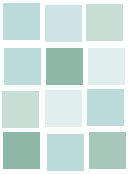
LIFE III

Environment




Best LIFE-Environment Projects 2004-2005

European Commission



European Commission
Environment Directorate-General

LIFE ("The Financial Instrument for the Environment") is a programme launched by the European Commission and coordinated by the Environment Directorate-General (LIFE Unit - BU-9 02/1).

The content of the publication "Best LIFE-Environment projects 2004-2005" does not necessarily reflect the opinions of the institutions of the European Union.

Editorial Department: Astrale GEIE - AEIDL (Catherine Stoneman) – **Managing Editor**: Philip Owen, European Commission, Environment DG, LIFE Unit – BU-9, 02/1, 200 rue de la Loi, B-1049 Brussels – **DG Environment:** Simon Goss (LIFE Communications Coordinator), Evelyne Jussiant (DG Environment Communications Coordinator) – **Journalism**: Eric Sarvan and Wendy Jones – **The following people also worked on this issue**: Eric Sarvan, Catherine Stoneman, Monique Braem, Peter Vissers – **Production coordinator**: Monique Braem, Christine Charlier – **Graphic design**: Daniel Renders, Anita Cortés - This publication is published in English and is available online.

Luxembourg: Office for Official Publications of the European Communities, 2005

ISBN 92-79-00889-7
ISSN 1725-5619

Foreword

Representatives of LIFE National Authorities from EU Member States and the LIFE Unit at the meeting in The Hague

LIFE-Environment projects tackle a wealth of environmental issues across a broad range of sectors and involve a wide range of actors. No two projects are the same; it's like trying to compare apples and pears. So how then can we tell, when a project has finished its work, if it is an example of 'best practice' and has produced results that should be celebrated and further disseminated?

We need to have criteria …

On 11-12 May 2004 at a meeting in The Hague, the Netherlands, representatives of the LIFE National Authorities from EU Member States and the European Commission's LIFE Unit, began a dialogue to see if they could come up with a methodology to address this issue. Some basic ground rules and a number of useful concepts emerged which, by the time of a meeting in the city of Malmö in Sweden on 27-28 April 2005 were turned into the draft methodology that formed the basis of the selection process. The success of both these meetings was down to the preparatory work by my colleagues from Sweden and the Netherlands, who set the context for the issues discussed at each meeting and managed to reconcile sometimes contradictory viewpoints. The conclusions were published in a leaflet *Best practice - a method for dissemination and implementation of project results*, which is also available electronically from the LIFE website: http://europa.eu.int/comm/environment/life/infoproducts/lifeenvironmentpublications.htm.

For the evaluation exercise, the LIFE Unit's external monitoring team, provided by the Astrale consortium, evaluated all the projects that ended during the reference period (Autumn 2004 to Spring 2005). This evaluation produced an initial ranking of all of the projects. The LIFE National Authorities then used the agreed set of criteria to identify the best projects from this list. The result was the 24 projects presented in this publication, five of which were deemed to be excellent examples and named "The Best of the Best".

I was responsible for managing this final part of the process. Allocating projects to each Member State was straightforward. Making sure that each project had four independent evaluations, keeping everyone to the deadline and ensuring that each National Authority evaluated projects in languages they could work in was a little more challenging. However, everyone pulled together and once I had received sufficient evaluations, it was simply a matter of drawing up a league table. The five projects that emerged come from different themes within the Programme and represent the diversity that is characteristic of the Programme. On a personal level, I found that evaluating projects originally submitted through other Member States broadened my sense of the high level of innovation and achievement by the activities supported through the LIFE-Environment Programme.

This is not the end of the story; these projects will now be encouraged to celebrate their success by telling more people – and in particular potential investors – about what they have achieved. In the process, they are flying the flag for the LIFE Programme. Our experiences from this first 'test drive' of the methodology will be reviewed again in 2006 and, hopefully, it will form part of the project LIFE-cycle in the future.

I would like to thank the LIFE National Authorities, the staff from the LIFE Unit and the external monitoring teams who took part in this exercise and commend them for their efforts. A special thank-you, of course, goes to all the project beneficiaries.

Robbie Craig
UK LIFE Committee Member

summary

Introduction

EU Member States represented on the LIFE Committee and the European Commission's LIFE Unit have announced the Best LIFE-Environment Projects 2004-2005. The result of the selection, as approved by the LIFE Committee on 28 July 2005, is the 24 projects featured in this publication.

The 24 Best LIFE-Environment Projects 2004-2005

Land-use development and planning	
✪ SMILE	France
ARTEMIDE	Italy
ECO-LUP	Germany

Water management	
✪ IMOS	Italy
Afino Conductividad	Spain

Impact of economic activities	
✪ Stirling Motor	Germany
GIADA	Italy
IEM in Hospitals	Germany
SPENT-PERCUS	Spain
Recycling of Grease	Spain
TANDEM	Italy

Waste management	
✪ ENERWASTE	Spain
WPC-Recycle	Germany
Compost Dissemination	Spain
ECOBUS	Spain
RECDEMO	Germany
MINOS	Greece

Integrated Product Policy	
✪ BBMpassiv	Austria
Roof Greening	Sweden
Green Certificate	Latvia
ECO-LAB	The Netherlands
ENERLAB	Latvia
EQUATION	The Netherlands
PlusPunten	The Netherlands

The selected 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. The projects 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. With beneficiaries from across the EU25, the selection includes the five 'Best of the Best' projects: IMOS (Italy), Stirling Motor (Germany), SMILE (France), BBMpassiv (Austria) and ENERWASTE (Spain).

"All of these projects have shown themselves to be the best in their respective thematic fields, according to the exacting best practice criteria developed to assess projects' immediate and long-term environmental impacts," said Philip Owen, Head of the LIFE Unit. "In recognition of this, the Commission will assist the project beneficiaries, notably the five 'Best of the Best', in finding additional and more efficient means of disseminating their results. This should enable a better implementation of practical and cost-effective environmentally-friendly solutions for industry and society in Europe."

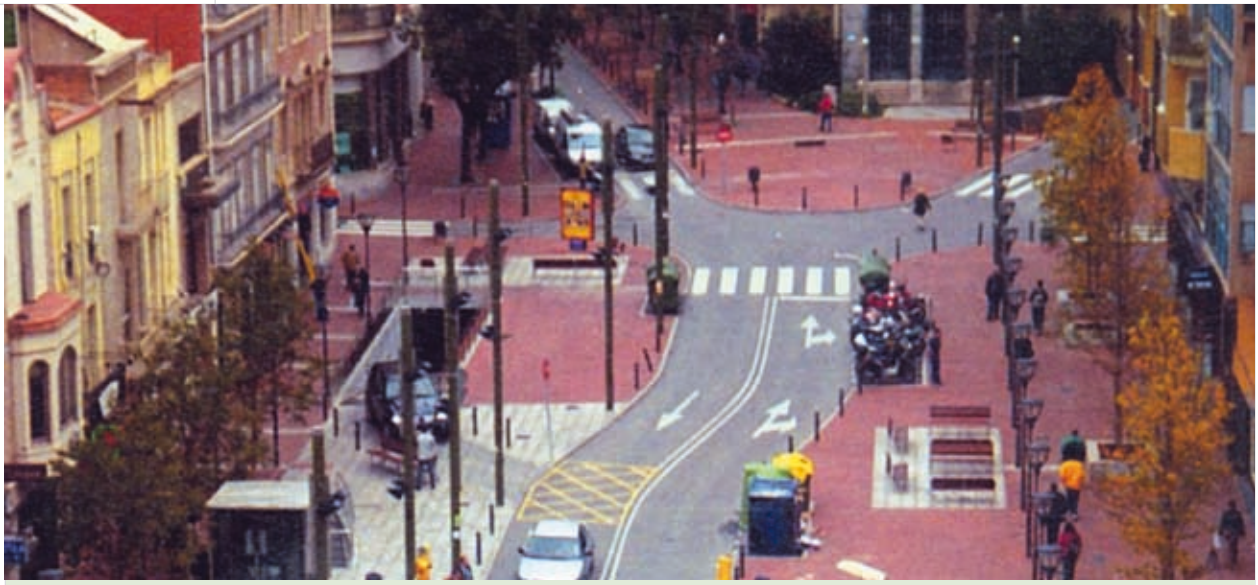
How were the best projects selected?

This first Best Projects exercise follows on from a lengthy identification and evaluation process based on a set of best practice criteria, developed by EU Member States in collaboration with the European Commission.

Following an initiative taken by Sweden and the Netherlands, scoring of completed LIFE-Environment projects was launched in the summer of 2004. At The Hague on 11-12 May 2004, the LIFE Committee decided to use best practice as a dissemination method to replicate LIFE-Environment project results. A best practice can be a technological innovation, a new way of utilising natural resources, a new working method or immaterial 'tool' or new ways of collaborating between stakeholders – or some combination of these – that gives positive results for the environment and preferably also for the economy and society at large. In view of the importance of these aspects to project success, LIFE-Environment beneficiaries will from now onwards be 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 will form an integral part of the evaluation process.

Of the 72 projects that closed by March 2005, the 24 best scoring projects were subject to a second round of evaluation by the Member States. The countries represented on the LIFE Committee then met in Malmö, Sweden on 27-28 April 2005 to discuss the evaluation methodology and to test criteria developed to help identify the five 'Best of the Best' projects. The final selection of the best LIFE-Environment projects 2004-2005 was undertaken by the Member States under the coordination of UK LIFE Committee member, Robbie Craig.

This publication presents the results of each of the best 24 projects, according to the five LIFE-Environment themes. It also includes the beneficiaries' contact details and website addresses. Further information is available on the LIFE website at: http://europa.eu.int/life/.



Land-use development and planning

The Commission is currently finalising a Thematic Strategy on the Urban Environment, which will seek to promote a more integrated approach to urban land-use planning at the local and regional level, as well as to urban transport, environmental management, and construction. To be sustainable, land-use planning and development must harmonise a wide array of cross-cutting aims, ranging from water, air and soil protection to the promotion of urban economic development; from the conservation of natural habitats to the fulfilling of transport needs; and from managing local climate change to reducing social segregation. Entailing partly contradictory objectives, land-use planning processes are often conflict-ridden. Sustainable land-use therefore requires integrated approaches, which take into account the economic and social, as well as environmental concerns of the numerous stakeholders involved.

Spreading SMILE across Europe – promoting sustainable urban transport policies

Every year, hundreds of cities across Europe celebrate a car-free day as part of the European Mobility Week (16th to 22nd of September). Supported by two LIFE projects, the awareness raising initiative has already reached millions of citizens, and is now spreading to other cities in Europe and beyond. A more recent LIFE project, SMILE, has compiled the results of the many permanent measures implemented as part of European Mobility Week, resulting in an online database with good-practice examples for sustainable mobility, and a number of in-depth publications with recommendations and guidelines for municipal decision-makers and planners.

An experience worth sharing

Across Europe, the migration of people from the city centre to the suburbs is leading to increasingly dispersed settlement patterns, with low population densities and long travel distances. This phenomenon, known as urban sprawl, goes hand in hand with an increase in car ownership and commuter traffic. Today, European local authorities are therefore confronted with significant and increasing transport-related problems. Indeed, the European Commission's White Paper "European transport policy for 2010: time to decide"[1] states clearly that "The big problem that urban authorities will have to resolve, sooner than might be thought, is that of traffic management, and in particular the role of the private car in large urban centres".

Transport currently contributes around 24% of the world's greenhouse gas emissions and by 2010 it will be the largest single cause of climate change. The use of private motorised vehicles is also a principal cause of air and noise pollution, the depletion of non-renewable resources, land consumption and the endangering of natural habitats. By closing their city centres to cars for one day a year and opening them to a wide range of mobility-related events, local authorities can raise citizens' awareness and thereby influence their mobility behaviour.

Local authorities can influence their citizens' mobility behaviour by raising awareness… and providing comfortable and efficient alternatives to the private car.

"Some experiences in life are so good, so special and so remarkable that you want to share them" thought the staff of the French Environment and Energy Management Agency (ADEME) after successfully organising the first car-free day in France in 1998. They therefore launched the LIFE project "In Town Without My Car!", getting hundreds of cities to support the first European car-free day on 22 September 2000.

The success of "In Town Without My Car!" led in 2002 to a second LIFE project, "European Mobility Week", coordinated by ADEME, together with the networks Energie-Cités, Climate Alliance and Eurocities. A wide range of initiatives related to different aspects of urban mobility were carried out in 320 cities across 21 countries, in partnership with local associations

1 COM(2001)370 final

and businesses, national agencies, NGOs and international companies. A year later, a great many more cities and towns had joined the initiative and were participating in European Mobility Week or implementing car free days.

Laurent Lanquar, who coordinated the SMILE project from ADEME's office near Nice, explains how the European Mobility Week partners decided that the next step in the campaign should be to capitalise on the results achieved by the numerous initiatives across Europe by gathering, systemising and evaluating the permanent measures implemented by the cities to promote sustainable mobility. The aim was to present local authorities with a range of recommendations and good-practice examples to assist them in their efforts to achieve more sustainable mobility. In August 2001, joining forces with the three national energy and environmental agencies ENEA (Italy), EVA (Austria) and IDEA (Spain), and the NGO EA.UE (Germany), they launched the LIFE project SMILE (Sustainable Mobility Initiatives for Local Environment).

SMILE compiled the results of the many permanent measures promoting sustainable mobility that were implemented as part of European Mobility Week.

SMILE products available online

- **Local Experiences Database**: A compilation of 170 successful and replicable practices for sustainable mobility.
- **Welcome to 14 European Cities... An Invitation to take Action**: A catalogue offering study visits to cities with innovative measures and policies. Available in English and Spanish.
- **Towards Sustainable Urban Transport Policies**: Recommendations for Local Authorities. Available in English and Spanish.
- **Sustainable Mobility for All**: Experiences of European cities and towns in designing specific measures to meet the needs of special target groups. Available in English and Spanish.
- **Public Transport**: A Pillar for Sustainable Mobility: Recommendations on public transport for both local authorities and public transport operators. Available in English and Spanish.
- **Guidelines on Noise Abatement Planning Principles**: Recommendations for road traffic management at the level of local government. Available in English and Spanish.

The SMILE team developed a questionnaire, available in eight languages on the project website, and sent it to 700 of the cities that had participated in the "In Town Without My Car!" day and the European Mobility Week. The survey achieved a return rate of 21%, with 170 replies from 23 countries. The analysis of the responses, undertaken jointly with the cities and thereby combining the partners' expertise with local authorities' experience, led to a series of tools and documents, all of which are available in English and Spanish on the project website.

A good-practice database and in-depth publications

Of the 223 permanent measures identified by the SMILE project, 175 successful and replicable practices were selected for inclusion in an online *Local Experiences Database*. The database is a powerful tool for local authorities seeking in-depth information on good practices in a wide range of mobility-related issues, including urban transport plans, urban planning, intermodal approaches, traffic information systems, public transport, car sharing, alternative modes of transport, noise abatement, awareness raising and urban freight management.

Recommendations and guidelines for local authorities were formulated in the project's main publication *Towards Sustainable Urban Transport Policies: Recommendations for Local Authorities.*

Three topic-related publications were produced, providing more in-depth information for experts working on these issues. The first, *Sustainable Mobility for All*, is a compilation of the experiences of European cities and towns in designing specific measures to meet the needs of special target groups, such as children, young people, women, low-income groups, the elderly and the handicapped. The second topic-related product is the publication *Public Transport: A Pillar for Sustainable Mobility*, which contains recommendations for both local authorities and transport operators on integrating public transport into sustainable mobility initiatives.

For the third topic-related publication, an additional survey focusing specifically on noise abatement was conducted for 86 of the cities, enabling the project to identify innovative activities to reduce traffic noise. The resulting publication, *Guidelines on Noise Abatement Planning Principles for Road Traffic at the Local Authority Level*, reveals the existing potential for noise-abatement measures in fields that are under the remit of local authorities and which these can therefore influence directly.

Finally, SMILE identified 14 European cities that had outstanding sustainable mobility policies and that wished to share their experience and knowledge by offering on-site visits and meetings with key actors. The *SMILE Study Tour Catalogue* invites local authorities wishing to benefit from the experiences of these 'host' cities to contact them, and experience first hand some of today's most innovative sustainable transport measures.

While the projects "In Town Without My Car!" and "European Mobility Week" comprised major communications campaigns, SMILE focused on making existing knowledge and experience available for political decision-makers and experts in the field. Nevertheless, the project also placed major importance on communicating its results and ensuring their availability online. More than 2,000 municipalities and organisations working in transport and urban issues received copies of the project CD-ROM, publications and newsletter. The website registered over 10,000 visits during the project's implementation, a third of which were for the good-practice database. Numerous presentations of the project's results have been, and are still being, given at international events, and a series of study tours were carried out to the SMILE 'host' cities.

The long road to sustainable mobility

Laurant Lanquar explains that one of ADEME's motives for applying for LIFE financing for exporting the initiative from France to other countries was to "learn from the wealth of experience outside France, import concepts and experiences from abroad, and thereby influence thinking within France itself". He is confident that this 'boomerang effect' has contributed to influencing transport policy in France, for instance by promoting concepts such as tramways and car sharing.

As the final report[2] of the Directorate-General for Regional Policy's thematic group on Environmentally Sustainable Transport makes clear, "environmental sustainability and meeting increased transport needs cannot be achieved without a reorientation of transport practices and policy modifications." Despite the prevalence of hidden subsidies for motorised private transport, and the increasingly difficult financial situation of local governments across the Europe, there is a growing awareness among local authorities that major policy change is needed to achieve a more economically efficient, socially just and environmentally responsible mobility for their communities.

This year, coordinated by Eurocities, Climate Alliance and Energie-Cités, and supported by the European Commission's Directorate-General for the Environment, the 4th European Mobility Week focused on "Clever Commuting". Again, over 1,000 cities participated in the week's highlight, the "In Town Without My Car!" day, including an increasing number from outside the 25 members of the European Union, such as Reykjavik (Iceland), Mérida (Venezuela), and Fortaleza (Brazil).

Transport currently contributes around 24% of the world's greenhouse gas emissions and by 2010 it will be the largest single cause of climate change.

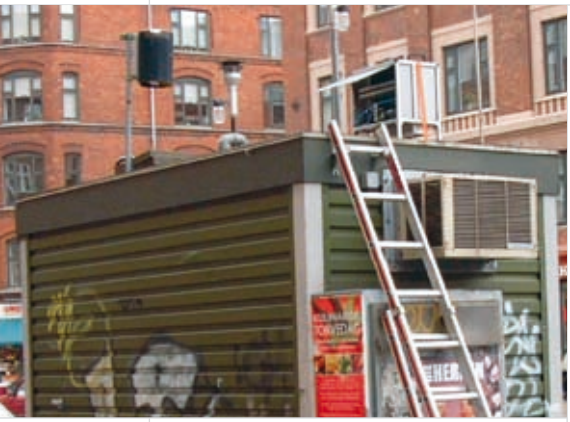
When speaking about the long way the initiative has come since the first car-free day in France in 1998, and when asked about the long way yet to go until sustainable urban mobility is achieved, Laurant Lanquar smiles. "Fundamentally changing people's behaviour requires a lot of effort and takes more than just a few years", he says, and then refers to Lao Tse's aphorism, "A journey of a 1,000 miles begins with a single step". This first step would seem to have been taken decisively and in the right direction.

2 Brussels, 15 March 2005

Project Number: LIFE00 ENV/F/000640
Title: Sustainable Mobility Initiative for Local Environment
Beneficiary: Agence de l'Environnement et de la Maîtrise de l'Energie
Total Budget: €1,318,000
LIFE Contribution: €658,000
Period: 01-Aug-2001 to 30-Jun-2004
Website: www.smile-europe.org
Contact: Laurent Lanquar
Email: laurent.lanquar@ademe.fr

ARTEMIDE offers a low-cost, accurate measurement of urban pollution by VOCs

This project, by Italian research institution Salvatore Maugeri, has demonstrated an innovative sampling device capable of providing accurate and low-cost measurements of urban pollution by volatile organic compounds (VOCs) including benzene.



The Artemide 'radiello' is tested on a roof in Copenhagen.

The main objective of the ARTEMIDE project was to design and implement a new sampling device capable of providing low-cost, accurate data on urban pollution by volatile organic compounds (VOCs), including benzene (also known as benzol), 1.3-butadiene and methylterbutylether (MTBE). All three VOCs are emitted by vehicles and are suspected of having carcinogenic effects. Benzene from road traffic can be extremely hazardous to human health and has been linked to leukaemia. The International Agency for Research on Cancer (IARC) of the World Health Organization includes it among the Group 1 compounds whose carcinogenic power in humans has been sufficiently demonstrated. The other two VOCs are emerging pollutants for which, at a European level, there exists an acknowledged need for more data.

To be able to take effective steps to control these substances, it is necessary to collect data on air pollution levels over both time and space. Therefore the project team designed a specially-developed 'radiello', or diffusive sampler device, capable of providing both spatial and time-related pollution data. Unlike other monitoring techniques, where the data available may be quite variable and often contradictory, the new sampler can provide accurate measurements of data collected continuously at a temporal resolution of 15 minutes to 24 hours. The sampler works on the principle of quantifying the mass trapped by the absorbing material and the time of exposure of the diffusive sampler.

Portable device

The new cost-effective, portable device can function for a long period without external power supply or surveillance. This means it can be placed anywhere, without the need for an equipped site. Field validation tests – carried out in northern and southern European towns and in winter and in summer, comparing the results obtained by the new sampling device and the BTX analysers of the local fixed monitoring networks – showed good correlation. As well as providing accurate data, there were savings in costs and in manpower.

The Project beneficiary is also confident that the device could have many other uses: for example, the sampler is also suitable for the automated sequential sampling of all compounds by radiello: nitrogen oxides, ozone, aldehydes, hydrochloric acid, hydrofluoric acid, odorous compounds, phenols, sulphur dioxide and hydrogen sulphide. Another interesting potential application is for measurements in the workplace where there usually exist high concentrations of pollutants. The device is sensitive enough to detect polluting compounds in the workplace with a time-resolution as high as every 15 minutes.

Project Number: LIFE00 ENV/IT/000005
Title: High temporal resolution urban monitoring of benzene…
Beneficiary: Fondazione Salvatore Maugeri
Total Budget: €745,000
LIFE Contribution: €199,000
Period: 03-Oct-2001 to 02-Feb-2004
Website: www.pc4.fsm.it:81/artemide/homepage.htm
Contact: Danilo Cottica
Email: dcottica@fsm.it

ECO-LUP: Applying EMAS to local authorities' land-use planning

The ECO-LUP project has demonstrated the application of an environmental management system to the land-use planning processes of four municipalities bordering Lake Constance in southern Germany and Austria.

The ECO-LUP project demonstrated the application of the European Union's Eco-management and Audit scheme (EMAS)[1] http://europa.eu.int/comm/environment/emas/index_en.htm, to the process of urban land-use planning, by developing and applying the scheme in the municipalities of Dornbirn and Wolfurt (Austria), and Constance and Überlingen (Germany). Environmental teams were created in the four municipalities to assess and establish procedures for sustainable land-use planning. As planning processes related to land-use are often conflict-ridden, the municipalities considered an integrated and participatory approach necessary to cope with such cross-cutting issues as water and soil protection, air quality, local climate change, transport demands, waste management, and the protection of natural habitats.

Cross-national initiative

The project was coordinated by the project beneficiary, the Lake Constance Foundation *(Bodensee-Stiftung)*, and assisted by the Institute of Applied Research at Nürtingen University, Germany. In the long-term, applying EMAS to land-use planning is expected to result in a continuous improvement of environmental quality standards in planning for municipal development, leading to an average reduction of land consumption of 5% per municipality, as well as to the sustainable development of urban green zones, reductions in energy consumption due to the promotion of low-energy housing, and improved flood protection.

The project effectively demonstrated the integration of environmental management into municipal development planning processes. Central to the project's successful introduction of EMAS to the four municipalities was the prior preparation of a detailed SWOT analysis (strengths, weaknesses, opportunities and threats) for each municipality. This was done through a series of local and regional workshops, which addressed all planning issues of municipal and regional relevance, and was closely linked to the Local Agenda 21[2] processes, http://www.un.org/esa/sustdev/documents/agenda21/index.htm. The team then carried out the trial certification of the respective municipal development planning processes, according to current EMAS standards and, in October 2004, the City of Überlingen was recognised as the first municipality with an EMAS-certified communal land-use planning process.

Based on the successful trials carried out by the LIFE project, the integration of EMAS should be replicable in any municipal development planning process. A handbook, *Environmental Management for Municipal Development Planning*, http://europa.eu.int/comm/environment/emas/local/pdf/ecolup_en.pdf was published by the project and widely distributed in English and German for use by municipalities throughout Europe.

1 EMAS - Regulation (EC) No 761/2001 [OJ L114, 24.4.2001, p1]

2 Agenda 21, which emerged from the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, calls on local authorities to adopt a Local Agenda 21, focusing on sustainable development strategies at the local level. Central to the concept is that the process should involve all sectors of the local community.

EMAS provided an integrated and participatory approach to municipal planning.

Project Number: LIFE00 ENV/D/000326
Title: Environmental management for communal urban local land-use planning
Beneficiary: Bodensee-Stiftung
Total Budget: €695,000
LIFE Contribution: €347,000
Period: 01-Jul-2001 to 31-Mar-2004
Website: www.ecolup.info
Contact: Marion Hammerl
Email: m.hammerl@bodensee-stiftung.org

Water management

The Water Framework Directive of the year 2000 provides a common framework for sustainable water management throughout Europe. It sets four groups of objectives: the protection of the environment; the supply of drinking water to the population; the supply of water for economic uses; and the mitigation of the effects of floods and droughts. Sustainable water management implies the integrated regulation of all artificial or natural water cycles. It covers a wide range of issues, from municipal service provision to the international management of river basins, and from the reduction of nitrate pollution by the agricultural activities to awareness raising measures promoting greater efficiency in the consumption of water.

IMOS: An integrated urban drainage management system – for when it rains and for when it pours

Through the IMOS project, the City of Genoa has successfully established a management system that combines surveillance instruments, computer modelling and water cisterns, to enable the real-time, remote-control regulation of rainwater flows within its urban drainage network. The project demonstrates how such an integrated management system can optimise the use of a city's rainwater drainage and wastewater treatment facilities, significantly reducing both the levels of pollution in discharged effluent, as well as the risk of flooding in urban areas.

A meteorological radar for monitoring precipitation is one of a series of instruments forming IMOS.

First flush and flash floods

For many cities, the management of rainwater drainage systems poses two central challenges. Firstly, under normal rainfall conditions, the first waters reaching the drainage system (so-called 'first flush flow') are usually contaminated with such substances as heavy metals, oils, greases and nutrients. Especially if the runoff is from metropolitan or industrial areas, it must be treated to reduce the environmental impact on the receiving water bodies.

Secondly, in cases of extreme precipitation, operators must manage the hazard of flooding by avoiding the overloading of drainage and treatment facilities. Inundations can not only cause significant material damage, but can also result in the mixing of wastewater (i.e. sewage) and rainwater. This results in a dramatic increase in the amount of water that needs to be treated before it can be discharged into the receiving water body. Changing climatic conditions mean that local authorities must be prepared for an increase in the frequency of intense rainfalls, and consequently of the occurrence rate of flash floods.

The City of Genoa's urban drainage problems are intensified by its irregular topology and the very limited capacity of its storm-water drainage system. Through the IMOS (Integrated Multi-Objective System for the optimal management of urban drainage) project, the Municipality of Genoa sought to create and demonstrate an integrated management system that would enable an efficient regulation of its rainwater drainage, under both normal conditions (i.e. the treatment of first flush flow) and critical conditions (i.e. the avoidance of capacity overload).

Financial constraints meant the best use had to be made of existing hydraulic infrastructure, and that the project had to focus its efforts on a limited section of the sewer network. However, the area covered needed to be big enough to achieve results that were sufficiently representative for the project's demonstrative purpose. IMOS therefore focused on the historical centre of the city. This covers an area of around 10 km^2, comprises eight small river basins and is served by a municipal wastewater treatment plant, located in the port area, which collects the city's waters through a trunk sewer that runs along the coast. The plant was frequently overburdened after heavy precipitation, leading to polluted water often being discharged into the Mediterranean without prior treatment.

BEST OF THE BEST 2004-2005

Integrating the system's components

The main components of the system resulting from the 36-month project can be divided into three categories: monitoring apparatus consisting of a series of sensors and a low-cost meteorological radar (for monitoring rainfall, as well as the quantity

and quality of the water in the drainage system); software programmes (for calculating and simulating rainfall and drainage-system responses); and hydraulic installations (retention tanks, by-passes, pumps and sluice gates for regulating water flow). The project's innovation, however, lies not so much in its application of state of the art technology, but in its combining of different elements to form an integrated system.

Basically, IMOS works as follows: data on precipitation are collected by the rain gauges and radar, and used for computer simulations that predict the sites and quantities of rainfall expected in the immediate future – a method known as 'now-casting'. Information is transmitted via a wireless connection to a central processing unit, which simulates the consequences for the drainage system and proposes possible measures to be taken, for example, the activation by remote control of an underground retention tank.

Under normal conditions, pollution sensors enable the operators to decide if the water flowing through the final section of the drainage network can be conducted directly to the sea, or if it needs prior treatment (as usually applies to first flush flow), in which case a sluice gate is operated to direct the flow to the plant.

In critical situations, the retention tank is connected to the drainage network, and the water is diverted and accumulated in the reservoir, thereby reducing both those peak-flow levels within the system and those entering the treatment plant. The water-level sensors throughout the network register the flow situation and provide real-time information for the taking of additional measures.

A replicable approach

The resulting optimisation of the water flow within the drainage network is expected to lead to a significant reduction in the risk of system failure under extreme conditions. The frequency of inundations as a result of sewers overflowing is anticipated to decrease from once every 1 to 2 years to once every 5 to 10 years.

Furthermore, under ordinary conditions, the efficient use of the treatment plant, by which, on the one hand, only contaminated water is directed to the facility and, on the other, system overloads are avoided, has led to an impressive 40% reduction in the amount of pollution delivered to the sea.

The system's low costs and flexible design make it also feasible for cities with only small rainwater retention facilities. Many Mediterranean cities have topologies, urban settlement patterns and wastewater infrastructure similar to those of Genoa. The Municipality of Genoa is now planning the extension of the IMOS system to other catchment sectors within its urban area. Other cities are expected to follow suit, applying similar systems in order to achieve a more cost-effective and environmentally responsible management of their wastewater drainage systems under all conditions, whether it rains or pours.

Sense and simulation

The system's sensors can be divided into three types:
- for monitoring precipitation (rain gauges, meteorological radar);
- for measuring water levels within the drainage system; and
- for assessing pollution levels with the drainage system (turbidity meters, spectrophotometer).

The models reconstruct, predict and simulate scenarios for:
- rainfall fields and precipitation intensities;
- water levels in different sections of the drainage system;
- pollution levels in the water in different sections of the drainage system; and
- sites and extensions of flooding.

Genoa's historical centre is served by a municipal wastewater treatment plant located in the port area.

Project Number: LIFE00 ENV/IT/000080
Title: Integrated Multi-Objective System for management of urban drainage
Beneficiary: Comune di Genoa
Total Budget: €1,075,000
LIFE Contribution: €469,000
Period: 01-Sep-2001 to 31-Aug-2004
Website: www.life-imos.com
Contact: Stefano Pinasco
Email: spinasco@comune.genova.it

Afino Conductividad: Reducing salinity in effluents from leather tanning

The Afino Conductividad project, located on the La Serrata industrial estate in Murcia (Spain), developed a new wastewater treatment process for the tanning sector. The method significantly reduces the salinity levels of discharged water, making it suitable for re-use in farming and industry.

Approximately 40% of leather production in Spain takes place on the La Serrata industrial estate in Lorca, Murcia. The estate houses 24 industrial units, all from the leather-tanning sector. Together, they employ over 1,000 workers directly and more than 3,000 indirectly.

Tanning processes, involving the preservation, moistening (in order to recover their original flexibility and softness), and finishing of skins, require the use of large quantities of mineral salts. The high levels of salinity in the resulting effluent make it difficult to manage tanneries' wastewater in an environmentally responsible and yet economically viable manner.

In the past, in order to reduce the high pollutant levels in their wastewater – and thereby comply with existing legislation – it was common for businesses to simply dilute the effluent with water before discharging it to the nearby River Guadalentin. This practice resulted in high levels of salinity, as well as organic and mineral pollution, in the receiving body of water, thereby endangering its ecosystem. Further consequences were the generation of unpleasant odours and health risks. In the medium- to long-term, it was feared that failure to address this issue could lead to a closure of the factories involved.

The Afino Conductividad project was implemented by the beneficiary, Aquagest Levante, a privately-owned company specialising in the supply and treatment of water, and belonging to the multinational Agbar Group. Aquagest Levante's main objective was to develop a new wastewater treatment system for the La Serrata tanning sector, enabling the leather producing companies to continue their operations under more sustainable conditions.

Biological reactor

The project sought to reduce the environmental impact of the leather production process by developing a new method of treating the resulting effluent. Using a specially-developed 4,000 m^3 biological reactor with aeration and agitation elements for the continuous treatment of the tannery wastewater, the project demonstrated the successful use of ultra-filtration, reverse-osmosis membrane technology to lower the salinity of wastewater to levels suitable for its reuse for agricultural and industrial purposes. The residues of the process were dried using evaporation technology, and then delivered to an authorised firm for further treatment.

Biological reactor for continuous treatment of the wastewater.

Using the results

Using the results of the project, the processing plant currently produces over 7,000 m^3 of recycled water a day. The technology used in the pilot project sets an example for other tanning businesses in Spain and in other European leather producing countries.

Project Number: LIFE02 ENV/E/000216
Title: New salt water purification system in the tanning sector …
Beneficiary: Aquagest Levante S.A.
Total Budget: €3,498,000
LIFE Contribution: €702,000
Period: 01-Dec-2001 to 30-Dec-2003
Website: www.afinoconductividad.com
Contact: Jorge Bonilla Beckmann
Email: jbonilla@agbar.es

Minimising the impact of economic activities

European Union policy on the environmental impact of economic activities is implemented through a wide range of instruments. The most important legislation includes the 1996 Directive on Integrated Pollution Prevention and Control (IPPC), which aims at minimising emissions to water, air and soil from point sources throughout Europe. The directive defines common rules on the authorisation of permits for industrial installations, based on Best Available Techniques (BAT). BAT refers to the most advanced stage in the development of an activity's operational methods, which indicates the practical suitability of particular techniques that provide the basis for emission limits.

Stirling Motor: Small-scale cogeneration – a home heating and power unit driven by a Stirling engine

The 'Stirling Motor' LIFE project, based in the Southwest of Germany, has developed a mini combined heat and power unit based on a Stirling engine, which is suitable for series production and cost-effective installation in homes, offices and small enterprises.

Every year, the heating and hot water systems of households in Germany lead to the release of around 125 million tonnes of carbon dioxide (CO_2) into the atmosphere, thereby contributing their share to the increasingly urgent global problem of climate change. The enterprise Mayer Cie. GmbH Co, located in the small town of Albstadt, usually specialises in the production of knitting machines. However, with LIFE funding it has successfully combined two existing technologies (cogeneration and the Stirling engine) to produce a mini thermal power plant for installation in homes, offices and small enterprises. The technology could enable the widespread use of decentralised heating units that, instead of burning fuel solely to heat a building or produce hot water, can also convert part of the energy generated into electricity, thereby contributing significantly to a reduction in CO_2 emissions, as well as energy costs.

Though the core technology for the small-scale use of Stirling engines already existed before the project, a finalised system adapted for large-scale production and market entry had yet to be developed. The objective of the LIFE project 'Stirling Motor' was to develop a mini CHP plant to generate up to 15 kW of heat and 1-3 kW of electrical power using a Stirling motor. Furthermore, the project aimed to develop a modular system, with different models being able to run on different sources of heat and with different output capacities, thereby enabling flexible solutions for different conditions and requirements.

Environmental performance

The 59-month project was divided into two main phases. Work in the first stage concentrated on optimising the heart of the unit, the Stirling engine itself. On one 'side' of the engine, a heater head is heated by a specially developed gas burner with low CO_2 and NOx (Nitrogen Oxide) emissions

BEST OF THE BEST 2004-2005

The turnkey mini CHP unit achieves an energy efficiency of over 85% and has a maintenance-free lifespan of 15 years.

Cogeneration

Cogeneration, also known as "combined heat and power" (CHP) production, is the simultaneous production of both heat and electricity. Compared to conventional plants, this allows a much more efficient use of the energy generated, as both the thermal and the electrical energy produced are made use of, and energy-efficiency rates can reach 70-90%. Currently, cogeneration plants are found mainly in hospitals, universities, hotels, industrial plants, wastewater treatment plants and other large installations with high heating requirements.

Stirling engines

A Stirling engine is an external combustion engine with an enclosed gas or fluid. Through temperature differences on either side of the engine, the gas or fluid is alternately compressed and expanded to operate a piston, thereby converting heat into mechanical energy. Stirling engines have several potential advantages over existing types of motors. For instance, despite generally being referred to as combustion engines, they can be powered by heat from any source, including solar energy and hot spring-waters.

and integrated fresh-air-preheating technology. The heater head drives an integrated generator in a crank case to produce electricity. On the engine's 'cool' side, once the cooling water has been heated by the engine, it is used for the building's heating and warm water.

During the second phase, efforts focused on the development of the entire CHP system, from the first prototype through to the turnkey unit. The resulting mini-plant generates 3 kW of electrical power, and achieves an overall energy efficiency (usable energy output per primary energy input) of over 85%, with an electrical efficiency (electric energy output per total usable energy output) of over 18%. The unit's gas consumption – and therefore its CO_2 emissions – are around 20-25% lower than current conventional cogeneration systems. Depending on the type of power plant on which the calculation is based, for each small office building or family house equipped with a Stirling CHP, 2.6 to 4 tonnes of CO_2 could be saved annually, thereby contributing significantly towards achieving Europe's commitments under the Kyoto Protocol.

Market competitiveness

However, for the project to be a success, the CHP unit had not only to prove its environmental benefits, but also its economic viability. A number of requirements had to be met to produce a low-cost unit that would be competitive on the open market. As is often the case, an attractive price could only be achieved through economies of scale, and from the start, the system was designed to be suitable for large-scale production.
A long operational life was equally important, and a maintenance-free lifespan of 15 years (the equivalent of 30,000 running hours) was targeted and achieved. One step towards fulfilling this goal was the development of a dry-running motor, which needs no oil for internal lubrication and therefore incurs hardly any maintenance costs.

Optimising the manufacturing process, as well as the materials used, was a further important factor in achieving a reasonable cost of the final product, despite the high mechanical and thermal requirements that the plant's components had to meet.

Finally, flexibility was crucial for achieving market competitiveness. The unit can be equipped with different types of Stirling engines (e.g. with a second piston), and can be powered by different sources of heat. Besides gas, a wood-pellet fired engine was developed, and biomass or even solar energy are further potential sources of heat.

Investor sought

Two drawbacks of all pure Stirling engines are that they (a) need time to warm up and (b) cannot change the level of power output quickly. However, in homes, offices and small enterprises, heat and electrical power are generally both needed during the same times of the day and at relatively constant levels. Furthermore, new regulations make it increasingly possible for small-scale energy producers to sell surplus power by feeding it to the regional energy provider's grid.

The heart of the cogeneration plant: the 3 kW Stirling engine on its test bench.

The developed technology has the potential to offer a real alternative for decentralised heat, hot water and electricity production. Given the many millions of potential customers in northern European countries, and the many buildings still equipped with outdated heating, the market potential for mini CHPs is enormous. Now, an investor is needed for the technology to go into series production.

Project Number: LIFE99 ENV/D/000452
Title: Miniature thermal power station based on a Stirling motor
Beneficiary: Mayer Cie. GmbH Co.
Total Budget: €2,141,000
LIFE Contribution: €640,000
Period: 01-Feb-1999 to 31-Dec-2003
Website: www.mayercie.de
Contact: Karl-Heinz Dommes
Email: Karl-Heinz.Dommes@mayercie.de

GIADA uses EMAS to help reduce pollution in Italian tannery district

The GIADA project successfully implemented an environmental management system to reduce the environmental impact of tanneries in the Chiampo Valley in the Province of Vicenza, the centre of the Italian tannery industry.

The Chiampo Valley is an area comprising 17 towns with a total population of over 100,000 people. The region is the centre of the Italian tannery industry and counts some 800 production units, mostly small-to medium-sized family-run companies. As Europe's largest tannery district, the Valley supports over 8,000 employees. In 2001, it generated a turnover of €3.15 billion, over half of which (€1.65 billion) was from exports, mainly of finished leather for use in the production of furniture and car upholstery, clothing, shoes and other goods. However, there is a downside to the region's economic success, as the industry is also responsible for a high level of pollution from normal and hazardous wastes, as well as water and air effluents. It is estimated that more than 250,000 tonnes/year of solid waste, and around 16,000 tonnes/year of volatile organic compounds (VOC) emissions are produced in this district.

The GIADA project was implemented by the Amministrazione Provinciale di Vicenza, the local authority for the Province of Vicenza, which is responsible for applying EU, national and regional environmental legislation. The project's main objective was to reduce the environmental impact of the tanning industry in the region by implementing an environmental management system throughout the entire industrial production cycle.

GIADA logo: promoting the use of EMAS among the Chiampo Valley tanneries.

Key results

The project's results were three-fold:

1. The project team carried out preparatory actions to promote the adoption of the EU's Eco-Management and Audit Scheme (EMAS)[1] http://europa.eu.int/comm/environment/emas/index_en.htm among SMEs. With the voluntary adoption of EMAS, local firms would have to comply with pollution limits lower than those presently set by law.
2. The project created a Local Environmental Agency devoted to developing and supporting the application of the environmental management system and policy.
3. The project then went on to demonstrate the feasibility of a method integrating economic and social aspects of sustainability into the environmental management system.

The GIADA project had a number of direct environmental of benefits including: a 28% reduction in VOC emissions, despite a growth of 17% in leather treatment in the district; a decrease in the average concentration of chlorides in water discharged from tanneries; and a more appropriate use of landfill for different kinds of waste.

1 EMAS - Regulation (EC) No 761/2001 [OJ L114, 24.4.2001, p1]

Project Number: LIFE00 ENV/IT/000184
Title: IEM in the tannery district of the Chiampo Valley
Beneficiary: Amministrazione Provinciale di Vicenza
Total Budget: €1,506,000
LIFE Contribution: €617,000
Period: 01-Feb-2001 to 31-Jan-2004
Website: www.progettogiada.org
Contact: Andrea Baldisseri
Email: baldisseri.andrea@provincia.vicenza.it

IEM: Integrated environmental management in hospitals

The 'IEM in Hospitals' project introduced EMAS-certified environmental management systems in four European healthcare organisations in northern Europe (Germany and Austria) and southern Europe (France and Italy).

In most areas of hospital operation, reductions in negative environmental impacts could be achieved without lowering medical or safety standards. A number of recent studies, including results from previous LIFE-funded projects, have shown that changes in operational procedures and appropriate investments can lead to energy savings of up to 40%. Additionally, there is a potential to reduce approximately 10-20% of the waste generated in hospitals, as well as to make reductions in the energy and water consumed. However, to achieve such improvements, hospitals should include environmental considerations in their general management by means of integrated environmental management (IEM).

The IEM in Hospitals project was coordinated by Asklepios Harzkliniken, a German public SME responsible for the management of three hospitals. The project's overall objective was to introduce EMAS-certified[1] environmental management systems in four European healthcare organisations – two in Central Europe (Germany and Austria), where a few hospitals were already EMAS-certified, and two in southern Europe (southern France and Italy), where prior to the launch of the LIFE project in 2001, no hospitals had introduced, or been verified as having, an environmental management system.

Getting staff involved was crucial

In Europe, this LIFE project was the first comprehensive approach to the environmental management of hospitals that, by means of a thorough environmental education system, put the staff at the centre of activities. The participatory approach was central to the project's success.

All four partner organisations were able to introduce environmental management systems in one or more of their healthcare organisations, and the hospitals have been EMAS certified by accredited EMAS verifiers. The LIFE project supported this certification by making improvements to hospital organisation and processes, whereby environmental targets and programmes are now regularly elaborated, realised, evaluated and adjusted, following the management concept of continuous improvement.

Concrete measures were also introduced, such as environmentally responsible processes for waste and management of hazardous material. Several procedures for procuring products and services were modified, and some processes were entirely redesigned, for example:

> cleaning practices in the Asklepios Harzkliniken, Goslar (Germany) and in the Sanatorium Hera (Austria);
> gas and water control in the hospitals of the Unità Sanitaria Locale 7, Siena (Italy); and
> the handling of hazardous material in the Institut Paoli Calmettes, Marseille (France).

[1] *EMAS http://europa.eu.int/comm/environment/emas/index_en.htm - The European Commission's Eco-Management and Audit Scheme: Regulation (EC) No 761/2001 [OJ L114, 24.4.2001, p1]*

Hospital cleaning practices were redesigned at the 'Sanitorium Hera', Austria.

Project Number: LIFE00 ENV/D/000317
Title: EMS in Hospitals from four European Regions
Beneficiary: Asklepios Harzkliniken GmbH
Total Budget: €1,805,000
LIFE Contribution: €845,000
Period: 01-Nov-2001 to 30-Apr-2004
Website: www.iem-life.de
Contact: Heinz Otto Nagorny
Email: h.nagorny@asklepios.com

SPENT-PERCUS: An innovative 'clean-tech' process for the recovery of copper

This LIFE project in Spain developed a prototype unit capable of the on-site recovery of copper contained in 'spent' alkaline etchant, generated by the manufacture of printed circuit boards.

Alkaline etchant is a substance used by manufacturers of printed circuits. After a period of use, the etchant becomes 'spent'. The spent etchant, a solution containing copper in chloride acid, is a dangerous and polluting industrial waste, which has to be managed with care to minimise its impact on the environment. This makes it difficult to transport to the few treatment plants existing in Europe. Currently, over 48 million litres of the spent solution are generated in Europe alone, with an increase expected in coming years.

The solution can, however, be treated by electrochemical processes that convert copper chloride to metal copper and hydrochloride solution. Metal copper is a more valuable raw material than chloride copper, and is also less hazardous to transport. The resulting hydrochloric acid can also be used as a raw material in the production of circuit boards. The SPENT-PERCUS project developed a prototype modular unit capable of recovering the copper contained in spent etchant in the form of copper metal. Crucially, the new technology can be applied at the place where the waste is generated, i.e. the printed circuits production plant.

The project was implemented by Industrias Quimicas Del Valles, a privately-owned chemical manufacturer, which has the capacity to produce more than 25,000 tonnes of copper salts (hydroxide, oxychloride and others) and more than 9,000 tonnes of other chemicals at its factory in Mollet del Vallés, near Barcelona.

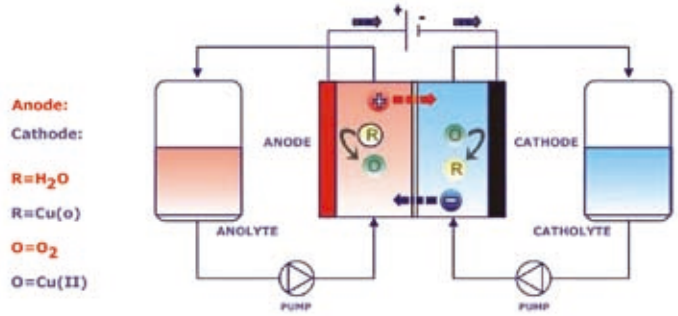


Diagram showing the reactions taking place in the electrochemical treatment of spent etchant.

From a variety of possible electrochemical processes, the treatment chosen for the spent solution was an electrochemical reactor with separation and a fixed cathode and non-adherent deposit. The electro-deposit of copper metal is produced on the cathode at the same time as the hydrochloric acid is produced. In the anolyte, oxygen is separately produced. A selective membrane is needed to separate the processes of oxidation and reduction.

Innovative technology

The results achieved by the prototype unit confirmed the technical and economic viability of this innovative technology. The project's achievements included:

> recovery of the copper contained in the spent solution in the form of copper metal;
> on-site utilisation in the new plant of the generated hydrochloric acid (HCl) as a raw material for the production of printed circuits; and
> elimination of the need to transport hazardous spent solution from the production centres to the treatment plants, thus complying with the European Commission's Hazardous Waste Directive[1]. http://europa.eu.int/eur-lex/en/consleg/pdf/1991/en_1991L0689_do_001.pdf.

1 Council Directive of 12 December 1991 on hazardous waste (91/689/EEC) [OJ L377, 31.12.1991, p. 20].

Project Number:
LIFE02 ENV/E/000237
Title: Electrochemical process to recover copper in metal form…
Beneficiary: Industrias Químicas del Vallés, S.A.
Total Budget: €1,265,000
LIFE Contribution: €311,000
Period: 01-May-2002 to 30-May-2004
Website: www.iqv-valles.com
Contact: José M. Santana
Email: jmsantana@matholding.com

Recycling of grease: Recycling sheepskin grease generated at tannery plants

The 'Recycling of grease' project has demonstrated a process to recycle the natural sheepskin fat generated by degreasing operations in certain tanneries. This reduces negative environmental impacts, makes the production cycle more efficient and at same time lowers costs.

Sheepskins ready for the degreasing process.

Sheepskins contain a high natural fat content, which is problematic for the leather industry as it interferes with the tanning process. In order to avoid stains and dyeing irregularities, tanneries that produce sheepskins therefore need to eliminate as much of this fat as possible. The process involves various 'degreasing stages', during which wastewaters with a high pollution load are produced. Most modern tanning plants have an effluent treatment system where fats are separated by filtration, generating a fat residue. This residue has to be stored in tubs or barrels and must be delivered to authorised plants for treatment. The quantities of fat generated are substantial, posing a problem for the whole tanning sector.

The LIFE co-funded project addressed this significant waste problem by demonstrating a new process for the recycling of the fat generated by the degreasing operation. The project was implemented by Inquimica S.A., a Barcelona-based manufacturer of chemicals for the tanning and construction industries. Prior to the launch of the LIFE project, the beneficiary had typically used high-cost raw materials such as fish oils in the formulation of lubricants for tanning. For this project Inquimica was able to partially replace the expensive raw material and to also harness the residue of the natural sheep fat for use as a raw material. This greatly added to the efficiency of the production cycle. At the same time, the process resulted in a lower cost raw material that can be used in the manufacture of other goods (for example, shoes and leather goods).

Sulphonated fish oil

The project first developed a complex process technology whereby sulphonated fish oil with an SO_3 index of 6% was used to absorb the recyclable fats. Secondly, the project carried out a study of the composition of samples of natural grease coming from various tanning industries, in order to determine the optimum regulation conditions. Trials of the products in which this fat could be used were then carried out to establish the appropriate percentages of use in formulating the various types of lubricants. Further trials of the application of products on skins evaluated their qualitative parameters. The stages of the fat recycling process were then established and the whole process was scaled-up to industrial level.

At the end of the LIFE co-financed phase, the project had recycled 80 tonnes of grease during the year 2003, with a projected capacity to recycle 700 tonnes per year, once the facilities were fully optimised. The project enabled the partial replacement of the costly raw material – fish oil – in the formulation of lubricants for tanning. In addition, the beneficiary has produced three products using the recycled raw material. These products could be sold at the same price as the one manufactured without recycled material, guaranteeing a financial return on the overall project costs and resulting in estimated savings of €450,000/year.

Project Number: LIFE02 ENV/E/000236
Title: Recycling fat produced by processes of degreasing skins
Beneficiary: Inquimica S.A.
Total Budget: €812,000
LIFE Contribution: €157,000
Period: 01-Apr-2002 to 30-Nov-2003
Website: www.inquimica.com
Contact: Miguel Corominas Sardà
Email: office@inquimica.com

Promoting EMAS in TANDEM with Local Agenda 21

The LIFE TANDEM project has promoted the introduction of EMAS – in combination with existing sustainable development policies such as Local Agenda 21 – for large local authorities in Italy.

The TANDEM project encouraged the adoption of the European Union's voluntary Eco-Management and Audit Scheme (EMAS)[1], http://europa.eu.int/comm/environment/emas/index_en.htm, by large local authorities in Italy. Promoting this environmental management scheme was considered the best means of harmonising other currently available environmental policy instruments, such as Local Agenda 21[2] (LA21), http://www.un.org/esa/sustdev/documents/agenda21/index.htm, and Strategic Environmental Assessment (SEA)[3], http://europa.eu.int/comm/environment/eia/home.htm, and thus of assisting local efforts towards sustainable development. In addition, the project promoted closer cooperation between neighbouring authorities at both provincial and municipal level in the application of their environmental policies.

The project was coordinated by the Amministrazione Provinciale di Bologna (the Province of Bologna), working in partnership with nine local authorities (the provinces of Ancona, Bari, Ferrara, Genoa, Modena, Parma, and Venice, and the municipalities of Ferrara and Modena), the chemical and industrial chemistry department of Genoa University, as well as two external advisers.

Launched in November 2001, TANDEM comprised of four main components:

> Organisation of thematic workshops to examine and share methodologies for adopting the key points of EMAS. These 'open group' workshops involved more than 40 local bodies.
> Establishment of a methodology to define and plan actions required for the implementation of environmental management systems (EMS) by public organisations operating in large territories.
> Establishment of methodologies for developing environmental reviews and for the planning and administration of an EMS in conjunction with LA21 processes and other management tools.
> Dissemination of results during and after the project.

The pilot project achieved its main goal of promoting the implementation of EMAS, by defining how the system can be adopted by local authorities operating on a large scale (regions, provinces, municipalities, harbours) in synergy with other territorial management tools. Among a number of deliverables, the project's widely-distributed *TANDEM Guidelines* have become a reference point for other local bodies wishing to promote EMAS alongside a Local Agenda 21 process.

Promoting EMAS among Italian local authorities: as easy as riding Tandem.

1 EMAS Regulation (EC) No 761/2001 [OJ L114, 24.4.2001, p1]

2 Agenda 21, which emerged from the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, calls on local authorities to adopt a Local Agenda 21, focusing on sustainable development strategies at the local level. Central to the concept is that the process should involve all sectors of the local community.

3 In principle, environmental assessment can be undertaken for individual projects such as a dam, motorway, airport or factory ('Environmental Impact Assessment') or for plans, programmes and policies ('Strategic Environmental Assessment').

Project Number: LIFE00 ENV/IT/000192
Title: EMAS among local bodies … in TANDEM with Local Agenda 21
Beneficiary: Amministrazione provinciale di Bologna
Total Budget: €996,000
LIFE Contribution: €495,000
Period: 01-Oct-2001 to 28-Feb-2004
Website: www.provincia.bologna.it/ambiente/tandem
Contact: Gianpaolo Soverini
Email: gianpaolo.soverini@provincia.bologna.it

Waste management

The Thematic Strategy on the Prevention and Recycling of Waste is one of the seven thematic strategies set by the 6th Environmental Action Programme. The European Union's approach to waste management is based on three principles. Top priority is given to the reduction of waste production, which is closely linked to improving manufacturing methods on the one hand and, on the other, to influencing consumers to adopt more sustainable consumption patterns. Secondly, waste recycling and reuse is promoted, and several EU countries have, for instance, managed to achieve recycling rates for packaging waste of over 50%. Finally, improvements are sought in the waste's final disposal. Measures include introducing stricter guidelines for landfill management and ensuring the implementation of existing regulations.

ENERWASTE – power from the anaerobic digestion of animal remains

A LIFE project in Asturias has proved that abattoir waste, including animal remains, can be effectively and economically treated with anaerobic digestion. This means that rather than having to dispose of waste material, which is costly and wasteful, the remains can be transformed directly into biogas, electricity and fertiliser.

Managing animal residues

The green countryside of Asturias in the northwest of Spain is traditionally a stock-breeding region, producing beef and spicy sausages. The very success of its meat producing and processing industry, however, also means that vast quantities of waste, including the remains of the animals themselves, are generated. Until recently, these by-products were generally converted into animal fodder and fertiliser. The outbreak of BSE (bovine spongiform encephalopathy), also known as mad-cow disease, has, however, led to the introduction of new EU regulations that greatly limit the possible uses of animal residues. Of the millions of tonnes of animal by-products produced in Europe every year, those parts considered possibly harmful to health are either incinerated and subsequently deposited in landfills, or disposed of by sterilisation, which is a similarly costly and environmentally harmful process. Increasingly strict control by national authorities also makes it less easy for abattoirs to dispose of their liquid residues by discharging effluents to the municipal wastewater treatment plants.

MFN (Matadero Frigorífico del Nalón) is a medium-sized enterprise that has been in family hands for over two generations. Built in 1994, its beef slaughterhouse in Frieres Langreo, near Oviedo, has 16 employees. By the late 1990s, MFN, like many other abattoirs, was not only no longer able to sell its animal residues for fertiliser, but was facing additional costs for their disposal. Led by Marco Díaz, coordinator of the LIFE-cofinanced ENERWASTE project and vice-president of the Asturian Association of Meat Industries, the company sought to reduce its high electricity costs for powering machinery and refrigeration, and to ease its expenses for waste disposal, while at the same time improving its environmental performance. This was to be achieved through the construction of a biogas plant based on the process of anaerobic digestion, which was both to treat the animal by-products and produce energy.

BEST OF THE BEST 2004-2005

Though animal waste is often used for anaerobic digestion, this was not the case for the remains of the animals themselves as, before the outbreak of BSE, these were sold at a profit. MFN's plan was based on the results of a previous European Commission project it had participated in. Financed by the Directorate-General for Energy and Transport's ALTENER programme, the research project had established that the use of animal remains as substrate for anaerobic digestion was technically feasible. However, little practical knowledge existed on the management of such a process. Consequently, the objective of the LIFE project ENERWASTE,

The pilot plant continues to run smoothly, with a capacity of around 180 tonnes of feedstock a year. The biogas produced has a methane content of around 80%.

which started in March 2002, was to establish a pilot plant to allow tests, obtain reliable data, and gain the experience necessary to design a large-scale industrial plant.

Pilot plant and process

The pilot plant was designed and built by the German firm Farmatic Biotech Energy AG. A horizontal transport container houses the hydrolysis tank, the heating system, the control panel, two pumps and a macerator. It is internally connected to a second, adjacent and vertically erected container that contains the digester. The plant also comprises a pasteurisation tank, two tanks for collecting the digester effluent at the end of the process, and a triturating machine.

The feedstock used includes bovine and pig fat, intestines and intestinal contents, as well as plant and animal washing-waters. The triturating machine shreds the incoming material, grinding the fibrous solid waste to fragments under 10 mm in size. This provides the bacteria with a larger surface area, enabling a faster digestion process. In one of the tanks, the material is mixed and pasteurised at 70°C for an hour. This further facilitates the later work of the bacteria. Liquid waste is added to obtain the optimal mixture with which to feed the digester. The material then passes through the macerator, which further reduces the particle size to below 4 mm.

The mixture is pumped into the hydrolysis tank, with a hydraulic retention time of 4-5 days. From there, it passes to an automatic mixer that sits on top of the digester and slowly mixes the incoming material, ensuring a continuous and homogenous feeding.

The process of anaerobic digestion

Anaerobic digestion is the biological breakdown of organic material by bacteria in an oxygen-free environment. Although this takes place naturally in digestive systems, as well as in landfills, marshes, and septic tanks, the term normally describes an artificially accelerated operation in closed vessels.

Though the largest sources of feedstock for anaerobic digestion are animal manure and crop residues derived from food production, the process can be used to treat many biodegradable materials such as waste paper, food remains, sewage sludge and municipal solid waste. Anaerobic digestion therefore greatly reduces the amount of organic matter that might otherwise end up in waste incinerators and landfills.

During anaerobic digestion, biogas is produced. This is composed of methane (50%-80%) and carbon dioxide (20%-50%), as well as trace levels of other gases such as hydrogen, carbon monoxide, nitrogen, oxygen, and hydrogen sulphide. The amount of gas produced varies with the type and amount of organic waste fed into the digester.

Both the production of biogas and the duration of the process vary with the type and amount of material fed into the digester, as well as the temperature within it. While mesophilic digestion takes place at temperatures of around 20° to 40°C and generally requires a residence time of between 15 and 30 days, thermophilic digestion takes place at higher temperatures of around 70°C, and is therefore usually faster, requiring only about two weeks.

The digester itself is 3.5 metres high, weighs 4.5 tonnes and has a capacity of 10 cubic metres. It is airtight and sufficiently strong to withstand the build-up of pressure inside, but accessible from above to allow maintenance of the temperature, level and acidity sensors, as well as the pumps installed inside it. As thermophilic digestion is energy intense (therefore also expensive) and less stable, the digester works under mesophilic conditions at 38°C. The continuous anaerobic digestion process has a duration of 25 days.

Digesting proteins and fat

The ENERWASTE project focused on two central aspects of the pilot plant's operation: achieving a suitable pretreatment of the feeding material, and optimising the digestion process itself.

Feedstock used includes bovine and pig fat, intestines and intestinal contents, as well as washing-waters.

Triturating the fibrous and resilient animal remains proved more difficult than treating conventional organic materials. The amounts being processed were too small for most existing industrial solutions, and problems persisted until suitable equipment was found and installed. Possibly the first lesson learnt from the project was that the suitable treatment of feedstock prior to digestion is an aspect that, though it can be mastered, demands careful consideration.

Maintaining suitable conditions in the digester was essential to sustaining a healthy bacterial population and thus preventing a breakdown of the process. Serguei Khainakov, MFN's head chemical engineer, explained that the digestion process for this kind of residue is very complicated, due to the material's high content of proteins and fat, and must therefore be intensively monitored. For instance, a high concentration of long-chain fatty acids must be avoided, as it reduces the production of biogas. Also, the content of dry matter in the digester must be increased at times in order to reach a stable operation at high levels of organic load.

After intensive testing and analysis of input material, digester contents and process outputs, undertaken in close cooperation with the University of Oviedo, the pilot plant now runs smoothly and satisfactorily. It has a capacity of approximately 180 tonnes of feedstock a year, and the biogas produced has a methane content of around 80%, which is higher than anticipated as a result of prior laboratory tests. Further products are liquid and solid fertiliser for agricultural use.

The slaughterhouse "Matadero Frigorífico del Nalón" sought to reduce is high electricity and waste-disposal costs, while improving its environmental performance.

The project succeeded in demonstrating that even difficult to treat abattoir remains can be processed through anaerobic digestion.

The plant has succeeded in demonstrating that even difficult to treat materials like slaughterhouse wastes can be processed through anaerobic digestion. Furthermore, it has served to determine the optimal operating conditions (organic loading rate, hydraulic retention time, temperature, etc.) for a full-scale plant.

Scaling up

Steven Trogish, the expert from the Austrian research enterprise Profactor that was subcontracted as technical advisor, will play a major role in establishing the planned industrial plant. He describes how the plant will treat 9,000 tonnes of waste a year, producing 600,000 Nm^3 of biogas and 1,970 MWh of electricity annually, of which only around 10% will be destined for the plant's own consumption.

Marco Díaz is eager for work on the new plant to begin. His ambitious goal is to be able, one day, to treat most of Asturias' animal waste with anaerobic digestion. "With minor adjustments, the process could also be used to treat residues from the other two food industries the region is famous for" explains Marco Díaz. "You can't imagine the huge quantities of apple pulp and milk sewage sludge we produce in Asturias", he adds, sipping his glass of apple cider and offering another slice of the local goat cheese.

Project Number: LIFE02 ENV/E/000187
Title: Implementation of an anaerobic digestion facility at a slaughterhouse
Beneficiary: Matadero Frigorífico del Nalón
Total Budget: €348,000
LIFE Contribution: €64,000
Period: 01-Feb-2002 to 31-Oct-2003
Website: www.enerwaste.info
Contact: Marcos Díaz
Email: hllaneza@uniovi.es

WPC-Recycle: 'Greener' treatment for outdoor products

The WPC-Recycle project has demonstrated a new, cost-effective and more environmentally friendly material for manufacturing outdoor products, such as garden furniture, using recycled thermoplastics in place of coated wood chipboards.

The German project beneficiary, Werzalit, is a privately-owned company from Baden-Württemberg, specialising in veneer sheets, woodchip panels, furniture and weather-resistant products, particularly suitable for outdoor use. Prior to the launch of the LIFE-Environment project, the company's products were typically manufactured using wood chipboards coated with duroplastic resins. However, there are a number of disadvantages associated with this type of production including: 1. the weatherproofing requires the addition of environmentally harmful fungicides, 2. productivity is relatively low due to a long manufacturing process, 3. energy input is high because of long treatment durations at high temperatures, 4. the production of the composite material requires the use of new duroplastic resins, and 5. because the material is made of a duroplastic/chipwood combination, used products could not be recycled.

The main objective of WPC-Recycle was to install a demonstration unit for the production of decorative, coated, polymer-bound wood materials that would be suitable for outdoor use, using a recycled thermoplastic-wood composite. The new material had to be weather-resistant, without using potentially environmentally harmful wood preservatives. Among other features, the material offered the opportunity: to combine the technical advantages of woodchips and of thermoplastics; to recycle thermoplastic waste (e.g. from packaging); to minimise the use of new thermoplastic material in wood-plastic-composites (with a substitution rate of up to 100%) without losses in quality; and to enlarge the range of possible applications of chipboards.

On project termination, a full-scale production unit for injection moulding was installed, which is now producing a growing number of products using the new material. The project successfully showed that the recycled material could, to a large extent, replace present coated wood chipboards, and that it was not only superior in many handling aspects than conventional polypropylene, but also cheaper.

"Win-win"

Offering a true 'win-win' situation, the material also has a number of environmental advantages: firstly, fungicides, halogens, chlorines, or formaldehyde are not used; secondly, new opportunity for recycling of thermoplastic waste material are created; and finally, the material itself is easily recyclable, as spare material and chippings can be easily be remoulded. Given the economic and environmental advantages of the material, the beneficiary is confident its use will increase in the future.

Recycled pellets from thermoplastic waste (e.g. packaging).

Plane board production at the Werzalit plant using Wood Plastic Composites (WPC).

Project Number: LIFE00 ENV/D/000348
Title: Material use of plastic waste … based on polymer-bound wood materials
Beneficiary: Werzalit AG + CO. KG
Total Budget: €1,579,000
LIFE Contribution: €153.000
Period: 01-Dec-2001 to 31-May-2004
Website: www.werzalit.de
Contact: Matthias Schulte
Email: m_schulte.of@werzalit.de

Compost Dissemination: Spreading the word about the value of compost

The Compost Dissemination project team brought together a group of participants from Andalusia and the Algarve to disseminate and demonstrate the efficacy of co-composting municipal waste as a source of organic slow-release fertiliser.

Andalusia (Spain) and the Algarve (Portugal), along with other European regions, are generating increasing quantities of municipal organic waste. Prior to the launch of this project, the beneficiary, Consejería de Medio Ambiente de la Junta de Andalucía (the Andalusian Regional Ministry for the Environment), had already taken a strong stance on recycling organic matter. In 1998-2000, it had launched an initiative [Decree 218/1999] supporting the recovery of the maximum proportion of organic waste for use as 'soil correctives', for the construction of plants for recovering and manufacturing organic fertilisers, and for the use of compost to restore damaged soils. This served as the precedent for the three-year LIFE Compost Dissemination project.

The LIFE project showed that 'co-composting' – joint composting of organic waste from human activity, such as household rubbish, bio-solids from urban wastewater treatment plants and plant remains from parks and gardens – is technically feasible and worthwhile both from an economic and an environmental point-of-view. The project was implemented in Andalusia and the Algarve with 10 participating private and company partners.

In the first phase, compost was processed at two plants that initially did not carry out co-composting. In the second phase the compost obtained was tested as humus for its use as an organic fertiliser in forests and agricultural cultivation. In the third and closing phase the results were widely disseminated. Additionally, a 'LIFE Compost Office' was created in Andalusia to provide a permanent feed-back point and information about co-composting technology and the application of compost.

The project successfully mixed different ratios of organic waste to manufacture three compost types using an open, simple and cost-effective system. The incorporation of chipped park and garden trimmings wastes allowed for better aeration during fermentation. This, coupled with the strict composting conditions, generated a stable, hygienic end product of high quality. Additionally, a compost-spreader was designed to expand the possibilities of a traditional manure spreader. For example, the prototype is able to automatically self-level, while spreading the material on terrain with slopes of up to 17%. This means that as well as distributing material uniformly on flat surfaces, it can be used on hilly terrain, typically used in the areas for olive cultivation.

The compost obtained was tested as humus for its use as an organic fertiliser.

The results were also extensively disseminated via the LIFE Compost Office and the project website, both of which remain open. The details on the manufacture of compost and its use have also been disseminated through an Andalusian and Algarvian Network where users can share experiences.

Project Number: LIFE00 ENV/E/000543
Title: Co-composting procedures in forestry, landscaping and agriculture…
Beneficiary: Consejería de Medio Ambiente de la Junta de Andalucía
Total contribution: €990,000
EC Contribution: €464,000
Period: 15-Dec-2000 to 31-Dec-2003
Website: www.juntadeandalucia.es/medioambiente/planesmed/life/ind_proyectolife.html
Contact: Esperanza Caro Gómez
Email: dgpca.cma@juntadeandalucia.es

ECOBUS: Using cooking oil to fuel Valencia's city buses

Used cooking oil is a waste material that is found everywhere in the EU and for which few collection schemes or recovery options exist. With LIFE co-funding, the ECOBUS project has implemented a pilot scheme for using recycled vegetable oil to fuel part of the city of Valencia's public bus fleet.

The most common method for disposing of used vegetable oil is simply to pour it into the sewage system. This is an illegal practice that causes many problems, including the clogging of the system, which can lead to malfunctions in its filters and oil/water separators. However, cooking oil can be recycled into an environmentally-friendly fuel for use in diesel engines. This has been successfully demonstrated by the ECOBUS pilot project, implemented by EMT, the publicly-owned Municipal Transport Company of Valencia.

The project initially involved the collection of cooking oil used for domestic purposes for re-use as bio-fuel to power the buses serving the city centre. The initiative's scope was later extended to include frying oils from the city's hotels, catering and food services sectors. All participating establishments were given containers for collecting the used oil. The oil was collected by the municipality, and sent to a transformation plant to produce an eco-diesel fuel mix for use by the city's bus fleet.

Stickers were distributed to participating hotels, catering and food services outlets.

Testing the bio-fuel in engines

On average, over the two-year period, approximately 100 litres/month of domestic and commercial waste oil were collected. By the end of the project, 800 commercial outlets and private homes had collected a total of around 800,000 litres of used cooking oil.

Tests were performed, running engines on the bio-diesel under controlled operating conditions. Data were gathered on the effects of different mixtures of bio-diesel fuel with respect to polluting emissions, as well as engine performance and durability. Altogether, 322,654 litres of eco-diesel was used by 120 of the municipality's fleet of 480 buses.

The eco-diesel fuel mix was tested on Valencia's buses.

The project's direct positive impacts on the environment included preventing the dumping of a significant amount of vegetable oil into the public drainage system, thereby improving the sewer system's functioning and helping to reduce its infestation by rodents. At the same time, the use of the bio-diesel fuel helped reduce the emission of atmospheric contaminants from EMT bus exhausts.

Project Number: LIFE02 ENV/E/000253
Title: Collecting used cooking oils to be recycled as bio-fuel …
Beneficiary: Empresa Municipal de Transportes de Valencia - EMT
Total Budget: €2,100,000
LIFE Contribution: €798,000
Period: 01-Nov-2002 to 01-Nov-2004
Website: www.ecobus.info
Contact: Ramón Ruiz Hernández
Email: emt@emtvalencia.es

RECDEMO: Recycling demolition sand to make concrete

Sand and gravel are used extensively in the production of concrete. Rather than using these natural resources, the RECDEMO project has developed a technique for using the sand fraction from demolition waste for producing concrete.

Sand fraction accounts for approximately 30% of demolition waste. Its use for the production of concrete is not common practice, yet it offers the potential to replace the current high consumption of natural sand. In addition, construction waste is the largest single waste category, representing 60% of all waste in Germany.

The LIFE project showed that with proper source selection and wet processing using an innovative 'jig', the sand fraction from demolition waste could be used effectively and efficiently in the production of concrete. The residues from the wet treatment, i.e. the finest fraction and the light fraction from jigging, contain substances that would normally impair the quality of the concrete produced. These residues are rich in lime and organic matter that can be used in the production of compost. Therefore, RECDEMO also demonstrated that composting was a suitable use for such materials, thus reducing the quantities deposited in landfills.

The LIFE project was managed by the Bundesanstalt für Materialforschung und -prüfung- a German public research institution. Working with industrial partners in Austria and Germany, a pre-selection of the material to be processed was performed in a commercial treatment plant, to ensure that the levels of contaminants contained were low enough to allow the material's recycling. The demolition waste was crushed during pre-treatment to fragments of less than 32 mm in size, and then filtered using a 4 mm sieve. Subsequently, in the pilot plant for wet treatment, a fraction between 0.1 and 4 mm was obtained.

High quality concrete

The applicability of the fraction as aggregate was determined by standard testing procedures for mortar and concrete. The analysis included strength tests and assessments of the manufacturing performance.

Jig for the wet treatment of the concrete sand fraction

The project results showed that high quality recycled concrete sand can be produced from wet processing, using the modified jig technology, and that it is possible to use these crushed concrete fines as aggregates to manufacture workable concrete of a satisfactory quality. Tests showed that replacing up to 50% of the natural aggregate with wet-treated crushed-concrete fines had little negative effect on the compressive strength of the resulting concrete. These results contrast clearly with the lower compressive strength of concrete made with dry-treated crushed-concrete fines.

Besides demonstrating the promising use of treated concrete sand as a building material, tests also indicated that the finest sand fraction, which is unsuitable for concrete production, can be used for mineralising compost, and may in this form also be recycled.

Project Number: LIFE00 ENV/D/000319
Title: Use of the Sand Fraction from Demolition Waste Recycling
Beneficiary: Bundesanstalt für Materialforschung und – prüfung
Total Budget: €907,000
LIFE Contribution: €387,000
Period: 01-Dec-2001 to 31-May-2004
Website: www.recdemo.bam.de
Contact: Karin Weimann
Email: karin.weimann@bam.de

MINOS: Integrated and sustainable management of waste from olive oil-making

The MINOS project, led by Athens University, developed a viable high-tech process for the recovery of natural anti-oxidants from the heavily-polluted wastewater produced in the pressing of olives to make olive oil.

In Greece, there are an estimated 2,500 to 3,000 olive presses used in the production of olive oil. Heavily polluted wastewater produced by the olive mills constitutes a major environmental problem for the agriculture sector. The majority of these olive mills are small businesses, which cannot afford the high capital cost required for proper wastewater treatment. As a result, they often resort to dumping their wastewater, untreated, into streams or rivers, or straight into the sea.

A major problem is the high organic content of this wastewater, which is not easily biodegradable. In addition, it contains high concentrations of toxic polyphenols. On the other hand, recent research studies showed that some of these substances are responsible for the unique nutritional value of olive oil, mainly due to their anti-oxidant and anti-microbial properties.

The LIFE project team comprised a consortium of partners led by the School of Pharmacy of the University of Athens and including GAIA Institute-Goulandris Natural History Museum, the University of Crete and the Technical Institute (TEI) of Crete. The project developed a viable high-technology process for the recovery of natural anti-oxidants from olive oil mill wastewater.

The recovery process consisted of the following:

- > successive wastewater filtration;
- > capture of polyphenols by absorbent resin;
- > treatment of resin outflow;
- > recovery of polyphenols captured in resin;
- > chromatographic separation of polyphenols; and
- > composting of sludge from filtration with olive leaves and solid waste from the mills.

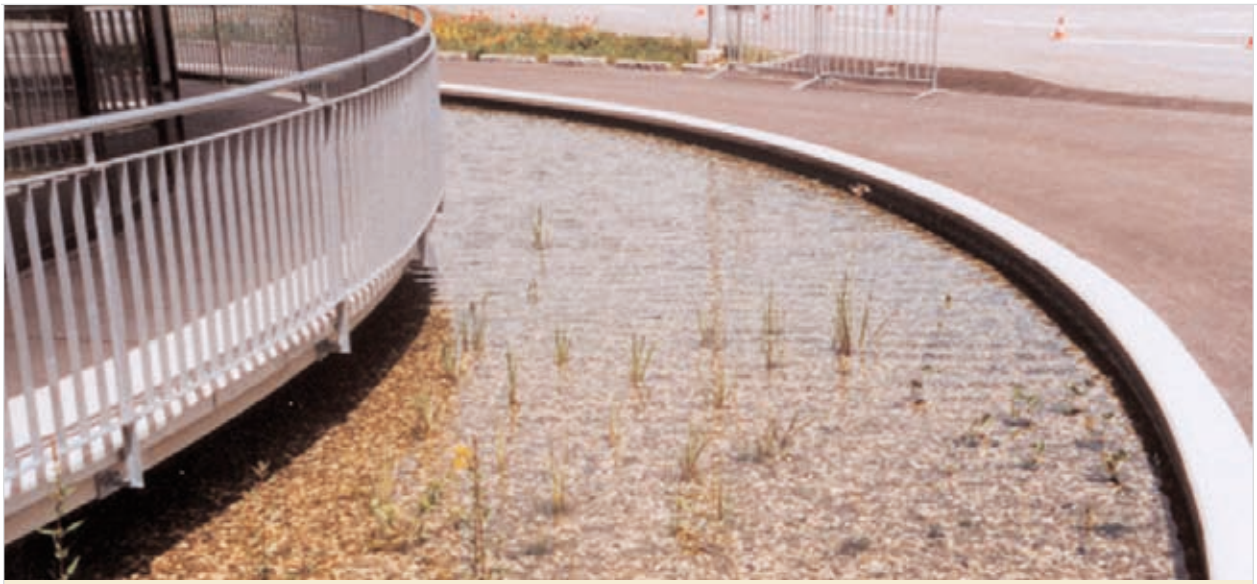
This integrated approach to waste management showed that the liquid waste pollutant from the olive oil pressing process could be successfully filtered and extracted to retrieve valuable substances with a high commercial value for the cosmetics, food additives and pharmaceutical industries.

Waste samples from the different stages of the treatment.

Organic fertiliser

In addition to the recovery of anti-oxidants, the project combined solid waste from the olive oil processing with the remaining organic fraction of the wastewater to produce an organic fertiliser. The project also reduced overall water consumption by re-using the treated wastewater, and achieved energy savings by using the solid waste from the process as solid fuels. The project therefore demonstrated a feasible solution for olive oil mill businesses concerning the management of their waste and minimisation of the environmental impacts caused by current waste disposal practices.

Project Number: LIFE00 ENV/GR/000671
Title: Olive oil mill waste management …producing organic fertiliser
Beneficiary: National and Kapodistrian University of Athens
Total Budget: €1,239,000
LIFE Contribution: €609,000
Period: 01-Sep-2001 to 01-Apr-2004
Website: www.pharm.uoa.gr/minos
Contact: Leandros Skaltsounis
Email: Skaltsounis@pharm.uoa.gr



Integrated Product Policy

The European Commission's strategy on Integrated Product Policy (IPP) aims to reduce the environmental impact of goods and services, by focusing on all phases of a product's life-cycle. The approach covers all issues related to a product, from its development, to the consumption of natural resources as raw materials, its manufacture, assembly and transport, on to its marketing and sale, its subsequent use and, finally, its recycling or disposal. An integrated approach implies involving many different actors, aiming to improve the environmental performance of all involved. In particular, however, IPP seeks to promote the coordination and exchange between all relevant groups, to overcome limited, sector-based approaches.

BBMpassiv: Christophorus House - sustainable construction comes full circle

Christophorus House in Stadl Paura, Upper Austria is the first multi-storey office building in Europe to be awarded 'Passive House' certification, by achieving a heating energy consumption of only 14 kWh/m² and a combined primary energy consumption of just 49 kWh/m². Since its completion the house, which is built almost entirely of natural and locally-produced materials, has won several environmental awards.

The Christophorus House's prominent circular form results in a compact building, with a reduced surface area and, therefore, lower energy loss.

BEST OF THE BEST 2004-2005

Named after Saint Christopher, the Patron Saint of Travellers, the building houses two related organisations: MIVA (Mission-Verkehrs-Arbeitsgemeinschaft), a Catholic relief organisation providing transport services in developing countries, and BBM, its procurement service arm, which is responsible for the technical and logistical management of MIVA's projects.

Since 1997, the project beneficiary, BBM has applied eco-efficient technology in its development projects in Africa. When a new location was needed for their headquarters, MIVA and BBM decided to demonstrate the consistency of their approach and set a credible sign in the field of climate protection in Europe. As charity organisations funded solely through donations, credibility was a major motivational factor. Franz Kumpfmüller, BBM's executive director and a leading force behind the LIFE project's conception and realisation, explains that: "The work with poor communities gives MIVA and BBM a greater understanding of the importance of using natural resources sustainably. The building was to reflect the values of the organisations it houses".

The new building sought to use a minimum of energy and be constructed, as far as possible, of environmentally-friendly and local materials. Furthermore, in order to build a truly sustainable building, a holistic approach would be needed, covering all aspects of the building's planning, construction and use. Most importantly, the overriding aim was to build economically as well as ecologically, and to demonstrate that the highest energy efficiency standards can be cost-effectively applied to multi-storey office buildings, even when these have multiple uses.

The project contributed to the implementation of the EC Directive on the energy performance of buildings[1], as well as to two of the priority areas of the Sixth European Environmental Action Programme: climate change, and natural resources and waste.

1 2002/91/EC, of 16 December 2002

A truly sustainable building

A 'passive house' is a building in which a comfortable climate is maintained without the active use of heating and cooling systems - hence the term passive. To achieve certification by the accreditation agency Passivhaus Dienstleistung GmbH (Darmstadt, Germany), a building must consume less than 15 kWh/m² a year for heating, and have a combined primary energy consumption for heating, hot water and household electricity of less than 120 kWh/m² per annum. This means that a passive house's total household energy consumption is less than that of

an average newly built European building for electricity and hot water alone.

The Christophorus House consumes 275,000 kWh per annum less than a conventional office building of comparable size and use. This amounts to a yearly CO_2 saving of 75,000 kg. Furthermore, the building's wood construction stores around 350,000 kg of CO_2. Indeed, according to BBM, if 25% of all new buildings in Austria were built with the same techniques, the country would fulfil its commitments under the Kyoto Protocol.

In winter, the heat produced by people and equipment is retained in the building by two ventilation systems that, through rotational air-to-air heat exchange, achieve heat recovery rates of 76% and 86%. Surprisingly, however, it was not the building's heating in winter, but its cooling in summer that required additional measures. Through a thermal pump with eight 100 metre deep probes, the earth, with its constant temperature of 14°C, serves not only as a source of heat in winter, but also acts as a heat sink for cooling in summer, enabling a pleasant room temperature throughout the hot months of the year. A photovoltaic plant with a peak output of 9.8 kW provides the power for the thermal pump and the ventilators, as well as for 70% of the building's hot water.

Supported by 51 solid tree trunks

Wood was chosen as the main building material because of its insulating quality, and the Christophorus House is supported by 51 solid tree trunks – a solution that required the development of special ceiling supports. The entire wooden structure and the building's cladding, which consists of around 90 prefabricated elements, were specially prepared in a workshop. This ensured ideal indoor production conditions for the building's main components, enabling the actual assembly of the building and the fixing of its cladding in only nine days, despite adverse weather conditions during the winter months.

Thought also went into reducing the consumption of energy, not only during the building's use, but also before and during construction. For instance, using locally grown pine and larch for the timber structure and the building's cladding ensured short transport distances.

Construction and demolition waste is the largest single category of waste in Europe and accounts for about 34% of all waste generated. Where possible, hemp and cellulose were used as natural insulating materials for the Christophorus House, and Rockwool was used only on the outer walls, to improve fire protection. The maximum possible use of natural material means that, should the building one day no longer be needed, its dismantling and the disposal of its elements will prove unproblematic.

The Christophorus House's prominent circular form not only underlines its demonstrative purpose, but also results in a compact building, with a reduced surface area and, therefore, lower energy loss. Admittedly, the resulting curve in the building's wooden façade proved an additional challenge to the construction firm involved. Special triple-glazed windows were developed, with an energy loss of half those of conventional

The entire wooden structure and the building's cladding were prefabricated in a workshop and assembled in only nine days.

windows used in Austria today. Once again, most of the materials used for the windows were from renewable sources, such as wood or cork.

The building's grey water and rainwater is collected separately, cleaned by three biological sand-bed filter systems, and reused for toilet flushes, car washing and plant irrigation. It was the first time in Austria that such a wastewater recycling system was applied to an office building of this size.

A financially worthwhile investment

The resulting 2,097m² multifunctional building is undoubtedly pioneering in many ways. However, its innovation lies not only in the different methods and materials used, but in the sum of their application, and in the integral and consequent way that a broad range of aspects were taken into consideration to create a building that is truly sustainable in its

BBMpassiv Awards

Since its completion on 18 October 2003, the LIFE co-funded 'Passive House' house has received the following awards:

- Special Energy Award Upper Austria 2004 (Sonderpreis Energy Globe Oberösterreich 2004).
- Austrian Solar Prize 2004 (Österreichischer Solarpreis 2004).
- Upper Austrian Regional Award for Environment and Nature 2004 (Oberösterreichischer Landespreis für Umwelt und Natur 2004).

construction, use and, eventually, end-of-life disposal.

However, the LIFE project achieved more than simply its environmental objectives. It is true that the construction costs of 1,500 €/m² were around 15% above those of comparable conventional building. The additional investment was nevertheless financially justified, and the originally calculated amortisation period of 13 years has already been halved to less than seven, due to increases in the price of energy.

Albert Böhm, one of the building's two architects, explains how two further factors must be taken into account when considering the immediate financial viability of sustainable building. Firstly, the planning costs of a single-purpose residential or administrative building would be noticeably below those of the multi-functional Christophorus House. Secondly, his associate, Helmut Frontwieser, explains, as is often the case with new technologies, once sustainable building has been established as standard building practice, its costs will decline dramatically.

Letting the facts speak for themselves

The Christophorus House was conceived as a showcase for environmentally responsible building in Austria and abroad, and from the start, the beneficiary worked hard to promote the project's central idea and its achievements. The project has enjoyed substantial media coverage in local and regional papers, and in October 2003, a 28-minute documentary on the project was broadcast on two Austrian television channels (ORF and 3SAT).

A number of articles have been published, and the project has been presented at several conferences, including the European Passive House Conference 2004 in Krems, Austria, and the World Sustainable Energy Days 2005 in Wels, Austria. Itself functioning in part as a venue for events, the Christophorus House is ideal for demonstration purposes, and since its inauguration in October 2003, over 9,000 people have visited the house.

Those behind the project hope the building will play an important role in promoting ecological construction in Austria and the region. The building's architects explain how those who lobby against tougher building regulations usually claim that sustainable building is too costly to become common practice. Today, the data on the building's environmental and economic performance can be used to quash the critics' arguments and, indeed, the project partners are confident that the Christophorus House has contributed to the introduction of stricter guidelines for social housing in Upper Austria.

However, the project team's members concur that to achieve a true change in today's building legislation and methods, awareness must be raised, above all, among political decision-makers. The political sphere in Austria and other countries in Europe, they say, does not sufficiently recognise either the long-term environmental and economic necessity, or the technical and economic viability, of energy and resource efficient building.

Indeed, Albert Böhm points out that one of the added values of LIFE funding is that "The project receives much greater political recognition. LIFE offers a credibility that is central to raising awareness of the project's results among policy-makers and experts at the national and European level." The financing provided by LIFE was "crucial", says Franz Kumpfmüller, and the project's appraisal by the Commission also helped secure funding from the Austrian Government and the Government of Upper Austria.

Due to the project's success, the Austrian Ministry for the Environment granted funding to continue monitoring the Christophorus House's technical performance for a period of two and a half years, starting in April 2004. "The figures speak for themselves, both technically and financially", says Franz Kumpfmüller. Waldemar Wagner from AEE (Arbeitsgemeinschaft Erneuerbare Energien), the firm in charge of the building's technical monitoring, agrees. But, as the man who provides the "hard facts" himself points out, "what is really satisfying is to see the positive effect the healthy building's climate has on its staff and visitors". And, as the MIVA-BBM team have proven, guests are always welcome at the Christophorus House.

Thermal pumps provide heat and cooling, enabling a pleasant room temperature throughout the year.

Project number: LIFE02 ENV/A/000285
Title: Multifunctional office building in passive house standard and timber construction
Beneficiary: BBM - Beschaffungsbetrieb der MIVA
Total budget: €2,150,000
LIFE contribution: €777,000
Period: 01-Dec-2001 to 31-Mar-2004
Website: www.miva.at/CHH/Start/CHH_frame.html
Contact: Franz Kumpfmüller
Email: office@miva.at

Roof Greening: Augustenborg's Botanical Roof Gardens

In Europe, millions of square metres of rooftops could easily be converted into natural green spaces, as demonstrated by Sweden's unique Botanical Roof Gardens in Augustenborg, a suburb of the city of Malmö in Sweden.

As cities continue to spread, green areas are being reduced in size and in number. One response to this has been to consider roofs as locations for planting gardens. Such roofs also have significant environmental benefits, providing such services as natural insulation. However, they are generally expensive, as the roof must be designed to carry a substantial additional weight, and because such gardens often require a high level of maintenance. An alternative solution is the so-called 'extensive green roof', which functions with a growing medium of only 15 centimetres or less deep and is planted with low-maintenance plants. The availability of thinner and lighter layers of earth makes it possible to green large areas of roof, such as on industrial buildings.

Implemented by the Malmö Stad Serviceförvaltningen (the Municipality of Malmö), the LIFE project examined the potential of green roofing within the context of a much larger social and ecological renewal programme for the suburb of Augustenborg. It involved the greening of 9,500 square metres of industrial roofing using different layers and types of growing medium to allow monitoring and analysis.

Green roofs improve insulation

The green roofs are sown, planted, or laid as prefabricated mats. Moss and sedum species are the main plants used. Water needs are met by natural rainfall, so the roofs need very little management.

The project demonstrated a number of promising results:

> Green roofs enable a considerable reduction in storm water run-off. Sixty percent of annual precipitation is absorbed by the green roof and returned to the atmosphere through evaporation.
> **Buildings' energy consumption can** be reduced significantly, and their indoor climate can be improved, through the roofs' additional thermal insulation in winter and provision of summer cooling through evaporation and transpiration.
> **Green roofs can increase biodiversity** in urban areas, making them not only of local, but of national and international interest.
> **Green roofs can contribute to urban** noise abatement.
> **Roof greening can extend the life of** a roof, offering savings in terms of maintenance and replacement.

The overall objectives concerning the construction of the demonstration facility for green roof installations were fully met. Research work was also completed, confirming the various environmental benefits of the green roof installations, as well as the sustainability of such roofs under Scandinavian climate conditions. A number of postgraduate students and doctoral researchers have based research papers on the topic of green roofing, in connection with the project.

The botanical gardens were opened to the public in April 2001 and have since then become a unique attraction in Malmö and Sweden. The visitors' centre, which was opened during the project's LIFE phase continues to operate. The green roof area is still maintained by the beneficiary and is expected to last for several decades.

Malmö's green roof area has become a popular visitor attraction.

Project Number: LIFE98 ENV/S/000482
Title: Extensive roof greening
Beneficiary: Malmö Stad Serviceförvaltningen
Total Budget: €1,394,000
LIFE Contribution: €484,000
Period: 01-Sep-1998 to 01-Mar-2003
Website: www.greenroof.se
Contact: Peter Lindqvist
Email: peter.lindqvist@malmo.se

Latvian rural areas strive for a 'Green Certificate'

One of the main achievements of the Latvian 'Green Certificate' project was – rather than trying to restrict the future development of tourism, as is often the case in many other European countries – to promote carefully-considered, balanced and sustainable rural tourism.

Uncontrolled tourism can have a number of negative impacts on the environment. It can lead to an over-exploitation of natural resources and generate significant increases in volumes of waste. It can also create irreversible changes to the landscape and historical and cultural heritage of regions. On the plus side, tourism generates income and new jobs. While Latvia has no history of mass tourism, its development, particularly in rural areas, needs to be encouraged in a sustainable way that will also help to stimulate growth of the rural economy.

The project was led by the Latvian Tourism Association. It sought to alter people's attitudes towards tourism – changing post-Soviet consumers and tourist-providers into eco-friendly tourists and/or entrepreneurs willing to contribute to sustainable development. This was achieved by the development and implementation of a national eco-label – the 'Green Certificate'.

Other project goals were to: protect Latvia's wealth of ecosystems and maintain its biological diversity; preserve the country's landscapes, cultural and historical heritage; control and prevent pollution and other environmental disturbances; and improve the quality of life of those living in rural communities.

Recognised eco-labels

The project team developed the Green Certificate label with national criteria, based on the most recognised European eco-labels. They established eco-labelling procedures and then applied their eco-label to a number of rural tourism providers. These were mainly small businesses offering accommodation. A 'Green Holidays' brand was also developed and promoted through the project website and publications (tour maps and guides, accommodation catalogues and brochures).

Together, the Green Certificate and Green Holidays gained positive publicity and recognition among consumers and rural tourism providers in Latvia. Involvement and interest from the supply, as well as from the demand, side created favourable conditions for further eco-labelling activities and development of 'green' rural products.

The Green Certificate has joined VISIT (the European Association of Eco-labels), where it contributes its experience and expertise on small-scale rural accommodation certification. In cooperation with ECEAT (the European Centre for Ecological and Agricultural Tourism), the project has benchmarked the Green Certificate criteria with the ECEAT environmental criteria. This means an establishment carrying the Green Certificate eco-label will also be able to use the ECEAT logo as a common brand for ecological accommodation in Europe. Following the completion of the LIFE funding, the eco-labelling activities have continued.

The opening of the Green Certificate demonstration accommodation.

Project Number: LIFE00 ENV/LV/000959
Title: Development the Green Certificate …
Beneficiary: Latvian Country Tourism Association
Total Budget: €311,000
LIFE Contribution: €149,000
Period: 01-Oct-2001 to 30-Sep-2004
Website: www.eco.celotajs.lv
Contact: Asnate Ziemele
Email: asnate@celotajs.lv

ECO-LAB: Eco-labelling for European tourism

The ECO-LAB project shows how tourism eco-labelling in Europe can be an effective instrument in moving consumers and the tourism sector towards sustainability.

In Europe there are over 40 schemes to assess the environmental performance of tourism services. Consumers expect that the certified products, e.g. hotels and beaches, meet the demanding criteria of these schemes and that they provide suitable verification procedures to ensure environmental aspirations are met. Tour-operators are willing to invest in sustainable tourism, but need reliable and detailed up-to-date information about eco-labels and their underlying environmentally-friendly products.

The problem with such a large number of certification schemes and eco-labels is that they can sometimes compete with each other. Prior to the launch of the LIFE project, there was concern among tourism providers that the proliferation of such schemes in Europe was becoming counterproductive. It was felt that a coordinated effort was needed to help make these schemes more understandable to consumers. This is where the ECO-LAB (Eco-labels for Sustainable Tourism in Europe) project came in. The project launched a partnership of eco-labels with a view to harmonising standards and contributing to increased transparency, quality and joint promotion. It successfully demonstrated that eco-labelling can be an effective instrument in moving the European tourism industry and consumers towards sustainability. It also showed that:

> environmental indicators and benchmarks for eco-labels (accommodation and destinations) could contribute to an assessment of environmental effects of various eco-labels and other instruments;
> labelled enterprises (in particular SMEs) and products could be integrated into tourism offers by providing information and by matching activities with tourism; and
> consumer awareness and demands for environmentally-friendly tourism could be increased by implementing a European image campaign during the UN Ecotourism year (2002).

12 eco-labelling schemes

The project was headed by Dutch beneficiary, ECEAT - the European Centre for Ecological and Agricultural Tourism. It established a partnership with 12 regional, national and international eco-labelling schemes. Together with ECOTRANS, an independent coordinator, these labels based their work on the International Standards Organisation (ISO) 14024 standard for Type 1 third party verified certificates for eco-labels. All ISO requirements were discussed and adapted to the needs of tourism services in Europe.

The eco-label standard for tourism services 'VISIT eco-label standard' was established consisting of 21 (pre-assessment) requirements that the participating eco-labelling organisations had to comply with. By the end of 2003, all 12 participating eco-labels had successfully achieved compliance with the key requirements.

The project closed in June 2004, but the work continues. In that year, the VISIT Association (Voluntary Initiative for Sustainability in Tourism) was established including eight of the LIFE project eco-label partners. With a total of more than 1,500 participating tourism enterprises, it aims to continue the LIFE work to ensure that eco-labelling in tourism is successful, practical and responsible. In the longer term, it is hoped that further developments will lead to the creation of a global forum and accreditation body for world-wide sustainable tourism certificates.

Getting away from it all: tourists can select eco-labelled beaches.

Project Number: LIFE00 ENV/NL/000810
Title: Eco-labels for Sustainable Tourism ...
Beneficiary: ECEAT - The European Centre for Ecological and Agricultural Tourism
Total Budget: €1,805,000
LIFE Contribution: €868,000
Period: 01-Jan-2001 to 30-Jun-2004
Website: www.yourvisit.info
Contact: Naut Kusters
Email: n.kusters@eceat-projects.org

ENERLAB: Ogre apartment dwellers embrace energy labelling

The Latvian ENERLAB project developed and implemented an energy-management system that was able to significantly reduce the energy consumption for heating and hot water of 139 apartment buildings in the town of Ogre. At the same time, the scheme has created energy-awareness among local residents.

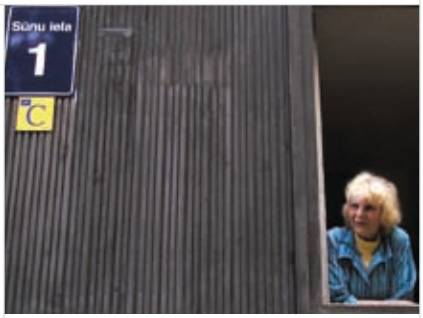
Latvia is required to reduce its CO_2 emissions by 8% under the terms of the Kyoto Protocol1, http://unfccc.int/essential_background/kyoto_protocol/items/3145.php which obliges all countries to reduce their CO_2 emissions by between at least 8% and 20% by 2012. Many other European countries have even higher targets. In Latvia, heating and hot water supply consumes at least 35% of the state's primary energy resources. Estonia and Lithuania have similar levels, compared to Finland, for example, where it is 23%.

The ENERLAB project was implemented by the energy supply and distribution company Malkalne. To energy-rate the 139 multi-storey apartment buildings, the project team used a method developed by the Institute of Heat, Gas and Water Technology at Riga Technical University. This rating took into account the number of inhabitants in each apartment building, calculated the heated area and outside temperature, and measured the volume of hot water and heat consumed.

Each year, the project produced energy labels showing the energy consumption category of the buildings. Six categories were used for energy rating, with A the worst and F the best category. The majority of buildings were rated C and D – i.e., average levels of heat consumption. The project team displayed the energy labels in the buildings to demonstrate the energy rating and inform apartment dwellers. In addition, all households received a bulletin explaining the results of energy labelling.

Energy-labelling results

The scheme was very successful. The results showed that, although the project's second year (2003-2004) was some 10% warmer than the first, mean annual heat consumption for space heating was reduced by over 20%. This surpassed initial expectations by 5-10% and suggested that the processes of labelling buildings and informing inhabitants had resulted in greater awareness and the active participation of residents.



Active participation of Ogre residents was crucial to success.

1 Countries that ratify the Kyoto Protocol commit to reduce their emissions of carbon dioxide and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases.

Energy labels (from A to E) were placed on buildings in clearly visible places.

Project Number: LIFE02 ENV/LV/000478
Title: Energy labelling of apartment buildings
Beneficiary: Municipal Agency Malkalne
Total Budget: €467,000
LIFE Contribution: €173,000
Period: 01-Apr-2002 to 01-Oct-2004
Website: bf.rtu.lv/~enerlab/eng/index.html
Contact: Olita Belindzeva-Korkla
Email: olita@bf.rtu.lv

EQUATION: Sustainable building using innovative design tools

The Netherlands-led EQUATION project shows architects and local authorities that, with the use of innovative design tools, it is possible to build comfortably, economically and in an environmentally responsible manner.

Architects were encouraged to design more eco-friendly housing.

Sustainable building in the Netherlands has been firmly embedded in government policy since 1995. Nevertheless, with the exception of the Energy Performance Standards, environmental building codes are still lacking, and sustainable building policy is left to the initiative and control of local governments. The lack of harmonisation between municipalities has resulted in a confusing array of sustainability policies and tools, and architects and developers are confronted with different requirements in each municipality.

To help resolve this problem, Dutch project partners – SBR, the Foundation for Building Research and SEV, the Steering Group on Experiments in Public Housing – launched the LIFE co-funded project in April 2001. Its main objective was to demonstrate and raise awareness on how more effective sustainable building policy could be formulated based on performance requirements instead of checklists. A further objective was for architects and local authorities to gain experience with the innovative performance-based tools for sustainable building that were developed and improved during the project.

Eco-Quantum and EcoHomes were key tools

A 'toolbox' was developed to make the targets quantifiable and allow their dissemination. These tools were tested and implemented on a large-scale in the Netherlands, Belgium, and the UK. In the Netherlands and Belgium, the most important tool was Eco-Quantum (EQ) – an advanced computer model, based on Life Cycle Analysis (LCA). This calculates the environmental impacts of materials, water and energy used during a building's construction and expresses the environmental impact in points per square metre of the building's floor space. The outcome is a single aggregated environmental indicator. The UK demonstrated a similar tool – EcoHomes, a method for the environmental assessment of homes that expresses environmental performance on a scale from 'pass' to 'excellent'.

The project successfully demonstrated that the market can use performance-based environmental standards based on the LCA-methodology. The results from the Dutch trials were evaluated using the VO-tool, a simplified version of EQ. The outcome showed an average improvement of their dwellings' environmental performance of 15% compared to the Dutch standard. EcoHomes, which was marketed in 2000, is also becoming successful in the UK, with some 6,000 units already certified by EcoHomes by the end of LIFE funding, on 30 April 2004.

The environmental performance of homes was significantly improved.

Project Number: LIFE00 ENV/NL/000808
Title: Building sustainably with innovative design tools …
Beneficiary: Stichting Bouwresearch (SBR)
Total Budget: €645,000
LIFE Contribution: €323,000
Period: 01-Apr-2001 to 30-Apr-2004
Website: www.life-equation.nl
Contact: Ruud Beek
Email: r.beek@sbr.nl

PlusPunten NU Card paves the way for 'green' customer loyalty

The PlusPunten pilot project in Rotterdam, the Netherlands, introduced a 'green' customer loyalty card – a world-wide first for a loyalty system focussing on sustainability.

Points were awarded for the purchase of goods in participating shops.

The PlusPunten project demonstrated the effectiveness of an incentive card designed to reduce the environmental impact of consumption and to change people's attitudes towards sustainable consumption. The concept behind the NU-Spaar-pas Card (NU Card) was that the card would increase the demand for, and improve the image of, green goods and services.

People participating in the pilot project were issued with a NU card to gain points for buying sustainable products and for separating their waste. Sustainable products included labelled organic, energy-efficient and fair-trade goods, bicycles, green financial products, renewable energy, rental, repairs and second-hand goods. Participants in the scheme could redeem their points on more sustainable products, on public transport, or on leisure activities around the city, such as going to the cinema.

The system worked using smart-card technology. Each point of issue was equipped with a terminal with a bar-code scanner and each NU card with a barcode and a chip. It was intended that NU would become self-financing from basic connection fee subscriptions that companies paid and the income that came from cross-selling. The system was defined, built and tested in the first period of the demonstration project, up to the beginning of May 2002. The actual demonstration started on 21 May 2002 when the system went live. From then on, the project team launched an intense and continuous marketing effort to increase the number of cardholders, participating shops and businesses.

Broadening the scheme

At the beginning of the project, points were only rewarded for sustainable products bought – one point for every Euro spent. However, as only 5% of the market carried an official label identifying it as a sustainable product, few shops were initially interested in joining the scheme. So the team broadened the scheme by offering one point per Euro spent on most products in participating shops, and four points per Euro for sustainable products. The number of participating households and businesses increased as a result, to meet initial expectations.

By far the greatest earner of points was the recycling of waste with taking waste to the dump earning 200 points for chemical waste and 300 points for other reusable items such as furniture or white goods. Results showed 86% of points came from waste separation, and that people used the waste dump more once they had the NU card

The pilot scheme was considered a success, even though – due to its slow start – it was not self-supporting by the end of the LIFE co-financing. The project overcame many hurdles to show that an innovative reward system can work in practice: it is the first advanced loyalty scheme in the world that focuses on sustainability and as such it has a high demonstration value.

NU Card for 'greener' consumer behaviour

Project Number: LIFE00 ENV/NL/000809
Title: Demonstration project PlusPunten, Rotterdam
Beneficiary: Municipality of Rotterdam
Total Budget: €1,786,000
LIFE Contribution: €411,000
Period: 01-Feb-2001 to 30-Sep-2003
Website: www.nuspaarpas.nl
Contact: Paul van Sambeek (Amsterdam)
Email: info@points-online.nl

List of available LIFE publications

A number of LIFE publications are available on the LIFE website:

LIFE-Environment Projects 2005 compilation (2005, 97 pp. – ISBN 92-79-00104-3)
http://europa.eu.int/comm/environment/life/infoproducts/lifeenvcompilation_05_lowres.pdf

LIFE-Nature Projects 2005 compilation (2005, 55 pp. – ISBN 92-79-00102-7)
http://europa.eu.int/comm/environment/life/infoproducts/lifenatcompilation_05_lowres.pdf

LIFE-Third Countries Projects 2005 compilation (2005, 19 pp. – ISBN 92-79-00103-5)
http://europa.eu.int/comm/environment/life/infoproducts/lifetcycompilation_05_lowres.pdf

LIFE-Environment 1992 – 2004 "Demonstrating excellence in environmental innovation" (2005, 124 pp. – ISBN 92-894-7699-3 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/bilanlife/lifeenv1992_2004_en.pdf

LIFE, Natura 2000 and the military (2005 - 86 pp. – ISBN 92-894-9213-9 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/lifeandmilitary_en.pdf

LIFE for birds - 25 years of the Birds Directive: the contribution of LIFE-Nature projects (2004 - 48 pp. – ISBN 92-894-7452-1 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/lifeforbirds_en.pdf

The air we breathe - LIFE and the European Union clean air policy (2004 - 32 pp. – ISBN 92-894-7899-3 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/focusair/lifeair_hr_en.pdf

LIFE-Nature: communicating with stakeholders and the general public - Best practice examples for Natura 2000 (2004 - 72 pp. – ISBN 92-894-7898-5 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/naturecommunicating_lowres_en.pdf

A cleaner, greener Europe - LIFE and the European Union waste policy (2004 - 28 pp. – ISBN 92-894-6018-0 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/lifewaste_en.pdf

Alien species and nature conservation in the EU - The role of the LIFE program (2004 - 56 pp. – ISBN 92-894-6022-9 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/alienspecies_en.pdf

Industrial pollution, European solutions: clean technologies - LIFE and the Directive on integrated pollution prevention and control (IPPC Directive) (2003 - 32 pp. – ISBN 92-894-6020-2 – ISSN 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/cleantechnologies_en.pdf

LIFE and agri-environment supporting Natura 2000 - Experience from the LIFE programme (2003 - 72 pp. – ISBN 92-894-6023-7 – ISSN N° 1725-5619)
http://europa.eu.int/comm/environment/life/infoproducts/agrienvironmentreport_en.pdf

LIFE for Natura 2000 - 10 years implementing the regulation (2003 - 108 pp. – ISBN 92-894-4337-5)
http://europa.eu.int/comm/environment/life/infoproducts/lifepournatura2000_en.pdf

A sustainable approach for the environment - LIFE and the Community Eco-Management and Audit Scheme (EMAS) (2003 - 32 pp. – ISBN 92-894-0543-0)
http://europa.eu.int/comm/environment/life/infoproducts/emas_en.pdf

Water, an essential resource - LIFE and the new European water policy (2002 - 28 pp. – ISBN 92-894-0538-4)
http://europa.eu.int/comm/environment/life/infoproducts/water_en.pdf

The financial instrument for the Environment (2002, 6 pp)
http://europa.eu.int/comm/environment/life/life/life_en.pdf

LIFE Environment in Action. 56 new success stories for Europe's environment (2001 -131 pp. – ISBN 92-894-0272-5)
http://www.europa.eu.int/comm/environment/life/infoproducts/successstories2001_en.pdf

identity card

Name LIFE ("L'Instrument Financier pour l'Environnement" / The financial instrument for the environment)

Type of intervention co-financing of actions in favour of the environment in the twenty-five Member States of the European Union, in the candidate countries who are associated to LIFE and in certain third countries bordering the Mediterranean and the Baltic Sea.

LIFE is made up of three thematic components: "LIFE-Nature", "LIFE-Environment" and "LIFE-Third countries".

Objectives

> with a view to sustainable development in the European Union, contribute to the drawing up, implementation and updating of Community policy and legislation in the area of the environment;
> explore new solutions to environmental problems on a Community scale.

Beneficiaries any natural or legal person, provided that the projects financed meet the following general criteria:

> they are of Community interest and make a significant contribution to the general objectives;
> they are carried out by technically and financially sound participants;
> they are feasible in terms of technical proposals, timetable, budget and value for money.

Types of project

> Eligible for LIFE-Environment are innovative pilot and demonstration projects which bring environment-related and sustainable development considerations together in land management, which promote sustainable water and waste management or which minimise the environmental impact of economic activities, products and services. LIFE-Environment also finances preparatory projects aiming at the development or updating of Community environmental actions, instruments, legislation or policies.
> Eligible for LIFE-Nature are nature conservation projects which contribute to maintaining or restoring natural habitats and/or populations of species in a favourable state of conservation within the meaning of the "Birds" (79/409/EEC) and "Habitats" (92/43/EEC) Community Directives and which contribute to the establishment of the European network of protected areas – NATURA 2000. LIFE-Nature also finances "co-op" projects aiming to develop the exchange of experiences between projects.
> Eligible for LIFE-Third countries are projects which contribute to the establishment of capacities and administrative structures needed in the environmental sector and in the development of environmental policy and action programmes in some countries bordering the Mediterranean and the Baltic Sea.

Implementation National authorities in the Member States or third countries send the Commission the proposals of projects to be co-financed (for LIFE-Environment preparatory projects, the applicants send their proposals directly to the Commission). The Commission sets the date for sending the proposals annually. It monitors the projects financed and supports the dissemination of their results. Accompanying measures enable the projects to be monitored on the ground.

Period covered (LIFE III) 2000-2006.

Funds from the Community approximately EUR 638 million for 2000-2004 and EUR 317 million for 2005-2006.

Contact

European Commission – Environment Directorate-General
LIFE Unit – BU-9 02/1 – 200 rue de la Loi – B-1049 Brussels – Fax: +32 2 292 17 87
Internet: http://europa.eu.int/life/

European Commission
Life Focus / Best Life-Environment projects 2004-2005
Luxembourg: Office for Official Publications of the European Communities

2005 - 44p - 21 x 28 cm
ISBN 92-79-00889-7
ISSN 1725-5619

KH-AJ-05-001-EN-C

Publications Office
Publications.eu.int

ISSN 1725-5619

ISBN 92-79-00889-7
9 789279 008894