

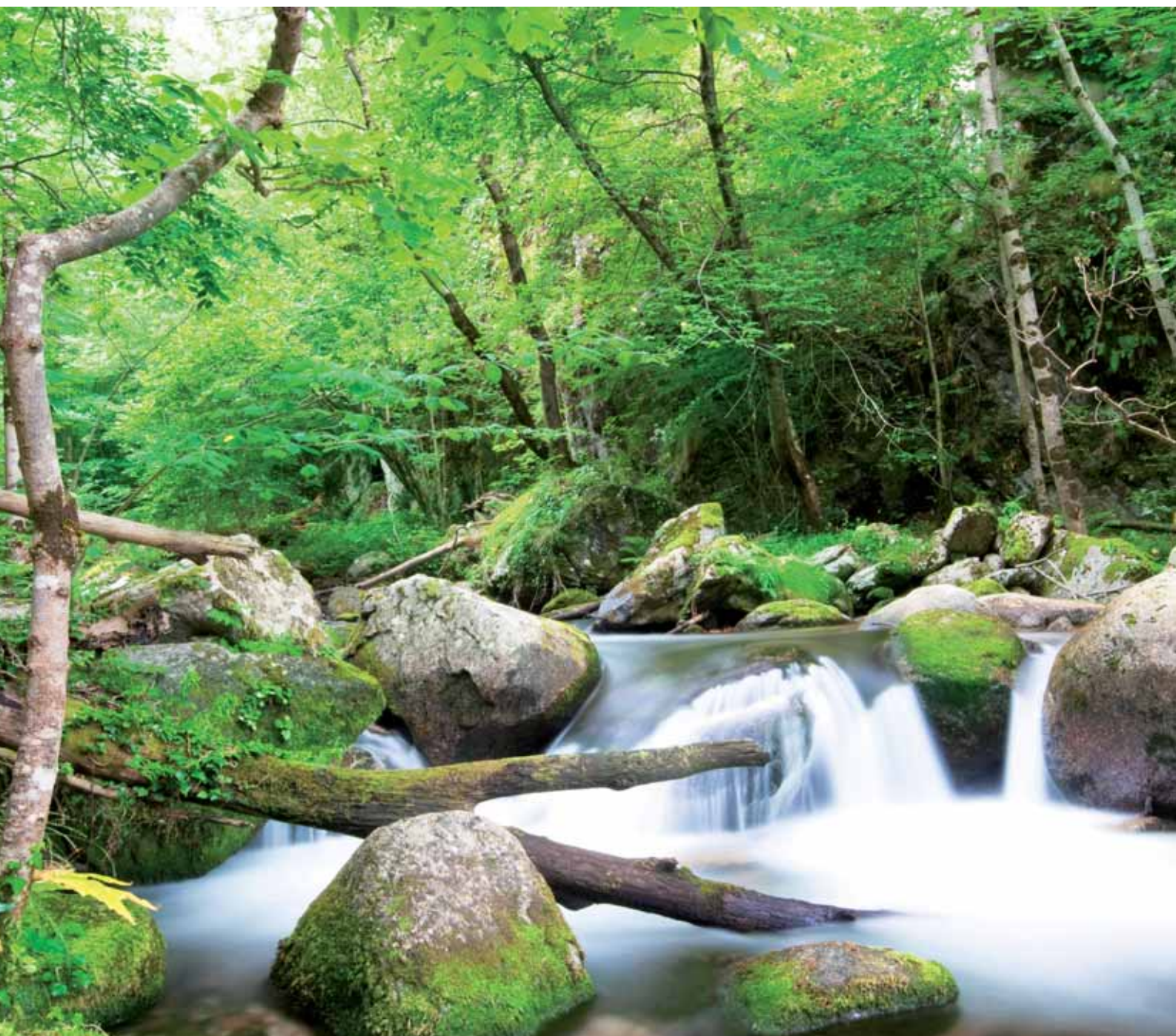


Eco-innovation

Greener business
through smart solutions

*‘The Eco-innovation initiative
is supporting green projects
when they need it most.’*

Janez Potočnik, Environment Commissioner



Find out more online

Eco-innovation website: ec.europa.eu/ecoinnovation

EACI website: ec.europa.eu/eaci



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‘Eco-innovation is making resource efficiency a reality by helping to decouple our consumption of resources and its impact on the environment from growth.’

Janez Potočnik, Environment Commissioner

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***‘Each euro of Eco-innovation
grant yields a leverage factor
of €10 in revenues.’***

Janez Potočnik, Environment Commissioner





FOREWORD BY JANEZ POTOČNIK,
EUROPEAN COMMISSIONER
FOR THE ENVIRONMENT

Guiding innovative solutions from trials to market

Europe has all too often generated cutting edge research with major potential for environmental benefits, but which then never made it into the market, missing the chance to unleash that potential and reap those benefits.

When Europe's businesses try to get bright ideas off the drawing board and into the market they face difficulties in scaling-up from pilot to industrial processes; they face resistance to change and aversion to risk-taking. To overcome these hurdles, the Eco-innovation initiative is supporting projects when they need it most — helping them prove their economic worth and environmental credentials to gain a foothold in the market.

Eco-innovation is important not only for businesses in the green niche, but to help the wider European economy become more competitive and resilient. Support from the Eco-innovation initiative is helping home-grown innovation gain a market within Europe. It is particularly good to see the high level of involvement by SMEs. Eco-innovation is making resource efficiency a reality by helping to decouple our consumption of resources and its impact on the environment from growth: a perfect match between environmental concerns and business opportunities.

A recent report on projects run between 2008 and 2010 showed that two years after the Eco-innovation projects finished we could expect savings of around 169 million m³ of water, reductions in hazardous waste of 65 tonnes, non-hazardous waste of 609000 tonnes, and radioactive waste of 65 tonnes. Greenhouse gas emissions will have been cut by 3.7 million tonnes, worth € 223 million, with a total annual monetised value of environmental savings (2008–10) of € 83 million.

The benefit to the EU economy is also considerable. Two years after its end, each Eco-innovation project is forecast to generate on average 9 additional jobs. Each euro of Eco-innovation grant yields a leverage factor of € 10 in revenues.

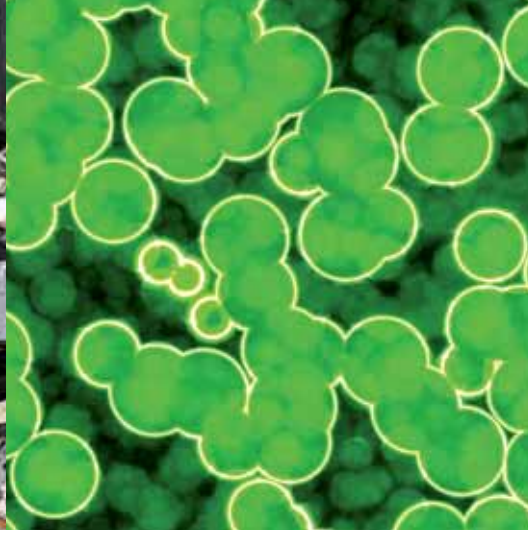
I invite you to read on to see how these individual success stories are making our production and consumption patterns more efficient and benefiting the environment and our economy alike.

Janez Potočnik
European Commissioner for the Environment



*We support innovation projects
that can be turned
into successful businesses...*





How is Europe funding change?

We support innovation projects that can be turned into successful businesses. Funding is only there to help get ideas off the ground – a project must be able to carry on without EU funding. Between 2008 and 2013, nearly €200 million was earmarked for the Eco-innovation initiative. More than 65% of beneficiaries were small and medium-sized businesses. Funding went to projects that:

- > Are innovative;*
- > Provide environmental improvements;*
- > Have a business approach and a good market uptake;*
- > Have a good leverage factor through replication;*
- > Are worth running at EU level.*

Priority areas include material recycling, buildings, the food and drink sector, water as well as greener business.

This brochure presents a collection of projects that have successfully managed to change the way we consume, produce, build and recycle: from using CO₂ to grow algae to convert into vital nutrients to turning old TVs into hard-wearing, decorative tiles.

What is the EU's Eco-innovation initiative setting out to do?

By increasing the rate of eco-innovation and its uptake in Europe, the initiative delivers profitable solutions to environmental problems, boosts the resource efficiency of Europe and increases its competitiveness.

Get on board

If you have a project you think could qualify or if you want to discover more stories, take a close look at the Eco-innovation website and see what the initiative can offer you.

Find out more:

ec.europa.eu/environment/eco-innovation





Healthy food from greener production methods

The food and drink industry is one of Europe's success stories, with a turnover of more than €956 billion. Employing over four million people it is responsible for processing around 70% of our agricultural production.

The multicultural diversity of the EU contributes to this success as each country, and region, has its own traditions when it comes to food and drink production and preparation. Within the EU itself, demand grows as our tastes become more diverse.

While the range and quality of what we offer remains the same, prices are being undercut. The sector is starting to feel the squeeze as competition increases from Brazil and China. Closer to home, food and drink are still identified as having the largest negative impact on our environment, greater even than private transport and housing. To stay ahead of the game, we need to produce, process and transport food and drink more efficiently while offering healthier, more innovative options.

One of the sector's main weaknesses is extreme fragmentation. Almost 99% of the industry is made up of SMEs. In terms

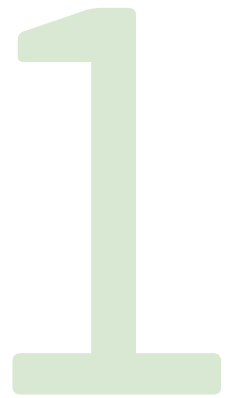
of marketing and bargaining power, smaller companies are at a distinct disadvantage. They also have a harder time finding the capital needed to invest in innovation: expenditure is very low, at 0.38% of the industry's output.

It isn't all bad news. The sector remained stable during the economic downturn, doing better than the manufacturing industries. With the right vision, the EU's food and drinks industry can continue to flourish while becoming less environmentally damaging.

New and greener products and processes can make businesses more competitive and dynamic. Some are being trialled today under the Eco-innovation initiative. They include: the valorisation and treatment of waste arising from food production and consumption; new or improved production processes increasing resource efficiency; innovative ways to treat wastewater, and new packaging solutions.

Read on to find out more.

Turning CO₂ into high quality nutrition



Construction and operation of an innovative photo-bioreactor (PBR) for the production of micro algae comprising high amounts of omega-3 fatty acids (PHOBIOR)

SUMMARY

We regard CO₂ warily, but it is a resource that can be used to encourage the growth of algae that are rich in nutrients and other factors. The Phobior project explains it is 'Closing the carbon cycle' by using CO₂ to grow algae producing omega-3 rich fatty acids. These fatty acids are essential to the human metabolism and are currently sourced from fish oil, despite concerns about over-fishing and pollutant contamination such as mercury.

By commercialising an innovative photo-bioreactor, Phobior is harnessing a natural source of omega-3 which avoids exploitation of fish stocks and puts CO₂ to good use.

RESULTS

Phobior's industrial-sized photo-bioreactor plant, the first of its kind, was opened in October 2012 at the Energiepark Bruck an der Leitha in Austria.

Instead of using extra energy, CO₂ moves the algae through the system on a complete, continuous production process, at the same time nourishing it and generating oxygen. By optimising space and sunlight, the best environment for healthy algae growth is created.

The plant boasts:

- > Photoactive volume (total plant): 90 000 litres;
- > Surface to light (total plant): 6 200 m²;
- > Footprint algae plant (greenhouse): 500 m²;
- > Algae cultivation distance: 100 000 metres;
- > Algae cultivation time: about 12–14 days (continuous production).

> DURATION

OCTOBER 2010 – OCTOBER 2013

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Cutting back on food wasted during transportation



Environmental benefits through the reduction of loss and waste in food products (ENBED)

SUMMARY

The transportation of perishable goods results in the production of significant amounts of waste. Estimated food losses are around 33% during storage and transportation, amounting to an annual global bill of over €25 billion. This not only has an environmental impact, but drives up food prices.

The ENBED project uses inter-communicating wireless sensors to maintain cold chain optimal conditions. The system, developed and manufactured by CartaSense, permits the real-time monitoring of perishable goods from the manufacturing phase all the way to the shelves at the point of sale.

RESULTS

The CartaSense technology, which helps the end customer make timely business decisions, runs low power transmitters and receivers and uses long-life batteries. Each disposable tag reduces the price to less than €4.

The constant monitoring of the conditions of perishable products lengthens their shelf life, guaranteeing their preservation along the entire supply chain, prevents waste and losses and increases consumers' trust in such products.

> DURATION

JULY 2010 – JULY 2013

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Making beer production more environmentally friendly



Full-scale implementation of an innovative CO₂ recovery plant for use in breweries (FICOB)

SUMMARY

The global market for CO₂ recovery plants in breweries is seeing a surge in mergers and acquisitions with the top 10 breweries consolidating themselves. The fact that existing set ups for CO₂ recovery have been in place for more than 20 years and use proven methods makes it hard for new technology to gain a foothold.

The project brings together Union Engineering (UE), a world leader in CO₂ technologies, and Carlsberg Danmark (CD). The latter will apply the innovation and offer feedback to fine-tune the technology.

RESULTS

The new technology requires no water for purification of the CO₂, resulting in savings of at least four million litres of water per year for a typical size plant. Globally this translates to a saving of 1 450 million litres by 2014.

The solution put forward by FICOB also allows for more CO₂ to be recovered, for the reduction of impurities in the CO₂ recovered, and for energy savings of five kWh per tonne of CO₂, an average of 40 000 kWh for a standard size plant.

The equipment also requires less maintenance so lowering the total cost of ownership. Cost price is estimated to be 10-20% lower than existing solutions while operating expenses are estimated at 30% less.

> DURATION

JUNE 2011 – JANUARY 2014

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Using bamboo to clean up wastewater



Market replication of bamboo remediation of food industry effluent grey water for re-use (BRITER-WATER)

SUMMARY

The use of plants to remove, contain or degrade environmental contaminants in water, soil or air is known as phytoremediation. The Briter-Water project harnessed the way in which bamboo roots function, to purify wastewater. The root system, and its associated microorganisms, exudates numerous chemical compounds into the soil which are able to degrade organic pollutants.

However, because volumes of wastewater are very high and may contain harmful pollutants, the system of purification the project developed has evolved from a wetlands technique to a filtration system.

RESULTS

The Bambou-Assainissement® filter has been up and running since September 2010. Covering less than 3 hectares, the system is designed to remediate up to 2 000 m³ of food industry grey water per day by breaking down nitrogenous compounds and phosphates of effluents by over 99%. A number of significant businesses within the food and drink industries are showing great interest in the solution put forward by the project.

> DURATION

SEPTEMBER 2009 – AUGUST 2012

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Building a greener construction industry

Building and construction are a key part of the EU's economy. The sector was heavily affected by the economic crisis and construction activity in the EU has been on a continuous decline since 2007. The international financial crisis, tight public sector budgets, the general economic downturn and high unemployment are all holding back construction demand.

But even taking the slow-down into consideration, the size and scope of the sector means it has a significant impact on the environment. More than half of all materials extracted from the earth are used in construction materials and products. These resources turn into around 30% of waste generated by the EU in the form of construction and demolition waste, including concrete, bricks, gypsum, wood, glass, metals, plastic, solvents, asbestos and excavated soil. Many of these can be recycled.

The sector also consumes vast amounts of energy and generates significant emissions into the air, soil and water. Innovations in how we construct and use buildings in the EU would have an impact on about 35% of our greenhouse gas emissions and 42% of our final energy consumption.

Barriers to the application of innovative solutions to the challenges of sustainability and the efficient use of natural resources and energy in the sector exist in a variety of forms. For example, high regulation within EU countries at national level makes the uptake of new technologies across the EU harder to secure. Change and innovation is also hampered by the public sector's dominance as a client, the long service life of buildings, and a complex and fragmented supply chain.

All these challenges mean that support from the Eco-innovation initiative is more vital than ever. By helping to change the way buildings and infrastructure are designed, constructed, refurbished, maintained and demolished, the initiative is helping the sector reduce the amount of raw materials and energy used. Read on to find out how this is being applied in practice.

Giving old bricks a new life

Market uptake of an automated technology for reusing old bricks (REBRICK)



SUMMARY

Even though baking new bricks is very resource and energy intensive and despite the fact that bricks have a very long lifespan and can last centuries, when it comes to demolition waste, many are either sent to landfill or crushed and recycled.

The Rebrick project has developed and demonstrated a technology that separates out used bricks using an automated sorting process for demolition waste. Once collected, the bricks are then cleaned and made ready for reuse. Each brick reused represents a saving of 0.5 kilos of CO₂.

RESULTS

The project sets up a full-scale brick cleaning facility and intends to replicate the technology in other countries. It is also developing public/private partnerships within the demolition and construction sectors.

The consortium aspires to have seven functional sites, within five years post project, in Denmark and with a strong focus on Poland and Germany, where huge demolition sites exist.

By achieving this, Rebrick will lead to an annual reduction of waste amounting to 24000 tonnes in the second year after the project ends. The first plant in Denmark will contribute to a reduction of 6000 tonnes of CO₂ by the second year after the project ends.

> DURATION

JUNE 2011 – DECEMBER 2013

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Plastics recycling for construction



High performance, lightweight aggregate for concrete from the recycling of urban waste (NUMIX)

SUMMARY

The amount of plastics sent for incineration or landfill within the EU is on the rise. At the same time there is an ever-increasing need for aggregate for mortar and lightweight concrete. A study conducted in the Italian market alone found 400 000 tonnes of aggregate a year, destined for lightweight concrete, was being produced.

NUMIX set out to develop two products from recycled plastics: a polymeric foam to replace expanded clay as a base for lightweight concrete, and homogenous flakes to be used as aggregate for mortar and as raw material for the expanded granules.

RESULTS

NUMIX successfully produced a recycled plastics replacement for expanded clay and by the end of the project, about 6 000 tonnes of plastic waste was recovered.

By using a plastics based lightweight aggregate instead of expanded clay, the project reduced water consumption from 15% to 10%.

> DURATION

JULY 2009 – JUNE 2012

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Taking straw bales mainstream as viable building material



EU market development of MODCELL: a prefabricated eco-building system utilising renewable materials (EUROCELL)

SUMMARY

Until now straw and hemp have been thought of as one-off, bespoke materials used in individual, quirky constructions. The EUROCELL project has created a commercially viable straw filled panel, combining low tech material with the latest methods of construction. The result? A sustainable, carbon neutral cladding system with high insulating properties for a variety of construction projects.

Panels are made off-site, in locations close to the construction area to maximise local facilities, materials and labour and minimise transport. Along with working to smooth out the production process, the project has also addressed the lack of product recognition. By performance testing and the development of EU market certification and a ModCell warranty scheme, the project hopes to encourage uptake.

RESULTS

The project aims at a 3-5% European market share for the product by 2020. The ModCell system and the BaleHaus will reduce the carbon impact of new buildings by up to 80% compared to conventional solutions.

The project will consolidate the straw supply chain, conduct post-occupancy analysis and complete performance monitoring in order to achieve product certification.

> DURATION

SEPTEMBER 2011 – AUGUST 2014

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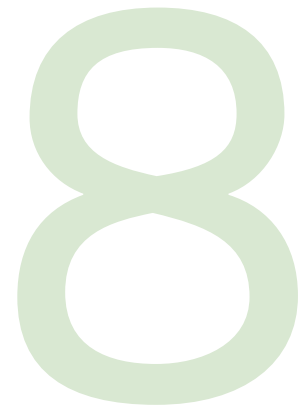
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Low cost solutions for low energy housing



Enhanced insulation in timber-frame housing using recycled materials (INSULATFH)

SUMMARY

Cellulose is a highly efficient insulator and offers the construction industry an effective, environmentally friendly alternative to traditional insulation. But its uptake has been held back by the difficulty in mass-producing standard sized wall panels.

The INSULATFH initiative set out to deliver a low cost solution for the production of pre-insulated panels, using a process any timber frame factory can employ.

The raw material used to insulate the timber frame panels is cellulose pulp from locally recycled paper, fire retardant and other materials. The process involved recycling waste paper into insulating pulp, filling the timber panels and then hermetically sealing them for delivery on-site.

RESULTS

The benefits of the project were notable, especially in terms of greenhouse gas savings, the recycling of waste and the diversion of packaging from landfill.

By its completion, the project was producing 1900 linear metres of panelling, which is equivalent to 1900 m x 2.7 m. This equates to 5 130 m² of production.

> DURATION

JUNE 2009 – MARCH 2012

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Innovative green businesses

Europe's small and medium-sized businesses are facing a need to reduce their consumption of energy and natural resources. This challenge can also present them with opportunities to seize new markets created by eco-friendly business practices. The 20 million SMEs that make up 99% of the firms operating in the EU are seeking new ways to provide greener forms of products and services: the Eco-innovation initiative is there to help them.

While we are improving our management of resources, our consumption and production patterns continue to rise, exerting increasing pressure on the environment. Each person living in the EU uses around 16 tonnes of materials derived from natural resources and produces approximately six tonnes of waste every year.

Clearly, despite past achievements, a sustainable Europe is not just around the corner and this has implications for business. A recent Eurobarometer survey shows that three quarters of the EU's businesses have seen an increase in the cost of the materials they need. Almost 90% of those surveyed say they think prices are set to go even higher. But they also recognise

that this could spur on the uptake and development of eco-innovative solutions to face such challenges.

Businesses are also greening-up their practices thanks to environmental protection legislation introduced both nationally and at EU level. Consumer led demand for eco-friendly products and services is helping to drive change. As a result, more than a quarter have introduced some form of eco-innovation to help them reach these goals.

Green business is one of the priority areas of the Eco-innovation initiative. Support is given to green products, processes and services, as well as innovations to the way businesses organise themselves, which can boost environmental performance.

So read on to see how imaginative new processes using fewer resources and reducing waste through innovation are contributing to support the leather and footwear production, and how a new service can help increase the amount of recycled plastic or compostable packaging.

Shoes that are comfortable for the wearer and the planet



Ecofriendly Leather Tanned with Titanium (TiLEATHER)

SUMMARY

Chrome is used in more than 90% of the leather tanned worldwide. A frequently used form is trivalent chromium, which, under certain conditions, can oxidise to hexavalent chromium. Proven to be carcinogenic, hexavalent chromium can harm humans and the environment by leaching into the water supply.

The initiative's goal is to market chrome-free leather under the label Sanotan with a production capacity of 1 200 000 square feet a year. This provides enough chrome-free leather to ensure safety footwear, children's shoes and town footwear reach EU markets.

RESULTS

TiLEATHER has so far produced and sold 2.2 million square feet of titanium-tanned leather, manufacturing a million pairs of shoes. The initiative also ran successful tests to see if leather and footwear conform to the established European Ecolabel requirements for footwear.

The main environmental improvements achieved over the two years of the project are as follows:

- > Reduction of the use of chromium compounds amounting to 25.5 tonnes;
- > Reduction of CO₂ emissions by 35 tonnes;
- > Elimination of chromium contamination in wastewater and generated waste products.

> DURATION

OCTOBER 2010 – SEPTEMBER 2012

> COORDINATOR

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A system for identifying responsible recyclers

European Certification of Plastics Recyclers (EUCERTPLAST)

10

SUMMARY

Recycling plastics is a big industry – around 16 000 people work in the sector, in approximately 1 500 companies which are mainly SMEs. These handle 4.5 million tonnes of plastic waste a year, which sounds like a sizeable amount until you compare it with the 47 million tonnes produced within the same period.

A lack of traceability means that materials frequently leave the EU to be recycled abroad where recycling costs are cheaper. Transporting the plastics across continents implies inefficient resource management and harms the environment.

By providing Europe with a standardised certification scheme for plastics recycling, the EuCertPlast project helps waste collectors to guarantee that what they deliver will be recycled in a sustainable manner. The output will be certified with the recycled content stated clearly and transparently.

RESULTS

The certification scheme leads to an increase in the volume of material recycled owing to the fact that if the contents and the process are more transparently identified, the secondary raw material becomes more desirable.

Additionally, it unites the integration of the different national schemes and reduces the administrative burdens.

> DURATION

SEPTEMBER 2009 – AUGUST 2012

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Reliable labelling for compostable packaging

Improvement on green labels for packaging (ECOPACK)



SUMMARY

Biodegradable and compostable packaging is a way forward for the food industry. Unfortunately, although a number of manufacturing and distribution companies acknowledge this idea, the lack of a reliable labelling system means 605 million tonnes of material is currently land filled or incinerated.

ECOPACK seeks to help eco friendly packaging gain more of a foothold in the market by improving the current green labels, focussing on human and environmental safety.

A new testing scheme will assess different toxicological factors such as acute, sub-acute and chronic toxicity along with genotoxicity and metabolism biomarkers. This goes considerably further than existing testing schemes.

RESULTS

By promoting the composting of food packaging residues and other food contact materials, the new certification contributes to the European landfill and incineration diversion objectives and to the reduction of greenhouse gas emissions.

Three commercial packaging types are being tested and the results are being communicated to the public, industries and retailers.

> DURATION

SEPTEMBER 2010 – SEPTEMBER 2013

> COORDINATOR

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Reducing footwear's environmental footprint

Plastics from renewable sources applied in footwear (ecoTPU)



SUMMARY

The footwear sector uses thermoplastic polyurethanes for stiffeners and soles made from fossil resources, especially oil. The project worked towards providing an alternative in the form of polyurethanes created using renewable raw materials such as plant oil, called ecoTPU.

Applied in the same manner, ecoTPU has similar properties but by using renewable resources to create the polymers, the process has less environmental impact.

RESULTS

A range of products has been designed for both injection moulding and stiffeners destined for the footwear industry, which has been identified as a major potential consumer.

The project has managed to:

- > Set up a production line with an estimated production capacity of 5 000 tonnes/year of ecoTPU;
- > Manufacture four kinds of ecoTPU products: ecoTPU raw material itself, stiffeners and soles made of ecoTPU and, finally, shoes incorporating ecoTPU soles and stiffeners;
- > Reduce non-renewable energy demand by about 480 tonnes per year (reduction of crude oil dependency);
- > Reduce emission of CO₂ by about 1 000 tonnes a year by the project's end and by up to 30 000 tonnes a year in the future under full production.

> DURATION

SEPTEMBER 2010 – AUGUST 2012

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Helping to green-up industrial parks

Eco-Industrial Park Environmental Support System (EPESUS)

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SUMMARY

Waste and energy flows produced by industrial parks are monitored by the software created by the EPESUS project. The project focussed on SMEs, helping to improve their compliance with environmental requirements and, manage their resource usage, waste treatment and energy consumption.

By allowing participating companies to share their knowledge through a community portal, the software also provides tools for them to calculate their potential for improvement, in terms of savings and energy use.

RESULTS

Pilots were run in Turkey, helping the managers of eco parks come to decisions on how best to support their members and offering guidance on waste minimisation, reuse and energy efficiency measures.

The system analysed five industrial sectors: textile processing, smitheries and foundries, large combustion plants, food processing polymers and construction/buildings.

Benefits of using the system, which is fully customisable to any location or sector, include cleaner methods of production, energy savings, pollution and waste reduction and reuse.

> DURATION

AUGUST 2009 – AUGUST 2012

> COORDINATOR

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Making less go further through recycling

It's hard to imagine that the recycling industry, currently worth €24 billion, barely existed in Europe a few decades ago. A showcase for the economic potential of green businesses, the EU's recycling sector now accounts for half of the global waste and recycling industries, employs half a million people and involves more than 60 000 companies.

Waste management in the EU has improved dramatically, thanks to stricter legislation and enforcement, greater commercialisation of waste streams, and the emergence of new technology to deal with waste and improve its recovery, recycling and reuse. But work remains to be done if we are to keep up with the mountains of new waste generated across the continent.

Each year, in the European Union alone, we throw away three billion tonnes of waste – some 90 million tonnes of it hazardous. This amounts to about six tonnes of solid waste for every man, woman and child, according to Eurostat statistics. By 2020, the OECD estimates, we could be generating 45% more waste than we did in 1995.

The Waste Framework Directive gave impetus to the move from landfill to a variety of forms of recycling but although use of these treatment methods has increased across the EU, around 40% of municipal waste is still sent to landfill. Only 23% is recycled, a further 20% incinerated and 17% composted.

The Directive sets out targets which are now legally binding, covering general and specific waste, along with the prevention, reuse, recycling, energy recovery and disposal of waste.

But making recycling second nature across Europe is going to take more effort. 'Closing the loop' is now the goal, for example transforming discarded shoes into components for making new shoes, or turning old carpets into the raw material needed to make new ones. Another target is to boost the traceability of waste that the disposal of electrical and electronic equipment generates.

Read on to find out how projects are achieving these and other goals through timely Eco-innovation support.

Purifying by-waste in car windscreen recycling

14

Design and construction of a windscreen recycling line (WS-REC)

SUMMARY

A car windscreen may be mainly composed of glass, but it includes a transparent laminate of polyvinyl butyral (PVB) for safety reasons. Recycling windscreens so far has focused on reclaiming the glass and land filling or incinerating the PVB, since current processes leave much to be desired when it comes to the purity of the reclaimed PVB.

The WS-REC project has established a way to extract the PVB and then purify it ready for processing and reuse. This is in line with Directive 2000/53/EC which requires at least 95% of the material in end-of-life vehicles (ELVs) to be recovered and reused. The PVB will be separated from the glass and the second purification phase will see contaminants removed and the resulting PVB formed into pellets.

RESULTS

The project is creating a recycling line based on a set of reactors including separation, purification and processing modules able to separate and recover glass and PVB with low impurity levels.

This line will be capable of processing an amount of 350 tonnes of PVB per year. Consequently, besides the resource efficiency and environmental benefit, this project also enhances the attractiveness of ELVs and windshield recycling due to the high market value of PVB.

> DURATION

APRIL 2011 – MARCH 2014

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Ensuring the proper treatment of electrical waste

15

Full Traceability of the management of WEEE (WEEE TRACE)

SUMMARY

Electrical and electronic equipment (WEEE) accounts for nine million tonnes of waste every year in Europe alone. In spite of legislation already in place, less than 40% is managed with a guarantee of legal compliance.

By using radiofrequency tagging or image recognition, the WEEE Trace project hopes to harness information and communication technologies in the fight against illegal exportation and substandard treatment. The WEEE project's use of these technologies can also be extrapolated to other types of waste streams with similar control and traceability constraints.

RESULTS

The project hopes to increase collection levels and proper treatment by 33% on 2009 figures and aims to reduce the emission of 12% CO₂-equivalent a year through the collection and treatment of greenhouse gases from thrown-away fridges.

The treatment costs of waste fridges will be reduced by more than 30% due to increased collection, improvements in logistics and less red tape associated with administrative compliance.

With 29 target customers sharing similar needs, the project hopes to have the chance to explore other possibilities for replication. Two potential customers are already connected following the project.

> DURATION

JULY 2011 – JULY 2014

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Recycling TVs into tiles

Glass Plus

16

SUMMARY

Television sets have changed dramatically in recent years with the introduction of 'flat-screen' LCD, plasma and LED monitors. These new technologies do away with the need for cathode ray tubes (CRTs). CRTs contain dangerous material, including lead and phosphor, which means they need specific treatment at the end of their lifecycles.

This initiative recovered CRT glass from recycling plants and used it as a raw material for the production of high quality ceramic tiles that are compliant with the Leadership in Energy and Environmental Design (LEED) certification system and Ecolabel certified.

RESULTS

Glass Plus operated plants for the pre-processing of CRT glass and for the production of atomised powders. The project implemented an innovative production process beginning with the recycling of CRTs through to the development and marketing of the resulting ceramic tiles.

The work has already produced more than 600 000 m² of ceramic tiles in three years, helping to reduce the amount of CRTs sent to landfill by about 3 000 tonnes.

> DURATION

SEPTEMBER 2010 – DECEMBER 2011

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Putting waste lime to good use

17

Integrated technology for recycling of smelting gases and sustainable production of frits and enamels (Frit-Rec)

SUMMARY

The manufacturing of glazes and ceramic compounds known as frit result in the production of waste lime, the reuse of which has been hampered by its lack of homogeneity. Traditional technologies have focussed on end-of-pipe cleaning and meeting the necessary environmental obligations.

By introducing a filtration unit at the inflow point, a reactor for neutralisation and a separation unit, the project is aiming to improve the production process and so enhance the stability and quality of the resulting waste lime. This will make it possible to use the lime as a substitute for raw material in frit and enamel production or as a new material for ceramic compounds.

RESULTS

Producers of ceramics, glass, small domestic appliances and electronics will benefit, along with the frit and enamel industries.

By the end of the project the amount of hazardous waste produced will be cut by 75 %, and CO₂ by 43 %, with reference to a 2008 baseline. Cost per unit of the product will be 4% cheaper.

> DURATION

OCTOBER 2010 – OCTOBER 2013

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From used shoe mountain to useful recycled material

18

Post-used shoes recovery in footwear industry and other applications (NATURALISTA)

SUMMARY

Around 2600 million pairs of shoes are bought in Europe every year and to make way in our closets for all these new shoes, around 1.5 million pairs a year end up on urban dumping sites. The NATURALISTA project is working to boost the recycling of raw materials and the reuse of these within various polymeric products such as pavements, road safety products and footwear component products.

Currently, the main disadvantage of footwear recycling is the need to separate out original components. The project intends to get over this by simply grinding down the whole shoe, rather like the system employed in tyre recycling.

A final goal will be the establishment of an eco-labelling system to certify products using the recycled material.

RESULTS

The project's participating companies have developed different products which incorporate footwear grinding in their structure (soles and insoles for footwear, casual footwear, orthopaedic footwear, road safety products and paving materials).

It has been demonstrated that footwear recycling, through a mechanical grinding process, is an interesting way of avoiding footwear waste in landfill sites, as well as being a source of raw material to be used in the manufacture of new, environmentally friendly products.

> DURATION

OCTOBER 2010 – OCTOBER 2013

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Giving used textiles a new lease of life

19

Textiles for Textiles (T4T)

SUMMARY

The production of fibres for the textile industry impacts heavily on the environment. Cotton in particular involves both a vast quantity of water and the use of pesticides and fertilisers. While various initiatives have tried to make the process more eco-friendly through certification and fair trade contracts, the real breakthrough necessitates extending the lifetime of the fibres through recycling, and so reducing the demand for raw material.

The quality of the recycled output depends on the accuracy of the sorting process. The T4T project uses an automated system which can sort, based on composition and colour, quickly and accurately. Along with the reclaiming of natural resources, the process also assures the saving of water, energy and chemicals.

RESULTS

The project developed, constructed and demonstrated an automated industrial sorting line, using the in-line NIR-identification of post-consumer textile waste.

Having analysed the economic benefits, T4T upgraded and adapted its installation based on sorting requirements and sorting results in relation to the envisaged products from the recovered fibres.

> DURATION

AUGUST 2009 – JUNE 2012

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Making carpet manufacturing more environmentally friendly

20

Towards closed loop chains in Europe
(EUROC2C Carpetchains)

SUMMARY

Traditionally the carpet manufacturing sector operates in a linear fashion: virgin raw materials are transformed into yarn, backing and other materials which are then used to make carpets. Used carpets are thrown into municipal incinerators, cement kilns or landfill.

There are many negative aspects to this system: the industry is dependent on expensive oil-based components and landfill volume is boosted by the inclusion of all the carpet waste – neither outcome being sustainable.

The project is setting up a take-back system in six EU countries in close cooperation with flooring contractors and selected waste collection and reprocessing companies, many of them SMEs.

RESULTS

The project aims to collect 4% of the carpet waste from the contract market, amounting to 16 000 tonnes a year, the equivalent of €3 million. It hopes to send 8 000 tonnes of this for material recycling, using an innovative EuroC2C carpet chains pilot plant.

The plant sorts and separates the waste into light and heavy fractions. The light fraction can be recycled into the building blocks for carpet yarns, the heavy for road surface applications.

This is reducing energy consumption by 36 million kWh per year, in relation to the average energy consumption of 1 600 households.

> DURATION

JULY 2010 – JUNE 2013

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Water innovation – think blue and go green

Water is key to human life, nature and the economy – everyone needs it and not just for drinking. It has been a factor for human development throughout history. From power generation to food processing, modern society depends on water.

Growing demand all over the planet is putting pressure on both quality and availability. Recent figures show 20% of surface water is at serious risk from pollution, 60% of European cities over-exploit their groundwater resources and 50% of wetlands are endangered. Europe is not widely regarded as an arid continent, so it may be surprising to know that nearly half the EU's population lives in 'water-stressed' countries.

Progress is being made but a lack of public awareness concerning the need to use water carefully and sustainably, and to cut out pollutants, is slowing us down. There is still a misguided conception that water is abundant – the price of consumption does not reflect its real worth.

By focussing on green growth and resource efficiency the EU has put in place many improvements to help competitiveness and growth in water-related sectors. Much can be done with

the application of innovative solutions and through the use of water management techniques; while changes in production patterns can be harnessed to increase water quality and availability.

The Eco-innovation initiative, which is in line with the European Innovation Partnership on Water, supports EU policies to prevent wastage and pollution by promoting innovative technologies. By timely funding, the initiative helps projects get out of the lab and into the light of day.

From water and wastewater treatment solutions to water efficient processes and products, including reuse or recovery of nutrients, many companies are already contributing to the protection of this vital resource. Read on to see how.

Efficient management of wastewater treatment plants



Efficient Management of Small and Medium Wastewater Treatment Plants (OptimEDAR)

SUMMARY

Wastewater treatment is one of the most energy consuming activities within the entire water cycle management – nearly 50% of the energy consumed in wastewater treatment is used by the aeration process in biological reactors.

The OptimEDAR project has developed a new control and management solution for small and medium wastewater treatment plants based on an online monitoring of chemical parameters and consequent adjustment of the bioreactor's functioning.

RESULTS

By managing the aeration process online through the continuous monitoring of dissolved oxygen and Redox (reduction-oxidation) and controlling the speed of blowers automatically, the project prevents the massive growth of filamentous bacteria preventing sludge bulking or foaming.

The project achieves a 15-25 % reduction in energy consumption, around 10% overall savings in operational costs and increased effluent quality. Other benefits are:

- > Water of higher quality which has both less reactant and chemical by-products;
- > Increased productivity;
- > Faster water control loops.

The project is installing and validating the system in treatment plants in Romania and Spain, aiming for replication across Europe.

> DURATION

AUGUST 2012 – AUGUST 2014

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From biogas waste to fertilisers

High Added Value Ecofertilisers from Anaerobic Digestion Effluent Wastes (WAValue)



SUMMARY

The digestate produced in biogas plants is a semisolid waste, difficult to manage but rich in organic matter and minerals. It rarely creates economic value for the biogas plant manager, and sometimes is a serious limiting factor. Due to the EU's focus on renewable energy sources the use of biogas is likely to increase as it is easy to both obtain and exploit.

This plant is the first of its kind in Europe. It creates high added value slow-release fertilisers from digestate by using a spouted bed technology combined with chemical hydrolysis, leading to more profitable biogas plants and easier digestate management.

RESULTS

There are about 10 000 biogas plants in Europe today. There is an estimated market potential of around 500 granulation plants through the use of this technology.

The consortium will treat about 900 tonnes of sludge a year in a pilot plant. By the end of the project two industrial size plants will treat 57 000 tonnes a year. The technology's high efficiency will save an estimated 3 MWh and 11 tonnes of CO₂ emissions a year during the project, together with the substantial added value resulting from fertiliser.

> DURATION

JULY 2012 - JULY 2014

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Advanced filtration system to boost water reuse



Increased Water Efficiency with Ceramic membrane technology (IWEC)

SUMMARY

Five to ten percent of groundwater extracted for drinking water supply purposes is wasted due to the periodic rinsing of sand filters. The result is called backwash water and contains iron and manganese in the form of suspended solids. This in turn is difficult to purify as the high particle loads result in fouling problems in current installations.

Ceramic membranes have great potential when it comes to treating and reusing this backwash water. The IWEC project estimates drinking water companies could reduce their stress on groundwater aquifers by 5-10% if the technology was fully implemented.

The project expects to prompt market uptake with this major end-user implementation of the technology since its high performance, over long periods of time, at a lower operational cost, should speak for itself.

RESULTS

IWEC is setting up a full-scale installation at a drinking water company for the treatment and reuse of backwash water as drinking water. The implementation of this technology should result in the annual reuse of 5.1 million m³ of wastewater in the EU two years after the project's end (2017). Consumption of energy will also be reduced by 30%.

> DURATION

JULY 2012 - JUNE 2015

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Cutting back on wasted drinking water

24

Intervention for Curing Pipeline Leakage in Urban Water Mains (LEAKCURE)

SUMMARY

Globally, 25-30% of drinking water is lost due to leakage in urban water distribution systems every year.

The majority of leaks are under detection levels and traditional find-and-fix methods are not keeping pace. High-cost methods of reducing leakage in bulk by replacing mains can mean prolonged social disruption.

LEAKCURE is putting forward an innovative approach called Trenchless, Automated, Leakage Repair (TALR) which automatically detects, seals and cures typical network pipes without the need for digging up pavements and roads.

RESULTS

The project is targeting the UK at first, by setting up local partnerships and field trials. Following the trials, once the necessary adaptations are made to suit local contexts, the project will also run in another EU country. It will gain certification at this stage and then widen its client base.

> DURATION

JUNE 2011 - JUNE 2014

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