Environment




Best LIFE Environment Projects 2008-2009

EUROPEAN COMMISSION

environment

European Commission
Environment Directorate-General

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Foreword

François André

This is the fifth year that we have selected LIFE Environment 'Best of the Best' (BoB) projects that are just that little bit better than the rest. Indeed, they can be held up as models for others as to what a successful, innovative, well-designed and well-executed project should look like.

Following an initial review carried out by its external monitoring team, the Commission selected the 22 most outstanding LIFE Environment projects from the 90 projects completed in 2008. Using the same criteria as in previous years, the Member States then reviewed these top 22 projects: the five BoBs came out particularly well and the 17 "best" projects also scored very highly.

The five "Best of the Best" LIFE Environment Projects 2008-2009 are drawn from diverse sectors and include: the development and demonstration of a prototype transcritical CO_2 refrigeration system; new and environmentally friendly oriented-strand board (OSB) panels; a new eco-spray system (NESS); an eco-sustainable drawing system for processing steel wire rods and by-products; and a high rate enzyme hydrolysis system for treating sewage.

My colleague, Ms. Herlinde Vanhoutte, took on the delicate work of coordinating this selection process. She went on maternity leave shortly after completing this task and will be pleased to hear that the process "gave birth" to such an exciting outcome.

In her name, I would like to thank all the colleagues from the Member States who evaluated the contenders. I would like to cite all 30 evaluators, but special thanks should go to Margareta Stubenrauch, Isabel Lico, Eleni Stylianopoulou, Annika Vahersalu, Pekka Harju-Autti, Brian Early, Nicole Kerkhof, Nicoleta Dobre and Katarina Likesova for being the "largest" contributors. I would also like to thank the project beneficiaries and their partners for their excellent work in favour of the environment.

To shine a spotlight on the top five, the European Commission's LIFE Unit organised a well-attended award presentation session during Green Week in Brussels on the 24th June 2009.

The higher profile that the best projects receive through these awards ensures that more people know about the LIFE programme and the projects it sponsors. I hope that these awards continue into the future and continue to grow in stature and range in the coming years.

François André on behalf of Ms. Herlinde Vanhoutte
LIFE Environment "Best of the Best" coordinator 2008-2009
Belgian Federal Public Service "Health,
Food Chain Safety and Environment"




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Introduction

The EU Member States represented on the LIFE Committee and the European Commission's LIFE Unit have announced the Best LIFE Environment Projects 2008-2009. The results of the selection, as approved by the LIFE Committee members in the spring of 2009, are the 22 projects featured in this publication. These projects represent the most recent successful LIFE Environment projects in terms of their contribution to immediate and long-term environmental, economic and social improvements; their degree of innovation and transferability; their relevance to policy; and their cost-effectiveness.

This, the fifth Best LIFE Environment Projects' exercise, is the product of an established identification and evaluation process based on a set of best practice criteria, developed by EU Member States in collaboration with the European Commission. The projects with 'beneficiaries', or project holders, from across the EU27, cover all of LIFE Environment's main themes: land-use development and planning; water management; minimising the impact of economic activities; waste management; and Integrated Product Policy (IPP).

The objective of the exercise is to help improve the transmission of LIFE Environment project results by using a set of criteria to identify those projects with the highest potential for long-term environmental improvement. From the 22 projects that concluded in 2009 and that have been selected as 'Best' projects, five have been awarded the title, 'Best of the Best'.

How were the best projects selected?

Scoring of completed LIFE Environment projects was launched in the summer of 2004. The system was introduced by the Commission, following an initiative taken by Sweden and the Netherlands. After a meeting at The Hague in May 2004, a set of 'best practice' criteria was developed in collaboration with the Member States. These criteria included: projects' contribution to immediate and long-term environmental, economic and social improvements; their degree of innovation and transferability; their relevance to policy; and their cost-effectiveness. In view of the importance of these aspects to project success, project beneficiaries are also required to provide an After-LIFE Communication Plan and an Analysis of the long-term benefits of the project with their final report. This information forms an integral part of the evaluation process.

Projects were initially technically assessed by the LIFE Unit's external monitoring team, provided by the Astrale consortium. The monitors ranked all the projects that ended in December 2008, to produce a first list. The final selection was undertaken by the Member States under the coordination of Herlinde Vanhoutte (from the Belgian Federal Public Service "Health, Food Chain Safety and Environment") using the agreed set of criteria to identify the awarded projects.

The winners of the Best LIFE Environment 2008- 2009 and Best LIFE Nature 2007-2008 awards held as part of the EU's Green Week. The ceremony provided an opportunity to reward the most successful recent LIFE projects and highlight their achievements

The 22 best LIFE Environment projects 2008-2009

Land-use development and planning	
PROMESSE	France
KAPA GS	Austria
AGEMAS	Italy
PRIORAT	Spain
CEDM	Italy
Water management	
✪ N.E.S.S.	Italy
✪ MAD but better	UK
VERBAL	The Netherlands
WILWATER	France
CLB	The Netherlands
Minimising the impact of economic activities	
✪ CO_2REF	Denmark
✪ ECOSB	Luxemburg
ExtEnSity	Portugal
Cellia	France
Waste management	
✪ ESD	Italy
REAGIR	Portugal
RESITEX	Spain
IDEAL 79	France
Integrated Product Policy	
ECO-CAMPS	France
ACADEMY	France
IPP TEL	Greece
StartIPP	Portugal

✪ "Best of the Best" projects

Land-use development and planning

The Commission ensures that Member States take environmental concerns into account when putting together their land use development plans, through the Thematic Strategy on the Urban Environment, the Directive on Environmental Impact Assessment (EIA) for projects, and the Directive on Strategic Environmental Assessment (SEA) for plans and programmes, in addition to initiatives such as INSPIRE (Infrastructure for Spatial InfoRmation in Europe) and GMES (Global Monitoring for Environment and Security).

All of these tools and initiatives emphasise the need to harmonise a large number of environmental issues such as air, water and soil protection; urban management and governance; integrated spatial planning; habitat conservation; economic competitiveness; and social inclusion.

If land-use planning and development is to be sustainable then an integrated approach, built on cross-departmental and sectoral cooperation with all relevant stakeholders and integration of local, regional and national policies will have to be adopted.

Promesse: Sustainable tourism in environmentally sensitive areas of France

Measures taken towards achieving EMAS certification for a site in the Camargue have not only greatly reduced the area's ecological footprint, but have also served as a example for environmental management of similar sites in France.

The Marais du Vigueirat conservation area in the Camargue, in the south of France, is an area popular with tourists. Every year some 20 000 visitors, along with 11 permanent inhabitants and 40 employees, produce 70 tonnes of solid waste, and consume 990 m^3 of drinking water and €15 000 in energy costs, with a consequent impact on the environment.

Like many European sites of ecological significance, Marais du Vigueirat could benefit from greater environmental management, and a LIFE project was set up to demonstrate how environmental management techniques could be used to conserve and reduce the environmental impact of tourism on a nature reserve.

The PROMESSE project achieved EMAS (Eco-Management and Audit Scheme) certification for the tourist infrastructure in the nature reserve and reduced the site's ecological footprint through voluntary measures. The project also embraced the area surrounding the nature reserve – an area with 15 000 inhabitants – in order to reduce the impact of external factors on the conservation site.

The Promesse project reduced the ecological footprint of the Marais du Vigueirat conservation area

Measures undertaken included preventing pollutants entering the canal that empties into the Marais du Vigueirat; a sustainable development plan was put in place in consultation with the inhabitants of Mas Thibert, a village adjacent to the nature reserve; furthermore a management board was formed to improve the water quality of the Canal du Vigueirat. These actions were taken as part of a long-term initiative to improve the environmental status of the area.

At the outset, it was expected that project actions would reduce the site's ecological footprint by 30%. The project succeeded in cutting its environmental impact in a number of ways: heating energy consumption was cut by 49% between 2004 and 2007; efficiencies led to a 10% reduction in electricity costs (2004-07); and water consumption was more than halved. Renewable energy infrastructure, such as photovoltaic panels and wood-fired boilers, was put in place. These sustainable sources now provide all the electricity the site needs. Greenhouse gas emissions have been cut by 75% within a four-year period.

Information on improving the environmental impact of conservation sites was shared with the management teams of 20 very fragile conservation areas in France. The managers of the selected areas received tailored training, and 10 of them committed to carrying out similar work in their conservation areas.

An awareness-raising booklet for teachers was distributed to 113 schools to ensure greater local understanding of the needs of the site. The beneficiary the World Wildlife Fund (WWF), believes that increased awareness of the issues among local inhabitants and stakeholders should serve to reduce significantly the external pressure on the Marais du Vigueirat.

The project has received various awards including the "Jean-Roland" award (a national award on the "reconciliation of man and nature"), the "MIREILLE" prize (awarded by the regional environmental agency for exemplary projects on sustainable development in the Côte d' Azur region), and a regional eco-tourism prize (provided by the Provence region, Côte d' Azur).

Project Number:
LIFE03 ENV/F/000260

Title: Promotion of Environmental management on a sensitive ecotouristical site in Camargue

Beneficiary: WWF France

Total Budget: €2 632 000

LIFE Contribution: €811 000

Period: Aug-2003 to Dec-2007

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KAPA GS: Clearing the air in Klagenfurt

The KAPA GS project successfully managed to reduce air pollution from cars and burning of domestic fuel in the southern part of the Alps.

Air pollution from high levels of particulate matter (PM: PM10 = particulate matter smaller than 10 µm) is a major environmental and health problem in many European cities. Raised levels of these tiny, solid particles in the air are linked to health hazards such as heart disease, breathing problems and lung cancer.

Pollution from PM is a particular problem for the southern alpine cities of Klagenfurt, Graz (Austria), and Bolzano (Italy), which suffer from high concentrations of air pollution, particularly in winter months. In some areas, air pollution has exceeded EU safe limits on more than 100 days each winter.

The KAPA GS project carried out a series of pilot actions with the objectives of reducing concentrations of PM in air; developing simulation models to predict the effects of different measures and provide PM level forecasts; informing the public about PM concentrations; and carrying out a cost-benefit analysis of various proposed measures.

Work began with the establishment of air-quality monitoring and particle-dispersion models that simulated methods of reducing emissions of PM, such as driving bans. Forecasts were compared with actual values of particulate matter, which were monitored and measured. Availability of forecasts allowed short-term measures to be taken, such as driving bans, on days when levels of particulate matter were especially high.

Other measures included retrofitting of buses in Graz and Klagenfurt to reduce their pollutant emissions; setting up of electronic sign boards giving information on current air quality; promoting public transport by reducing prices and establishing park-and-ride schemes; connecting households with inefficient domestic heating to the district heating supply; using adapted street-sweeping vehicles to suck up particulate matter; and optimising winter services to reduce re-suspension by the application of CMA (Calcium-Magnesium-Acetate). Awareness-raising measures such as school projects and advertising campaigns were also used.

Results

The results were highly promising, with many specific findings that will help inform future schemes. For example, retrofitting of buses with particle filters eliminated their emissions of particulate matter. The calculations, chemical analysis and tests found that 26% of PM in winter comes from re-suspension of particles from the streets. By using new techniques re-suspension of particulate matter can be reduced by 48%. CMA (Calcium Magnesium Acetate) was used as an agent to "glue" PM and avoid re-suspension of PM. This is an innovative methodology that has a realistic chance of being adopted by other municipalities.

The KAPA project estimates the following reductions of particulate matter as a result of its actions:

- Retrofitting of catalytic converters in Graz: 1 400kg/yr of PM10;
- Retrofitting of particle filters in Klagenfurt: 182 kg/yr of PM10;
- New district heating and natural gas connections: 811 kg/yr of PM10;
- Optimised winter services: - 1-2µg PM/m²/yr on average.

Innovative street-sweeping vehicles to suck up particulate matter were introduced in the city of Klagenfurt

The monitoring and forecasting work carried out by the project led to the conclusion that the number of days on which safe reductions of levels of particulate matter are exceeded could be reduced by as many as 50 by 2020. However, forecast higher traffic levels could threaten this progress, unless additional measures, such as road tolls, are introduced.

Project Number:
LIFE04 ENV/AT/000006

Title: Klagenfurt's Anti-PM 10 Action Programme in co-operation with Graz and the South-Tyrol

Beneficiary: The municipality of Klagenfurt, Austria

Total Budget: €4 059 000

LIFE Contribution: €1 826 000

Period: Jul-2004 to Sept-2007

Website: http://www.feinstaubfrei.at/htm/eng/kapags.htm

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AGEMAS: Promoting quality brands and EMAS in the Dolomites

The LIFE AGEMAS project promoted the introduction of EMAS over a wide area in Italy's southern Dolomites. The project also helped promote local farm products and other 'green' small and micro-businesses.

The LIFE project encouraged the wider adoption of the EU's voluntary eco-management and audit scheme (EMAS) over an extensive area incorporating Italy's Dolomiti Bellunesi National Park and several surrounding towns. Promoting this environmental management scheme was considered the best means of harmonising other currently available environmental policy instruments such as Local Agenda 21, and thus of assisting local efforts towards sustainable development.

The AGEMAS project was coordinated by the national park authority. A key aim was to obtain EMAS registration for a distinct territory covering 32 000 ha with some 62 000 inhabitants. This included defining the park authority's role as an "agency for sustainable development". Long-term sustainability would be achieved by the transfer of the project activities to surrounding municipalities -12 of which were already involved in the Agenda 21 process.

An Environmental Management System was implemented in Italy's Dolomiti Bellunesi National Park

The project met its objectives in terms of undertaking all the work involved in gaining EMAS registration. However, it was unable to secure a registration since the "wide area" concept was an innovative one that didn't fit with the existing Italian EMAS Committee's procedures. An interim solution has since been agreed and the park authority is now confident of achieving formal registration, following revision of the EMAS Regulation.

Implementing EMS and a quality brand

Key outputs from the project actions included the drawing up and implementation of a complete Environmental Management System (EMS) for the targeted area. This innovative spatial planning tool involves assessing and coordinating management decisions for different environmental and socio-economic factors such as: air, water, landscape, soil quality, agriculture, food and handmade products, noise control, waste management, energy saving, as well as sustainable tourism, transport and other services.

An Action Plan for Environmental Improvement was produced as a concrete result and approved by all relevant bodies. The plan set targets for sustainable mobility (cycle lanes, etc.); surface- and groundwater-pollution prevention through upgrading of wastewater treatment systems; separation of household waste streams (targeting 60-70% differentiated collection by 2009; up to 100% recovery of the organic fraction and 30-40% reduction in paper waste); support for organic farming; and reduction of energy consumption in public by buildings (by 10%, with a 15% cut in CO_2 emissions).

Municipalities have played an important role in the delivery of this complete EMS through their individual commitment to the EMAS registration process. Of particular note is their support for the quality brand "Carta Qualità" scheme, whereby the park logo is granted to agricultural products and crafts, or to 'green' tourism, catering or commercial services. Under LIFE, the scheme has grown from just four to over 190 participants – providing a strong incentive for local businesses to participate in the process of continuous improvement of the environment, in compliance with EMAS standards.

Project Number:
LIFE04 ENV/IT/000494

Title: Integration of Agenda 21 and EMAS in a wide area with relevant ecological value

Beneficiary: Parco Nazionale Dolomiti Bellunesi

Total Budget: €700,000

LIFE Contribution: €350,000

Period: Apr-2004 to Mar-2007

Website: www.dolomitipark.it/it/life_agemas.html

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PRIORAT: laying the groundwork for environmentally friendly wine production

This Spanish LIFE project developed an integrated system to improve the management of water resources and reduce soil erosion and loss of nutrients in mountain viticulture. It minimised the environmental impacts of terraced vineyards, whilst improving productivity and grape quality.

The LIFE PRIORAT project aimed to show that quality grapes could be grown without the environmental costs of traditional terracing systems for growing grapes in mountains areas (e.g. soil erosion). It developed a 'Mountain Viticulture Sustainable Management System' and tested it in three viticulture establishments over 31 ha in the areas of Priorat and Empordà in Catalunia and the Côtes du Rhône in France.

The project employed a number of innovative viticultural techniques. It introduced a new style of terracing to replace previous inexpert bulldozing practices. This generated terraces that are some 65% narrower and with up to 60% less slope. Innovative vine architecture – including double arbours and circles – was used to respect the natural topography of the land.

Some 80% more vegetative cover was added to the terraces through autochthonous herbaceous plants. A drainage system to direct rainwater off the land without causing surface run-offs and a rainwater-based subsurface drip irrigation system to more efficiently target the vines' roots were also introduced.

Impressive results

The effect of these measures was impressive, particularly when they were used conjointly in a system of comprehensive viticulture management. Soil erosion was significantly reduced. This, combined with the vegetative cover, increased the organic content of the soil. Less fertilisers and herbicides were needed, since these were not washed away as much. The visual impact of the terraces on the natural environment was reduced.

Consumption of water and pesticides was further reduced through using specific monitoring devices and technologies, such as dendrometers, moisture and temperature sensors, and weather-forecasting software to enable optimised remote management of vineyards based on "vine-stress" parameters. Water consumption was cut by as much as 85% and herbicides were completely eliminated.

The project also showed that it was possible to include design elements to allow easy and safe access to the terraces for small machinery that can substantially increase the efficiency of grape cultivation in mountain viticulture. The quality of the grapes achieved at harvest and the productivity of the vines was the same or higher than that achieved through traditional systems.

Economic benefits were also derived from reduced consumption of water, energy and chemicals. An "investment return period" of 11 years was calculated for a small producer (2 ha) and 20 years for a larger company (15 ha).

PRIORAT therefore represents an important step towards more environmentally and economically sustainable mountain viticulture. The methodology is transferable and could have great significance in particular for the conservation of natural resources in Mediterranean regions and for the implementation of the European Landscape Convention. The project developed free software that can be used in terracing design, and produced a handbook of good practices. Future activities could see the adaptation of the methodology and techniques to other types of wine-making areas or other mountain crops.

The innovative terracing system cut nutrients loss and soil erosion

Project Number:
LIFE05 ENV/E/000330

Title: PRIORAT- Making compatible mountain viticulture development with European Landscape Convention objectives

Beneficiary:
Fundació Fòrum Ambiental (FFA)

Total Budget: €730 000

LIFE Contribution: €287 000

Period: Mar-2005 to Jun-2008

Website: http://www.forumambiental.org/life.html

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CEDM: Eco-friendly freight distribution in Lucca

The LIFE CEDM project has trialled an integrated and innovative approach to reducing freight transport in the historic centre of the Tuscan city of Lucca.

While European cities have taken major strides towards reducing traffic congestion and related pollution in the last decade, little attention has been paid to freight distribution, which is one of the biggest sources of energy consumption, noxious gas emissions and noise pollution in urban areas. The main reason for this lack has been the multiplicity of actors involved in logistics networks.

To address this problem, the LIFE "Centre for Eco-Friendly City Freight Distribution" (CEDM) project set out to implement, on a pilot basis, a series of regulatory, organisational and technological measures targeting different actors within the logistics chain in the Italian city of Lucca, from freight transport companies to local authorities, public transport providers and local businesses. These measures, which integrated city logistics schemes into a broader mobility and transport planning context, were designed to allow Lucca to achieve high standards of energy efficiency and environmental quality, thereby acting as a model for other European cities.

Ecological freight distribution vehicles increased the efficiency of deliveries whilst cutting down pollution levels

Integrated approach delivers results

A key element of the project was the establishment of Transit Point, a logistical hub linked to main roads and situated at the edge of the historic walled city. Goods brought in and out of the centre of Lucca pass through this point.

A web-based IT system was set up to manage urban distribution activities, with the aim of reducing the number of vehicles in circulation and of increasing the efficiency of deliveries. To further cut pollution levels, a third element of the project was a trial of ecological freight distribution vehicles in place of diesel ones.

A business plan for a full-scale CEDM system was drawn up, calculating the environmental impact of reductions of respectively one-third and two-thirds in traditional freight traffic within the historic centre. According to this plan, such measures could lead to a reduction of:

- the visual intrusion of duty vehicles by 24% (one-third) or 54% (two-thirds);
- polluting vehicles by 48% (one-third) or 85% (two-thirds);
- emissions of the most harmful air pollutants (CO, PM, NOx and VOC) by 35% (one-third) or 75-80% (two-thirds);
- average noise levels during the day by 2.8 dB (one-third) or 8.6 dB (two-thirds).

Following the successful trial of the system during the LIFE project, the Italian Ministry of Environment granted the additional funds needed to implement a full-scale system, which will be operational by the end of February in 2010.

Goods brought in and out of Lucca pass through the CEDM transit point

Sustainability of the project's achievements will depend on the ability of the new municipal utility managers to gain market share as well as to develop CEDM solutions to their full potential. This includes further innovative services with added value and higher quality aimed at different categories of urban logistics users (e.g. third party warehouse services for shopkeepers; services for hotels; 'park and buy schemes'; services for the underprivileged, etc).

Project Number: LIFE05 ENV/IT/000870

Title: Centre for Eco-Friendly City Freight Distribution

Beneficiary: Comune di Lucca (Municipality of Lucca)

Total Budget: €1 423 000

LIFE Contribution: €712 000

Period: Nov-2005 to Apr-2008

Website: http://srvweb01.softeco.it/LIFE-CEDM

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Water management

Almost two out of three Europeans consider that the quality and quantity of water in their country is a serious problem, with industrial and agricultural activities seen as producing the greatest environmental impact. This is one of the reasons why the European Commission has made water one if its top priorities. It has adopted the Water Framework Directive (WFD) 2000, which sets out ambitious targets for Member States to achieve by 2015. The WFD's measures must also be coordinated with those foreseen by the Urban Waste Water Treatment Directive, the Nitrates Directive and the Directive on Integrated Pollution Prevention and Control (IPPC).

The roles of citizens and citizens' groups will be crucial in achieving these objectives. River basin management plans that have involved the local community have boosted a sense of ownership and responsibility for clean and safe water supplies.

Member States will continue to allocate significant funds for investments aimed at addressing WFD objectives, including in new measures and technologies that enable sustainable river basin management.

NESS: Eco-friendly spray technology for Italian tanneries

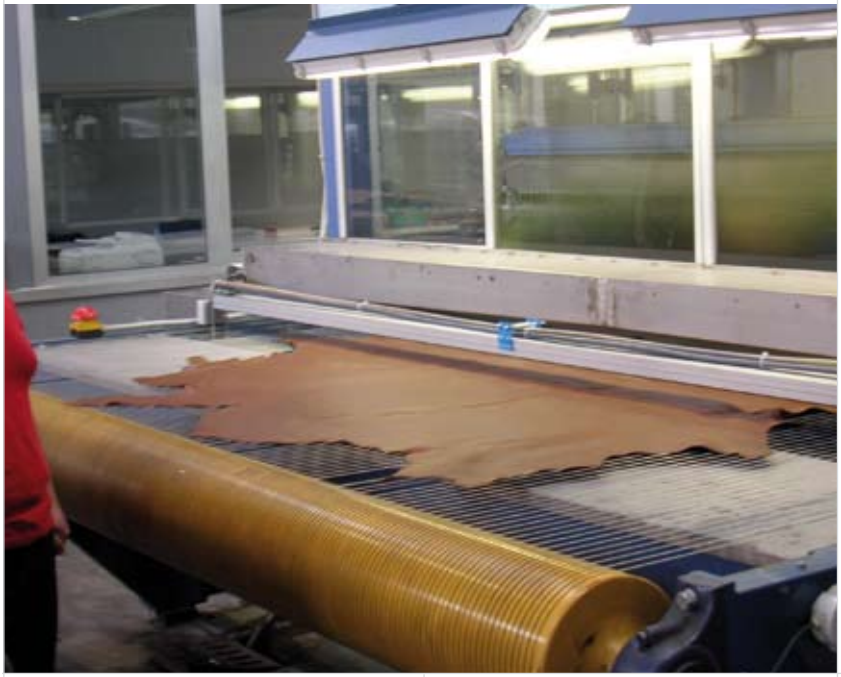
Italy's NESS LIFE-Environment project has demonstrated that innovative adaptations to leather manufacturing processes can result in leaner and cleaner production systems, as well as smarter consumption via reduced raw material use.

Europe's tannery industry has made considerable progress in modernising its manufacturing systems in order to help increase their cost efficiency and reduce their environmental impacts. LIFE funds have been used to help facilitate this process by supporting companies' efforts to explore and adopt modern environmentally-friendly methods that manage and mitigate the downsides associated with some current production technologies.

Conventional production cycles for leather goods normally consist of four separate stages: liming, tanning, dyeing and finishing. The latter finishing operations tend to be carried out using technology such as curtain coaters, roller coaters or spraying booths, followed by a drying tunnel. These types of finishing techniques can often operate at very low efficiency levels, since up to 85% of the finishing products do not stick to the leather and so become waste. Much of the negative environmental impact from tannery finishing processes is associated with these high volumes of waste, which commonly contain hazardous compounds.

Spray finishing techniques remain the most widespread method used by Europe's tanneries because of their relative versatility, compared with the alternatives. Spray finishing takes place in a 'spray booth' which consists of a large cabin containing a rotary carousel equipped with spray-guns and aerograph systems. After the spraying process has been completed, the hides pass through a drying tunnel.

LIFE support helped to achieve a significant reduction in the use of chemicals for leather finishing processes



The combination of these spraying and drying processes creates a number of environmental problems that have to be addressed by tanneries, to ensure the safety of workers and provide protection for the natural environment.

Environmental risks

Most environmental risks stem from the finishing products. Up to 75% of these comprise chemical compounds, including: organic and non organic dye pigments; plastifying agents; wax emulsions and polishes; synthetic resins; and nitrocellulose binders. Many of the products contain toxic elements that create dangerous vapours and fumes that need to be extracted using costly, noisy airflow scrubbers.

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Furthermore, due to the spray technologies' low efficiency, large volumes of waste are also generated. These are washed away but form hazardous wastewater that needs to be treated; it is estimated that 200 kg of toxic sludge is created each day by each spray booth. Particular problems relate to the emission of volatile organic compounds (VOCs) into the atmosphere, significantly contributing to air pollution.

Other environmental problems relate to the noise pollution caused by the air scrubbers, with noise levels reaching up to 86 dB in finishing plants. Energy use is also high and much of this is linked to managing the environmental impacts of finishing processes.

Non-oscillating guns increased spraying efficiency whilst abating dispersion of pollutants

Managing impacts

These environmental problems create considerable cost implications for EU tanneries and financial factors provided an incentive for the industry to identify alternative, more environmentally friendly approaches to finishing leather goods. Such a challenge was taken up by the Italian company, SICA SpA, which is based in the Chiampo Valley, east of Verona.

The tannery sector is an important part of the Chiampo Valley's economy and SICA has been working for many years in the production of cattle hide leather for upholstery and automobiles. The company specialises in skin finishing and its concern for the both the environment and cost efficiencies led it to apply for LIFE support. As Simone Voltolin, SICA's Managing Director, says, "We have always been an entrepreneurial and dynamic company and we wanted to apply our innovation skills to help remove, or drastically reduce, the main downsides associated with current spray-finishing technology for cattle-hides."

LIFE interventions

SICA's ambitious LIFE Environment project was launched in October 2006 with the aims of identifying, testing and demonstrating modern environmental friendly spray-finishing technologies. Titled the New Eco Spray System (NESS) project, its core objectives focused on building a new prototype spraying booth.

The NESS prototype was designed to incorporate innovative spraying booth technologies, and the bulk of the LIFE project workload involved testing this NESS system to identify optimal operational parameters. Tests were carried out over the complete leather finishing cycle, covering the spraying, pollutant abatement and skin drying phases.

NESS innovations

Key innovations in the NESS technology included removing conventional rotating spraying structures and replacing these with linear spraying bars. In addition, the previous spraying devices were also replaced and new aerograph airbrushes were introduced in order to enhance spraying precision. Finally, the entire spraying system was automated to allow more efficient operations.

These innovations are described in more detail by Roberto Graffagnino, the NESS project's technical manager, who explained that the new experimental plant uses a computerised conveyor system that houses the spray bars and airbrushes. There are three bars and each bar is equipped with 100 airbrush spray guns that are mounted in line. The important difference between these bars and the old system is that previously, the rotating bars would spray products all around the booth, but the new system's bars stay in a fixed position and direct uniform sprays more accurately. The new air brushes use much lower atomised pressures and these also reduce the amount of spray product that is dispersed into the air.

SICA has found that this new spraying approach helps to ensure that the finishing products are evenly distributed on the cattle hide. The improved accuracy also allows conveyor speeds to be increased by up to 40%, which reduces the overall production cycle time and energy requirements per hide.

Roberto Graffagnino underlines this point and goes on to highlight some of the NESS system's other advantages compared with standard spray booths. "We have introduced jet shields that are used to spread the nebulised finishing products, and these offer exceptional uniform spraying quality, to a level that previously was not possible. This means we can reduce the amount of covering substances by some 35% and such gains can be attributed to the fact that NESS technology uses the non-oscillating guns, which makes the spray jet uniform."

Efficiency was a priority goal for the NESS prototype designers and the new system's technical innovations were extended to include its cleaning features. Each of the spray bars can be easily dismantled into five separate pieces for cleaning in an airtight tank. The hermetic tank performs the cleaning cycle automatically, and so helps to avoid any waste spillages into the environment. This has also considerably reduced the water consumption requirements of leather finishing phases.

Improved accuracy allows conveyor speeds to be increased by up to 40%

Environmental gains

Major environmental gains have been achieved by the NESS project and these are endorsed by Agnese Roccato, from the LIFE Programme's external monitoring team, who states that "I have seen that the NESS prototype has been extremely successful and the LIFE project has achieved all of its strategic objectives."

She continues, "The new automated system provides much more control and only uses the amount of finishing products that are needed. This is a great improvement on the industry standard which tends to waste large amounts of finishing products, and this in turn creates environmental hazards. In my opinion the NESS project is definitely worthy of its Best of the Best award since its environmental benefits include an impressive range of outcomes."

A summary review of results from SICA's NESS prototype demonstrates that the LIFE-funded technology is capable of achieving:

- a reduction of up to 95% in the use of chemicals for leather finishing processes;
- an equivalent reduction in VOC emissions from the lower chemical inputs;
- a reduction of up to 98% in solid sludge waste from water depuration;
- a reduction of up to 75% in the use of electricity;
- a reduction of up to 95% in water consumption requirements; and
- a reduction of some 85% in acoustic pollution.

Business benefits

All of the LIFE project's environmental gains translate into direct business benefits for SICA and these can be illustrated by the fact that the NESS technology now allows spraying efficiencies of some 96%, compared with standard booths that generally cannot achieve efficiencies above 35%.

The LIFE-funded prototype adopted new computerised systems that provide more control over the amount of finishing products needed

Operating costs of the new finishing line are therefore lower than those of more traditional systems. Further cost savings are achieved as a result of lower energy and water consumption rates, and reduced demands for thermal-destruction of VOCs also contributes to the NESS project's range of commercial advantages.

Quality was another crucial business factor for SICA during the LIFE project trials and results show that final product quality is both high, and comparable with products treated by conventional booths.

However, as SICA's Commercial Director, Stefano Dal Molin, points out, "the only disadvantage that we have discovered is that we were not able to use as many environmentally-friendly water-based dyestuffs as we would have liked, as there are fewer water-based colours than solvent-based ones. We have therefore taken steps to address this issue and we are currently working on a new 'Self Natural Spray System' (SNSS). This further develops our LIFE NESS technology and aims to allow us to use environmentally-friendly water-based dyestuffs on an industrial scale."

SICA's three year LIFE project demonstrated the potential of the New Eco Spray System as a cost effective and more environmentally friendly technology. The project has built successfully on aspects of tannery related Best Available Technology (BAT), which were developed by the GIADA LIFE project (**LIFE00/ENV/IT/000184**), and the wider uptake of NESS approaches could lead to an improvement in IPPC standards for the EU's tannery industry.

Simone Voltolin sums up the company's experience by saying, "Our LIFE project helped us to achieve smarter and more sustainable production processes, and we firmly believe that the NESS technology and its SNSS successor have great demonstration value that will be relevant for all the companies working in the tannery industry's finishing sector."

Project Number:
LIFE04 ENV/IT/000414

Title: New Eco Spray System

Beneficiary: SICA S.r.l.

Total Budget: €3 238 000

LIFE Contribution: €846 000

Period: Oct-2004 to Sept-2007

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MAD but better: providing a catalyst for improved wastewater management

The UK LIFE Environment project 'MAD but better' demonstrated enzymic hydrolysis as an improved process for treating wastewater and sewage. The end-product sludge surpassed the environmental standards foreseen by existing legislation on the use of sludge as fertilisers in agriculture. When compared with existing treatment processes, it also generated more biogas and consumed less energy, improving both the environmental and economic sustainability of the treatment plant.

BEST OF THE BEST 2008-2009

One of the objectives of the Water Framework Directive (WFD) is the long-term progressive reduction of contaminant discharges to the aquatic environment in urban wastewater. One of the products of wastewater treatment processes is sludge, the use of which is encouraged by the Urban Waste Water Treatment Directive whenever appropriate. However, during the wastewater treatment process, potentially toxic elements and organic contaminants transfer to the sewage sludge with potential implications for the use of sludge. Wastewater treatment plants are becoming more advanced and more numerous across the EU. In recent years, significant progress has been made in several countries to curb water pollution from municipal wastewater. However, a problem that needs to be considered carefully is the efficient and environmentally sound management of the sludge generated by these plants. When processing sludge it is critical to not redirect the pollution that originally affected water to other media, such as soil and air. This can happen through the use of inappropriate technologies or by applying disposal approaches unsuitable for the local conditions.

Increases in the production of wastewater sludge have been dramatic in recent times. By 1992, 5.5 m tonnes of dry matter were produced each year in Europe and this had risen to 9m tonnes per annum by 2005. Using the sludge as fertiliser on agricultural land has long been seen as the most sustainable solution for recycling this dry matter. However, this practice has encountered a number of obstacles.

There have been concerns - although not always with great scientific justification - about the use of sewage sludge on agricultural land due to fears of contamination of the soil with pathogens and health risks from organisms such as salmonella and E.coli. Techniques used around Europe to enable sludge to meet established standards for agricultural recycling have all had limitations in terms of speed and capacity, but more particularly in guaranteeing elimination of pathogens.

This became a particularly pressing issue in the UK after outbreaks of foot-and-mouth disease and the BSE crisis, which significantly raised concerns about agricultural practices and contamination of farms and food. The Safe Sludge Matrix emerged to address these concerns as an agreement between water companies, retailers and the government, setting new stricter environmental standards for sludge to be used as fertiliser.

A new technology for a new challenge

United Utilities (UU) is the UK's largest listed operator of water and wastewater infrastructure, supplying water to 3 million UK households and businesses. It has long recycled 80% of its waste sludge to the agricultural sector, transporting and applying the sludge for farmers.

The wastewater is initially treated by traditional settling and filtration methods

Son Le from United Utilities demonstrates the six small vessels in series that allow greater control of the reaction conditions and therefore greater gas production.

The demands for a higher standard of sludge quality were therefore a challenge to UU. Its sludge treatment methods were already considered as good practice and farmers that used the sludge were very happy with its many benefits.

UU wanted to address public concerns about sludge safety in agriculture and ensure that it stayed ahead of the game in terms of environmental performance. The company carried out an audit of its current practices and found that its sludge treatment processes failed the new stricter environmental standards in around 50% of cases.

Improved technology was clearly needed. Son Le, Technology Development Manager at UU explains that "We wanted to understand why the digestion process was not enough to meet the new standards and we started to suspect that some sludge was going through the digester only partially treated."

The traditional process saw raw sewage treated in two digesters. It would stay in the first digester for around 16 days at 35°C and then be left in a second digester for 14 days. The problem with this was that it did not accurately reflect or encourage the natural microbial cycle, which mineralises complex organic matter, releasing bio-gas and destroying pathogens.

Bacteria in the air settle on and feed on waste, turning non-soluble components such as carbohydrates, proteins and lipids into soluble sugars, amino acids and fatty acids. Their actions release enzymes, which trigger new bio-transformations with the broken-down particulates being converted eventually into methane (CH4) and carbon dioxide (CO_2).

However, since the chain of reactions requires specific conditions for the bacteria to grow and flourish, the rather simplistic digester process provided a less than satisfactory compromise that failed to provide optimum conditions for many crucial bacteria.

The beneficiary therefore decided to explore the use of enzymic hydrolysis in the wastewater treatment process. This would create a plug-flow regime, providing different conditions at different stages of the treatment process and allowing each stage to operate in optimum conditions. This would break down the sludge in a more effective and efficient way.

As Son Le explains, "The key to the new process was the introduction of a pre- digestion phase at a higher temperature. This provides better conditions for the bacteria that break down non-soluble components into soluble ones. These can then be more easily broken down in the normal digester stage, that follows."

Successful demonstration through LIFE

Initial research showed the promise of such an approach and UU decided to apply for LIFE funds to develop and test a demonstration plant using these new technological ideas. The project team called the new process 'MAD, but better', MAD standing for Mesophilic Anaerobic Digestion. This refers to the bacterial process carried out in the absence of oxygen and at a moderate temperature of around 35°C.

The LIFE project enabled the demonstration plant to be built and tested at the UU treatment works at Blackburn. The trial allowed full-scale analysis of the new process and showed the new technology to be hugely successful. The only problems encountered were with the limitations of the existing installation.

The plant treated a volume of up to 740 m^3/day of sludge per day, providing an expected annualised throughput of 14 860 tonnes at full capacity. The 8,490 tonnes of treated sludge produced during the demonstration phase of the project had high agronomic value, more than meeting the new stricter Sewage Sludge Matrix standards.

The new process involves passing the sludge through a series of vessels at 42°C over a period of two days. As well as providing optimum temperature and pH conditions for the early stages of the biochemical process, the new technology increases movement and circulation of the sludge as it transfers through the vessels. This increases the ability of the bacteria to reach and feed off the matter contained in the sludge.

To further increase the mixing of the sludge, compressed bio-gas is pumped into the bottom of the tank in the digester stage to bubble up through the sludge. Son Le explains that using the bio-gas given off by the digestion itself to mix the sludge provided a low-energy process that "Was more important than we initially thought at allowing the bacteria to flourish and do its work on all the sludge."

The digester stage is made more efficient and effective, cutting 99% of pathogens from the sludge

Environmental and economic benefits

Since initial breakdown of the sludge has already taken place in optimum conditions and mixing is increased, the digestion stage is rendered both more effective and more efficient. The full treatment eliminated 99.9999% of pathogens from the sludge. This means that farmers and consumers can be reassured that the food grown using this type of fertiliser is totally safe and the soil is not being contaminated.

The pre-treatment of the sludge means that the time required in the digester stage is significantly reduced. Overall, the process time was cut from around 30 days to only 14. This reduces the energy requirements of the treatment process substantially. Existing digesters would be able to handle additional material allowing for growth in sludge to be treated. New plants could be built smaller allowing significant capital savings and reduced footprint.

Furthermore, the technology improves the efficiency of bio-gas release from digestion, which is collected to generate energy. Energy recovery efficiency, although slightly lower than expected, was 57-63% compared with the usual 30-50%. At the maximum throughput rate and assuming only 55% recovery efficiency, the plant delivers 13 MWh/yr, enough to drive the whole process and provide a surplus that can be sold to the national grid.

The process provides further economic advantages, since it enables cheaper disposal of the sludge by-product. The recycling to agriculture enabled by the process costs €210 per tonne of dry solid, compared with average landfill costs of €415 per tonne. It also saves farmers around €175 per ha in fertiliser replacement.

The project represents a great success for UU and a personal achievement for Son Le. “What I am most proud of is that we were able to develop a new process from basic principles and take it right through to successful implementation in such a short amount of time with the help of support from the LIFE programme.”

United Utilities has already introduced the ‘MAD but better’ technology in four of its plants with a fifth under construction and several more being planned. The partner company Monsal, which has a licence for the process, has also sold the technology and built five other plants outside of UU. There are plans to explore the potential of the large North American and Middle Eastern markets. It is also being proposed as a technical solution for treating and recovering energy from municipal wastes.

As the wastewater treatment sector responds to constantly evolving environmental requirements, a big plus for the ‘MAD but better’ technology is that it can be retrofitted to existing plants. It represents new best practice on the road to environmentally and economically sustainable treatment of wastewater.

The project has been recognised as one of the Best of the Best within the LIFE programme. It has also received the UK Utility Industry Achievement Award for the Environment, the Institute of Chemical Engineers Award and a regional environment award in the North-West of England. It was awarded the Energy Globe national award for the UK in 2008 and also the Tata Innovation in the Marketplace Business in the Community “Big Tick” award. Over 1 000 people from around the world have visited the site and seen the effectiveness of this LIFE-supported project at first hand.

Project Number:
LIFE05 ENV/UK/000124

Title: MAD but better - The demonstration of high rate enzyme hydrolysis as the safest and most environmentally friendly way...

Beneficiary: United Utilities

Total Budget: €4 868 000

LIFE Contribution: €1 447 000

Period: Jan-2005 to Jun-2007

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VERBAL: Dutch reed bed project pilots the way to clean water

The LIFE VERBAL project in the Netherlands successfully tested a technique for keeping surface water clean in densely-populated urban areas.

Urban areas in Europe are dealing with the challenge of having to assure the good quality of surface waters and of having to reach this objective and maintain it in an ecological manner. Nitrate and phosphate pollution pose a severe threat to as much as 20% of the European Union's surface waters as they can lead to excessive algal blooms that in turn starve the water of oxygen, destroying aquatic biodiversity.

Vertical flow reed beds are one solution to this. These are layers of sand, iron filings and gravel, planted with reeds. Drainage systems can also be built into the beds. The reed beds clean the water because phosphates bind to the iron filings, and can subsequently be filtered out.

A Dutch LIFE Environment project, VERBAL set out to use reed beds as part of an ambitious sustainable urban water system. The target area was Leidsche Rijn, an area near Utrecht in which homes and amenities for some 100 000 people are being created on former agricultural land. As part of the development, 82 km of waterways were constructed, and it was decided that as far as possible, these would be filled from sustainable groundwater and rainwater sources. The project beneficiary, Hoogheemraadschap De Stichtse Rijnlanden (the local water board), wanted a clean water system to sustain flora and fauna and to ensure a good quality of life for inhabitants, with water clean enough to swim or fish in. But the objective was also to create a closed water system that would not impoverish other water resources, or be a source of pollution for other areas, because of run off from the residential areas.

The LIFE programme supported a pilot scheme in Leidsche Rijn, which involved the construction of a test filter bed across an area of 1 ha. This would allow the optimal set-up of a larger reed bed, covering 6 ha, to be defined. The pilot project would also lead to the creation of a general applicable model for the design, maintenance and control of vertical flow reed beds in other settings. Because of the transferability of the reed bed techniques, the project was considered to have international importance.

The project constructed one large filter bed covering 2 220 m^2 and 12 filter beds of 170 m^2, with a depth of one metre. Each filter had a unique combination of variables, such as the amount of iron and limestone, the filling frequency or the presence of reeds, to enable the measurement of a wide range of variables. Phosphate concentrations were also artificially increased in some beds, to enable the effectiveness of the filters to be monitored.

Positive outcomes

The results were highly satisfactory. Removal of phosphates was done very effectively using the reed bed system. In fact, removal rates for phosphates and pathogenic bacteria were higher than the project's original targets, leading the beneficiary to conclude that the filter is a good option for cleaning surface waters in urban areas, and could even treat higher surface loads than forecast in the original design parameters.

The LIFE project resulted in the design of a reed bed system robust enough to ensure water quality meeting Dutch and European standards over a 30-year period. Additionally, the project demonstrated the benefits and cost effectiveness of vertical flow methods, which are more compact and require fewer artificial inputs than methods such as horizontal reed bed filters or chemical disposal, and so offer financial savings. The success of the pilot project convinced the beneficiary that the system could work on a larger scale, and the water board and municipality of Utrecht have moved forward with the 6 ha reed bed scheme.

The vertical flow system of reed beds was highly successful in reducing phosphates and pathogenic bacteria

Project Number:
LIFE03 ENV/NL/000467

Title: VERBAL –The Vertical Flow Reed Bed at Leidsche Rijn. A natural way to filter urban water

Beneficiary: Hoogheemraadschap De Stichtse Rijnlanden

Total Budget: €1 415 000

LIFE Contribution: €675 000

Period: Jan-2003 to Sept-2007

Website: http://www.utrecht.nl/smartsite.dws?id=49254

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WILWATER: Developing the purifying properties of willow

The French WILWATER project successfully demonstrated the economic and environmental advantages of using willow coppicing as a bio-filter for the treatment of wastewater.

Short rotation willow coppice (SRWC) is a perennial crop often used as a source of bioenergy. The crop was introduced in Sweden after the oil crisis of the 1970s with a view to replacing fossil fuels with new energy sources. Countries such as Denmark, Belgium, France and the UK have also developed the crop, but with the emphasis on the purifying properties of willow coppice for tertiary treatment of wastewater or land application of sewage sludge.

The first experiments using willow grown as very short rotation coppice in Brittany date from 1998. Two small-scale experiments were carried out by the regional energy agency AILE, (the LIFE project beneficiary): (i) to test the technical and economic feasibility of willow cultivation; and (ii) for trials of land application of liquid slurry - carried out in conjunction with a wood boiler project using the harvested willow chips as biofuel.

This LIFE project sought to develop these trials on a wider scale. The project focused on the following actions:

- Planting 100 ha of willow;
- Developing production methods: SRWC requires machines that are specially adapted to local conditions for planting, weed control, sludge spraying and harvesting;
- Monitoring the purification effect;
- Validating the environmental and economic importance: The impact of the crop on the soil, water quality, fauna, flora, landscape and the greenhouse effect was evaluated at each site. The cost-effectiveness of SRWC was also assessed;
- Experience sharing: The results of the project were widely disseminated to show that the techniques can be transferred to other regions in Europe.

The purifying properties of willow coppice on sewage sludge reduced nitrates and phosphorous below levels required by European legislation on urban residual water

Results

Short rotation coppices of willow were planted on 20 sites covering a total of 100 ha. Each site was evaluated and the impacts measured. The majority of the expected environmental results were achieved. Nitrate and phosphorous was reduced to 30% below the levels required by European legislation on urban residual water. The willow completely absorbed the effluents as demonstrated by their absence from the drain installed on each site used for irrigation. Using SRWC as biomass, the project also showed that a productivity of 8-12 tonnes of dry matter/ha/yr can be reached (equivalent to approximately 40 MWh ha/yr), with a very good energy conversion ratio : the energy produced using the woodchips is equivalent to more than 30 times the energy input for the crop.

A new rod harvester (whole stem harvester) was tested in the final year of the project. However, at project closure it was too early to evaluate the benefits of using the new machine at full capacity. While the harvesting costs remain high, they are expected to decrease with SRWC development. The continuation of the SRWC sites should ensure the sustainability and continuation of the project outputs. The goal is to increase a network of the sites in Brittany, in order to reduce current running costs.

The project also developed guidelines that are useful for the transfer of the project. A number of farmers, communities and businesses have already expressed an interest in these and a further 50 ha have been planted in the two years since the LIFE project ended. Projects that are more likely to develop are those combining a number of economic benefits and/or environmental synergies – energy independence in agriculture; water protection; tertiary treatment; and the combination of sludge for agriculture with local energy production.

Project Number: LIFE04 ENV/FR/000320

Title: WILWATER

Beneficiary: AILE

Total Budget: €2 202,000

LIFE Contribution: €770 000

Period: Jul-2004 to Dec-2007

Website: http://www.aile.asso.fr/valorisation-de-la-biomasse/wilwater

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CLB: the benefits of closed-loop blanching in potato processing

A Dutch project demonstrated a closed-loop blanching technology for the potato-processing industry that uses new selective de-sugaring technology that avoids the loss of valuable potato mass, re-uses water and reduces energy consumption.

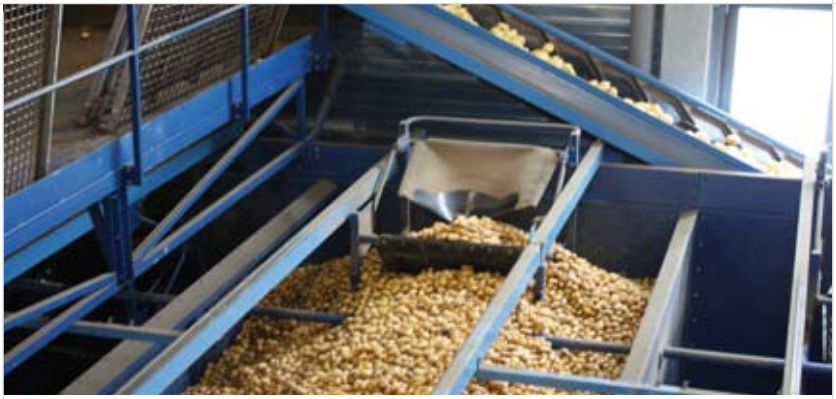
In order to produce the golden colour of deep-frozen or chilled specialty products such as French fries, an additional step in the potato production process is required: blanching. This step involves immersing peeled and cut potatoes in hot water to reduce the amount of natural sugars within the potatoes.

Traditional blanching methods, however, have several disadvantages:

- Valuable substances such as minerals, amino acids, anti-oxidants and vitamins are also extracted from the potatoes;
- Relatively large volumes of 'fresh' water are required;
- The wastewater contains high levels of potato mass that requires treatment before the effluent can be discharged into surface waters;
- The water needs to be heated to about 70°C, but the energy is usually lost since the wastewater is not recycled within the blancher.

A LIFE project implemented between 2005 and 2007 by Aviko at its Dutch premises at Steenderen aimed to address these disadvantages. The project also aimed to increase the raw-material-yield efficiency by reducing mass losses at source. Aviko's R&D department proposed a new Closed-Loop Blanching (CLB) technology, which applies an innovative approach to achieve selective leaching of the sugars during blanching in a closed-loop system.

The CLB system works by balancing the concentration levels of all components – ions, anti-oxidants, amino acids and organic acids – in the blanching water. Studies showed that the valuable components did not leach out from the potatoes into the hot water if the hot water was already saturated with a constant concentration of similar substances. Reducing the concentration of a particular substance in the hot water therefore changed the overall balance and resulted in an increased amount of that substance leaching from the potatoes into the hot water.



The closed loop blanching technology for the potato-processing industry reduced wastewater by 240 L/tonne of potatoes.

LIFE co-funding enabled the company to test the effectiveness of the system by implementing a CLB prototype at its factory producing chilled French fries. Using the CLB technique the following economic and environmental benefits were achieved:

- Savings of 3.6% of raw material, equalling 43 tonnes;
- Reduction of 240 litres of freshwater extraction per tonne of potatoes;
- Energy consumption down by a total of 94MJ/tonne of potatoes;
- Emission reductions totalling 5.4kg of CO_2 and 4.6g of NOx per tonne of processed potatoes.

The technology can be adapted for use in all potato processing factories, as well as other food production systems that use blanching procedures. Aviko is considering plans for the first full-scale CLB installation, a proposed 500 000 tonne/yr plant in Steenderen, and a cost analysis is currently being undertaken. A decision on the investment is expected by the end of 2009. CLB also offers the possibility of introducing additional nutrients as desired and further extracting unwanted elements.

Project Number:
LIFE05 ENV/NL/000035

Title: Demonstration of a closed loop blanching system for the potato processing industry

Beneficiary: Aviko B.V.

Total Budget: €1 008 000

LIFE Contribution:
€302 000 (maximum)

Period: Jan-2005 to Dec-2007

Website: www.cosun.nl/nl/406/415/1858/default.aspx

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Minimising the impact of economic activities

The environmental impact of industrial processes is addressed by a wide range of EU policy initiatives. The recently amended Directive on Integrated Pollution Prevention and Control (IPPC) is one piece of legislation that aims at improving the whole environmental performance of large medium and small-scale industrial plants throughout the EU-27, by covering emissions to air, water and land; generation of waste; use of raw materials; energy efficiency; noise; prevention of accidents; and site restoration upon closure.

Reduction of negative environmental impacts and sustainable management of toxic substances are all promoted by the IPPC Directive, which defines common rules on the authorisation of permits for industrial installations, based on Best Available Techniques (BAT). BAT refers to the most advanced techniques that can be used to achieve a high level of environmental protection for the industrial sector in question.

CO_2Ref: A greener approach to refrigeration

This Danish LIFE project successfully demonstrated how greenhouse gas emissions and energy consumption from supermarket refrigeration systems can be dramatically reduced by adapting what was once a common technology – the use of CO_2 as a refrigerant.

Increasing demand for cooling and freezing facilities in supermarkets is a growing threat in the battle against climate change. Current best practice encourages installation of centralised refrigeration systems as the most effective way of trying to reduce energy consumption. But these systems mostly rely on use of the heavy greenhouse gases, hydrofluorocarbons (HFCs), as their refrigerant.

The CO_2Ref LIFE project was innovative in investigating the use of carbon dioxide (CO_2) as a more environmentally friendly alternative to HFCs - then finding and trialling a way to introduce it in a prototype centralised supermarket system.

CO_2 has a global warming potential 2 000-3 000 times lower than HFCs. It is not unknown as a refrigerant. Indeed, from 1850 to 1930 it was widely used in all kinds of refrigerant systems, as were hydrocarbons and ammonia. These were forced out of the market during the 1930s by the chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) gases, which were less toxic, non-flammable and worked at lower pressures.

About half a century later however, CFCs and HCFCs were linked to the hole in the ozone layer and the Montreal Protocol enforced their phase-out from 1989. They were substituted by HFC gases, but these also turned out to be problematic. Despite containing chlorine, they are based on fluorine, making HFCs potent greenhouse gases. The Kyoto Protocol bans them in new installations from 2010 and a total ban throughout the EU will be implemented by 2015.

BEST OF THE BEST 2008-2009

With CO_2Ref energy consumption is 4% lower than with an HFC or CO_2 cascade system

Climate-friendly solution

Denmark has been at the forefront in promoting use of climate-friendly refrigerants. In 1996, it decided to shift its industry's main focus from HFCs to natural refrigerants. A dual approach of high taxes and a complete phase-out of HFC refrigerants succeeded in achieving a quick technology shift within the country.

The LIFE CO_2Ref project was run by the project beneficiary, Knudsen Køling, a leader in supermarket refrigeration systems in Denmark. Finn Christensen, the firm's Research and Development Manager, says: "These clear political signals in Denmark were an important catalyst for action by its refrigeration industry. Since the mid-90s we knew we needed to find

a suitable and cost-efficient replacement for HFCs. When Denmark also decided – as the first country in the world - to drastically phase out refrigerants with global warming potential with a general ban on HFCs in new installations from January 1st 2007, all our efforts were targeted on R&D."

The hunt for climate-friendly alternatives led Knudsen Køling to consider three natural refrigerants as possible alternatives to the synthetic ones: 1) Hydrocarbons, such as propane or isobutene; 2) Ammonia; and 3) CO_2. Both hydrocarbons and ammonia are inflammable, while the latter is also toxic. CO_2, by contrast, is non- or only slightly toxic and non-flammable, and was therefore considered the best option.

The problem is that CO_2 is a high-pressure refrigerant requiring redesigned technology. In the years leading up to the LIFE project, Knudsen Køling gradually developed and launched on to the market several different systems using collected and cleaned CO_2 in the refrigeration process. Originally the company had to use it as a linked system alongside HFC technology, but finally succeeded in finding the right partners and components to allow it to design a test system that did not require any synthetic refrigerant in the process.

Other projects had also been run investigating use of CO_2 and these had resulted in development of 'cascade systems', where the gas is compressed with a low-pressure compressor and another refrigerant is used to cool it and cause it to liquefy. This option however, is costly. Systems using this technology are not economic for smaller supermarkets.

The main obstacle to further development was the compressor – the core constituent of the new technology. Knudsen Køling, worked with German partner, Bock Kältemaschinen GmbH, which was able to provide the compressor technology needed for use in a stand-alone CO_2 system. These two companies, together with the Danish Technological Institute (DTI) and Danfoss, one of the world's largest refrigeration companies, then applied for LIFE funding to develop the so-called 'transcritical' system – referring to the low critical temperature of CO_2 (31°C), that is an obtainable condensation temperature – that would answer the technical challenges and bring environmental gain, while also being commercially attractive.

The CO_2-based technology requires special components, such as gas coolers and evaporators.

New lease of LIFE

The CO_2 Ref LIFE project system works by using high pressure to compress the carbon dioxide to 90 bar and 130°C. The system does not allow the CO_2 to condense but it is cooled as a gas and passed through a pressure reduction valve where it is then circulated as a liquid towards the refrigeration cabinets. In a closed loop, it is then passed back to the two Bock high-pressure compressors for the cycle to start again.

The LIFE-supported system is designed to be as reliable and functional as conventional systems; uses the same or even less energy; and requires no more servicing than the old-style alternatives. It is the first CO_2 system to use the concept of a booster – commonly used with other refrigerants – which reduces the number of heat exchanges and therefore the system's energy consumption as well as giving a safe oil return. The booster is built with a gas bypass to ensure a low pressure in the distribution system. Gas from a low pressure compressor is mixed with gas from the gas bypass as well as a medium temperature evapo-

46 systems in Danish supermarkets are reducing GHG emissions and energy consumption thanks to CO_2Ref

rator. When the gas is flashed, a small amount of liquid is formed, which is then used to cool the gas exiting the low pressure compressor. Other components include high temperature heat exchanger and expansion valves, a separator, gas bypass and medium temperature expansion valves.

This system was first tested as a laboratory prototype by the partner DTI, to probe reliability and performance of the components and their interaction. Issues such as higher energy consumption and noise were revealed. Valuable data were also provided for the particular problem of high-pressure control. These issues were addressed, leading to the production of a new generation of controllers that were then used in a prototype commercial system.

The prototype was installed in March 2007 at a Rema 1000 supermarket in Esbjerg, on the west coast of Denmark. The full system involved cold storage rooms within the building and refrigeration cabinets on the shop floor. The compressor was set up in a combined machine and stock room.

Results

Results of the new system show that the final design has achieved an energy consumption some 4% lower than that of a conventional HFC or CO_2 cascade system. Studies also indicate that the new system has halved the contribution to global warming of the reference HFC system. The global warming impact in this system comes from the generation of the electric energy needed to run the system.

Furthermore, indications are that service costs may be 15% lower than for the conventional systems, mainly because of the inexpensive refrigerant. In Denmark, the system is cost-neutral compared with other systems, because of the effects of taxation and national regulations on the capital costs. In other countries, initial costs would be likely to be 10-20% higher than for a conventional system. But as the technology matures, the prices of the more expensive specialised components will also decline.

The CO_2Ref compressor system installed at the Roskilde supermarket

Crucially, the project has been a commercial as well as technical success with its results being welcomed by manufacturers of refrigeration systems and clients alike. The beneficiary is excited about the expansion of the product, thanks to the project: “We have and always had complete solutions for a whole supermarket,” says Finn Christensen, who co-initiated the LIFE project. “Now our clients not only get their cabinets from us, but also an environmentally friendly refrigeration system.”

By June 2009, a total of 46 CO_2Ref systems were in operation, including 300 transcritical compressors with 4.8 MW cooling capacity and 135 subcritical compressors with 2.0 MW freezing capacity.

One client is a brand new supermarket in the university area of Roskilde, which has installed the CO_2Ref technology. Hidden in the compressor room, a 2x4m^2 compressor system stands ready to cool all the shop’s beverages, dairy products, fruit and vegetables. Insulated piping systems connect the different cooling islands and multidecks, each guaranteeing the respective required temperatures and without the emissions generated by other systems.

Thomas Munch Nielsen, MD at Knudsen Køling, concludes that the project “not only helped us to meet the legal requirements and protect the environment, but it has also been a great commercial success.” These benefits have already been noticed by the beneficiary’s competitors. Other companies are also starting to offer systems based on a return to the use of CO_2 as refrigerant.

Project Number:
LIFE05 ENV/DK/000156

Title: Development and demonstration of a prototype transcritical CO_2 refrigeration system

Beneficiary: Knudsen Køling

Total Budget: €556 000

LIFE Contribution:
€167 000 (maximum)

Period: Oct-2005 to Oct-2007

Website: http://knudsenkoling.itide.dk/Default.asp?Id=880

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ECOSB: Cutting VOC emissions in the processing of wood-based panels

LIFE funds have been used to great effect by this Luxembourg-based project to dramatically reduce emissions of volatile organic compounds (VOCs) released in the manufacture of wood-based panel boards.

Oriented strand boards (OSBs) are wood-based panels, made from three layers of dried wood flakes that are glued and pressed together under intense heat. Commonly used by Europe's building trades, such panels are lighter and stronger than ordinary wooden planks.

BEST OF THE BEST 2008-2009

Conventional manufacturing processes for OSB panels create high levels of VOC emissions that are mainly attributed to the natural terpenes and waxes found in the soft wood raw materials. These VOCs pose a strong risk of odour pollution that can cause considerable environmental management challenges for OSB producers. Post-production, VOCs from timber products can also contribute to "sick building syndrome" – whereby workers experience health problems that appear to be linked to their working environment – a factor that is thought to have a negative impact on Europe's business operations.

The project was implemented by Kronospan, a family business that has been in existence for more than a century, with operations in Germany, Poland, the Czech Republic and Sanem in southern Luxembourg. The firm's site in the Grand Duchy covers 30 ha and employs a workforce of more than 300 people drawn from the surrounding rural areas.

The ECOSB project used steam to dry the OSB Panels, reducing the VOC content by 75%

Green business

The company gears its operations towards sustainability and innovation, as Marko Becker, energy and environment manager at the Luxembourg plant, underlines: "Our goal is to produce quality wood panel products with a high ecological value to the greatest possible benefit of customers and our environment." Furthermore, he emphasises that renewable raw materials form the basis of Kronospan's products. "Our contribution to a healthy environment includes dealing with natural resources efficiently,

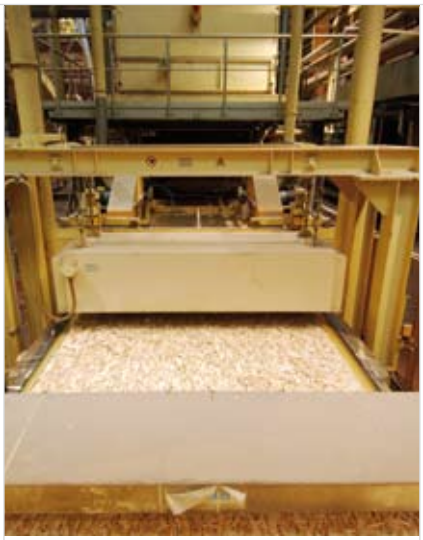
ensuring an optimal use of renewable energy feedstock and consistently monitoring opportunities for improvements in our processes," he says.

These green business objectives were incorporated into Kronospan's LIFE project proposal, which involved a partnership with Germany's Fraunhofer-Institute for Wood Research – the Wilhelm-Klauditz-Institut (FhG-WKI). This technical body works with a variety of wood-processing systems and carries out applied environmental research. Luxembourg's Resource Centre for Environmental Technologies also provided important support. The combined forces of these three sectoral specialists were brought together in the 2005-07 ECOSB project, which set out to design and implement a new environmentally friendly production process for engineered wood-based panels.

Innovation

The LIFE partners' new "ecoDry" process was to be based on an innovative closed-loop system for drying the OSB raw material. This would allow wood particles to be dried prior to pressing, using an integrated process that purified exhaust gases by incineration. Mr. Becker explains: "We wanted to modify our conventional OSB production systems to enable them to capture VOC particles in superheated steam as they evaporate from the wood-flake-drying process. The steam would be fed back into the dryer to secure a closed loop. Additional steam from drying could then be channelled through a burning chamber where organic compounds become neutralised. This should reduce the need for cleaning atmospheric emissions by an electro-static precipitator."

The use of steam to dry wood flakes was also expected to have a positive effect on reducing VOCs in the panels finished by ECOSB, since the steam drying was predicted to act as a kind



The ecoDry system captures VOCs before the wood flakes are processed into OSB panels

of distilling process, leaving the dried wood flakes with a greatly reduced VOC content. In addition, CO_2 emissions would be cut since the closed-loop system involves burning less air and provides a more stable temperature within the heating chamber that in turn contributes to lower CO_2 outputs during OSB production.

Another innovative element planned for the new environmentally friendly ECOSB production line involved the introduction of a multi-fuel burner that could recycle wood dust from the panel manufacturing process for use as a fuel to heat the closed-loop dryer. The heat exchanger would minimise any loss of heat. Further efficiencies were planned by incorporating new wood flaker blades which could cut the timber at a larger angle and so facilitate more cost-effective production.

These proposals were expected to substantially reduce VOC emissions and have a positive impact on the whole life cycle of the product. Ambitious targets were set to help ensure optimal operational efficiencies for the company and maximise value for money from the LIFE support. Analysis indicated that the new closed-loop system could aim to:

- reduce primary emissions of VOC by 90% and the content of VOC in panels after the drying process by 75%;
- cut CO_2 emissions per m^3 of board by around 7%, equating to 10.3kg for each m^3; and
- decrease thermal and electrical energy consumption by at least 10% and 5% respectively.

A monitoring programme was set up to track performance against these environmental targets and findings were planned to inform the LIFE project's dissemination activities, as well as the company's ongoing environmental management objectives.

Highly-rated results

The beneficiary is highly satisfied that its LIFE project succeeded in achieving all of its objectives. The various testing stages investigated different operational parameters and identified a set of operating procedures that provide the desired technical, economic and environmental outcomes.

Kronospan rates the quality of the OSB boards produced using ecoDry technology as "excellent" and the ecoDry system is now used to manufacture all the different panel types at its Luxembourg plant. These come in a range of thicknesses that can be used in dry or humid conditions and have been designed for different markets, including wall coverings, flooring, structural supports and various 'do-it-yourself' uses.

Alexander Bircumshaw, the plant's OSB production line manager, believes that the company's ecoDry system has already made a significant difference to improving environmental standards in Europe's building industry. He says, "Our new production process allows us to reduce emissions and also use quicker growing, younger wood, which creates an important carbon

sink opportunity for the construction sector."

The Sanem factory currently produces 160 000 m^3/yr of the new ECOSB panels. These are actively promoted by the company as a green business product on the basis of the environmental benefits achieved by the LIFE-assisted ecoDry system.

All of the LIFE project's main environmental targets were either met or exceeded and a life-cycle analysis (LCA) of the new panel-production process concluded that the ECOSB project helped reduce environmental impacts by between 25% and 50% at the Kronospan factory. VOC emissions from the manufacturing process itself were reduced by up to 97% and emissions from the panels, after production, are down by 90%. Odour emissions have been reduced by 40% and glue consumption also fell.

Greenhouse gas emissions from energy consumption and VOC emissions have both been cut by 19% and power inputs are down by 15%, from 751.5 kWh to 651 kWh. These benefits are largely attributed to the heat recovery made possible by the heat exchanger, which achieves a 12% reduction in energy used to heat the dryer. The new flaker system requires 3% less wood consumption and electricity used to power the production line was reduced by 27%, due to the more efficient closed-loop system. The LCA reveals that GHG emissions over the entire production chain are down by 10%. A new type of less toxic glue has now also been introduced following the LIFE-financed LCA findings.

These environmental gains translate into tangible business benefits with the company estimating that the new low-impact, closed-loop OSB production system leads to a cost reduction of about 3.5% (in 2004 prices).

Greener credentials

All of the ECOSB panels are PEFC-certified. This gives buyers of ECOSB products an assurance that the panels are produced using methods that promote sustainable management of forests. Further acknowledgement of the ECOSB project's green credentials came from the Employers' Federation of Luxembourg, which selected Kronospan's new closed-loop drying system as the winner of its Environmental Award Scheme.

Kronospan has also undertaken an active LIFE dissemination strategy that has already succeeded in demonstrating the value of ecoDry systems for other wood-processing manufacturers, including a production line in Germany that is currently converting to the VOC-limiting process.

Kronospan's LIFE funds reduced the factory's environmental footprint

Finally, Marko Becker concludes that the closed-loop drying system technology's future is secure and the lessons learned during the LIFE project have been "extremely useful". He says the company is now investigating how its medium-density fibreboards (MDF) might also benefit from the innovations introduced for OSB boards. Such developments could considerably increase the scope of improvements introduced under the ECOSB project and greatly enhance the long-term legacy from LIFE support for European wood-processing plants.

The quality of OSB boards is rated as excellent and all ECOSB panels are certified by the Programme for the Endorsement of Forest Certification schemes (PEFC)

Project Number:
LIFE05 ENV/L/000047

Title: New and environmentally friendly OSB panels

Beneficiary:
Kronospan Luxembourg S.A

Total Budget: €1 875 000

LIFE Contribution:
€417 000

Period: Jan-2005 to Dec-2007

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ExtEnSity : EMAS market

The ExtEnSity project demonstrated the benefits of environmental management for Portugal's farms and agricultural businesses.

The agricultural sector has been relatively slow to adopt environmental management standards, let alone sustainability management systems. In 2003, when the LIFE Environment ExtEnSity project started, there were only 12 agricultural businesses in the whole of the European Union that had achieved certification under the EU's Eco-Management and Audit Scheme (EMAS). Agriculture also lagged behind in the adoption of the ISO 14001 environmental management standard.

The project beneficiary, the Instituto Superior Técnico, noted that one reason for this slow adoption was that environmental management systems do not promote strongly enough the socio-economic benefits – such as higher profits – that can derive from environmentally-run agricultural holdings. Without this evidence, farmers have been slow to take up schemes such as EMAS.

The ExtEnSity project set out to address this issue by creating a cost-effective and simple Sustainability Management System (SMS) for extensive agriculture, which included environmental, social and economic aspects. Farmers would participate in this, initially, by providing sustainability indicators related to issues such as use of fertilisers, herbicides and pesticides, water consumption, or the amount of waste generated. Moving beyond this, farms could then choose to fully implement environmental management systems.

Sustainability indicators of farms were collected through an online Information System (IS) created by the project.

This approach was designed to enable SMS development with the involvement of farmers from the beginning. The collection of data would allow comparisons to be made between different farming methods and to show where both environmental improvements and cost savings could be realised.

The project began with 10 pilot farms, but the number of participants increased to 86, with holdings covering a total area of 70 000 ha, by the end of the project. For farmers and agricultural companies participating at the first level (providing sustainability indicators), simplified sustainability reports were produced, showing social (such as labour practices), economic and environmental indicators. The collected data were also used to create something entirely new for Portugal: an environmental impact database for agricultural products and activities.

Sixteen of the participating agricultural businesses went on to draw up full sustainability reports and 13 implemented EMAS certification audits. The project produced the first sustainability report by a farming company in Portugal. The Guaranteed Sustainability Standard (GSS) was developed by the project, by adapting the Forest Stewardship Council (FSC) standard to agricultural activities. It is based on a life cycle approach and was initially adapted for cattle-rearing, though the project aimed to extend it to other types of agricultural activities.

A core area of the project's activity was the assessment of the capacity of carbon sequestration of the sown permanent biodiverse pastures and direct sowing. This assessment was used by the Portuguese government to choose the "grassland management" and "cropland management" optional carbon sinks to ensure compliance with the Kyoto Protocol and it did so by joining several ExtEnSity farms, covering an area of over 40 000 ha.

The Guaranteed Sustainability Standard was initially adapted for cattle-rearing

The project's main outcomes were the systematic compilation of useful data that can be used to inform and plan the future of farming in Portugal. The project also demonstrated an approach that is transferable to other contexts, addressed biodiversity monitoring and food safety issues, and carried out a consumer survey that showed to farmers how consumers might be prepared to pay more for food produced by sustainability-managed farms.

ExtEnSity was considered a success, and the beneficiaries looked to establish contacts and create plans for a wide-scale implementation of the principles explored by the project.

Project Number:
LIFE03 ENV/P/000505

Title: ExtEnSity – Environmental and Sustainable Management Systems in Extensive Agriculture

Beneficiary: Instituto Superior Técnico

Total Budget: €1 420 000

LIFE Contribution: €710 000

Period: Nov-2003 to Feb-2008

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FUEL CELL: The application of fuel cells in Paris

The installation of a high temperature fuel cell in a Parisian residential complex demonstrated the environmental benefits of this emerging energy source.

High temperature fuel cells offer several environmental advantages: reduction of carbon dioxide (CO_2) emissions, primary and network energy savings and reduced air pollution. While some companies, such as MTU and Siemens, have constructed cells for demonstration purposes for several sectors, they are only just starting to be marketed.

The Fuel Cell in Paris project aimed to test such fuel cells for collective housing by installing a cell in a boiler-house in a 280-unit building in Paris. The project beneficiary, the energy company Dalkia Ile de France, aimed to demonstrate that fuel cells can reduce the amount of CO_2 released by thermal installations in the housing sector, which is currently responsible for 19% of the EU's greenhouse gas emissions.

The FUEL in PARIS project helped supply heat and domestic hot water to 283 housing units at Porte Brancion

Environmental benefits

Introduced in Paris in November 2006, Cellia is the first fuel cell to be installed in a city-centre public housing complex. Since March 2007, Cellia helped supply heat and domestic hot water to 283 housing units at Porte Brancion managed by the Paris public housing office (OPAC). To date, Cellia has operated for 5 100 hours and generated 806 MWh of electricity and nearly 374 MWh of heat.

The project demonstrated the technical feasibility of this forward-looking solution, which offers clean, steady heat in a way that is compatible with sustainable development. It is also low cost (it reduces heating costs by 10% on average through the re-sale of electricity). Other advantages of the system include the lack of mechanical wear and tear, noise and vibrations. Moreover, the system is highly efficient and emits fewer greenhouse gases into the atmosphere. The system does not emit NOx or SOx and produces 30% less CO_2 on average than a traditional combined cycle gas boiler and steam turbine.

The system's performance, however, is slightly below the manufacturer's specifications. Fine-tuning is required for the fuel cell to achieve its promised performance, but after a few problems at the start of the project, net electrical efficiency exceeded 41% and the fuel cell operated steadily. Exhaust produced during nominal output was generally in line with expectations and complied with initial specifications. The system does not emit any sulphur compounds, as they are trapped by activated carbon filters when the natural gas is channelled into the fuel cell.

The importance of auxiliary gases to start up and shut down the system, in particular nitrogen to inert the fuel cell during shutdown, is highlighted by an analysis of maintenance costs. To make these systems marketable, manufacturers will have to make substantial progress in this area, for example by shortening transitional phases and reducing the cost of auxiliary gases. The system has not been in operation long enough to get a meaningful estimate of the average cost of maintenance.

The project also carried out some good communication actions. A movie about the fuel cell won a prize in the "Engineering, industrial and technical processes, innovations, research and development" category at the 2007 Festival International des Médias Audiovisuels Corporate (FIMAC).

Project Number:
LIFE04 ENV/FR/000331

Title: Installation of A Fuel Cell in Paris

Beneficiary: Dalkia Ile de France

Total Budget: €6 451 000

LIFE Contribution: €1 561 000

Period: Nov-2004 to Oct-2007

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Waste management

The EU's Thematic Strategy on the prevention and recycling of waste aims to reduce the overall negative environmental impact of resource use. Preventing waste generation and promoting recycling and recovery of waste will increase the resource efficiency of the European economy and reduce the negative environmental impact of resource use. This will contribute to maintaining the resource base, essential for sustained economic growth. The basic objectives of current EU waste policy – to prevent waste and promote re-use, recycling and recovery so as to reduce negative environmental impacts –will be supported by this impact-based approach.

The long-term goal is for the EU to become a recycling society that seeks to avoid waste and uses waste as a resource.

ESD: Cleaner and greener steel wire production technology

The Italian ESD project has used LIFE funding to develop a highly innovative clean technology that significantly reduces negative environmental impacts from steel wire rod production using a combination of new de-scaling, drawing, lubrication and thermal treatment processes.

One of the main issues that Europe's steel industry faces is how to boost its competitiveness whilst meeting the demands of relevant environmental legislation. This can be achieved by investing in technological innovation and by improving production in terms of energy efficiency and environmental performance.

Steel wire rod manufacturers have the same challenge: how to invest in greener technologies whilst still remaining competitive on the global market. The LIFE programme has supported steel manufacturers in developing innovative processes that can drastically cut the environmental impacts of production whilst improving economic efficiency.

The innovative ESD rollers grind the wire removing 85% of the iron oxides

Hazardous waste and environmental impacts

Steel wire traditionally undergoes the following production cycle before it is galvanised: de-scaling of the wire rod to eliminate superficial oxidisation; 'drawing' of the rod; annealing in a furnace; and chemical 'pickling' in hydrochloric acid (HCl) to prevent scaling.

The 'drawing' stage, which involves stretching the metal repeatedly through progressively smaller holes in 'draw plates', requires large amounts of toxic chemicals and energy.

Large quantities of water are used for cooling the wire after the annealing phase, for conveying the acids and for washing. Water consumption is 420 litres/tonne and the polluted process water has to undergo treatment before being discharged. The conventional pickling process uses hydrochloric acid (11.75 kg/tonne) and sulphuric acid (3.75 kg/tonne) at high temperatures thus producing toxic gas emissions and creating health risks in the working environment.

Hazardous wastes are, however, the main negative environmental impact. Wastewater is laced with industrial lubricants and acid sludge, both of which can present serious health and safety risks for Europe's wire-production workforce. The acids can only be partly regenerated, and, combined with the waste from rods, have to be disposed of and/or incinerated. Another pollution hazard is created by the acid sludge that is formed by the suction and purification plants that recover the gases deriving from the acids. Energy consumption is also high given the complexity of the industrial process necessary to obtain the final product.

The idea of ESD

Metallurgica Abruzzese, one of Italy's largest producers of steel wire,

understood the urgency to enhance competitiveness by investing in environmental technologies. The company sought to develop and demonstrate new eco-sustainable drawing (ESD) techniques. These have been designed primarily to eliminate the production of hazardous waste from the process whilst also improving energy efficiency. Giovanni Cavatorta, Managing Director of Metallurgica Abruzzese, believes that the LIFE programme was essential in developing these innovative techniques in an industrial sector that can be considered as a bit of a dinosaur. "Any innovative techniques introduced in the steel wire industry that modify the processes making them environmentally friendly, are usually welcomed with some scepticism," he explains. "An EU funded programme such as LIFE certainly helped us to invest in environmentally innovative techniques whilst proving their economic viability in the long-run." According to Mr Cavatorta, Metallurgica Abruzzese did not want to merely invest in innovation, "Our aim was to put our money in green technologies. European companies can no longer compete at a global level on quantity, we have the obligation to highlight the quality of the process and of the final product, which implies greening them."

The absence of oxidation also gives the wire rod produced with the LIFE funded technologies a shinier appearance

Greening the process

The LIFE ESD project focused on a radical redesign of the entire wire-drawing process that targeted the main environmental problems and established an innovative set of manufacturing techniques with excellent transferability for other EU wire producers. LIFE funds were used to introduce three new technologies that were combined within a pilot plant based on: an innovative and acid-free mechanical dry de-scaling treatment; an energy-efficient thermal-treatment process that works in a controlled atmosphere; and a pioneering drawing system using polycrystalline diamond dies and reusable sodium lubricants.

"Our aim was to by-pass the pickling phase which would have the effect of eliminating the production of hazardous waste," explains Sergio D' Angelo, chemical technician of Metallurgica Abruzzese. "The only way to do this was to change the process upstream by eliminating the oxidisation that is naturally present on the wire rod," he adds. When the rod enters the drawing line it undergoes a process of mechanical de-scaling in order to eliminate superficial oxidisation. According to D'Angelo, the new system has demonstrated 60-65% greater efficiency than the traditional system, meaning that there is less than 1% residual oxides present on the wire rod.

De-scaling

While a conventional plant uses only a simple de-scaling technique, the ESD plant consists of a three-step de-scaling device, a brushing press and a dust-control system that sucks up particle emissions. During the first stage, the surface oxides are coarsely ground through three sets of opposed rollers, which are adjusted by a touch screen terminal that was also developed during the project. This first phase removes 75-85% of impurities (mainly iron oxides - Fe_3O_4 and F_2O_3) traditionally eliminated through the chemical process of pickling. The second phase consists of an in-line transition press that fine cleans the rod – 90-95% of impurities are gone after this stage. During the third phase, the rod passes through a set of rollers with compressed air bellows designed to capture residual fine particles. "Through the new de-scaling device, the semi-finished product is completely de-oxidised when it enters the next phase of the production cycle," notes Mr D'Angelo proudly.

Drawing

The drawing line makes innovative use of polycrystalline diamond dies and a closed circuit cooling system; the latter guarantees that the temperature of the die is maintained, enabling greater efficiency. The dies also have a higher friction coefficient, thereby increasing the work speed of the wire whilst reducing the use of lubricants. While traditional lubricants such as animal and vegetable oils and fats, calcium and sodium soaps, hydrate choke and graphite are deposited on the rod in large quantities and have to be disposed of as waste, the ESD method uses calcium stearate, a non-polluting lubricant that is also used in the pharmaceutical and food industries. According to the beneficiary, this results in a 90% reduction in lubricants present on the

The wire is annealed in an electric furnace thus avoiding the pickling phase and eliminating the production of hazardous waste

rod, reducing non-metallic impurities to below the accepted threshold of 0.0035%. The absence of oxidation also gives the wire rod produced with the LIFE funded technologies a shinier appearance.

Annealing without pickling

In the old plant, the wire was annealed in a furnace supplied with a mixture of methane gas and air. "As soon as the hot wire entered into contact with the air and the combustion fumed, it oxidised again," explains Mr. D'Angelo. This meant that the wire would then have to be cooled in water, bathed in acid and washed in water before galvanisation, a highly polluting stage of the process generating dangerous gases (sulphuric and hydrochloric acid), hazardous waste and acid sludge and water pollution, as well as consuming lots of energy.

In the ESD plant, the wire is annealed in an electric furnace and is subjected to thermal treatment in a non-oxidising (nitrogen-based) controlled atmosphere, a method that avoids the need for the highly polluting pickling stage.

Results and business opportunities

The ESD prototype performed even better than anticipated: water consumption was reduced by 99.87% and acids were totally eliminated (6 400 tonnes/yr of sulphuric acid and 1 900 tonnes/yr of hydrochloric acid). Emissions of toxic-noxious gases have also been eradicated and all related risks removed. Recycling has enabled unit consumption of lubricant to be reduced more than 39% compared with traditional methods. The new thermal technology has cut power consumption by 59% during cold galvanising and 35% during hot galvanising. Most importantly, the ESD project eliminates the production of hazardous wastes by 54 tonnes/month and provides a better working environment.

The ESD pilot plant was able to produce 1 tonne/hr on average. With a standard three-shift production schedule, this equates to 5 520 tonnes/yr and the beneficiary estimates that 7 176 tonnes/yr could be possible with the prototype. Space-saving is another benefit of the new process: it has a smaller footprint than the traditional method. Cutting the production line from 60m to 30m also reduces energy consumption by eliminating the need for two electric engines used to wrap the spools.

Substantial economic benefits, which globally amount to approximately €20 000/tonne, have also derived from the project due to having cut costs in the consumption of energy and natural resources, in the transportation and treatment of hazardous waste and shortening of the production line.

ESD: the way forward

Mr. Cavatorta believes that the ESD project was a success as it brought environmental innovation in a heavy and conservative industrial sector: "The project set some ambitious targets such as the total elimination of acids and of hazardous waste. Since these were met successfully the prototype can be considered a groundbreaking technology in the steel wire manufacturing industry". He also believes that the ESD project has started a new "environmental movement" within Metallurgica Abruzzese. Since the LIFE project started in 2004, the company has applied for an IPPC permit and was one of the first six firms in the Region of Abruzzo to obtain ISO 14001 certification.

"For the time being we cannot close the old industrial plant and throw away the key, so to speak, as the prototype has to be developed further in order to produce all types of products, essentially wire rods of different dimensions and nails," states Mr. Cavatorta, "However, the company aims to bring the prototype to an industrial scale with further private investments and will also conduct research on other green processes and products."

Once an industrial-scale plant is operational, Metallurgica Abruzzese hopes to transfer the technology to its associate companies in France and UK. The project team is convinced that ESD technologies have a future and that this future is greener, with substantial environmental benefits from lower energy consumption and the elimination of the use of acids and production of hazardous waste.

Project Number:
LIFE04 ENV/IT/000598

Title: New ESD (eco-sustainable drawing)

Beneficiary:
Metallurgica Abruzzese S.p.A

Total Budget: €3 848 000

LIFE Contribution: €965 000

Period: Nov-2004 to Oct-2007

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REAGIR: Building waste strategies in Portugal

The REAGIR project tackled the problem of safe disposal and recycling of construction and demolition waste (CDW) in the Alentejo region of east-central Portugal.

The problem of the safe disposal and recycling of construction and demolition waste (CDW) is a priority of European Union environment policy. The aim is to reduce environmental damage by recycling or re-using the large amounts of material involved, thereby reducing consumption of raw materials and helping to foster the sector's economic stability.

In Europe, there are significant differences in the extent to which countries are dealing with the issue and much CDW material still goes for incineration or landfill. In Portugal, regulations to control such waste have been widely ignored and the lack of any integrated strategy or inspection programme has resulted in continuing illegal dumping around the country. The LIFE project beneficiary, the "Câmara Municipal de Montemor-o-Novo" municipality, estimates that more than 15 480 tonnes/yr of CDW are produced in the Alentejo region.

The REAGIR project aimed to establish a service for collection and recycling of CDW in order to reverse the trend towards illegal dumping and degradation of the local landscape. A recycling facility, based on crushing, was established as a pilot for promoting recovery and re-use of CDW products in current public works, a system not yet well established in Portugal. The project also gained the support of local CDW producers, persuading the majority to participate in a recycling scheme, introducing better controls and promoting separation at source.

Work was also carried out on the analysis of information gathered from the 60 enterprises producing CDW in the project area. A collection system was then designed and implemented so that waste was separated at source into the inert fraction for recycling, other fractions that could also be recycled or re-used, and the remainder for disposal. A database was established to assist in monitoring the work.

Innovative Local Solid Waste and Construction Regulations and CDW Collection System Regulations were adopted thanks to the REAGIR project

Ground-breaking results

Existing European, national and local laws governing CDW were examined and proposals developed for a new law to achieve the controls required in the project area. The result was the innovative Local Solid Waste and Construction Regulations and CDW Collection System Regulations. The resulting mandatory requirement for operators to hold a CDW Management Certificate had a major impact. These local regulations proved ground-breaking, paving the way for changes in national law.

A pilot recycling unit producing broken stone and other construction materials was successfully installed and operated. During the 16 months of regular operation, 3 976 tonnes of waste was used to provide 3 690 tonnes of usable aggregates. Recycling produced 16 000 paving blocks and more than 400 smaller paving stones - using 20% of aggregate-recycled material.

The new measures have showed progressive environmental benefits. Over the course of the project some 20 deposits were removed and the illegal-dumping tendency reversed. Two areas were also cleaned up within the Natura 2000 conservation sites of Cabrela and Monfurado. Finally, the unit continues to function by recycling and reusing more than 10 000 tonnes/yr of the inert fraction of CDW. The beneficiary remains firmly committed to continuing the measures started under LIFE.

Project Number:
LIFE03 ENV/P/000506

Title: REAGIR - Recycling and re-use of CDW as a part of Integrated Waste Management

Beneficiary:
Câmara Municipal de Montemor-o-Novo

Total Budget: €1 257 000

LIFE Contribution: €493 000

Period: Dec-2003 to Jul-2007

Website:
http://www.cm-montemornovo.pt/reagir

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RESITEX: Helping make green fashionable every year

A Spanish project demonstrated how a small- to medium-sized (SME) textile company can considerably reduce its impact on the environment.

Europe's textile manufacturing industry discharges huge volumes of wastewater containing chemicals of major environmental concern. It also consumes large amounts of energy, and produces gas emissions, solid wastes and odours.

While SMEs play a leading role in the fashion world, they often lack the capacity to be at the forefront of environmental performance. They can find it hard to invest in the research and development necessary to identify environmentally friendly technologies or lack awareness of existing possibilities. In Spain, more than 70% of textile SMEs had no plan for waste reduction or waste management.

In response to these concerns a LIFE project, RESITEX, was set up to identify specific ways in which waste can be managed and reduced in the textile-finishing sector. This sector, which includes printing and dyeing, was considered to have the greatest scope for environmental savings.

Drawing up a guide

The beneficiary, AITEX, and 10 companies in Spain and Portugal worked together to gather existing knowledge, which formed the basis of the document, 'Procedure for Waste Management in the Textile Sector' – a reference point providing practical and specific advice on reducing waste and saving costs.

Advice in the guide is divided into three categories:

1. Identification, classification and description of wastes produced by the four different textile industry subsectors: spinning, weaving, clothing and finishing.
2. Identification, classification and description of specific waste reduction technologies applicable to the four subsectors:
   a. Good management practices – including advice on training, use of chemicals and colour management, for example highlighting water savings to be made by moving from light to dark colours during a production cycle.
   b. Selection and substitution of chemicals – for instance replacing toxic surfactants with bio-degradable ones, or using anti-foaming agents free from mineral oils.
   c. Minimisation of resources and recycling opportunities – such as recovery and re-use of printing pastes or rinsing water, and use of biological sludge on agricultural land.
   d. Equipment and new technologies – highlighting such areas as digital printing, automated chemical dispensing, and ozone systems for wastewater colour removal.
3. Identification of general waste minimization technologies for the textile industry.

The identification and dissemination of these best practices will enable Europe's textile SMEs to reduce their waste. Such measures should also help them comply with increasing environmental requirements while keeping costs down. Cost will become an important factor as the sector faces greater competition from producers in China and India.

Furthermore, the project's results are applicable to the whole industry including spinning, weaving and clothing, as well as being transferable across Europe. The success of the RESITEX project was recognised in 2008, when it received a Regional Government award as Best European Project of the Valencian Community.

RESITEX identified best practices for reducing and managing waste in the textile-finishing sector

Project Number:
LIFE05 ENV/E/000285

Title: Alternatives for waste volume reduction in the textile sector through the application of minimisation measures in the process and in the consumption

Beneficiary: AITEX - Asociación de Investigación de la Industria Textil

Total Budget: €375 000

LIFE Contribution: €187 000

Period: Dec-2005 to Dec-2007

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IDEAL 79: No place for waste

The city of Niort in France showed how waste could be reduced, through a coordinated series of measures.

The people of Deux-Sèvres, a département in western France, were in 2004 responsible for the generation of, on average, 314 kg of residual household waste meaning waste that cannot be re-used, recycled or recovered: The Deux-Sèvres authorities collect 173 450 tonnes/yr of waste in total.

The city authority in Niort, the administrative capital of Deux-Sèvres, and the department's waste collection and treatment organisation (SMITED), joined forces to try to reduce these waste flows. The two partners put in place the LIFE Environment IDEAL 79 project (**LIFE05 ENV/F/000063**), with the aim of cutting the volume of residual waste by 10% over a three-year period. The project also set out to reduce the toxicity and environmental impact of waste generated in the Deux-Sèvres area.

A four-step plan

To achieve its aims, the project followed four steps: drawing up an inventory of waste prevention good practices in Deux-Sèvres; creating partnerships and planning actions; putting measures into place; and evaluating and assessing the programme, so that good practice principles could be adopted throughout France and beyond.

In particular, the project examined what could be done with waste paper, kitchen and garden waste, products containing hazardous substances, and equipment and machinery. A number of steps were taken, from the promotional to the practical. A communication campaign was planned and executed, including on- and offline promotions, publication of an eco-consumers' guide, a partnership with supermarkets that ensured that discounts were offered for eco-products, and a programme with five companies that agreed to take a number of steps to reduce their waste generation.

The specific practical measures covered a number of areas. 'Repair days' were organised, allowing members of the public to bring different items to be reconditioned and thus re-used. Under a separate initiative, use of tap water was promoted to cut down on waste from the production, transportation and consumption of bottled water. Meanwhile, steps including training workshops were taken to cut paper consumption in public authorities, one of the main producers of paper waste. Finally, composting of kitchen and garden waste was promoted, with 3 451 compostors distributed, making it possible to reduce the production of residual waste by 714 tonnes.

'Eco-family' LIFE

To demonstrate how awareness and good practices could cut waste, nine "eco-families" were selected to work for a year with the project. The families committed to buying eco-products and services that reduced the size of their waste bin, and recorded their experiences, producing a host of waste-cutting tips. The families received advice from project specialists throughout the period of their involvement. The results were encouraging, showing that with a concerted effort, household waste volumes could be cut by around one-third.

By the end of the programme, the project had met its goal, reducing residual waste production by 9.9% compared with 2004. The amount of recycled waste went up, from 199 kg per inhabitant in 2004 to 259 kg per inhabitant in 2007. However, these achievements were secured in the context of an increase in the overall amount of waste generated. Average household waste per inhabitant in Deux-Sèvres increased from 513 to 542 kg between 2004 and 2007.

The IDEAL 79 project raised awareness amongst nine families on buying eco-products that reduced the size of their waste bin

Nevertheless, the project showed that people in Deux-Sèvres had become more aware of the issue of waste. The project was also presented at various conferences, and carried out an exchange of good practices with the Polish region of Biala-Podlaska. These initiatives show that there is an appetite for waste reduction measures that can be built on in the future.

Project Number:
LIFE05 ENV/F/000063

Title: IDEAL 79 – Ideal Deux-Sèvres: Sustainable Initiatives and Local Alternatives towards waste prevention

Beneficiary: Communauté d'Agglomération de Niort

Total Budget: €1 997 000

LIFE Contribution: €953 000

Period: Feb-2005 to Jun-2008

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Integrated Product Policy

The EU's Integrated Product Policy (IPP) strategy seeks to minimise the environmental impacts that are associated with the manufacturing, use or disposal of many products, by looking at all phases of a product's life-cycle and taking action where it is most effective. The life-cycle of a product is often long and complicated. It covers all the areas from the extraction of natural resources, through to their design, manufacture, assembly, marketing, distribution, sale and use to their eventual disposal as waste. These phases involve many different stakeholders, such as designers, industry, marketing, retailers and consumers. IPP attempts to stimulate each of these individual phases to improve their environmental performance. Given the complexity of products and actors concerned, both voluntary and mandatory are necessary.

IPP TEL redesigning the modem for recyclability

The Greek IPP TEL project drew on the Design for Recyclability (DFR) concept to develop a more eco-friendly modem, addressing the key issue of end-of-life management of telecommunications devices.

Design for Recyclability' (DFR) is an important concept for improving new products by making them more easily disposable when they reach the end of their life-cycles, particularly in the case of electronic products.

Material and process selection at the initial product design stage determines 80-90% of product cost. This initial design stage is therefore the most cost-effective point at which to address recyclability - an approach consistent with Total Quality Management (TQM) models. Recyclability can be enhanced by ease of disassembly; material identification; consolidation and simplification of parts; and by material selection and compatibility.

The IPP TEL project applied Integrated Product Policy (IPP) principles to the telecommunications equipment sector, with the following key objectives: the development of an eco-designed telecommunications device with minimal environmental impacts during its entire life cycle; the demonstration of an eco-efficient way to close the material and component loop, through reuse and recycling; and the development of a model for eco-design and end-of-life management of other electronic products.

Eco-design of telecommunication products was developed through the IPP TEL project

LCA leads to eco-design

As an initial step, the project beneficiary, Intracom, undertook a life cycle analysis (LCA) of two of its telecommunications products: the netMod modem and the IRIS 6001 telephone set. In both cases, it was concluded that the release of heavy metals into the environment and acidification constitute the major negative environmental effects of the production phase.

Market research was carried out using questionnaires to investigate consumers' attitudes towards the recycling of telecommunication devices and/or take-back practices; their behaviour concerning reuse; and their awareness of eco-design. The survey revealed that consumers were generally willing to buy eco-designed products if they cost no more than conventional devices. A technical/economic study of different end-of-life management options was carried out (covering reuse of devices, disassembly and reuse of components, and material recycling options). The economic efficiency of the devices was also examined.

Results of the LCA were used as a basis for examining and evaluating the eco-design options for the netMod, taking account of both environmental and economic criteria. Following this evaluation, Intracom redesigned the modem and manufactured 200 pilot units. It also carried out a pilot project for management of end-of-life equipment involving 200 telephone sets, 200 modems and 200 CPU towers.

This pilot recycling programme contributed valuable information regarding the disassembly and management of electronic appliances at the end of their life cycle, which then fed back into the redesign of the netMod according to DFR principles.

Full-scale production and transferable benefits

Thanks to the LIFE project, the beneficiary has begun regular production of the eco-designed netMod modem at its Romanian subsidiary. It has also submitted a list of proposed Eco-label criteria for the new device, sorted by life cycle steps (manufacturing, use, and end-of-life management). This is currently being evaluated by the European Union Eco-labelling board (EUEB).

Intracom has also adopted the LIFE project's findings in the manufacturing of other, similar products, such as its WiBAS range of broadband wireless point-to-multipoint systems based on 802.16 technology.

Project Number:
LIFE04 ENV/GR/000138

Title: Integrated Product Policy in the Telecommunication Sector

Beneficiary: Intracom

Total Budget: €1 305 000

LIFE Contribution: €335 000

Period: Oct-2004 to Sept-2007

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StartIPP: Promoting IPP in Mediterranean countries

A LIFE project helps to lay the groundwork for the implementation of Integrated Product Policy (IPP) in Portugal and Greece.

IPP is an attempt to bring together different strands of legislation to better contribute to sustainable development goals and better integrate environmental considerations into other policy areas. Greener products mean better conservation of energy and natural resources, and less waste and pollution. It is also hoped that better information on green consumption could change production practices.

A LIFE project, StartIPP, was set up to implement IPP in Portugal and Greece through the development of a set of methodologies that allow the integration of environmental considerations during the lifecycle of products and services in Mediterranean countries, as well as the practical application of IPP instruments.

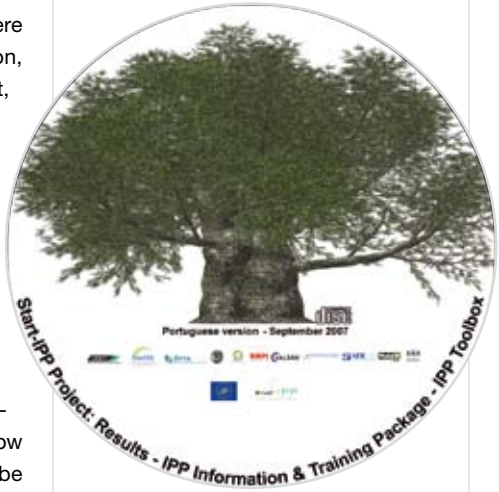
The project carried out an assessment of the status of the implementation of IPP in Europe, as well as national studies in Portugal and Greece, with the goal of identifying the priority products/services for IPP. For Portugal, these were food and beverages, transportation, energy, housing, equipment, forest, textiles and tourism. For Greece, they were the food industry, fuels, chemicals, construction, communication equipment and tourism.

The StartIPP project devised methods for integrating environmental considerations in the lifecycle of products and services

Following the identification of products/services, the next step was to improve their environmental performance through the application of three methodologies that allow environmental considerations to be integrated into the lifecycle of products/services and a comparison of the results obtained. Lifecycle assessment (LCA) studies were also carried out for the products that have potential for IPP in Portugal and Greece, identifying the lifecycle stages with the greatest impacts. Another important result was the development of an IPP Toolbox, which finds synergies between the IPP instruments and identifies the most feasible for a given organisation, product or service. It addresses all the relevant information about the following IPP instruments: Ecodesign, cleaner production, EMAS, environmental labels, environmental product declaration, green procurement, sustainability reports and self-declared environmental claims.

Putting IPP to the test

The IPP Toolbox and the practical application of the IPP instruments were tested in pilot projects in three Portuguese companies and one Greek company. As a follow-up, the project produced an IPP Information & Training Package to complement the IPP Toolbox. The package offers guidance to



organisations (public and private) in the implementation of IPP, allowing them to take informed decisions.

Finally, the project also drew up a proposal for national IPP action plans in Portugal and Greece, and produced a CD-Rom containing the results of the project. The methodologies and tools developed during the project can be easily transferred to Mediterranean countries, or countries where there is a low level of experience in the application of IPP instruments.

Project Number:
LIFE04 ENV/P/000716

Title: Starting with the promotion of IPP approach in Mediterranean countries

Beneficiary: Instituto Nacional de Engenharia e Tecnologia Industrial

Total Budget: €894 000

LIFE Contribution: €444 000

Period: Oct-2004 to Sept-2007

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ECO-CAMPS: Carry on green camping

The ECO-CAMPS project concluded that campsites can significantly improve their environmental performance through a concerted environmental management approach.

Increasingly, campsites are no longer just a place to pitch a tent. Some sites have become tourism complexes with a wide range of services and facilities: restaurants, swimming pools, night-clubs and play areas, including water games areas. Unfortunately this metamorphosis of the simple campsite of old can mean increased environmental impacts, including water and energy consumption, increased waste and pollution, and disturbance to habitats.

The region of Aquitaine in southwest France became concerned about the potentially poor environmental performance of campsites, of which it has more than 700, providing 13 million accommodation nights in 2001. With support from the LIFE Environment programme, the Aquitaine regional authority carried out the ECO-CAMPS project to improve the environmental performance of campsites and to put in place a demonstration tool that would tackle environmental issues at the design stage of campsite buildings and facilities.

ECO-CAMPS did this by following the High Environmental Quality (HEQ) approach, a voluntary code used for new constructions and renovation of buildings. This approach assesses performance through a number of indicators covering 14 categories, from eco-design and eco-management, to health and comfort.

LCA was used for the eco-design of the chalets

The project found that campsite managers had environmental concerns, but lacked a 'toolbox' for improving performance. HEQ gave them just that. The methodology was piloted on five sites, including one that was being built from scratch. A number of measures were introduced:

- Water consumption was reduced (by 5 000 m^3/yr) by using sanitation systems that minimise water use, and by collecting rainwater for tasks such as plant-watering. Chemical-free water treatment systems were introduced so that swimming pool water could be reused;
- Energy consumption was reduced through building design innovations, such as better insulation and better use of natural light. Roofs were planted with grass and other plants as an insulating layer, and as a means of keeping buildings cool in summer. Solar power systems were put in place;
- Waste management was optimised, through the introduction of waste separation systems and by rationalising waste collection;
- Sustainable materials from the local area were used for chalet construction and other buildings on the campsites. This meant, in the main, using wood, which was prepared in 'clean' ways, with use of solvents minimised, and toxic products largely eradicated from holiday chalets.

Greener chalets and other benefits

The project showed that, with proper planning and by taking a number of measures addressing different aspects of the services provided by campsites, considerable environmental improvements could be achieved. The total environmental benefit of the measures recommended by ECO-CAMPS is estimated at 40 tonnes less CO_2 generated per year for the five pilot sites.

In particular, a number of benefits were realised through eco-design of chalets. The project found that chalet water consumption could be reduced by 45%, while energy consumption for appliances could be cut by 28% and for heating by 60%. Use of solvents for chalet assembly was reduced by 41%, and chalet frames are now made from 95% certified wood.

The project's results could clearly be applied across many campsites. Interest in the ECO-CAMPS findings was demonstrated at three information days held by the beneficiary, which were attended by 93 regional campsite managers. A next step for the beneficiary will be to achieve European Union Eco-label status for its campsites, based on the HEQ environmental management approach.

Project Number:
LIFE04 ENV/FR/000321

Title: ECO-CAMPS – Eco-design and eco-engineering of buildings, amenities and accommodations in campsites

Beneficiary: Conseil Régional d'Aquitaine

Total Budget: €809 000

LIFE Contribution: €402 000

Period: Nov-2004 to Dec-2007

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http://ecocamps.aquitaine.fr

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ACADEMY: EMS for aviation

The LIFE ACADEMY project studied the environmental impacts of the production and use of aircraft, with a view to implementing a comprehensive environmental management system.

Although a great deal of knowledge has been gained in recent years about environmental management and its implementation, most environmental management schemes (EMS) concentrate on controlling the impact of operations at a particular industrial site. These schemes can lead to considerable improvements, but in general they do not address wider environmental questions related to manufacturing. In particular, they do not consider if the environmental performance of a product can be improved throughout its lifecycle, from design or procurement, through to use of the product and its eventual disposal.

Through the LIFE ACADEMY project, the beneficiary, Airbus, set out to broaden the scope of environmental management for the aviation industry. The plan was to put in place a Site and Product Oriented Environmental Management System (SPOEMS). The first phase of the project took place at six Airbus sites in France, Germany, Spain and the United Kingdom, and involved establishing the tools and databases necessary for the SPOEMS. Subsequently, the elements of the system were shared with all of Airbus's European sites – a total of 17 locations, including the headquarters in Toulouse, France.

A fundamental aim of the project was to analyse and understand better the industrial processes and parts that go into an aircraft. A better understanding was also developed of the links between each stage of aircraft production, and between each part of an aircraft's lifecycle, so that an overall approach to controlling Airbus's impacts could be established.

The project concentrated on several key areas, including resource consumption, land use, climate change impacts, stratospheric ozone depletion, chemical hazards, fog formation, acidification and noise. In each case, the aircraft lifecycle phases with the greatest overall environmental impact were identified, in order to implement the most appropriate procedures for controlling and reducing such impacts.

Using this approach, the project was able to address environmental concerns at defined stages in the life of an aircraft: design, provisioning, procurement, delivery, operation, maintenance, and end-of-life. A diagnosis was carried out for each stage, resulting in a set of defined improvement objectives that were then implemented, accompanied by audits and monitoring. The overall aim was to achieve compliance with ISO 14001 international environmental standards across Airbus's sites and prepare for later implementation of EMAS.

Results

ISO 14001 certification was successfully obtained, a significant achievement considering that, at the outset of the project, less than 4% of ISO 14001 certified companies came from the aeronautical sector. It was also the first SPOEMS to be successfully certified.

The ACADEMY project also led to the publication of a number of guidelines, which could be transferred throughout the aviation industry and beyond. These covered streamlined lifecycle assessment; environmental tracking regulation; environmental analysis; environmental reporting; training and communication; environmental design; supply chain management and standards; environmental aspects of aircraft maintenance; and, finally, processes for safe disposal of aircraft. This project was coupled with another LIFE project, PAMELA (for Process of advanced Management of End-of-Life of Aircraft), which demonstrated that significant volumes of the materials that go into making an aircraft could be reused or recycled.

Through the ACADEMY project, Airbus obtained ISO 14001 and SPOEMS certification

Project Number:
LIFE04 ENV/FR/000353

Title: ACADEMY – Airbus Corporate Answer to Disseminate integrated Environmental Management sYstem.

Beneficiary: Airbus

Total Budget: €4 518 000

LIFE Contribution: €2 245 000

Period: Sept-2004 to Aug-2007

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Available LIFE publications

LIFE-Focus brochures

Getting more from less: LIFE and sustainable production in the EU (2009 - 40pp. - ISBN 978-92-79-12231-6 - ISSN 1725-5619)

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Other publications

Environment Policy & Governance and Information & Communications Projects 2007 compilation (2009, 92 pp.-ISBN 978-92-79-12256-9)

Nature & Biodiversity Projects 2007 compilation (2009, 67 pp. – ISBN 978-92-79-12257-6)

Best LIFE Environment projects 2007-2008 (2008, 44pp.-ISBN 978-92-79-09325-8 ISSN 1725-5619)

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Best LIFE-Environment Projects 2004-2005 (2005, 44 pp. – ISBN 92-79-00889-7)

LIFE-Environment 1992 – 2004 "Demonstrating excellence in environmental innovation" (2005, 124 pp. – ISBN 92-894-7699-3 – ISSN 1725-5619)

A number of LIFE publications are available on the LIFE website: *http://ec.europa.eu/environment/life/publications/lifepublications/index.htm*

A number of printed copies of certain LIFE publications are available and can be ordered free-of-charge at: *http://ec.europa.eu/environment/life/publications/order.htm*

The programme

LIFE+ "**L**'**I**nstrument **F**inancier pour l'**E**nvironnement" / The financial instrument for the environment

Period covered (LIFE+) 2007-2013.

EU funding available approximately EUR 2,143 million

Type of intervention at least 78% of the budget is for co-financing actions in favour of the environment (LIFE+ projects) in the Member States of the European Union and in certain non-EU countries.

LIFE+ projects

> **LIFE+ Nature projects** improve the conservation status of endangered species and natural habitats. They support the implementation of the Birds and Habitats Directives and the Natura 2000 network.
> **LIFE+ Biodiversity projects** improve biodiversity in the EU. They contribute to the implementation of the objectives of the Commission Communication, "*Halting the loss of Biodiversity by 2010 – and beyond*" (COM (2006) 216 final).
> **LIFE+ Environment Policy and Governance projects** contribute to the development and demonstration of innovative policy approaches, technologies, methods and instruments in support of European environmental policy and legislation.
> **LIFE+ Information and Communication projects** are communication and awareness raising campaigns related to the implementation, updating and development of European environmental policy and legislation, including the prevention of forest fires and training for forest fire agents.

Further information further information on LIFE and LIFE+ is available at http://ec.europa.eu/life.

How to apply for LIFE+ funding The European Commission organises annual calls for proposals. Full details are available at http://ec.europa.eu/environment/life/funding/lifeplus.htm

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European Commission – Directorate-General for the Environment
LIFE Unit – BU-9 02/1 – B-1049 Brussels – Internet: http://ec.europa.eu/life

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