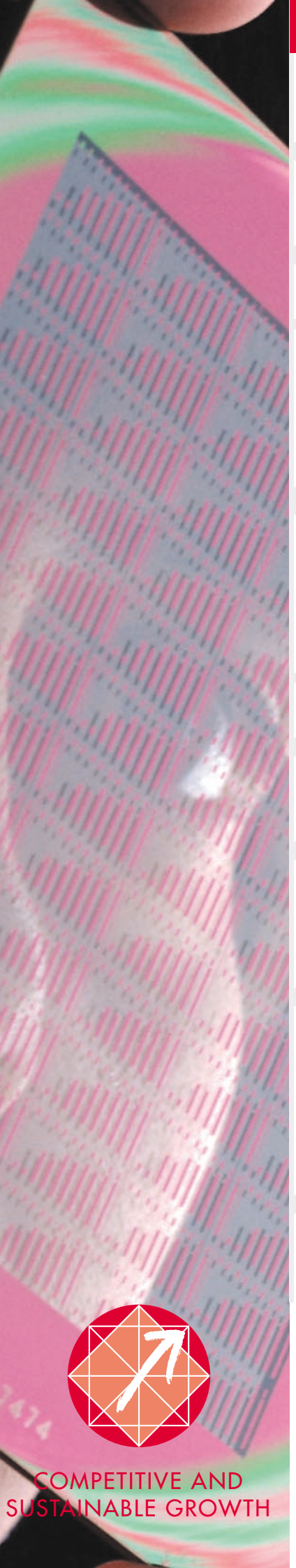


COMPETITIVE AND SUSTAINABLE GROWTH

The Path towards Sustainable Industrial Production...

Industrial production is a key area of human activity. Due to its multi-dimensional importance, it is strongly linked to the three pillars of Sustainable Development: economic competitiveness, social importance (employment, quality of life), and environmental impact.

The future economic power of the European Union will be based on the capability of industry to produce goods and services combining environmental friendliness and competitiveness.

In their efforts to assist EU industry, European Research programs such as BRITE EURAM (FP4) and GROWTH (FP5) have taken these concepts into consideration.

In terms of research activities three main paths are leading towards sustainable industrial production:

Minimising natural resources and energy consumption

- *Research helps to focus on more efficient production systems, machines, industrial processes and plants.*
- *Research supports the development of extended enterprises, knowledge based supply chain and production networks, virtual manufacturing and methodologies to increase overall effectiveness and making optimal use of resources.*

Towards Zero waste production

- *Research helps modernise industrial processes through clean production technologies aiming at reduction of gas emissions, effluents and solid residues and contributing to climate and environment protection.*
- *Research contributes to the development of product-services through a life cycle approach.*

Changing production and consumption patterns

- *Research highlights the need for risk minimisation with a significant improvement in working and living conditions.*
- *Research supports optimisation and monitoring of the life cycle aspects.*
- *Research also contributes to recovery, treatment and safe re-use of products and industrial waste.*

It is vital to adhere to the concept of sustainable development, taking into account the repercussions originating from production, consumption and various socio -economic factors. Research on new industrial technologies or methodologies and risk prevention aiming, not only at a sustainable and even better environment, but also at sustainable competitiveness, represents a key issue.

To leave problems for the next generation to inherit is not acceptable. Indeed, sustainable development encompasses the ability to produce goods that create jobs and guarantee quality of life, without generating a negative impact on the environment.

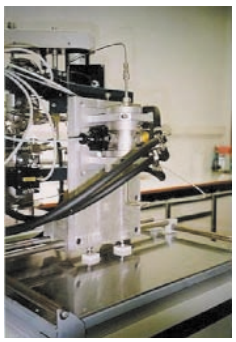
Through European research programmes, industry and associated research organisations are stimulated to cost-shared research actions through a system-oriented approach in which chemistry, physics, engineering, life sciences or social sciences become essential and interdependent.

In the context of the next framework programme and the implementation of the European Research Area, research could be considered as the driving force for sustainable development, providing sustainable technologies, knowledge and support to EU decision-makers, but also pertinent indicators for an appropriate monitoring.

Some EC financed RTD projects and studies are illustrated in the following pages.

Research meets

In line with the strategic goals set by the EU Lisbon meeting of the Council in 2000 try: maintenance of competitiveness and support for sustainable development. At ment of new paradigms of production and new concepts of product-services with h



A novel way for cleaner manufacturing of plastics

Traditional manufacturing of plastics is often made through a polymerisation process that uses solvents as dispersion medium. These solvents can be highly flammable, toxic and not environmentally friendly. Chemists are exploring alternative routes for cleaner and more eco-efficient processes. Among them, supercritical fluids are highly compressed gases, which combine properties of gases and liquids in a fascinating way. Supercritical fluid processes pave the way for promising opportunities to manufacture new products from natural or synthetic sources and to "design" new materials with specific characteristics.

The project SUPERPOL contributes to the modernisation of the plastics manufacturing process. Within industry-university collaboration, it explores the use of supercritical CO_2 ($scCO_2$) in macromolecular chemistry and moreover it offers an environmentally acceptable alternative to conventional and sometimes harmful solvents.

Website
http://lpre1.cperi.forth.gr/~lpre/

Towards zero effluent water systems in the paper and board industries

Paper and board production is one of the most water intensive industrial processes. In Europe, most paper mills release a certain amount of process water as effluent and add fresh water to reduce contamination in the water cycle. Large quantities of dissolved or colloidal contaminants cause a severe deterioration in quality and a drop in productivity. This situation is aggravated by the use of waste paper.

The PAPER KIDNEY project develops technologies to close the water cycle in waste paper using mills. In that case no fresh water is added, resulting in higher water temperatures and increased pollutants. The project proposes a combination of thermophilic aerobic treatment and thermophilic anaerobic treatment combined with integrated biomass separation and ultrafiltration. The project contributes not only to reduced fresh water use but also increases productivity and reduces energy consumption in the targeted board mills.

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IN-TIME storage and e-commercialisation for timber components

In an effort to create a more sustainable system of natural resource, the concept of an "Extended Enterprise" requires new RTD developments for the effective integration of tasks carried out by suppliers, manufacturers, services and logistics companies, etc...

The timber trade is composed of large variety of sometimes very small enterprises. The storage and maintenance of timber is traditionally managed on the ground. Therefore, finding the right product to satisfy an order is time-consuming and may involve dangerous handling operation. Development planners are now implementing sustainable resource management strategies.

Through a "Targeted Research Action" (TRA) on "Extended Enterprises", the project IN-TIME will develop an innovative lean management process for the production, storage and commercialisation of timber components along the supply chain, including builders, depots, sawmills, and log suppliers.

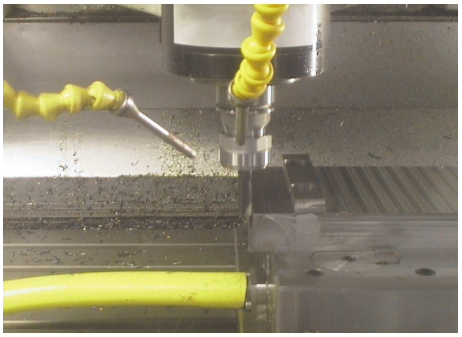
Website
http://www.springer-maschinen.com/

Towards less polluting production technologies

Cooling lubricants are an established component of production technology. These traditional lubricants may be harmful to health. Furthermore any effluents may pollute the soil, water and the air. Legislators and insurers have therefore imposed an increasingly strict network of regulations on the use and disposal of cooling lubricants.

As a result of the drastically reduced availability of cooling lubricants available to industry, and taking into account both economical and ecological advantages, the LEPOCUT project (less pollutant cutting technologies) was conceived.

The project has helped the European community to prepare for an increasing need for environmentally compatible products, including the necessity



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two challenges are binding on our society and, accordingly, on European indus-
he intersection of these needs a principal objective to be pursued is the develop-
gh added value, incorporating the results of scientific and technological research.

for ecological production processes. This in turn improves the quality of life in the European Union.

Website
http://www.cecimo.be/TEAMS/Projects/lepocut/

Safety and reliability of industrial products, systems and structures

SAFERELNET is a Thematic Network gathering European partners, aimed at providing safe and cost effective solutions to industrial products, systems, facilities and structures across different sectors and industries.

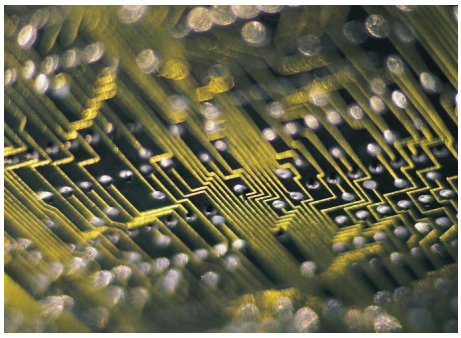
The main emphasis is on the use of reliability based methods for the optimal design, production and operation of products, production facilities, industrial systems and structures.

An integrated approach is planned, balancing economic aspects associated with providing predefined safety levels with the related costs of maintenance and availability.

The thematic network will facilitate interaction between researchers, industry and legislation, promote the exchange of RTD methods and results, the adoption of emerging technologies in the field and general awareness of the crucial aspects of safety and reliability within all industrial sectors.

Saferelnet will contribute to the prevention of risks in a broad range of industrial sectors like Energy, Chemical, Oil & Gas, but also Transport, Infrastructure and Construction.

Website
http://mar.ist.utl.pt/saferelnet/ (soon to be opened)



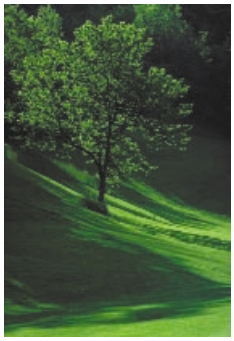
Life cycle approaches for the electronic and electric industries

Evolving customers demands and international regulations are constantly pushing the electronic industry to improve the environmental performance of their products. This not only concerns the environmental impact during the manufacturing phases but also their considerations during the use and end of life phases.

In order to exploit the advanced environmental standards of the European electrical and electronics industries, the GrEEEn project develops a Cost Management System tool for assessing the life cycle costs of different options in the life cycle of the products.

This will facilitate the design and development of eco-efficient electronic and electric equipment and also their ability to be dismantled and safely reused.

Website
http://www.greeen.it/



Social and environmental impacts from energy use

«...Protecting the environment... is not only that people aspire to living in a clean and healthy environment but we must also recognise that the costs and other damages caused by pollution and climate change are considerable...» (Communication on the Sixth Environment Action Programme - COM (2001)31, 24/1/2001).

The quantification of external costs has been a key point tackled by the socio-economic research activities of the programme. The European EXTERNE project, using the "impact pathway analysis", evaluates the damage to the natural and built environment, such as the effects of air pollution on human health and global warming. This damage is translated in monetary terms - through the willingness to pay to counteract any negative impact - for the whole European Union and for different fuel cycles (fossil, nuclear and renewable). In such a way, EXTERNE allows the comparison of technologies on the basis of their socio-environmental costs.

Also thanks to EXTERNE, the new Community guidelines on State aid for environmental protection (OJEC, C 37, 3/2/2001) mention the principle of "prices to reflect costs" stating that the prices of goods or services should incorporate the external costs associated with the negative impact on the environment of their production and marketing.

Website
http://externe.jrc.es

Competitive and Sustainable Production Systems in Europe

Recommendation from an external expert group

The results of a 15-member independent expert group working in the frame of the Growth Programme show how research, technology development and innovation (RTD&I) policies and actions can contribute to competitive and sustainable production systems in Europe in the period to 2020.
Four principal remarks are made:

De-coupling environmental impacts of products from functional performance and value-added

Today
- the European system of production is not sustainable
- current trends in modernisation run the risk of not leading to sustainability
- present EU policies and actions for Research, Technological development and Innovation (RTD&I) will have to be radically re-addressed in order to achieve sustainable production

Support and foster context-breaking approaches based on sufficiency

Institutional, organisational and managerial deficiencies must be overcome through changes in culture and approach based on a re-appraisal of material consumption. This will require a broader and more flexible set of policy instruments.

A framework based on concurrent processes in response to the present system RTD&I system

- generating ideas for innovative approaches in selected socio-technical systems
- understanding socio-technical Systems
- resolving the barriers to change
- supporting enabling technologies
- engaging a variety of actors
- demonstrating and disseminating the processes and their outcomes.

Clear opportunity for international collaboration through co-operation

with other developed industrial economies as well as with developing economies and economies in transition, involving support and commitments to capacity building towards sufficiency strategies and context-breaking pathways.

Additional information to better understand, participate, and benefit from the EC activities is available at

RTD Beyond 2002
http://www.cordis.lu/rtd2002/

The Commission's Proposal for a New Framework Programme (2002-2006)
http://europa.eu.int/comm/research

Thematic Programme "Competitive and Sustainable Growth"
http://europa.eu.int/comm/research/growth/index.html

Thematic Programme "Energy, Environment, and Sustainable Development"
http://europa.eu.int/comm/research/eesd.html

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