

ECO-INNOVATE!

A guide to eco-innovation
for SMEs and business coaches

Contents

1	Introducing eco-innovation and circular economy	6
2	Revisit your business model	11
3	Eco-innovate production processes.....	17
3.1	Waste and emissions	18
3.2	Material and energy productivity	24
3.3	Supply chains.....	31
4	Eco-innovate products and services.....	36
4.1	Research and development	37
4.2	Design	42
4.3	Marketing	49
5	Get your eco-innovation and circular idea off the ground	54
5.1	Test your idea	55
5.2	Assess your strategic capacity.....	55
5.3	Get your eco-innovation funded	55
5.4	Get your first customer.....	56
6	Examples of European projects on eco-innovation and circular economy	61

Eco-innovation in the European policy

Eco-innovation represents an opportunity for many SMEs to increase their competitiveness and is essential to turn circular economy into a reality. The Eco-Innovation Action Plan (EcoAP) is therefore an important element of the European policy framework for sustainable consumption and production. It reinforces initiatives such as, the Eco-Management and Audit Scheme (EMAS), the EU Ecolabel, the Environmental Technology Verification (ETV) scheme and the Product Environmental Footprint pilot. Since its adoption, the EcoAP has been targeting innovative SMEs. In fact, it recognises innovative front-runner businesses with the European Business Awards for the Environment (EBAE), it opens up funding opportunities under COSME, Horizon 2020, and the LIFE programme and builds on the Enterprise Europe Network (EEN) for business matchmaking. The EcoAP has a dedicated action for funding and SME support, addressing also the complementarity and synergies between the EcoAP and the Green Action Plan for SMEs (GAP).

The GAP, currently under implementation, aims to help SMEs take advantage of the opportunities offered by the transition to a green economy. It presents ways for SMEs to turn environmental challenges into business opportunities, such as in the field of 'circular economy'. The European Commission's Directorate-General for Environment (DG ENV) and for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) are currently working on setting up a web-based resource efficiency self-assessment tool, and the virtual Resource Efficiency Excellence Centre for SMEs, that were pledged in the GAP. The self-assessment tool is to become operational in 2016. The centre will start working in early 2017. It will organise training and events, and produce information resources for SME support organisations on the national level and directly for SMEs.

In December 2015 the European Commission adopted an ambitious Circular Economy Package, including the EU Action Plan for the Circular Economy that

establishes a concrete and ambitious programme of action, with measures covering the whole cycle: from production and consumption to waste management and the market for secondary raw materials. It offers new opportunities for SME to innovate their business models and find new values via circular activities.

DGs ENV, GROW and DG for Research and Innovation (DG RTD) are also working together in order to ensure synergies between the Pilot Project on 'Fostering a green circular economy in Europe through capacity building, networking and exchanges of innovative solutions – Bridging the green innovations gap' and the Resource Efficiency Excellence Centre for SMEs. The main objectives of the pilot project are to facilitate knowledge transfer and exchange of innovative best practices related to circular economy and to build capacity and innovation potential to develop eco-innovative solutions and seize new opportunities in the circular economy.

Not sure what eco-innovation and circular economy can mean for your business? This guide is for you.

This guide is a practical and comprehensive introduction to eco-innovation addressed primarily to small and medium-sized enterprises (SMEs). The booklet overviews emerging business opportunities that eco-innovation and circular economy has to offer to companies that reconsider or start new business models, develop new or improving existing products, technologies or services, or improve production processes.

The aim is to summarise key business issues, questions and lessons learnt for SMEs based on existing resources, notably specific assessment tools, checklists and databases, as well as to present selected eco-innovation good practices.

This guide is addressed above all to companies that have not yet embarked on any eco-innovation activity, but are interested in exploring the potential offered by eco-innovation and circular economy for their business or new business idea.

The publication will be equally useful for business support organisations providing or planning to provide eco-innovation support and coaching services to SMEs.

This guide is one of many publications and information sources developed by the Eco-Innovation Observatory (EIO). Over the years we have gathered convincing evidence on the benefits from eco-innovation, especially regarding cost savings and new market opportunities.

We believe that eco-innovations in SMEs will contribute to a making a sustainable circular economy work in Europe and worldwide.

Visit ec.europa.eu/environment/ecoap, the EU Eco-Innovation action plan website and ec.europa.eu/environment/circular-economy, the EU Action Plan for the Circular Economy website, for further information. Businesses are invited especially to browse practical examples of eco-innovation from across the EU at <https://ec.europa.eu/environment/ecoap/about-eco-innovation/business-fundings>

How to use this guide

This guide is divided into six sections. The “Eco-innovation Wheel” (see Figure 1, right) provides visual guidance on the focus of individual sections.

The opening chapter introduces the concepts of eco-innovation and circular economy. The focus then shifts to the key issues, challenges and opportunities of eco-innovation and circular economy for SMEs.

The guide includes sections on:

- business model and value proposition
- process eco-innovation
- product eco-innovation
- getting eco-innovations on the market
- online resources for eco-innovation and circular economy

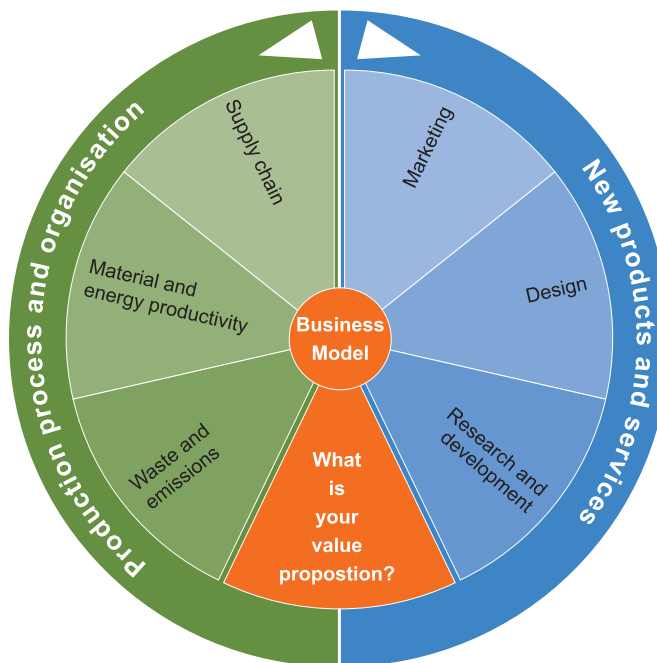


Figure 1: Eco-innovation Wheel

1

Introducing eco-innovation and circular economy

What is eco-innovation?

Eco-innovation makes both economic and environmental sense. It means being economically competitive while respecting the natural environment.

Eco-innovation can be an idea for a new start-up or product as well as for making improvements to existing operations. One focus of eco-innovation is new technologies, but creating new services and introducing organisational changes are just as important. At its core, eco-innovation is about creating business models that are both competitive and respect the environment by reducing resource intensity of products and services.

Eco-innovation takes the full lifecycle perspective into account, rather than just focusing on environmental aspects of individual lifecycle stages. It does not just mean inventing new products and delivering new services, but it also encompasses reducing environmental impacts in the way products are designed, produced, used, reused and recycled.

Incremental eco-innovation focuses on improving existing goods and services, whereas disruptive eco-innovation is about thinking outside of the box and bringing completely novel approaches to market.

Eco-innovation is the introduction of any new or significantly improved product (good or service), process, organisational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole lifecycle¹.

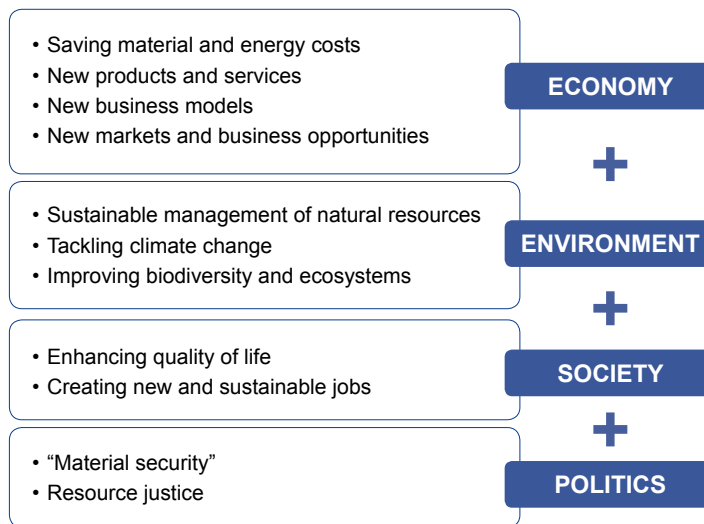


Figure 2 : Why eco-innovation

¹ EIO 2010: Eco-innovation Observatory Annual Report 2010. Pathways to a resource-efficient Europe, www.eco-innovation.eu/index.php?option=com_content&view=article&id=200&Itemid=258

What is Circular economy?

Circular economy is an economy that learns from nature in that it wastes nothing

Circular economy is a concept beyond recycling. The Ellen McArthur Foundation defines it as “an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals which impair re-use, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models”.

The Eco-innovation Observatory (EIO) defines six functional pillars of a circular economy, including Recycling, Remanufacturing, Re-use, Repair, Sharing and Design (Figure 3)

Recycling can generate new streams of secondary resources and new economic opportunities related to that.

Repair and maintenance can play a key role in service-based business models.

Remanufacturing has been called a “hidden giant”² thanks to the economic and job creation potential.

Re-use can include traditional second-hand product use as well as using the components from products

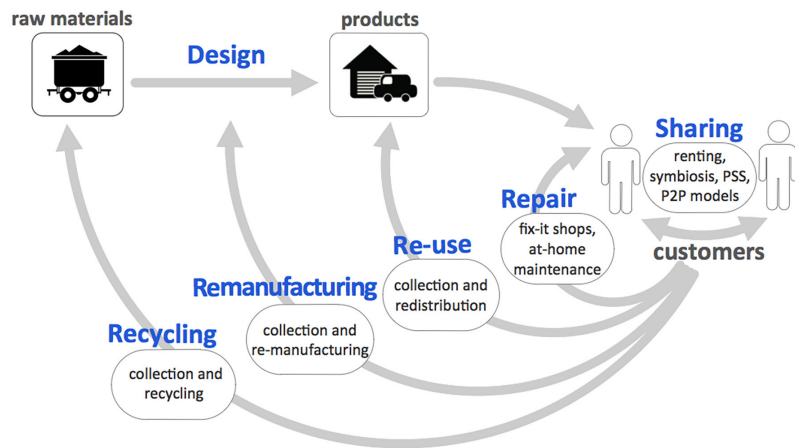


Figure 3: Functional pillars of Circular economy

that are no longer in use (spare parts, fibres from fabric, etc.) in new products. Well-known examples of sharing business models include car-sharing, car-pooling, sharing of holiday houses and laundry facilities.

Design is crucial in circular economy as it can predefine if the product can be repairable, durable recyclable, re-usable, or suitable for shared use, or remanufactured after its life span is over.

²Lund R.T. (1996). The Remanufacturing Industry: Hidden Giant. Boston. Boston University. Final report of Argonne National Laboratory study

Business case for eco-innovation

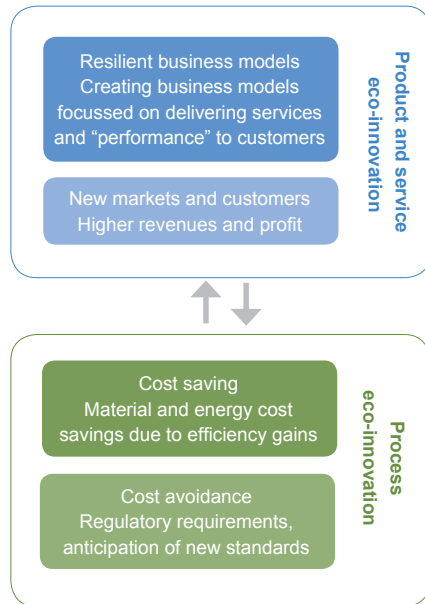


Figure 4: Business case for eco-innovation

Resilient business models

Companies can revisit their **business models and value propositions** by reconsidering novel ways of delivering value to their customers. For example, shifting from products to services (e.g. functional sales) can reduce resource intensity, bring about new market opportunities and make business more resilient in the face of market trends, such as fluctuating commodity prices.

New markets and customers

Companies **developing and selling new eco-innovative products, services and technologies** are motivated by the opportunity to access new markets and customer segments. A clear incentive here is maintaining and generating higher profits.

Cost saving

Eco-innovations resulting in **improved resource productivity** save money by reducing costs of material and energy. This type of "savings opportunity" is especially associated with process innovation and grounded in initiatives like "cleaner and leaner" production. The business case for material efficiency has increased with rising commodity prices.

Complying with regulations

Many companies **eco-innovate their processes and products to comply with regulatory requirements**, but also to meet growing environmental and social standards applied by their strategic partners and clients (e.g. retailers).

Functions	Business cases	Environmental benefits
Sharing	<ul style="list-style-type: none"> • Renting business (tools, equipment, furniture) • Sharing-based business models (e.g. bike-sharing system, washing machine facilities) • "Pay-per-service" business models • Product leasing • Functional sales (e.g. chemical management service, integrated pest control, etc.) • Industrial symbiosis where products and secondary materials are shared 	<ul style="list-style-type: none"> • Lower material use and lower ecological footprint per user of a shared product • Reduction of waste • More careful and efficient input use (e.g. chemicals, secondary materials, etc.)
Repair and maintenance	<ul style="list-style-type: none"> • Maintenance services (e.g. cars, appliances, machines, etc.) • Services for maintenance and retrofitting of old buildings and infrastructure • Business models offering lifetime product guarantees and repairs integrated in after-sales services • Social enterprises, e.g. tech shops, fab labs, repair cafés 	<ul style="list-style-type: none"> • Reduction of waste • Avoided emissions and energy use for managing waste (e.g. landfilling, processing, incineration, etc.) • Reduced consumption of raw materials
Re-use	<ul style="list-style-type: none"> • Second-hand commerce, including social enterprises • Using or building online collaborative platforms and markets (e.g. eBay, Zillow, eBid, etc.) • Redesigning of old products (e.g. clothing, furniture) • Re-use of packaging 	<ul style="list-style-type: none"> • Avoided waste and all emissions and energy associated with it • Avoided consumption of raw materials, energy and emissions for production
Remanufacturing	<ul style="list-style-type: none"> • Remanufacturing old/discarded products and selling them (e.g. medical, precision and optical equipment remanufacturing is a well-established practice) 	<p>Remanufacturing can save 85% of the energy that went into manufacturing the original product</p>
Recycling	<ul style="list-style-type: none"> • Developing and improving more effective recycling technologies (e.g. processes in recycling facilities) • New systems for waste: collection, separation and delivery to recyclers 	<ul style="list-style-type: none"> • Reduction of waste • Avoided emissions and energy use for managing waste (e.g. landfilling, processing, incineration, etc.)
Design	<ul style="list-style-type: none"> • Design of products for businesses (selling or service provision) based on repair, re-use, remanufacturing, recycling • Producing and selling the products that are modular (e.g. modular furniture, partially replaceable tile carpets) or upgradable (e.g. cell phones that can get their phones, screens upgraded) 	<ul style="list-style-type: none"> • Reduced resource use • Reduced waste and associated emissions

Table 1: Business case for Circular economy and environmental benefits

2

Revisit your business model



Revisit your business model

Companies most often decide to rethink and redesign their business model to reduce costs and improve customer experience. Many companies are also driven by environmental and social concerns.

Key challenges for your business model

- Rethink your value proposition and your offer: customers do not necessarily need to own products; services can meet their needs, perhaps even better. Consider concepts like leasing or sharing for your business.
- Scan the horizon: what are emerging trends that may influence your value proposition and business model in the short- and long-term?
- Prepare to take risks: changing a business model is a continuous process. Integrate an ongoing strategic reflection of your business model. This will make your business more resilient.

A fundamental question for any eco-innovative company is how to deliver value to a customer in a way that is both profitable and less resource intensive. Reflecting on how to satisfy fundamental needs of a customer, be it a business or household, is the first step in tackling this challenge.

The need for mobility, for example, does not necessarily equal the need to own a car; the “function” or “performance” of a car can be delivered by many other means and forms of transportation or the need can be addressed by limiting the need for mobility altogether! Similarly, the most effective waste management approach is to avoid generating waste rather than developing even the most effective recycling methods.

KEY QUESTIONS

- What value do we deliver to customers?
- Which customers' needs are we helping to satisfy?
- What are the key activities and resources that help us to develop and deliver value to customers (e.g. skills, resources, strategic partnerships, Intellectual Property)?
- How much does our business model depend on our companies' and our customers' access to and use of material and energy?
- Could we consider an alternative way to satisfy the needs of our customers (e.g. product-service systems)?

Good practice examples

Turntoo: pay for use model

Turntoo (NL) is an intermediary that makes pay-for-use agreements between users and manufacturers in relation to washing machines, carpeting, tiles, furniture, lighting and power monitoring. In such models producers retain ownership of a product and derive their profits from its use rather than its sale. Therefore, they have an incentive to make the product as durable and efficient as possible, as well as designing it so that it can readily reenter the production loop at the end of its lifecycle.

www.turntoo.com/en

Swedish AGA Gas: efficient chemical management system

Swedish AGA Gas offers its customers the ability to continuously introduce safer chemicals at lower consumption levels and with less hazardous waste disposal. AGA Gas reduces their customers' overall chemical procurement costs by reducing use of chemical products, mitigating risks related to the use of chemicals and improving the data management of the chemicals³. www.aga.com

CAR2GO: selling new forms mobility

The “next step” for car-sharing models may be the concept of CAR2GO. This is an urban mobility concept designed by Daimler, which involves a vehicle fleet of “smarts” that are accessible to registered users at all times. 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. The customer is charged per minute, or for longer trips per hour or day, whereas the company pays for fuel and cleaning.

www.car2go.com



³ See more about chemicals management business models in Green Paper by FORA on www.foranet.dk/media/27577/greenpaper_fora_211010.pdf

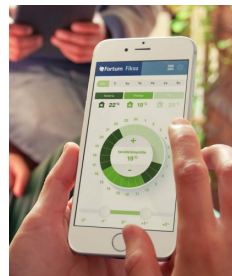
ResQ Club business model: no food wasted

ResQ Club is the start-up with a mission to help people rescue quality food from going to waste. Relying on an intuitive mobile app, users receive notifications directly from local restaurants that have food that is about to go to waste. They can buy selected food directly in the app and pick it up at a chosen time – with an affordable price tag.

<https://resq.club>



THERE energy management solutions



THERE home energy management solutions allows users to connect their home's heating system to the cloud that links home data with the electricity prices and weather data. It helps to make the home heating process to become automatics, more dynamic and efficient, and automatically choose the cheapest and most eco-

logical electricity production hours for heating.

www.therecorporation.com



Learning Resources

Business Model Generation offers a wide range of resources for entrepreneurs and companies on business model innovation.

www.businessmodelgeneration.com/canvas

‘Why New Business Models Matter for Green Growth’ is an OECD green growth paper.

http://www.oecd-ilibrary.org/environment/why-new-business-models-matter-for-green-growth_5k97gk40v3ln-en

Nordic Innovation produced a series of publications on **green business models**

[www.nordicinnovation.org/Publications/green-business-model-](http://www.nordicinnovation.org/Publications/green-business-model-innovation-empirical-and-literature-studies)

[innovation-empirical-and-literature-studies](http://www.nordicinnovation.org/Publications/green-business-model-innovation-empirical-and-literature-studies)

FORA present a number of cases of green business models in its Green paper: **“Green business models in the Nordic Region. A key to promote sustainable growth.”**

www.foranet.dk/media/27577/greenpaper_fora_211010.pdf

INNEON offers a **project toolbox** for entrepreneurs/SMEs who want to design an eco-innovation business plan.

<http://www.inneon.eu/self-help-tools>

Eco-Innovation Manual, a step-by-step guide to support technical experts in assisting SMEs to implement eco-innovation in developing and emerging economies.

<http://www.unep.org/resourceefficiency/Business/Eco-Innovation/TheEco-InnovationProject/Eco-innovationManual/tabid/1059803/Default.aspx>

Measuring environmental performance

Ecological rucksacks are the resource requirements of producing products or services. For products, it is the complete material input needed to manufacture a product from the cradle to the point of sale, minus its own weight. For services, it is the sum of the shares of the rucksacks of the technical means ("Service delivery machines") employed (for example, vehicles, buildings, etc.), plus the sum of materials and energy used to deliver a unit of service³.

MIPS (material input per unit of service) is the life-cycle input of natural material (MI) which is employed to fulfill a human need (S). MIPS is a robust indicator for comparing functionally comparable goods or services in terms of their material or energy requirements.

www.factor10-institute.org/terms.html

The **ecological footprint** is a measure of human demand on the Earth's ecosystems. It represents the amount of biologically productive land and sea area necessary to supply the resources a human population consumes and to assimilate associated waste.

www.ecologicalfootprint.com

The **carbon footprint** measures greenhouse gas (GHG) emissions caused by an organisation, event, product or person. Carbon Trust guide to carbon footprinting for organisations and products.

www.carbontrust.com/resources/guides/carbon-footprinting-and-reporting/carbon-footprinting

EC's LCA database including carbon footprint data of over 300 materials, energy carriers, and delivery of waste treatment and transport

lca.jrc.ec.europa.eu/lcainfohub/datasetArea.vm

Guide to PAS 2050—How to assess the carbon footprint of goods and services

shop.bsigroup.com/en/forms/PASs/PAS-2050-Guide/Confirmation

The **water footprint** of an individual, community or business is defined as the total volume of freshwater used to produce the goods and services consumed by the individual or community or produced by the business.

www.waterfootprint.org

³ See Schmidt-Bleek F., 2011: English glossary: suited for the approach to ecological and economic sustainability. Factor 10 Institute.

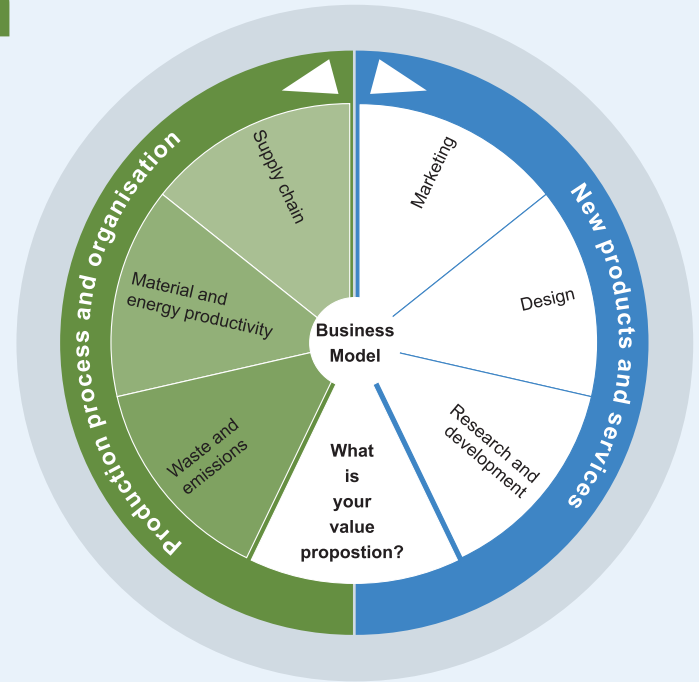
3

Eco-innovation in production processes

3.1 | Waste and emissions

3.2 | Material and energy productivity

3.3 | Supply chains





3.1 | Waste and emissions

Waste management has undergone a radical change. Instead of focussing on treating waste and developing “end of pipe” solutions to reducing emissions the focus has shifted to avoiding or minimising waste and recovering the valuable materials from waste.



Key challenges for your business

Dealing with waste. Disposal costs are typically about 15% of waste management costs. The hidden waste costs could be sinking your company's profit margins. Savings could also take the form of reduced environmental compliance costs⁴.

Monitoring and assessing your waste. Waste minimisation is not just about reducing materials. It involves an examination of the energy, emissions and effort needed to recycle or reuse the waste. When the full cost of waste is understood, initial waste reduction projects often show payback periods of less than one year. As raw material costs rise and the processing of recyclables expands, segregation of waste materials with acceptable levels of contamination becomes economically viable and yields valuable income.

⁴ See Minnesota Technical Assistance Programme
<http://www.mntap.umn.edu/industries/waste.html>



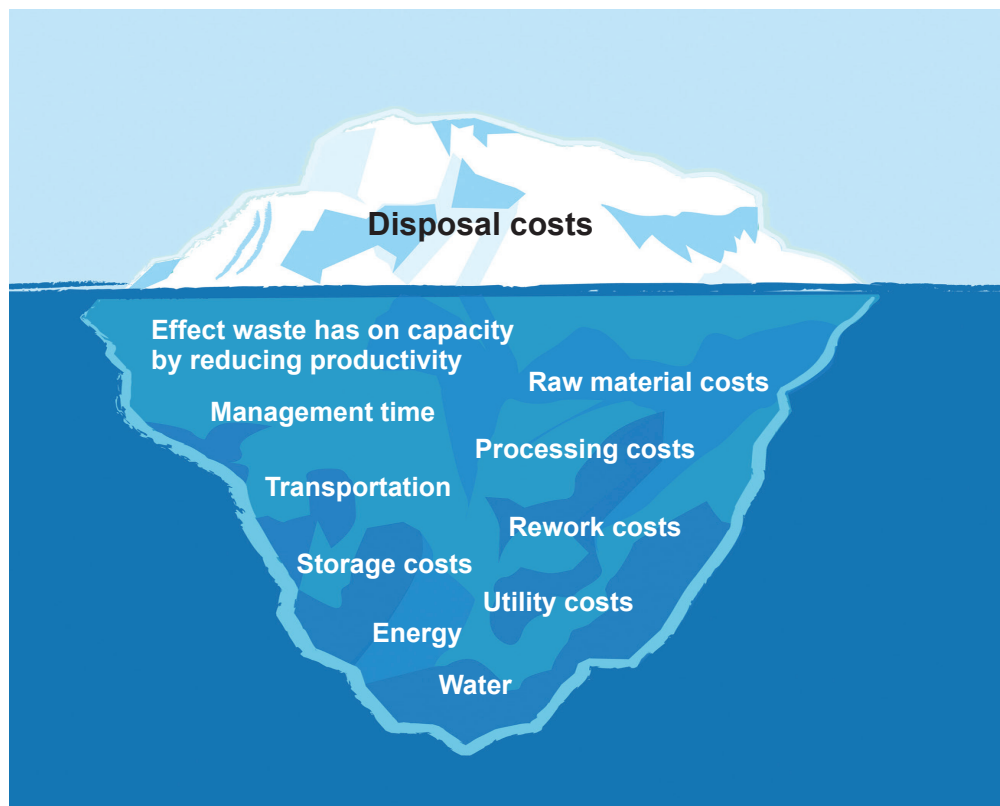
Business case for eco-innovation and circular economy

Reducing waste and emissions

- Establishing partnerships for materials recycling initiatives and waste exchange can lead to good business opportunities and also have positive impacts on the economy and create jobs.
- Brings down regulatory compliance costs, considering that pollution and landfill charges increase each year (currently landfill charges can be as high as €80/tonne).
- Saves costs of raw materials, transport, storage, management etc. over relatively short time periods and with generally low-risk investments.
- Creates a socially responsible image for the company.

KEY QUESTIONS

- What types of waste and emissions does our business produce?
- What are the sources of direct waste and emissions?
- What are the sources of indirect waste and emissions?
- Can our waste become secondary material for our own or other companies?
- Could waste from other companies in our city or region become material for production?



Source: WRAP

Figure 5: Hidden waste costs

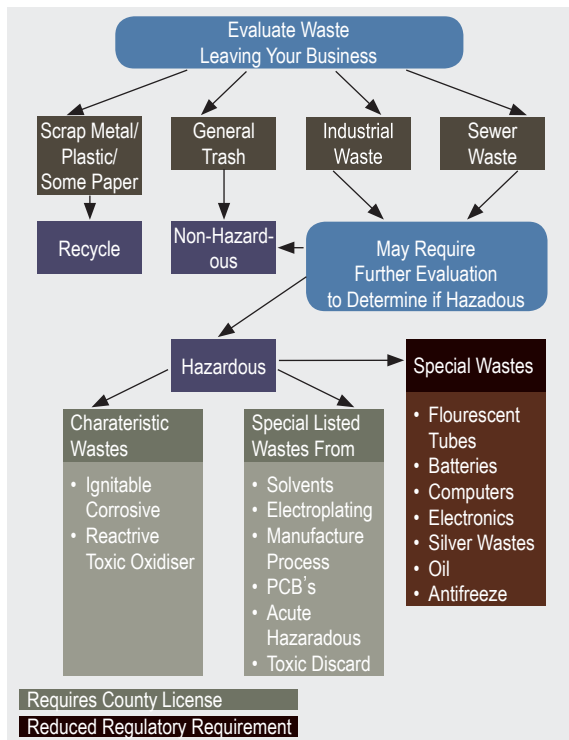
Waste and emissions come in diverse forms (e.g. waste-water, solid and biological waste, chemical waste, air emissions, etc.). **Direct wastes and emissions** refer to those discharged by the production facility and processes such as transportation. **Indirect wastes and emissions** are embedded in the input materials and energy used in the extraction, processing, production, and delivery of products and services.



Quick wins

Reducing waste and emissions in SMEs

- Conducting audits of material use and waste streams will help your business to cut waste and inefficiencies and gain savings (business support in this area is increasingly being promoted and co-funded by governments).
- Selecting materials with high recycling content can minimise your costs for waste disposal.
- Ensuring proper handling and storage may help you to avoid breakages and loss.
- Check if you can re-use specific materials and products and introduce circularity in your activities by collecting and processing materials already existing in circulation today.
- Establishing supplier “take back” schemes could be a way for you to resource used materials for remanufacturing.
- Establishing partnerships for circular use of materials and waste exchange can reduce the amount of waste needed to send for landfill or processing.



Source: UNEP, 2010. PRE-SME—Promoting Resource Efficiency in Small- & Medium-Sized Enterprises: Industrial training handbook

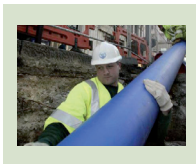
Figure 6 : “Quick wins” in reducing waste and emissions in SMEs

Good practice examples

NISP: leading industrial symbiosis in the UK

The south-east team of the UK National Industrial Symbiosis Programme (NISP) facilitated a complex collaboration between four companies. This network delivered 100,000 tonnes of recovered and reprocessed clay and other materials for reuse from Thames Water's replacement works. This has injected new life into an old deposition site near Chatham Docks and helped to generate additional sales of around €2million and reduce more than 12,000 tonnes of CO₂ emissions.

www.nispnetwork.com/media-centre/case-studies



Destamatic Oyt

Destamatic Oy produces recycled composite products for construction with the underlying objective of manufacturing products that are made of 100% recycled materials. It develops products for construction from construction waste. One of Destamatic's main products, the Destaclean wood stones, are intended among other uses for yard construction and landscaping, and consist of recycled and processed construction waste wood.

www.destamatic.fi/fi/in-english



Rubbish collection based on need

Enevo produces a sensor device that has been likened to a "bloated hockey puck."



The device is installed in municipal rubbish bins and recycling

containers – for example in parks or shopping areas – and monitors the level of waste that is piling up. It can also detect movement and act as a smoke detector. Data generated from the sensors is continuously relayed to municipal managers via a digital management system.

<https://www.enevo.com/>



Genan: turning tyres into new products

The Danish company Genan recycles 80% of all Danish tyres. In 2003 Genan built the



world's largest tyre recycling plant in Germany. The company has developed a product based on rubber powder and

granulates that can be used as a surface in athletic fields or as artificial grass in football fields. It can also be used in paint, floors, reproduction of new tyres, or even as a sound reduction component in new asphalt. Material recycling through the Genan method compared to other disposal methods saves 1–2 tonnes of CO₂ per tonne of scrap tyres. Being one of the pioneers in a new market allowed the company to grow and become one of the world's largest recyclers of used car tyres in just a few years.

www.genan.eu/Tyres-2.aspx

The Textiles Recycling Valley in France

The Textiles Recycling Valley initiative in Northern France puts interdisciplinary collaboration at the forefront of a drive to dramatically increase collection and re-use of textiles. Core partners of the project each bring different skills or



knowledge in convening relevant stakeholders,

textile innovation, reverse logistics, materials re-use and economics. The project has firm targets of sorting/capturing 50% of waste fabric on the market, and re-using/recycling 95% of that by 2019. Going beyond this, Northern France seeks to avoid producing waste by involving diverse companies in rethinking the end of life of their products at the design stage.

<http://www.valleerecyclagetextile.com/>

Newlife Paints: from waste to eco-paint

This UK process for retreating waste paint and turns it back into useable paint. Newlife Paints was started by an industrial chemist who now has a waste carrier's license and agreements with several



household/commercial waste sites to take away their waste paint and retreat it. Newlife Paints also has

agreements with paint manufacturers to take their waste and use it in his product. The company won a contract with a major do-it-yourself retailer to supply their own brand of eco-paint.

www.newlifepaints.com



Learning Resources

- **RESAT – The European Resource Efficiency Self-Assessment Tool** allows SMEs to better understand their resource efficiency performance. It includes practical guidelines and information on how to improve resource productivity by saving energy, water and raw materials, and by reducing and better managing waste.

<https://ec.europa.eu/growth/tools-databases/resat/>

- **The Circularity Indicators** web tool was developed by the Ellen McArthur Foundation and Granta Design, with support from the EU Life Programme. It offers companies free-of-charge access to tools (and a methodology) to assess how well they perform in the context of circular economy, and identify opportunities for introducing more circular design into their products or operations.

<https://www.ellenmacarthurfoundation.org/programmes/insight/circularity-indicators>

- The **OECD Sustainable Manufacturing Toolkit** provides a set of internationally applicable and comparable indicators to measure the environmental performance of manufacturing facilities in any sector, country or size of business. The toolkit includes a step-by-step start-up guide and a web portal providing technical guidance and useful links.

<https://www.oecd.org/innovation/green/toolkit/>

- **PRE-SME.** Promoting Resource Efficiency in Small & Medium-Sized Enterprises is an industrial training handbook. It explains basic concepts like resource efficiency and lifecycle thinking, and includes the “Plan-Do-Check-Act” cycle.

www.unep.org/pdf/PRE-SME_handbook_2010.pdf

- **The Solid and Hazardous Waste Education Center** (Wisconsin, USA) website contains a wide range of resources that could be useful for eco-innovators.

www4.shwec.uwm.edu/shwec

- The Money back through the window initiative of the **KÖVET Association for Sustainable Economies** in Hungary disseminates case study books to help SMEs invest in environmental measures that generate economic returns.

www.environmental-savings.com

- **RREUSE** is a European umbrella for social enterprises with activities in reuse, repair and recycling.

www.rreuse.org

- **National Industrial Symbiosis Programme (NISP)** in the UK helps to identify opportunities where waste products from one industry can be recovered, reprocessed or reused by other businesses, reducing the waste going to landfill.

www.nisppnetwork.com

- **WRAP** is a platform working with businesses, individuals and communities. It provides information and tools that can help in reaping the benefits of reducing waste, developing sustainable products and using resources in an efficient way.

www.wrap.org.uk

- **SMILE.** Saving Money through Industry Links & Exchanges is a free service for business encouraging the sharing and exchanging of resources (Ireland).

www.smileexchange.ie



3.2 | Material and energy productivity

Improving material and energy productivity are cornerstones of circular economy and eco-innovative actions. They can save costs for businesses and lower risk by making companies less dependent on imports.



Key challenges for your business

Global resource extraction and use increased by 132% between 1980 and 2013⁵. This trend cannot continue without serious detrimental consequences for environment.

The price volatility for commodities, notably metals, food and non-food agricultural items, was higher in the 2000s than in any decade of the 20th century⁶. The World Economic Forum (WEF) Global Risks Report 2016 ranked the failure of climate change mitigation and adaptation as the most impactful risk for the years to come, while energy price shocks are at the top of businesses' concerns⁷. At the same time, Europe is the world region most dependent on imports, especially for fossil fuels and metals (Eurostat). Many companies are exposed to risks of raw material supply shortages, price volatility and high material prices. But gathering market intelligence can be challenging for small companies. In order to identify "hot spots" for eco-innovation and circular economy, knowledge on the challenges specific to the materials and energy used in their products is needed.

⁵ SERI, 2016, Global Material Flow Database, 1908-2013 Trend Analysis, www.materialflows.net

⁶ Ellen McArthur Foundation 2012: Towards the circular economy. Economic and business rationale for an accelerated tradition.

⁷ World Economic Forum Global Risks Report 2016, <http://reports.weforum.org/global-risks-2016/>

KEY QUESTIONS

- What type and quantity of materials are consumed throughout the lifecycle of our products and services?
- What energy sources and quantities are consumed in company operations?
- What measures can we take to reduce the use of materials, energy, water and other resources?
- Are we considering alternative materials and different energy sources for your processes and products?
- Who in our company team can support idea generation related to energy and material efficiency opportunities? Is it necessary to get specialised advice?
- Do I have an action plan and assigned team members and budget for implementing the new measures?

Material productivity expresses the amount of economic value generated by a unit of material input or consumption. Energy productivity expresses the amount of economic value generated by one unit of energy input or consumption.

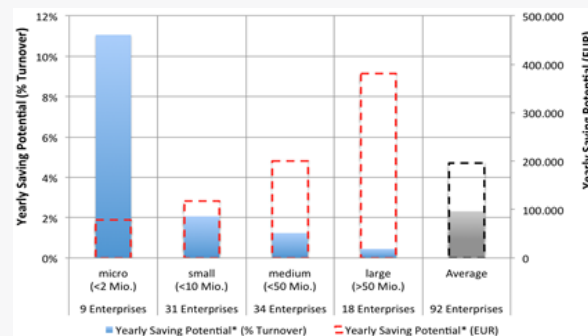


Business case for eco-innovation and circular economy

Reducing waste and emissions

Analysis of case studies in Germany revealed that companies could save around €200,000 per year by implementing material efficiency in the manufacturing sector. On average, these investments paid off after 13 months. Micro companies achieved high relative savings (comparable to 11 % of annual turnover) while large companies had high absolute savings (€350,000 on average).⁸

Other examples of cost savings achieved through material efficiency include some from the work of WRAP UK. Following its programmes of implementing green innovations in the construction sector in 2008-2012, the programme had 800 signatory businesses, prevented 5 million tonnes per year of waste from landfilling, and created cost savings of around £400 million (€510 million) per year to the organisations involved in construction⁹. Several other examples of cost savings were achieved in the food or clothing sectors due to WRAP's work.



Source: EIO 2012 based on data from Demea (N=92)

Figure 7: Yearly savings potential in SMEs introducing material efficiency solutions

⁸ See EIO 2012: Eco-Innovation Observatory Annual Report 2011, Closing the eco-innovation gap, an economic opportunity for business, p. 17, www.eco-innovation.eu/index.php?option=com_content&view=article&id=420&Itemid=210

⁹ See WRAP UK, 2013, "The benefits of classic green innovation in business. Preventing construction, demolition and excavation waste", http://www.wrap.org.uk/system/files/priv_download/The%20benefits%20of%20green%20innovation%20in%20business%20-%20%20Construction%20case%20study.pdf



Quick wins

Cost savings and cost avoidance

- **Invest in material efficiency.** German enterprises that reduced their use of metal achieved average savings of €72,000 per year¹⁰.
- **Substitute resource-intensive materials and products** with new materials, products or services that also improve the functionality of the end product.
- **Select lightweight materials** to improve energy efficiency and the options for storage or handling of the products (see LiSEC).
- **Invest in energy efficiency.** Research by the Carbon Trust showed that large UK businesses undervalue the financial returns from investments in energy efficiency by more than half. This leads them to waste at least £1.6 billion (€2 billion) every year on energy they could easily save through simple energy-saving measures.

www.carbontrust.com/resources/reports/advice/the-business-of-energy-efficiency

Adopting new practices for long-term gains

- **Recover used products and materials and reuse or recirculate** them in the production process. The Italian company Aquafil Group has reexamined the material inputs and improved their resource management system so that it regenerates 10% of the materials it produces (polymers). Apart from cost savings, it reduced CO₂ emissions (kg/tonne) by 29% between 2007–2011 and water consumption by 15%.

www.aquafil.com/en

www.ellenmacarthurfoundation.org/business/articles/case-study-aquafil-group

¹⁰ Around 100 case studies from companies which were supported by demea (The German Material Efficiency Agency) co-funding and consultancy between 2006 and 2010 were assessed by the EIO. See EIO (2012) Closing the eco-innovation gap: an economic opportunity for business, p. 17, www.eco-innovation.eu.

Good practice examples

LISEC: weight and energy efficiency optimisation with glass systems.

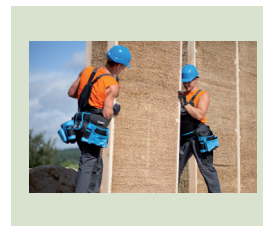
The glass tempering process of LISEC has received the Austrian Innovation Award for the “flatbed” glass tempering technology developed especially for tempering very thin (down to 0.9 mm) and laminated glass. This process helps to reduce resource and energy consumption and leads to cost savings and longer life performances of solar panels.



<http://www.lisec.com/en/Innovation/Flexible-Thin-Glass/LiSEC-revolutionizes-the-glass-tempering-process>

Ecococon: material substitution in construction

A good example from the construction industry is the alternative use of straw-based materials and clay for building. Ecococon in Lithuania is a small company that has started reaping the benefits of building houses out of straw panels, which are cost-effective and have increased the speed of assembling houses at the construction site. Ecococon houses rely on a wood frame, straw as a thermal insulator, and clay plaster as a finish to protect against wind and fire.



www.ecococon.lt



Good practice examples

ElectroSelf: closed-loop energy system

ElectroSelf (Italy) is an enabling technology for distributed energy that self-generates its own fuel and guarantees back-



up power in remote areas. The intelligent closed-loop system stores energy from the grid or when renewables are plentiful and instantaneously releases energy when there is a power dip or outage. ElectroSelf engages immediately whenever external

power fails, and when-ever power is available it automatically generates its own hydrogen and oxygen from water. The producer Electro Power Systems SPA, was nominated as one of the Technology Pioneers in the field of energy and environment by the World Economic Forum in 2012.

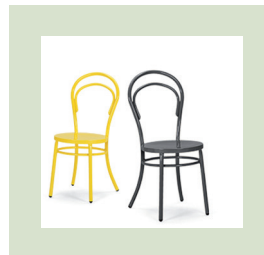
<http://electropowersystems.com/>

WEF 2012, Technology Pioneers report, p. 69

<http://reports.weforum.org/technology-pioneers-2012/>

Made: sustainable furniture

The customers of Made can choose online what the company manufactures by voting on the designs they prefer most. The



company provides furniture directly from the makers and designers, eliminating the need for warehouses, physical stores and intermediaries. This allows for cost savings for customers of up to 70%. The material choice for the furniture production is based on a comparative analysis of

closest equivalent products in functionality, materials and design to “typical high-street” items.

www.made.com/about-us



Learning Resources

- **RESAT – The European Resource Efficiency Self-Assessment Tool** allows SMEs to better understand their resource efficiency and improve resource productivity by saving energy, water and raw materials, and by reducing and better managing waste.

<https://ec.europa.eu/growth/tools-databases/resat/>

- The **material input per unit of service (MIPS)** method compares the material and energy requirements of functionally comparable goods or services. The Wuppertal Institute has developed a step-by-step guide to how to perform MIPS.

www.wupperinst.org/en/publications/entnd/index.html?beitrag_id=1926&bid=169

- The **OECD Sustainable Manufacturing Toolkit** offers well-structured steps on becoming more sustainable and can be found online.

www.oecd.org/innovation/green/toolkit

- The **Competence Platform for Resource Efficiency in Central Europe** provides information on good practices and stakeholders in the field in Central European countries. It also offers a toolkit to assess resource efficiency potential in industrial companies and case studies from companies in the region.

<http://www.resourceefficiencyatlas.eu/toolkit>

- The **Guide Towards The Circular Economy of the Ellen MacArthur Foundation** offers interesting guidance on how businesses can benefit from adopting new practices based on the circular economy philosophy.

www.ellenmacarthurfoundation.org/publications/towards-a-circular-economy-business-rationale-for-an-accelerated-transition

Several in-depth case studies also provide insights on how companies have changed their material inputs, increased material and energy productivity and improved their processes.

<https://www.ellenmacarthurfoundation.org/case-studies>



LiMaS: a comprehensive assessment tool

The LiMaS project (Life Cycle Innovation and Management for SMEs) was funded by the EU to provide SMEs with a practical tool and web application to integrate lifecycle assessment into their business and become aware of the materials and energy flow in their company. The tool enables the user to:

- Determine the applicability and compliance with the environmental legislation affecting the sector, for example the WEEE, RoHS, Eco-design and REACH regulations;
- Monitor the use of hazardous substances in the company;
- Evaluate environmental performance of the company within the frame of an environmental management system, such as ISO 14001 or EMAS;
- Determine the environmental profile of a product by carrying out a simplified lifecycle assessment and determining its carbon footprint.

The Tool comes with two alternatives for use:

- The WebSuite online application is available for free to test
- The EuP Eco-profiler is a cost-free lifecycle assessment software tool for energy-using products and processes for SMEs in this sector.

<http://www.simppl.com/en/products/limas-tools/>



The circular economy toolkit is a free-of-charge resource for companies and facilitators to assess opportunity areas for cradle-to-cradle and circular economy actions within companies.

- The 5-minute toolkit offers information for opportunities to adopt circular economy measures to reduce waste, decrease material use or consider alternative business models for companies active at any stage of the production cycle.
- There are also opportunities for business coaches and facilitators to learn workshop facilitation measures to train companies to integrate circular economy ideas and switch to creating more sustainable products or services.

<http://circulareconomytoolkit.org/index.html>

3.3 | Supply chains

Supply chain management includes coordination and collaboration with suppliers, intermediaries, third party service providers and customers¹¹. Sustainable supply chain management requires the management of environmental, social and economic impacts—and the encouragement of good governance practices—throughout the life-cycle of goods and services¹². Enterprises are scrapping today's 'linear', monolithic model in favour of splintered supply chains, or "supply circles", which are better suited to handle and manage higher levels of complexity¹³.



Key challenges for your business

The challenges related to supply chain management include: coping with the rising volatility of commodity prices and dealing with uncertain supply of materials.

Demand for an improved transparency of supply chain is another challenge increasingly faced by many businesses. More and more customers want to know about the origin of resources used in products and the social and environmental impacts of resource use across the supply chain.

Additional pressure is emerging due to growing enforcement of 'extended producer responsibility' (EPR) policies across countries.

¹¹ Council of Supply Chain Management Professionals (CSCMP), www.cscmp.org

¹² BSR 2011: The Business Case for Supply Chain Sustainability, www.bsr.org/en/our-insights/report-view/the-business-case-for-supply-chain-sustainability-a-brief-for-business-lead

¹³ Ellen MacArthur Foundation and McKinsey

KEY QUESTIONS

- What is our position in the global supply chain?
- What are the most value adding aspects in the supply chain?
- How can the collaboration with partners be improved?
- Where can sustainable practices be applied: from design to purchase, from production to packaging (i.e. shelf-ready packaging), from storage to transport and finally to recycling?
- What are the risks and opportunities of implementing a sustainable supply chain management approach?



THE GREEN DOT. Extended Producer Responsibility (EPR) is "an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of the product's life cycle" (OECD). It involves shifting of responsibility from municipalities to businesses for managing the environmental impacts of their products and services and can take the form of a reuse, buy-back, or recycling programme. This can also be delegated to packaging recovery organisations that are developing to support companies in fulfilling their obligations. PRO Europe and its Green dot licence symbol are one of many examples. Material stewardship is "the responsible provision of materials and supervision of material flows to create maximum societal value and minimum impact on humans and the environment" (ICMM). Materials stewardship encompasses both process and product stewardship.



Business case for eco-innovation and circular economy



Eco-innovation and circularity can be introduced in the supply chain through coordination and integration of tasks. To close the loop in supply chains, companies should think about reverse logistics, reconditioning and remarketing. Constant re-design of supply chains, will enable businesses to find new sources of profit and an advantage over competitors.

Evaluate business case for action

- Evaluate the current approach to supply chain management within your company.
- Set a vision of a new circular or sustainable supply chain: this can be done internally or by involving key suppliers and other related stakeholders.
- Map and measure resource inflows and outflows from the company.
- Explore where “supply circles” or loops can be introduced and how you can work with your partners in this circles.
- Conduct benchmarks and consider what is being done externally in the field.

Map Resources

- Redesign a supply chain map: identify the scope of flows , circular loops, and roles and responsibilities within and outside the company.
- Define internal roles and responsibilities (supply chain manager, committee or at the executive level).
- Evaluate risks and opportunities through a risk management approach or an opportunity-based approach.

Establish a common language

- Set sustainability targets and procurement criteria for the supply chain.
- Develop indicators to monitor performance.
- Develop clear indicators based on the

code of conduct to monitor progress.

- Internal and external communication is also very important at all stages.

Develop collaborative practices and strong relationships with clients and suppliers

- Foster collaborative practices, e.g. mutualised supply management systems, collaborative planning, forecasting and replenishment.
- Encourage cooperation with suppliers to green the supply chain, and with customers to enforce the extended producer responsibility schemes.
- Foster the use of IT and information systems in supply chain management.

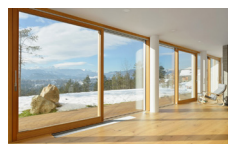
Quick Wins

- Save costs from closing loops and streamlining processes at all steps of the supply chain.
- Procure eco-efficient products and services. According to the Carbon Disclosure Project, 39% of its members and 28% of their suppliers witnessed cost savings after introducing a sustainable procurement approach¹⁴.
- Develop “sustainable stories” to increase customers’ adhesion to the company and its products and services.

Good practice examples

New windows from old materials

A Slovenian company M SORA that emerged from a farming cooperative to become a manufacturer of windows is leading a move away from synthetic window



frames to a new generation of recyclable frames made from wood and aluminium, which are suitable for passive and low-energy houses and applications.

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https://ec.europa.eu/environment/ecoap/about-eco-innovation/business-fundings/slovenian-company-makes-new-windows-old-materials_en

Closing the loop in carpet production

Flooring company Desso have been one of the pioneers of the Cradle to Cradle approach. The company continues to innovate around circular economy principles, developing take-back programmes and products with recyclable yarn that can be



separated from the backing and used over and over again. It has introduced a return system in which the company collects its customers’ used carpets and recycles them into new materials used in carpet production. The company also uses only materials that are biologically or technically recyclable at the end of their useful lives.

<https://www.ellenmacarthurfoundation.org/case-studies/cradle-to-cradle-design-of-carpets>
www.desso.com

¹⁴ <https://www.cdp.net/CDPResults/CDP-Supply-Chain-Report-2012.pdf>



The Footprint Chronicles® : transparency in the supply chain

Patagonia is a US-based company specialised in high-end outdoor clothing. It developed Footprint Chronicles®, an interactive web-based map that provides information on the supplier policy towards sustainability and results of Patagonia's audits in terms of social and environmental indicators.



www.patagonia.com/us/footprint

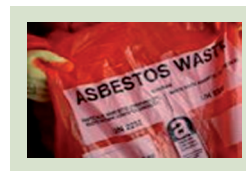
TRI-VIZOR: towards smart freight models

TRI-VIZOR, a spin-off from the University of Antwerp in Belgium, developed an original horizontal cooperation based business model for freight transport. The model is called "smart bundling" and is similar to carpooling, since freight flows also require consolidation. TRI-VIZOR's Cross Supply Chain Methodology® software makes it possible to maximise in real-time the total community gains in cost and CO₂. www.trivizor.com

Shields Environment: recycling and remarketing

Shields Environmental is a UK based company that provides support services to the telecommunication sector, mainly accompanying companies with environmental management solutions and recycling. Its flagship initiative was launched in 2002. The "Fonebak" initiative was the world's first mobile phone recycling scheme. The company saw an increase in turnover of 254 % since the start of the initiative and recruited more than 100 employees.

www.shields-e.com





Learning Resources

- **Towards the Circular Economy**

Accelerating the scale-up across global supply chains

<https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Towards-the-circular-economy-volume-3.pdf>

- **Supply Chain Sustainability: A Practical Guide for Continuous Improvement** (2015) 2nd edition.

The UN Global Compact Initiative and Business for Social Responsibility (BSR) jointly developed a guide on practical steps to implement supply chain sustainability and a guide dedicated to SMEs.

https://www.unglobalcompact.org/docs/issues_doc/supply_chain/SupplyChain-Rep_spread.pdf

- The UN Global Compact's **Quick Self-Assessment and Learning Tool** is an online tool to help companies assess their approach to supply chain sustainability, identify areas for improvement and provide access to relevant resources.

supply-chain-self-assessment.unglobalcompact.org

- **Unchaining Value, Innovative Approaches to Sustainable Supply Sustainability**, UNEP and UNGC (2008)

<http://www.unep.org/resourceefficiency/Portals/24147/scp/unchaining/publications/Unchaining-Value-Final-Report.pdf>

- **BSR Key Performance Indicators for Responsible Sourcing, A Beyond Monitoring Trends Report** (2009)

<http://www.bsr.org/en/our-insights/report-view/key-performance-indicators-for-responsible-sourcing>

- **Circle Assessments** online tool from Circle Economy measures organisations against circular objectives and provides recommendations for how to capitalise on opportunities to minimise future risks by adopting circular business practices

<http://www.circle-economy.com/tool/circleassessment/>

- **The Higg Index:** Developed by the Sustainable Apparel Coalition, an industry-wide group of over 60 apparel and footwear brands, retailers, suppliers, non-profits and NGOs, the Higg index is composed a supplier facility module and a brand/product module.

www.apparelcoalition.org

- Developed by CERES, a non-profit network of investors, companies and public interest groups for sustainable business strategies; the **SAQ** is a **self-assessment questionnaire** for suppliers.

www.ceres.org/resources/reports/supplier-self-assessment-questionnaire-saq-building-the-foundation-for-sustainable-supply-chains/view

- The **Buy Smart+** project is funded by the European programme “Intelligent Energy Europe” and provides free consultation and information material on green procurement. They developed a questionnaire to assess your company’s knowledge of sustainable procurement issues.

www.buy-smart.info/trainingstool-en/training-en

4

Eco-innovate products and services



4.1 | Research and development

4.2 | Design

4.3 | Marketing

4.1 | Research and development

Building eco-innovative capacity into the research & development (R&D) process will help identify new business opportunities. Introducing a circular model or a design of durable, repairable, re-usable, and recyclable products can require substantial R&D efforts.



Key challenges for your business

- Developing eco-innovative and circular, processes, products and services may mean fundamental changes to existing designs, which may be costly in the short term but beneficial in the long term.
- Evaluating risk, especially long-term costs and benefits may be challenging.
- Understanding the environmental impacts across the life-cycle is essential, especially considering the complexity of upstream and downstream direct and indirect impacts.
- Skills (questioning, observing, experimenting and networking) and information relevant to eco-innovative R&D may not be available internally. Sourcing and impartially evaluating information, perhaps through a specialist R&D organisation, may be needed. Partnership brings the added challenge of conveying R&D ambitions and focus.

KEY QUESTIONS

- Does our company have the skills, time and money to pursue relevant R&D?
- Who has the research and technical skills to undertake eco-innovative R&D internally or externally?
- Do R&D staff need to be trained to build internal eco-innovation capacity?
- Is there a possibility to partner with a research organisation or lab in order to implement R&D for new products, technologies or processes?
- How could R&D help identify opportunities?
- Do we have systems in place to monitor eco-innovation trends related to our core business?



Business case for eco-innovation and circular economy

- Integrate environmental and circular economy considerations into the R&D strategy.
- Allocate a specific percentage of the R&D budget to eco-innovations and introduction of circular activities.
- Develop an internal award for the best new ideas.
- If the company wants to develop radical eco-innovation consider the development of a team that sits outside of the normal R&D process.
- Raise awareness and understanding of sustainability and environmental impacts throughout the firm to highlight opportunities and priorities related to eco-innovation alongside other product and service attributes.
- Map lifecycle environmental impacts of products, identify any “material and energy use hotspots” and indicate how resource productivity can be improved.
- Analyse market needs and trends that could stimulate eco-innovation and disseminate your findings to key managers and designers.
- Communicate new technologies, materials and processes to key internal and external stakeholders in R&D.
- Subscribe to sources of information on emerging technologies that could be applied to bring environmental and circular economy benefits.



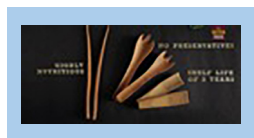
Quick wins

- Engage key partners and stakeholders: this may produce interesting opportunities for new eco-innovative and circular solutions, or ways to reduce environmental impacts of existing products and processes.
- Share causes of environmental impacts, improvement priorities and new technology with designers to stimulate and enable eco-innovation.
- Regularly scan websites, join groups and network proactively to identify emerging eco-innovative technologies, materials and processes.

Good practice examples

Edible cutlery – waste free innovation

After continuous research, the company Bakeys Foods Private Limited (India) have designed the edible cutlery as an alternative to disposable plastic/



wood cutlery and bamboo chopsticks. The cutlery is made of flours of rice, wheat, jowar and water, and come in plain, savoury and sweet flavours.

<http://www.bakeys.com/>

Trulstech: biodegradable flame retardant

The science behind natural fire protection known as the Molecular Heat Eater led to Swedish inventor Mats Nilsson founding **Trulstech**. If heat and oxygen are channelled away then there is no chance for a fire. While materials like asbestos and chemicals such as bromides are toxic and potentially harmful, Mats' innovation can be extracted from grape pomace and citrus fruits.

www.trulstech.com

First Energy: efficient wood-burning stove



A wood-burning stove, invented by the Indian start-up company **First Energy**, consumes less energy and produces

less smoke than regular stoves.

www.firstenergy.in

TECNARO: new sustainable materials

Arboform®, a new material developed by **TECNARO GmbH**, combines the proper-



ties of natural wood with the processing capabilities of thermoplastic materials. The material is a biodegradable and

renewable polymer, which has already substituted plastics in many products, e.g. various components used in automotive sector, furniture, toys etc.

www.tecnaro.de



Nylon yarn from waste materials

Aquafil, producers of nylon yarn, designed the Econyl system. Econyl enables Poly-



amide 6 or Nylon 6 post-industrial and post-consumer waste to be manufactured new Nylon 6 with no loss of quality. Key to

success is the Reclaiming Programme, an essential tool to facilitate a reverse supply chain and ensure reliable materials inputs.

<https://www.ellenmacarthurfoundation.org/case-studies/production-of-nylon-yarn-from-waste-materials>

Glowee – bioluminescent street lighting

A French start-up plans to use natural bioluminescence in street lighting and shop-



front displays. Glowee is working to cut electricity consumption by

developing illumination based on bacteria into which a bioluminescent gene has been inserted. The company takes inspiration from sea creatures, many of which are bioluminescent to some degree – for example, algae, jellyfish and squid. When placed in a suitable environment, the glowing bacteria created by Glowee multiply and can therefore, in principle, be scaled up into large lighting displays.

www.glowee.fr

Bioplastics for packaging

Company Nipon Ltd. has developed a prototype for producing bioplastic packaging.



Bioplastics are made from renewable biomass, such as starch and polylactic acid from plants. These new materials' char-

acteristics are very similar to traditional plastics, but they are more durable and biodegradable. The new bioplastic packaging is cheaper than previously available options and companies will be able to customise shape, colour, size and finish according to their needs.

<http://www.nipon.lv>



Learning Resources

- **MATREC** materials database showcases developments in new, recycled materials.
www.matrec.it/en/materials-catalogue/recycled-materials
- **IPR SME HELPDESK** – Free business tools for SMEs to manage Intellectual Property Rights (IPR). These take the form of jargon-free, first-line, confidential advice on intellectual property and related issues, plus training, materials and online resources.
<http://www.ipr-hub.eu/>
- **Enterprise Europe Network** shares new technologies for partnering and licensing.
portal.enterprise-europe-network.ec.europa.eu
- **EUREKA** is a European network that supports businesses carrying out R&D.
www.eurekanetwork.org/supporting
- **INNEON** supports innovative SMEs in converting their innovations into business ideas.
<http://www.inneon.eu/services>



4.2 | Design

Eco-design is at the cornerstone of the circular economy. It implies the integration of environmental considerations into product design and development that aims to improve performance throughout the product's life cycle. Many adverse environmental impacts can be minimised or avoided at the design stage. Proactively addressing sustainability issues at the “front of the pipe” will therefore generate most benefits. For instance, design specifies which materials and to some extent which production methods will be applied. It also affects the potential reuse, recycling or disposal, as well as the indirect impacts from distribution of new products.



Key challenges for your business

- Design may be performed by product designers, design engineers, consultants or can be completed by other technical or business functions as part of other responsibilities.
- In smaller companies design, market research and R&D may be fairly closely integrated. When this is not the case, activities like the evaluation of alternative technologies, competitor products and product concepts, and environmental performance criteria need to be closely connected to establishing the design brief and informing designers' decision making.
- Tackling single product attributes such as recyclability, biodegradability or energy-efficiency may not mean that a product has a lower environmental impact overall. A more thorough lifecycle approach is necessary to manage trade-offs, where one attribute of a product, such as the use of an energy-intensive material, is counter-balanced by another, e.g. may create better or worse resource efficiency of the product.
- A common challenge is to cost-effectively calculate environmental impacts for designs that are not fully-specified and decide on trade-offs between different types of environmental impacts, e.g. CO₂ emissions versus scarce resource depletion versus toxic material dispersion expert judgements may be needed.
- Radically new solutions may demand creativity applied alongside the systematic life-cycle approach, with inspiration possibly not easily available internally.
- Existing process development and production resources may limit what is possible internally or externally.
- Communicating data or information on a product's environmental impacts is not always a strong motivator for customers or users to change behaviour e.g. reduction in energy in the use phase. Designers may choose to explore user-centred design approaches to help customer and/or users reduce their environmental impacts.

KEY QUESTIONS

- What product design options are there to improve the environmental performance of products?
- What is the potential to extend product life and reuse, remanufacture, repair, upgrade or recycle all/ part of the product? Are parts separable?
- Can less material and fewer material types be used, or materials substituted for alternatives with less impact e.g. recycled/re-cyclable?
- Can any energy, water and consumables used by the product in use be reduced, or substituted for those with less impact? (See EcoDesign Checklist, page 45)
- What data and tools are available to assess the (quantified) environmental impacts in each stage of the product life cycle at the design stage? Does using these tools require training or external expertise to ensure results are accurate and understandable?
- What product design features or user information will enable low-impact behaviours? Are materials marked, also with recycling information?
- Can design enable lower impact production e.g. production consumables?
- What expertise is needed for eco-design? Can it be built internally or contracted? Which phases of development, e.g. prototyping, are best done externally?



Business case for eco-innovation

- Identify the appropriate focal areas of eco-design for your products and services (e.g. energy, water, packaging, recycling and lifetime reliability). For example, Philips as an electronics company explored opportunities to improve product-related environmental performance in six focal areas: reduced weight, increased energy efficiency, reduced packaging, increased re-cyclability, substitution of hazardous materials and increased longevity.
- Add environmental criteria to product design and evaluate comparable, working prototypes with customer representatives to confirm the likely environmental performance related to typical user-behaviour. Similarly, define environmental validation requirements taking into account both customer specifications and other potential failures.
- If eco-design expertise is not available in-house, you may choose to train a designer, contract an external consultancy or partner with an appropriate university or technical school.
- Find suitable tools to assess (preferably quantifiable) predicted impacts and enable designers to learn how to compare alternatives during design.
- Stimulate creative approaches, diverse concepts and involve stakeholders/experts. Reward buy-in when concepts eco-innovative ideas are implemented.
- Choose whether to pursue patents to protect the novel function, or registered designs to protect the novel and distinctive (non-functional) 3D form.

How does the product system actually fulfil customer needs?

Consider:

- ☐ Dematerialisation
- ☐ Shared use of the product
- ☐ Integration of functions
- ☐ Functional optimisation of product (components)

What problems arise in the production and supply of materials and components?

Consider:

- ☐ Clean/renewable/low energy content materials
- ☐ Recycled materials
- ☐ Recyclable materials
- ☐ Reduction in weight
- ☐ Reduction in (transport) volume

What problems can arise in the production process in your own company?

Consider:

- ☐ Alternative production techniques
- ☐ Low/clean energy consumption
- ☐ Less production waste
- ☐ Few/clean production consumables

What problems can arise in the distribution of the product to the customer?

Consider:

- ☐ Reduction in weight
- ☐ Reduction in (transport) volume
- ☐ Less/clean/reusable packaging
- ☐ Energy-efficient transport mode
- ☐ Energy-efficient logistics

What problems arise when using, operating, servicing and repairing the product?

Consider:

- ☐ Low energy or cleaner energy consumption
- ☐ Few/clean consumables
- ☐ No wastage of energy or consumables
- ☐ Reliability & durability
- ☐ Easy maintenance & repair
- ☐ Modular product structure
- ☐ Strong product-user relation

What problems arise in the recovery and disposal of the product?

Consider:

- ☐ Reuse of product (components)
- ☐ Remanufacturing/refurbishing
- ☐ Recycling of materials
- ☐ Safe incineration



Quick wins

- Creative approaches and focused improvement strategies help identify potential design improvement.
- Environmental criteria enable design evaluation and comparison e.g. with competitors, involving customers informs their relative importance.
- Tools for assessment help designers to directly inform their decision-making.
- Decisions on patents or registered designs can help secure the value of designs.
- Design of packaging focused on lightweight or re-usable packaging can generate resource, energy and cost savings.

“The eco-design checklist can act like a catalyst, influencing the way you think and design. Focusing on the environmental aspects of a product makes you start asking questions of suppliers and customers in the supply chain, and this questioning can drive innovation. The result of that can be products that give a real competitive edge, such as adding value in the supply chain, as we have done.”

“In addition, we know that the PCB is more easily disassembled to its component parts at its end of life, making it easier to recycle. It can now be disassembled with one screwdriver.” The entire new PCB was produced at no extra cost. The company soon used the knowledge it has gained in a new contract, which it won partly because of its eco-design capabilities.”

John Simmonds, Managing director, Crawford, Hansford & Kimber

Good practice examples

gDiapers – Redefining Disposable Diapers via redesign

gDiapers acknowledged the environmental impact of diapers and



went back to the drawing board to answer the following questions:

- What part of the diaper actually needs to be disposed, what can we keep re-usable?
- Can we make the disposable part as eco-friendly as possible?
- Can we improve the product along the way?

The result was a combination of a re-usable pants, in which disposable, biodegradable inserts can be laid that be composted, flushed or landfilled. By using more natural materials and less plastic, the product is friendlier to the skin. In addition, the re-usable pants can be designed to look better because they don't have to be disposed.

With this approach, gDiapers became the first Cradle-to-Cradle certified company in the USA. This green image got the company a lot of attention, new customers and a positive environmental impact.

www.gdiapers.com/

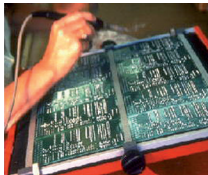
OrangeBox: C2C for sustainable design

OrangeBox used a “cradle to cradle” approach to apply materials safe and suitable to recycle. The Ara chair design, for example, achieves product light weighting through a mono-material backing unit, improved assembly and disassembly times and improved overall resource efficiency. Orangebox has set up a recycling centre at their site in Wales achieving a significant return on investment and reduction of materials sent to landfill. Orangebox has been actively embedding eco-design for a number of years, involving all the company’s personnel from shop floor through to senior management.

<http://www.ecodesign-centres.org/ecodesign-centre-wales-case-studies.htm>

Crawford Hansford & Kimber: a cleaner printed circuit board

Crawford Hansford & Kimber developed a ‘cleaner’ printed circuit board (PCB) that is now in use in higher education around the world, incorporated into equipment that interfaces with data loggers. The eco-design approach followed training around an eco-design checklist, which prompted the use of new materials in the outsourced printed circuit board base; new track design; the reduction in the chemicals used in the production process; and the substitution of lead by organic silver in the soldering process. www.crawfordhk.com/study.html



Saving cost and waste via redesign of packaging: case of cleaning supplies by Replenish

When consumers buy cleaning supplies, they buy a mix of chemicals and water, often in a 10:90 mix so the product is not irritable, toxic or damaging when in contact with materials or skin. But what

the consumer actually wants is the right mix of chemicals to clean the house. **Replenish** went back to rethink what consumers actually desire from the product, and strived to deliver that in a safe, environmentally friendly way. They came up with a re-usable, refillable bottle to which the consumer can attach car-



tridges that contain the actual cleaning chemicals. The combination of the bottle and cartridge is filled with tap water, then mixed and ready for use. This system saves:

- Materials, by having re-usable bottles and cartridges;
- Transport movements and weight;
- Costs for both the producer and the consumer.

<http://www.myreplenish.com>



Learning Resources

- Granta Design, a Cambridge University spin-off, produced an **Eco-design Guide** for starters that offers an easy-to-understand overview of how to start with eco-design.

www.grantadesign.com/eco/ecodesign.htm

- An award-winning open online product design course, and design guide containing an eco-design checklist, is available from TU Delft

<https://ocw.tudelft.nl/courses/delft-design-guide/subjects/>

- Ellen McArthur Foundation offers a list of courses that can be taken online free of charge to understand the principles of the circular economy.

<https://www.ellenmacarthurfoundation.org/programmes/education/courses>

- The Ellen McArthur Foundation website also provides an very diverse range of online resources for education in circular economy specific topics such as Design Technology.

<https://kumu.io/ellenmacarthurfoundation/educational-resources#ce-general-resources-map/key-for-general-resources-map>

- AskNature is a catalogue of nature's solutions to human design challenges that can be sources of inspiration in new products or services design.

http://www.asknature.org/article/view/why_asknature

- The **Eco-strategy Wheel** may be used with ratings of performance to illustrate existing product, priorities for the new product and achievements.

cfsd.org.uk/seeba/general/ecostrat.zip

- For energy-using products, a lifecycle assessment tool (EuPeco-profiler)

www.limas-eup.eu/ecoprofiler/new_eco_profiler_user?lang=en

- Generic guidance Guide to PAS 2050 – How to assess the carbon footprint of goods and services

<http://shop.bsigroup.com/en/forms/PASs/PAS-2050-Guide/Confirmation/>

- The **ECODESIGN Pilot and Assistant** is an online eco-design guide for improving environmental performance and resource efficiency of different types of products (e.g. raw material intensive, transportation intensive etc.). The guide suggests appropriate eco-design measures for products that can be taken at different phases of product lifecycle.

www.ecodesign.at/pilot/ONLINE/ENGLISH/INFO/SITEMAP.HTM

4.3 | Marketing

Today's customers buy greener products, services or technologies because they work better, save money or enhance health. Eco-brands integrate relevant environmental benefits into products alongside cost and quality and communicate evidence-based messages - but avoid greenwashing.



Key challenges for your business

- Customers whether they are end consumers or buyers in business or government are increasingly integrating environmental and social considerations into purchasing decisions.
 - Market research may highlight important areas of environmental or social interest, improvement or concern related to existing or new eco-innovative products, services or technologies.
 - Identifying more radical product concepts or new business models driven by environmental considerations will require approaches outside of normal day-to-day R&D processes with dialogue with a range of stakeholders including customers, partners or suppliers.
 - Lifecycle considerations are increasingly important to customers e.g. companies need to understand how products are sourced, manufactured, packaged and disposed.
 - Understanding customer and user behaviour is important. User behaviour may be a strong determinant of a product's environmental impact e.g. reducing energy consumption in the use phase of products' lifecycle is a key area for consumer electronics or "white goods".
- Companies need to address environmental aspects at all stages of the customer experience:
 - **Awareness** - how do we raise awareness about products and services?
 - **Evaluation** - how do we help people evaluate greener value propositions?
 - **Purchase** - how do customers purchase products and services?
 - **Delivery** - how do we deliver a greener value proposition to customers?
 - **After sales** - how do we provide greener post-purchase support?
 - Greener customers are influenced by recommendations of trusted peers and third parties. There is a backlash against perceived greenwashing, therefore companies must be clear about the environmental impacts of products.
 - Proactive companies build trust related to environmental and other issues through engaging customers in meaningful conversations through a variety of media, especially via websites and online social networks, rather than by simply talking "at" customers through traditional media.



KEY QUESTIONS

- Have we completed market research amongst customer groups to determine environmental awareness, understanding, potential opportunities and concerns?
- Who are the target audiences - consumer, business, retail or government - that we aim to create value for? What are the characteristics of our core customer groups (e.g. mass, niche, segmented)? What type of relationship does each customer type expect from us? How do we establish and maintain strong customer relationships? How can environmental considerations become integrated into customer relationships and integral to our business model?
- Which combination of customer needs are the companies' products satisfying e.g. newness, performance customisation, "getting the job done", design, reputation, price, cost reduction, risk reduction, accessibility, convenience and/or usability? How does improved environmental performance (e.g. reduced energy consumption and lower costs) strengthen the product's offer? How do we incorporate environmental performance related data in communications?
- What is the product's Unique Selling Proposition (USP) relative to competitive offers? Has environmental benchmarking been completed on indirectly and directly competing products?
- Can the product's environmental features and benefits strengthen the USP? For example, product A has a X% lower electricity consumption with Y% lower CO2 emissions which means that customers energy bills are reduced by €Z per month.
- What will the market pay? How will the perceived "added value" or business benefits from distinct environmental performance affect pricing, costing and communications?
- What "added value" environmental benefits can be attached to the core concept ? How can stakeholders be rewarded for adopting and promoting pro-environmental behaviour?



Business case for eco-innovation and circular economy

- Feedback from market research and ongoing communications with customers and other stakeholders can identify new opportunities for eco and circular innovations.
- Eco-labels, like Fairtrade or Rainforest Alliance Certified for example, have played an important role in ensuring ongoing credibility and accountability, but it is still important to tell the company or product story in a clear and simple way.
- Promotion based on clear evidence-based claims related to environmental performance will enhance internal and external reputation.
 - Test stakeholders' responses and attitudes surrounding environmental aspects. Engage existing and potential customers, as well as other stakeholders, in conversations through a variety of media. Use positive and negative feedback to improve business/product development and promotional strategies.
 - Benchmark your product(s) against competitors on environmental aspects and benefits, alongside function, cost, pricing, etc.
 - Determine if your product's environmental performance adds to your USP and integrate positives into communications with customers.
 - Ensure environmental performance claims are valid and understandable before you incorporate them into promotional messages.

- Use social networks (Facebook, Twitter, LinkedIn etc.) selectively and carefully to promote product-related environmental messages.
- Develop press relationships with environmental media and websites and communicate good news.



Quick wins

- Determining the extent of customers and other stakeholders environmental awareness and understanding may help to reveal business opportunities or threats.
- Identifying product(s) environmental features and business benefits may help determine areas for product differentiation.
- Researching competitors product environmental performance may identify relative strengths of your product that you can exploit in promotion.
- Communications incorporating understandable, valid and clear environmental performance claims underpinned by fact-based information will build trust and reputation amongst customers.
- Establishing a reputation for environmental knowledge and expertise may attract new prospects and generate new customers.

Good practice

Elvis & Kresse have been reclaiming materials, such as the discarded fire hoses destined for landfill. The company achieved international press features for their bags and fashion accessories made from waste, as well as other awards and accreditations.

www.elvisandkresse.com/

Mud Jeans is a jeans producer that builds its production module on circularity principles. Mud Jeans are made with 30% recycled content and 70% organic cotton. Customers can lease jeans and return them for repair or recycling. Due to the multiple options for buying and re-selling



Mud Jeans, the company CEO Bert van Son sees “endless marketing opportunities” around his products, especially around maintaining and re-selling – the tighter loops of a circular economy.

<http://www.mudjeans.eu/>

FRUTA FEIA : “Beautiful people eat Ugly Fruit” is the motto of the Portuguese initiative Fruta Feia (Ugly Fruit), which targets product that is rejected in terms of calibre and general appearance by the distributors, defined by standard guidelines. Ugly Fruit is a



cooperative of producers that breaks with this modus operandi and tries to invert the normalisation of fruits and vegetables that are not related with health and safety issues. Ugly Fruit sells fruits and vegetables in 3-4 kg and 6-8 kg boxes, in prices that range from €3.50 to €7. It currently has 800 consumers (with 2000 signed up) and prevents the end disposal of 4 tonnes of waste per week.

<http://frutafeia.pt/>

Holis market is derived from “holistic” and is an innovative concept for a new generation of food retail markets, combining a radical zero-waste food packaging philosophy with initiatives to raise public awareness and information with regard to diet change. All



products in the Holis market are sold without packaging, i.e. customers bring their own bins or buy food in returnable bowls. Holis provides ready-made food packages for vegetarian or vegan recipes with organic

ingredients from regional sources to prepare at home, or alternatively offers snacks directly in the market. In the evenings, cooking courses can be booked at Holis.

<http://holis-market.at/>



Learning Resources

- SIGMA - Sustainability Marketing Guide contains four steps towards sustainability marketing as well as some practical lessons.

www.projectsigma.co.uk/Toolkit/SIGMASustainabilityMarketing.pdf

- Jacquie Ottman - New Rules of Green Marketing

www.greenmarketing.com/our-book

- Charter et. al - Marketing & Sustainability BRASS (Cardiff University) and The Centre for Sustainable Design, 2002

cfsd.org.uk/smart-know-net/smart-know-net.pdf

- The EU Eco-label helps identify products and services that have a reduced environmental impact. It is a voluntary label used following certification through independent compliance checks, following a simple online application process with special discounts for SMEs.

ec.europa.eu/environment/ecolabel

- Eco-labels

limas.simpple.com/resources/results-communication-eco-labels

- ISO guidelines on environmental labelling

www.iso.org/iso/environmental-labelling.pdf

- Defra - “Green Claims Guidance” provides clear principles and examples.

www.defra.gov.uk/environment/economy/products-consumers/green-claims-labels/

5

**Get your eco-innovation
and circular business
idea off the ground**

Test your idea

- What are the features and benefits of your eco-innovative or circular product, service or technology?
- What value does your new product, service or technology deliver to your customers?
- Who are the potential customers for your product?
- Have you done any market research?
- Who are your competitors? Have you benchmarked your product, service or technology compared to competitive products and services? What are relative benefits of your product compared to competitive offers?

Assess your strategic capacity

- What knowledge and skills does your company possess? What are your strengths and weaknesses?
- What knowledge, skills or other resources do you need to obtain from external sources to develop a new product, service or technology? How will you organise the process of pulling internal assets and external expertise together (e.g. long-standing partnerships, short-term contracts)?
- Do you need to set up a partnership with consultants or companies that possess this expertise?
- Do you need to train yourself (or partners) in order to move a weakness into part of your skill set and build competence?
- Do you make the product yourself (and invest in production equipment) or do you outsource the production to a contract manufacturer?
- If you are at an early stage of your company or product development, are there

any incubation or acceleration programmes you could join to gain access to training, coaching and a network of funders and potential partners?

Get your eco-innovation funded

- What amount of funding do you need for which tasks?
- Have you considered your fixed costs?
- What sources of funding are available: self funding, friends and family, overdraft, credit cards, bank loans, venture capital, “angel investors”, share ownership, and “crowd funding”?
- What are the risks associated with each source of funding?
- What types of free or subsidised funding or business support is available from government programmes or SME business support agencies in your country?

Get your first customer

- What is your target market? Are you focussing on business-to-business (B2B) or business-to-customer (B2C) markets?
- What is your pricing strategy?
- How are you going to get your product to the market (e.g. warehousing, retail or online?)
- Do you have a good understanding and evidence of environmental performance of your product, service or technology? Have you got evidence to back up your claims? Greenwashing must be avoided!
- How are you going to create “noise” in the market and amongst your customers?
- What can you do yourself? What will you need to outsource? What can you address by establishing new collaborative arrangements?



Good practice

HPW: towards integrated sustainable design

An established SME specialised in architectural practice recognised that sustainability was becoming a growing business issue and that many of its competitors did not have robust knowledge-based skills. In order to ‘upskill’ the business, the Creative Director attended a master’s degree course in eco-innovative building technologies and processes. The company is now winning business due to its knowledge-based skill-set.

www.hpw.co.uk



Learning Resources

- Selling sustainability - a report by NESTA
<http://www.nesta.org.uk/publications/selling-sustainability>
- Selling sustainability - a ‘primer for marketers’ by Futerra and BSR
http://www.wearefuterra.com/wp-content/uploads/2015/10/FuterraBSR_SellingSustainability2015.pdf

Crowdfunding and impact investment for eco-innovators and circular economy solutions

What is crowdfunding?

Crowdfunding is a peer-to-peer funding model that offers transparency and a sense of community for both funder and entrepreneur. A pitch for funds is made to a crowd of “investors” who commit either small or large amounts in return for rewards, equity or loan repayments if the funding target is reached and the project goes forward. Crowdfunding is a growing trend in the EU. Around €4.2 billion was successfully raised through EU crowdfunding platforms in 2015, more than twice as much as in 2014¹⁵.

Impact investment for eco-innovation and the circular economy?

Impact investment is investment assessing not only the financial return on investment, but also the environmental and

social impacts in the course of the operations of the business and the consumption of the product or service, which the business creates. Impact investing reached nearly \$10.6 billion worldwide in 2014¹⁶. The ImpactBase database offers access to a list of funds by geographical coverage that specialise in impact investment for ventures that aim to create environmental, social and economic impact. <http://www.impactbase.org/info/funds>

Tips for establishing a crowdfunding campaign

- Consider the proposition and scope for tiers of rewards alongside the environmental impact of the proposition and establish a clear link between the reward and the product or service offered.
- Keep in mind that people are more likely to invest in a business or project idea that they are already passionate about, in a

story that is compelling and where the team's track record and past successes are evident. It is a good practice to visualise a new idea through images or video.

- Start promotion within a community of interest – e.g. networks of suppliers and customers – and extend it to the like-minded crowd who have affinity with your product, service or technology, followed by the professionally interested (impact) investors. Keep your followers up-to-date with the progress of the campaign and later with the progress of the project and distribution of rewards or loan repayments.

These tips come from Dutch foundation Enviu, <http://www.enviu.org>

Support for finding investment

The EU-funded INNEON network for eco-innovation investment aims to extend public and private funding sources available for eco-innovation and social innovation in Europe, and provide a unique forum dedicated to the interaction between a select cohort of innovators and relevant investors. Eco-innovation is a fast and growing market in EU and globally.

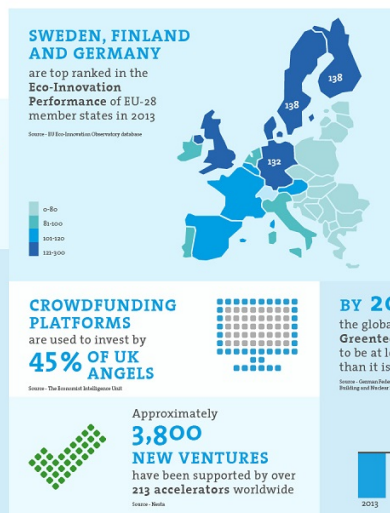
<http://www.inneon.eu/>



Source : <http://www.inneon.eu/>

ECO-INNOVATION

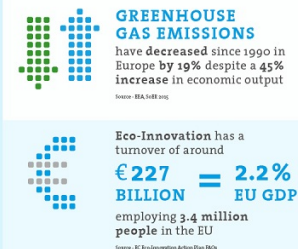
aims at significant and demonstrable progress towards the goal of sustainable development. It is a large and fast growing market in the EU and globally.



INNEON connects innovators and investors in the EU to extend the funding sources for Eco-Innovation

To find out more visit:
WWW.INNEON.EU

Funded by



¹⁵ See European Commission, 2016 Report on Crowdfunding in the EU Capital Markets Union, http://ec.europa.eu/finance/general-policy/docs/crowdfunding/160428-crowdfunding-study_en.pdf

¹⁶ See Global Impact investment Network, <https://thegiin.org/impact-investing/need-to-know/>

Good practice examples

In the **US Mosaic** targets small businesses who seek part funding for solar photovoltaic projects. For example, Oakland's Youth Partnership's 47-kilowatt solar installation was funded by a limited pool of 51 investors offering a total of \$40,325 (€35,000). This was part of the project's \$264,000 (€230,000) cost that also benefited from a grant and a rebate from a California government programme. Small scale investors can contribute as little as \$25 (€22) and receive a fixed 4.5% annual return, which helps pay for solar installations on small businesses, community centres and other facilities.

www.joinmosaic.com



E-car is a London-based, competitively priced, wholly electric car club operating through established community channels, building on the increasingly established pay-per-hour car club model. £100,000 (€130,000) was raised through Crowdcube; (www.crowdcube.com) investors together own 20% equity.



www.e-carclub.org

ReKixx 100% recyclable sneakers, with \$44,000 (€39,000) raised from 496 backers, **ReKixx**™ and ANI (As Nature Intended) (www.anibrand.com) vegan “Barefoot” shoes were both funded by Kickstarter



www.rekixx.com

www.kickstarter.com



Learning Resources

- A Directory of crowdfunding platforms www.crowdsourcing.org/directory

Choose the category as Crowdfunding and then country. Results can be filtered by sub-category for donations, equity or lending. Some articles focus on eco-innovation and consider the specific legal and financial considerations relevant in each country.

- The European Commission provides an overview and guide on the landscape of EU crowdfunding platforms for SMEs in 23 languages.

http://ec.europa.eu/growth/tools-databases/crowdfunding-guide/index_en.htm

- Further tips for running crowdfunding campaigns can also be found via NESTA.

<http://www.nesta.org.uk/news/crowdfunding-tips>

- Crowdcube articles

www.crowdcube.com/pg/press-29

- Seedrs blog

<http://www.blog.seedrs.com>

- Funding Circle articles

www.fundingcircle.com/about-us/in-the-news

6

Examples of European projects on eco-innovation and circular economy

Examples of European projects on eco-innovation

The European Commission has funded a range of projects collecting data and good practice examples on eco-innovation. The following sources may be useful in looking for good practice as well as for tools supporting development and marketing of eco-innovation.

Eco-Innovation Observatory is an online platform for the structured collection and analysis of eco-innovation information from across the European Union. Among its resources are analytical reports, a repository of good practices and online database.

www.eco-innovation.eu

The **INNOVATIONSEEDS** interactive portal for environmental research and knowledge repackages 100 promising EU-funded environmental R&D results to accelerate their uptake as policy measures and market success. Its navigation system provide guidance to SMEs to the most appropriate public and private funding for eco-innovation projects.

www.innovationseeds.eu

GreenEcoNet website is the European-wide platform to connect small and medium-sized enterprises (SMEs) and the research community to accelerate the transition to a green economy.

<http://greeneconet.eu>

SPREE aims at reaching a thorough understanding of the transition dynamics of 'Servicizing' systems, providing a tool for testing

adaptive policies to promote the transition, and to develop a better understanding of the differences within the EU with regard to customer approach, production standards, research development and policymaking.

<http://www.spreeproject.com/>

ResCoM's objective is to develop an innovative framework and a collaborative software platform for the industrial implementation of closed-loop manufacturing systems. The ResCoM consortium will develop a software platform consisting of a closed-loop product lifecycle management module, coupled with a materials information module.

<http://www.rescoms.eu/>

DESIRE is a FP7 project to develop and apply a set of indicators to monitor European progress towards resource efficiency, most notably in the field of biodiversity/ecosystem services and critical materials. DESIRE will also develop novel indicators to address the problem of indicator proliferation.

<http://fp7desire.eu/>

BENISI project worked since 2013 to highlight 300 of the most promising social innovations; a wide network of partners was established across Europe to provide guidance and tools to establish the conditions for social innovation to happen, balancing local actions with continent-wide strategy and vision.

<http://www.benisi.eu>

INNO4SD.net (European Global Transition Network on Eco-Innovation, Green Economy and Sustainable Development) project has built an international network that brings together key stakeholders who are interested in innovation for sustainable development.

<http://www.inno4sd.net/>

INTERREG EUROPE policy learning platforms hosts information resources for various stakeholders including SMEs and intermediaries in the areas of environmental and resource efficiency, low-carbon economy, SME competitiveness, and research and innovation.

<http://www.interregeurope.eu/>

ECO-INNOVERA project focuses on the support of eco-innovation in research and development. R&D as the first pillar of the value chain has a key function to provide markets and society with new products and services. The project supports research, innovation and environmental policy makers with recommendations on how to boost the implementation of Eco-Innovation in R&D, economy and society.

www.eco-innova.eu

ECOWEB project provides information on over 3500 European eco-innovations, mainly including technologies, applications, products, processes and other solutions. It aimed to link enterprises, in particular SMEs, and eco-innovations to increase the uptake of EU-funded research.

www.ecoweb.info

European Initiatives with SME focus



The European Eco-Management and Audit Scheme

The scheme is a voluntary environmental management tool for companies. It aims at achieving a continual improvement of environmental performance in compliance with environmental legislation, and provides verified data for environmental reporting

www.emas.eu



European Business Awards for the Environment

European Business Awards for the Environment Rewarding Eco-Innovation for Jobs and Growth

Recognising European companies of all sizes that have made an outstanding contribution to sustainable development building on innovation. There are five award categories: Management, Product & Services,

Process, International Business Cooperation and Business & Biodiversity.

<http://ec.europa.eu/environment/awards>



EU Environmental Technology Verification pilot programme

Environmental Technology Verification (ETV) is a new tool to help innovative environmental technologies reach the market.

Under ETV, claims about innovative environmental technologies can be verified – if the ‘owner’ of the technology so wishes – by qualified third parties called ‘Verification Bodies’. The ‘Statement of Verification’ delivered at the end of the ETV process can be used as evidence that the claims made about the innovation are both credible and scientifically sound.

<http://iet.jrc.ec.europa.eu/etv/>

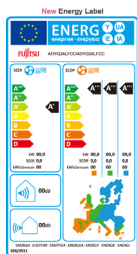




EU Ecolabel, The Environmental label from the European Union that makes green choices easy

Helping consumers to choose products and services with high environmental performance. It ensures that their main environmental impacts are reduced throughout their whole lifecycle, from the extraction of raw materials to production, use and disposal

www.ecolabel.eu



Eco Design, Energy efficient products

In the EU, many everyday products – such as washing machines, refrigerators and cooking appliances – carry energy labels and have been designed to meet minimum energy-efficiency standards. The results of these labels and standards will be an energy saving of around 166 million tonnes of oil equivalent (Mtoe) by 2020, roughly equivalent to the annual primary energy consumption of Italy. For consumers, this means a saving of €465 per year on household energy bills. Moreover, energy-efficiency measures will create €55 billion in extra revenue for European companies

<https://ec.europa.eu/energy/en>

The Product Environmental Footprint

The Product Environmental Footprint (PEF) is a multi-criteria measure of the environmental performance of a good or service throughout its lifecycle. PEF information is produced for the overarching purpose of seeking to reduce the environmental impacts of goods and services taking into account supply chain activities (from extraction of raw materials, through production and use, to final waste management).


Organisation Environmental Footprint

The Organisation Environmental Footprint (OEF) is a multi-criteria measure of the environmental performance of a goods/services-providing Organisation from a life cycle perspective. OEF studies are produced for the overarching purpose of seeking to reduce the environmental impacts associated with organisational activities, taking into account supply chain activities (from extraction of raw materials, through production and use, to final waste management). The Organisations involved include companies, public administrative entities, non-profit organisations and other bodies.

EU funding for eco-innovation and circular economy

HORIZON 2020


EU Framework Programme for Research and Innovation (2014-2020)

 nearly €80 billion

-  resource efficiency
 - water
 - waste
 - key enabling technologies
 - SMEs
-  innovation action
 - SME instrument
 - public procurement of innovation
 - pre-commercial procurement

LIFE


EU Funding Instrument for the Environment and Climate Action (2014-2020)

 €3.4 billion

-  environmental technologies
 - resource efficiency
 - industry & production
 - waste
 - water
-  demonstration & pilot
 - capacity building
 - best practice
 - information, awareness & dissemination

COSME


Programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (2014-2020)

 €2.3 billion

-  improving access to finance and markets
 - improving conditions for competitiveness & sustainability
 - promoting entrepreneurship
-  Loan Guarantee Facility (LGF)
 - Equity Facility for Growth (EFG)
 - access to finance for SMEs



ESIF

European Structural and Investment Funds (2014-2020)

 €351 billion

-  regional development
 - research & innovation
 - SME competitiveness
 - low carbon economy
 - environment & resource efficiency
-  EU Regional Development Fund
 - EU Social Fund
 - Cohesion Fund
 - EU Agricultural Fund for Rural Development
 - EU Maritime and Fisheries Fund

INVESTMENT PLAN (2015-2017)

-  pipeline of EU projects with a focus on large infrastructure, research & innovation, employment and environmental sustainability
-  new financial tool: EFSI (European Fund for Strategic Investments), in partnership with the European Investment Bank

Source : <https://ec.europa.eu/environment/ecoap/about-action-plan/union-funding-programmes>

List of Figures

Figure 1: Eco-innovation Wheel

Figure 2: Why eco-innovation

Figure 3: functional pillar of Circular economy

Figure 4: Business case for eco-innovation

Figure 5: Hidden waste costs

Figure 6: “Quick wins” in reducing waste and emissions in SMEs

Figure 7: Yearly savings potential in SMEs introducing material efficiency solutions

List of Tables

Table 1: Business case for Circular economy and environmental benefits

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The Eco-Innovation Observatory (EIO) is an initiative financed by the European Commission's Directorate-General for the Environment (DG ENV). The Observatory has developed an integrated information source and a series of analyses of eco-innovation trends and markets, targeting business, innovation service providers, policy makers, researchers and analysts.

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