eco-innovation observatory

Introducing eco-innovation: from incremental changes to systemic transformations

Eco-Innovation Brief

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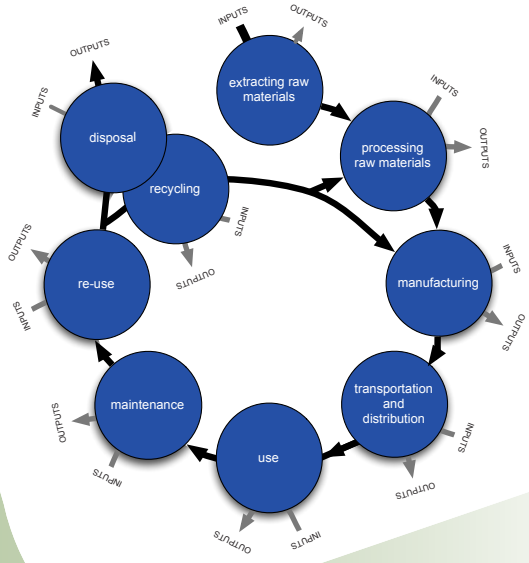

Life cycle phases
Source: Eco-Innovation Observatory

What is eco-innovation?

Eco-innovation is any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole lifecycle.

As all innovations, eco-innovation means bringing a new product (good or service) to the market or implementing a new solution in the production or organisational processes of a company. What distinguishes it from other innovations, however, is that eco-innovation **results in both economic and environmental benefits**.

Environmental benefits include reducing the use of natural resources and decreasing the release of harmful substances per unit output across the whole life cycle. Natural resources include abiotic resources (e.g. minerals, metals), energy (e.g. energy carrying resources such as oil or gas), biotic resources (i.e. biomass), water as well as land. Eco-innovations result in improved resource productivity, lower GHG emissions and reduced waste generation.

The life cycle perspective means that eco-innovation is not simply about reducing input of resources into a single product, but about **an overall better use of resources used to deliver certain utility or service**. In some cases, it may even mean increasing input of resources in the production process if it is to substantially improve the utility and durability as well as to reduce resource use over the lifetime of the new solution.

EUROPEAN COMMISSION

cip competitiveness and innovation framework programme 2007–2013

EUROPE INNOVA

eTAP Environmental Technologies Action Plan

environment

Eco-innovation comes in different forms

All types of innovation can become eco-innovation if their environmental benefits can be demonstrated. **Eco-innovation can thus be a new good or service, process, organisational change, marketing method in a company, but also a wider change with systemic implications for economy and society** (e.g. new urban designs, new transportation systems, new production-consumption models based on services).

The EIO places a particular emphasis on **material flow eco-innovation**. This captures innovations across the value chains of products and processes that lower the material intensity of production and use while increasing the utility of the new good or service. Material flow eco-innovation moves societies from the extract-consume-dispose system of today's resource use towards a more circular system of use and re-use with less total material requirements overall.

Box 1. Examples of different types of eco-innovation

Product eco-innovation: new biodegradable material

ARBOFORM® combines the properties of natural wood with the processing capabilities of thermoplastic materials; it is a biodegradable and renewable polymer which has, to some extent, substituted plastics. With it, TECNARO GmbH (Germany) won the European inventor award 2010 in the SMEs/research category. While this 'bioplastic' can be formed into very precise shapes and is extremely stable, it can also, just like wood, eventually decomposes in landfills.

Process eco-innovation: improving energy efficiency at water treatment plants

Perceptive Engineering Ltd (UK) developed a new real time monitoring and management system of water treatment process. Its WaterMV system at a water treatment works in North West England demonstrated a 25-35% energy saving. WaterMV is a multi-variate model predictive control solution, which enables the operation of a water treatment plant at its optimum efficiency by learning what is efficient and continually monitoring the parameters used to define that situation, using the feedback to adjust inputs as required.

Marketing eco-innovation: green brands

Globe Hope Ltd (Finland) has developed a "green brand" by designing fashionable clothes and positioning itself as an alternative to a fast-paced textile industry. Globe Hope Ltd. uses recycled materials to design and produce new clothes and accessories. The materials used include hospital and army textiles, worker uniforms, advertisement banners, flags, recycled sails, seatbelts and vintage home textiles (e.g. sheets, curtains, and tablecloths). The mission of the company is to offer customers an ecological and sustainable choice and encourage them to move to a more sustainable life styles and way of thinking.

For further information on the above and other examples of eco-innovations see EIO website: http://www.eco-innovation.eu/practice

Material flow eco-innovation may be considered a **system innovation**. System innovations lead to large-scale transformations having social, economic and technological implications. System innovation may include elements or combinations of all types of innovations (product, process, marketing, organisational or social) and are, by definition, developed and implemented by many actors. The observations and analysis undertaken within the observatory also encompass social innovations developed primarily to deliver social value.

From incremental to disruptive changes

The impact of eco-innovation can range from incremental to disruptive. Incremental eco-innovations concern improved components of products or services, improved processes or streamlined organisational set-ups. Incremental changes do not lead to a substantial change alone. They do, however, result in improved environmental performance. Over time, incremental innovations may accumulate and result in a significant change. The scale of application also makes a difference: incremental changes applied on a large scale may lead to substantial environmental and economic benefits.

Innovations that lead to shifts in a paradigm or in the functioning of an entire system are often referred to as **disruptive eco-innovations**. They can lead to reconfiguring entire markets, consumer behaviour and technological systems. Systemic changes resulting from such innovations can make some existing products or services redundant.

Box 2. Examples of potentially disruptive eco-innovations: intelligent mobility

Lorry-Rail (France - Luxembourg)

The Lorry-Rail is a Europe's longest lorry-trailer carrying railway freight service that links Perpignan in the south of France and Bettembourg in the Grand Duchy of Luxembourg. The system enables simultaneous and very fast loading and unloading without using heavy equipment. The Lorry Rail complies with co-modality (optimal use and combination of different modes of transport) as a new concept for intelligent mobility. It enables more competitive logistic chains, the development of intelligent transport systems, decreases in the cost of freight transport, environmental negative impacts, traffic congestion, and it cut journey times down by 20 hours.

© Lorry Rail

Car2go (Germany)

Car2go is a new generation of "car-sharing" designed by Daimler. It involves a vehicle fleet accessible to registered users at all times. It was first launched in Ulm, Germany, where there are now around 20,000 customers with a vehicle fleet of 200 smarts. The main concept is that cars can be spontaneously 'hired' (customers use a chip to unlock the car), kept for as long as needed and left anywhere within the city borders when finished. Daimler has already expanded the concept to Austin, Texas, and has plans to start Car2go in Hamburg and Vancouver BC. The concept of Car2go may present a new mobility concept for densely populated cities.

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Eco-innovations need to be carefully scrutinised before being hailed a win-win solution. Some innovations may indeed lead to negative environmental and social impacts. Problem shifting or rebound effects may occur when, for example, the life cycle implications of resource use and emissions caused by innovation are not considered in the early design and development phases. Unexpected negative environmental impacts may take place if the scale effects are not taken into account (i.e. impacts of applying a new solution on a larger scale or implications of an intensified use of new product). In this context, attention should be given to the potential synergies as well as possible trade-offs between different inputs (e.g. energy, materials, water) and outputs (e.g. emissions, waste) occurring over the life cycle of innovation.

Eco-innovation is needed everywhere

Eco-innovation has the potential to become one of the key ways forward to meeting the environmental, economic and social challenges facing Europe and other continents. It directly tackles the issues of resource scarcity and climate change while taking economic and social factors into account. It is about new practical solutions applied in companies, clusters and supply chains. As a pervasive approach, it is not confined to specific sectors or regions. Eco-innovation can be applied to save money and resources, but also to venture system transformations toward more sustainable economies and societies.

The Eco-Innovation Observatory analyses eco-innovation trends and collects examples of existing and emerging eco-innovative practices. We invite you to explore our reports and on-line resources and welcome your comments and feedback.

Further links and resources

From the Eco-Innovation Observatory:

The EIO website is at **http://www.eco-innovation.eu**

The EIO Methodological Report is at **http://www.eco-innovation.eu/reports**

Good practice examples: eco-innovation in practice: **http://www.eco-innovation.eu/practice**

'The Eco-innovation challenge: Pathways to a resource-efficient Europe' is available at **www.eco-innovation.eu/reports**

The Eco-IS visualization tool is available at **http://database.eco-innovation.eu**

Detailed analyses of eco-innovation in EU Member States are available at **www.eco-innovation.eu/countries**

C-Tech Innovation ...advantage through technology

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