRODUCT'S LIFECYCLE



Life Cycle Assessment (LCA) is an analytical tool that serves to evaluate eco-design concepts. It examines inputs (e.g. materials, resources, energy) and outputs (e.g. emissions to air and water, waste) at every stage in a product's lifecycle to then quantify its environmental impacts. This framework has been standardized within the series ISO 14040.
www.iso-14001.org.uk
www.eiolca.net
www.uneptie.org/pc/pc/tools/lca.htm
www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=33020

↓Over the years, deposit bottles have fallen out of favour to be replaced by disposable packaging. This must then be collected and recycled, which involves the transformation of raw materials. In some countries, led by Germany, deposit bottles are now making a comeback at the majority of points of sale.

ON THE RIGHT TRACK

→ Product service systems

A new marketable mix of products and services is emerging: instead of producing goods to then sell, a company that adheres to the principle of product service systems (PSS) adapts its offer to customers' needs. The result is more tailored solutions, based on the notion of product-sharing. Alongside its traditional activity of selling products, a company might decide to develop a rental business, or to sell services. By fulfilling customers' needs and by optimizing product use, product service systems globally reduce environmental impacts.
www.uneptie.org/pc/sustain/design/pss.htm

→ Zero emission

The ZERI Foundation (Zero Emission Research Initiative) is a network of academics, businesspeople and educators. Its purpose is to respond to human needs by reusing existing waste without creating any form of new waste -liquid, gaseous or solid. Projects include farming mushrooms on coffee waste or on spent grains from brewing to make animal feed, and converting a cement factory into Europe's largest composting plant.
www.zeri.org/systems.htm

→ Green materials

New materials are appearing that make use of natural renewable resources. Mainly of plant origin, their composition means they are biodegradable and they can be safely incinerated. For example, plastics made from potato, corn, wheat or rye starch - as an alternative to traditional oil by-products - help avoid the depletion of non-renewable resources and stimulate agriculture by offering new outlets. These materials must however undergo a full quantitative analysis (water, energy, component materials, end-of-life collection, etc.) depending on their usage to guarantee they are indeed more beneficial to the environment.

THE DIFFERENT ECO-DESIGN STRATEGIES

- The product focused approach aims to render existing goods and services more economical, more efficient and less harmful to the environment, as well as improving after-sales service, and end-of-life collection and processing.
- The results focused approach pursues the same objectives from a different angle, for example by selling not the product itself but its use (rental).
- The needs focused approach studies the needs and expectations that a product or service must fulfil, then looks for the best way to satisfy them using a product, or a service, or both.

AT UNEP

→ LIFECYCLE AND INTERNATIONAL PARTNERSHIP

UNEP has set up the Life Cycle Initiative to develop and disseminate practical tools for evaluating the opportunities, risks, and trade-offs associated with products and services over their entire lifecycle. The objective is to found a network of companies that will become a platform for sharing experiences and best practices in this area.
www.uneptie.org/sustain/lcinitiative

BEWARE THE REBOUND EFFECT!

Environmental progress can sometimes trigger a "rebound effect" that defeats the initial objectives. For example, the development of greener industrial processes might result in increased consumption of goods or services. Indeed, the lower cost price, made possible by these improved processes, generates additional disposable income that can be spent on more products and services.

PUTTING IDEAS INTO PRACTICE

Individuals

→ CHOOSE CONCENTRATED OR REFILLABLE PRODUCTS, AND PRODUCTS SOLD WITH ECO-REFILLS OR THAT USE THE LEAST AMOUNT OF PACKAGING, MADE FROM RECYCLABLE MATERIALS → AVOID BUYING SINGLE DOSES → PREFER DURABLE TO DISPOSABLE: THINK REUSE, REPAIR, RECYCLE! → ASK MANUFACTURERS HOW MUCH WATER, ENERGY AND PRODUCTS APPLIANCES NEED TO FUNCTION OR BE SERVICED. ASK TOO ABOUT THE ORIGINS, PROPERTIES AND TYPE OF RAW MATERIALS USED. → BEFORE BUYING A PRODUCT OR AN APPLIANCE, CHECK OUT THE POSSIBILITIES FOR SERVICES OR RENTAL

Companies

→ WHEN DEVELOPING PRODUCTS, USE ECO-DESIGN TOOLS AS FAR UPSTREAM AS POSSIBLE BY FACILITATING CONTACT BETWEEN DESIGNERS AND ENGINEERS OR PRODUCTION MANAGERS → PROVIDE A MAXIMUM OF INFORMATION ABOUT THE PRODUCT AND APPLY FOR CERTIFICATION BY INDEPENDENT BODIES → APPLY FOR ISO 14001 CERTIFICATION → OPTIMIZE WATER AND ENERGY COSTS, BUILDING CONSTRUCTION AND WASTE MANAGEMENT → ASK SUPPLIERS ABOUT THEIR MANUFACTURING METHODS, WHERE THEY SOURCE RAW MATERIALS, ETC → PROPOSE A RANGE OF SERVICES IN ADDITION TO SELLING GOODS AND APPLIANCES → BE INSPIRED BY BEST PRACTICES IN THE SECTOR

Local authorities

→ DEVELOP BIOCLIMATIC ARCHITECTURE (SWIMMING POOLS, SCHOOLS, HOUSING, ETC.) → EVALUATE THE COST OF DIFFERENT PROJECTS OVER THEIR ENTIRE LIFECYCLE → PREFER RECYCLED MATERIALS FOR URBAN FURNITURE AND OPTIMIZE STREET LIGHTING → EXTEND WASTE RECYCLING FACILITIES AND ENCOURAGE PEOPLE TO USE THEM → PROVIDE A COLLECTION SERVICE FOR BULKY ITEMS; MAKE IT EASIER TO RECOVER AND RECYCLE OBJECTS → CHOOSE LESS POLLUTING VEHICLES FOR FLEETS

FIND OUT MORE

Canada Institute for Scientific and Technical Information, Design for Environment programme: **http://dfe-sce.nrc-cnrc.gc.ca/home_e.html**
Ecocycle Canada, environmental life-cycle management: **www.ec.gc.ca/ecocycle**
Information on products and companies: **www.responsibleshopper.org**
Society of Environmental Toxicology and Chemistry: **www.setac.org**
Centre for Sustainable Design: **www.cfsd.org.uk**
TNO, organization for applied scientific research: **www.tno.nl/homepage.html**
Guide to eco-labels: **www.eco-labels.org**
Cleaner production gateway: **www.cleanerproduction.com**
EcoDesign Resource Society: **www.vcn.bc.ca/edrs**
02 Sustainable design network: **http://o2-usa.org/bayarea/links3.html**
Approach of Industrial ecology: **www.chairetmetal.com/cm06/erkman-complet.htm**
Institute for Engineering Design–Practice: **www.ecodesign.at/information/anwendung/index.en.html**
The EcoDesign Foundation, Sydney, Australia: **www.edf.edu.au**
Container recycling Institute : **www.container-recycling.org**