European Commission

Best LIFE Environment projects 2013

LIFE *Environment*

Environment

EUROPEAN COMMISSION
ENVIRONMENT DIRECTORATE-GENERAL

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Foreword

Photo: European Commission

Markéta Konecna
LIFE Environment "Best of the Best" coordinator 2013
Department of EU Funds, Ministry of the Environment of the Czech Republic

The 10th edition of the LIFE Environment Awards took place in Brussels in June 2014. This annual event is a means of acknowledging the work of the most outstanding LIFE Environment projects completed by the end of the previous calendar year. Its importance was highlighted by the presence of Hans Bruyninckx, Executive Director of the European Environment Agency, who gave the keynote address and presented the awards (see pp. 4-5).

It was a great honour to be asked to coordinate the process by which the long list of contenders was whittled down to the final selection: a total of 21 LIFE Environment projects, of which the five most exemplary were recognised as "Best of the Best" projects, with the remaining 16 awarded LIFE "Best" project status. I would also like to place on record my sincere thanks to my fellow National Contact Points involved in the selection procedure.

Each of the award-winning projects demonstrates the potential of the LIFE programme to support actions that aid the implementation of EU Environment policy across the Union. I hope that LIFE continues to build on its long record of achievement and continues to demonstrate practical solutions to the environmental challenges ahead.

Photo: European Commission

Dirk Schaap
LIFE Information & Communication "Best of the Best" coordinator 2013
Netherlands Ministry of Infrastructure and the Environment

This 10th year of the LIFE Environment Awards was the first in which LIFE Information & Communication (LIFE INF) projects with an environmental focus were also recognised. Introduced under LIFE+ in 2007, the aim of LIFE INF projects has been to disseminate information, raise the profile of environmental issues, or provide training and awareness-raising for the prevention of forest fires.

The high standard of projects under consideration made selecting one as a "Best of the Best" and three as "Best" projects a challenging process - challenging, but also extremely interesting and rewarding. I would like to thank my colleagues on the selection panel for their support and expertise during this process (see page 5 for details of the selection criteria).

Whilst all the projects we assessed had their strengths, it was the transnational reach, replicability and lasting impact of the European Week for Waste Reduction (EWWR) that set this project apart from the rest and led to its recognition as the first "Best of the Best" LIFE INF project. The EWWR inspired more than 14 000 awareness-raising actions in over 20 countries during the first phase of LIFE co-funding and it has continued to grow and spread the message about waste reduction across Europe.

The three "Best" projects were also noteworthy for the quality of their communications, their innovative approaches and the impact on target audiences – respectively farmers and agricultural technicians (the CHANGING THE CHANGE project) and young people (the Com-U and Eco-Animation projects).

I hope that the success of these four projects will continue to be a source of inspiration to those communicating environmental messages across the EU.




BEST LIFE ENVIRONMENT PROJECTS

LIFE ENVIRONMENT BEST AWARD WINNERS 2013

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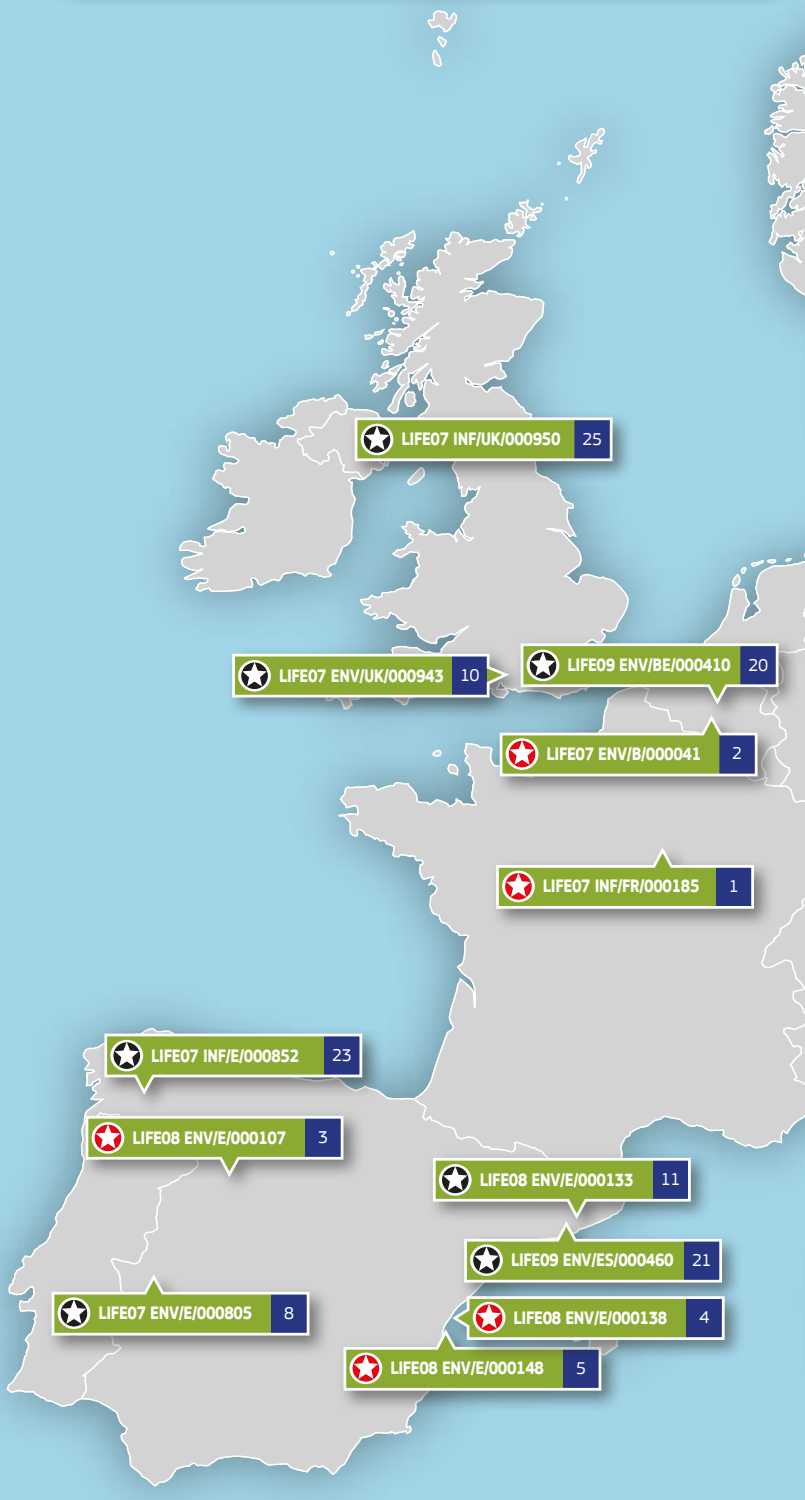

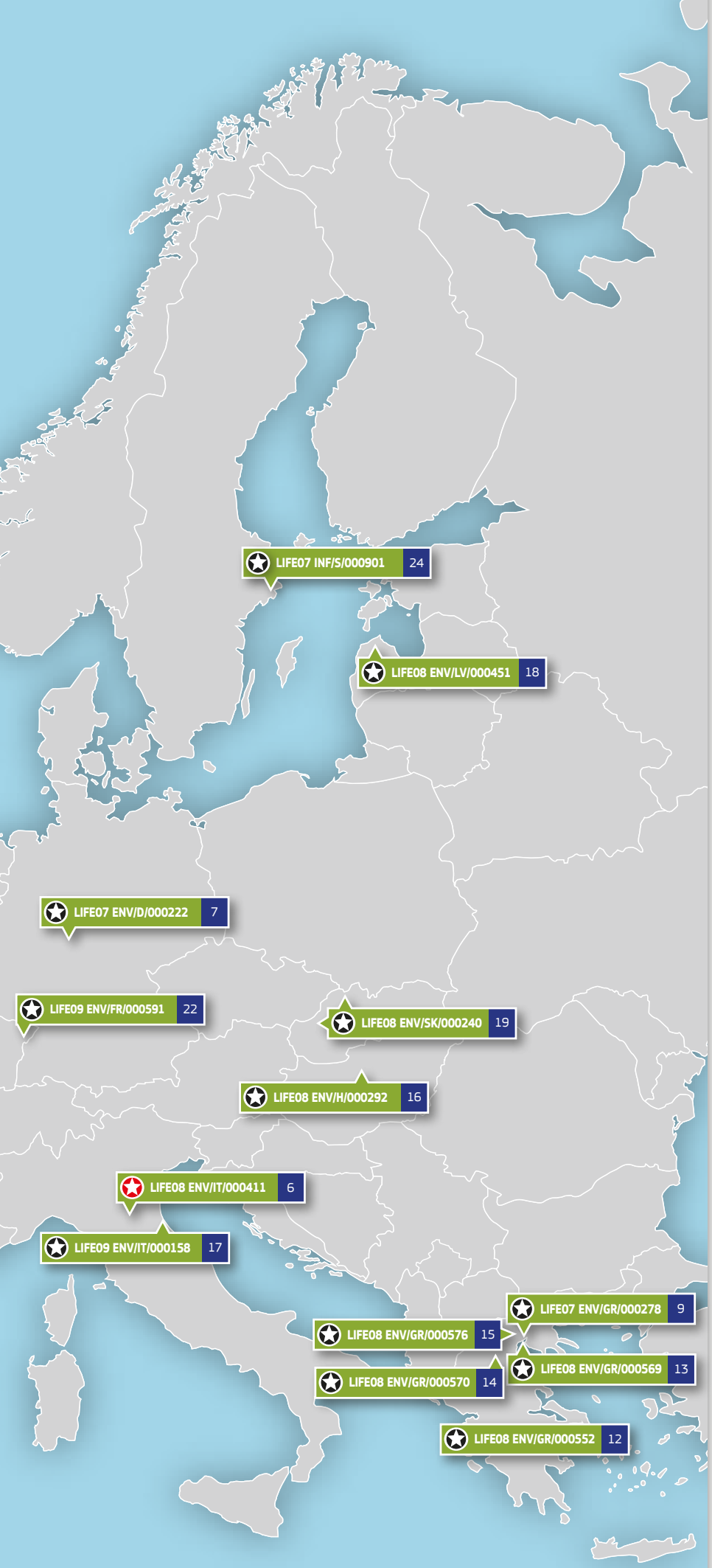

BEST OF THE BEST PROJECTS

1 **LIFE07 INF/F/000185**
EWWR
European Week of Waste Reduction

2 **LIFE07 ENV/B/000041**
WEEELABEX
WEEE LABEL OF EXCELLENCE. European Standards for Treatment and Recycling of E&E Waste and for Monitoring the Processing Companies

3 **LIFE08 ENV/E/000107**
RESCATAME
Pervasive Air-quality Sensors Network for an Environmental Friendly Urban Traffic Management.

4 **LIFE08 ENV/E/000138**
GREEN COMMERCE
Compromise for a reduction of the environmental impact of the retail sector

5 **LIFE08 ENV/E/000148**
ECO-VITRUM-TRC
Integral management model of cathode rays glass: closing the circle of recovery, recycling and reuse of WEEE'S

6 **LIFE08 ENV/IT/000411**
ENERG-ICE
New PU Foaming Technology for the Cold Appliance Industry Assuring a Cost-Efficient Ecodesign with Augmented Energy Saving

BEST PROJECTS

7 **LIFE07 ENV/D/000222**
PROGRASS
Securing the Conservation of Natura Grassland Habitats with a Distributed Bioenergy Production

8 **LIFE07 ENV/E/000805**
EDEA
Efficient Development of Eco-Architecture: Methods and Technologies for Public Social Housing Building in Extremadura

9 **LIFE07 ENV/GR/000278**
Soil Sustainability(So.S) Thessaloniki - Anthemountas
Soil Sustainable Management in a Mediterranean River basin based on the European Soil Thematic Strategy

10 **LIFE07 ENV/UK/000943**
PISCES
Partnerships Involving Stakeholders in the Celtic sea Eco-System

11 **LIFE08 ENV/E/000133**
RESALTTECH
Concentrated saline rejection treatment: Environmental Technology using a non profitable solid waste as energy source.

12 **LIFE08 ENV/GR/000552**
ClimaBiz
Financial Institutions: Preparing the Market for adapting to Climate Change

13 **LIFE08 ENV/GR/000569**
BIOFUELS-2G Thessaloniki
Demonstration of a Sustainable & Effective 2nd Generation Biofuels Application in an Urban Environment

14 **LIFE08 ENV/GR/000570**
HydroSense
Innovative precision technologies for optimised irrigation and integrated crop management in a water-limited agrosystem

15 **LIFE08 ENV/GR/000576**
SMARt-CHP Western Macedonia
Demonstration of a small-scale mobile agricultural residue gasification unit for decentralized combined heat and power production

16 **LIFE08 ENV/H/000292**
MEDAPHON
Monitoring Soil Biological Activity by using a novel tool: EDAPHOLOG-System - system building and field testing

17 **LIFE09 ENV/IT/000158**
SEDI.PORT.SIL
Recovery of dredged SEDIments of the PORT of Ravenna and SILicon extraction

18 **LIFE08 ENV/LV/000451**
HydroClimateStrategyRiga
Integrated Strategy for Riga City to Adapt to the Hydrological Processes Intensified by Climate Change Phenomena

19 **LIFE08 ENV/SK/000240**
CHEFUB
Creative high efficient and effective use of biomass

20 **LIFE09 ENV/BE/000410**
DEMOCOPHESII
Demonstration of a study to coordinate and perform human biomonitoring on a European scale

21 **LIFE09 ENV/ES/000460**
ELVISUSTECH
End life vehicles: innovative and sustainable technology for chieving European Directive targets

22 **LIFE09 ENV/FR/000591**
ECOTRANSFLUX Alsace
Transverse Flux Induction Strip Heating Demonstrator, a technology limiting CO2 emissions & acid wastes in Steel Industry

23 **LIFE07 INF/E/000852**
CHANGING THE CHANGE
LIFE+campaign 'Changing the change'. The Galician agriculture and forest sector facing climate change.

24 **LIFE07 INF/S/000901**
COM-U
Communicating environmental actions to children and youth

25 **LIFE07 INF/UK/000950**
Eco-Animation
Eco-Animation: a cutting edge cartoon to raise awareness on climate change and sustainable use of natural resources among European children

The LIFE Best Awards

The LIFE Best Environment Awards highlight the demonstration value of the LIFE programme and the importance of replicable results. This year's awards include, for the first time, Best LIFE Information and Communication projects with environmental themes.

Photo: ASTRALE EEIG/Fabrice Wagner

The 2013 LIFE ENV Best of the Best projects deal with waste, air quality monitoring, climate change, eco-product design and reducing the environmental impact of the retail sector

The objective of the LIFE Environment Awards programme is to help improve the dissemination of LIFE project results by clearly identifying those projects whose results, if widely applied, could have the most positive impact on the environment.

The latest round of Best LIFE Environment awards - for projects completed by the end of 2013 – sees a total of 25 LIFE+ projects singled out for special attention. These comprise six particularly exemplary "Best of the Best" projects and 19 "Best" projects – and include, for the first time, three LIFE+ Information and Communication projects addressing environmental themes.

The "Best of the Best" projects (see pages 6-25), five from the LIFE+ Environment (LIFE ENV) strand and one from LIFE+ Information and Communication (LIFE INF) are in chronological order: WEEELABEX from Belgium, EWWR from France, RESCATAME, GREEN COMMERCE and ECO-VITRUM-TRC from Spain, and ENERG-ICE from Italy.

Key environmental issues

Highlighting some of the key environmental issues addressed by the LIFE programme, the LIFE ENV projects cover waste – including innovations in recycling and management of waste from electrical and electronic equipment (WEEE) – monitoring of air quality, reduction of environmental problems in the retailing sector, climate change and eco-product design. Meanwhile, the first ever "Best of the Best" LIFE INF winner (EWWR) also tackles waste reduction – helping to encourage over a three-year period, the participation of

more than two million people in over 7 000 events across 20 European countries (EU and non-EU) to mark the European Week for Waste Reduction. With follow-up LIFE funding the EWWR continues to expand and in 2014 instigated the first official pan-European clean-up day (Let's Clean up Europe!), which will be an annual event.

The 19 "Best" projects (see pages 26-63) comprise two further LIFE INF projects – from Spain and Sweden respectively – as well as further representations from LIFE ENV projects in Spain, Italy, Belgium and France, together with best practice examples from Germany, Greece, the UK, Hungary, Latvia, Slovakia and Sweden.

An awards' ceremony for the successful projects was held in Brussels on 4 June 2014, during the EU Green Week, which this year was on the theme, "Circular economy – saving resources, creating jobs". Following an introduction from Timo Mäkelä, Director of Global and Regional Challenges and LIFE, DG Environment, European Commission, the awards were presented by Hans Bruyninckx, Executive Director of the European Environment Agency (EEA).

Keynote messages

In his keynote address, Dr Bruyninckx said: "Many of the issues that have been tackled in LIFE projects have found their way into [the EEA's] reporting and our knowledge base, so we have a keen interest in the work that all of you have been doing." He highlighted the fact that many projects funded under LIFE during the previous cycle (2007-2013) have been addressing the three core agendas for Europe of a low carbon society, economic resilience and the circular economy.

Dr Bruyninckx added: "But as we are entering the 7th EAP [Environmental Action Programme] with a horizon of 2020, of 2050, the innovation that we find in many of these projects will be an inspiration for the European institutions and for Member States and for a number of other actors that are engaging in them."

The selection of this year's winners follows an established procedure (see Box), started in 2004 under the LIFE Environment strand, whereby projects were initially technically assessed by the LIFE Unit's external monitoring team.. The monitors ranked all the projects that ended by December 2013, to produce a first list. Using the agreed criteria, the final selection was undertaken by the Member States under the coordination of Markéta Konecna, Department of EU Funds, Ministry of the Environment of the Czech Republic (LIFE ENV projects) and Dirk Schaap of the Netherlands Ministry of Infrastructure and the Environment (LIFE INF projects).

Photo: EC/Patrick Mascart

Hans Bruyninckx, Executive Director of the European Environment Agency (EEA)

What makes a Best LIFE INF project?

Asked for his view on what makes a successful LIFE Information and Communication project, Mr Schaap said: "For me a project would qualify [for the awards] if it addressed an environmental problem through an information or communication action, or strategy, where communication or information was clearly the best, or only, instrument to address the problem. It should also have a clear innovative element and it should be replicable and applicable to other situations."

How the winners were chosen

LIFE+ Environment projects: *Scoring of completed projects was launched in the summer of 2004, judging them against a set of 'best practice' criteria developed by the Commission in cooperation with the Member States. These comprise: projects' contribution to immediate and long-term environmental, economic and social improvements; their degree of innovation and transferability; their relevance to policy; and their cost-effectiveness.*

LIFE+ Information and Communication projects: *Scoring of completed projects was launched in the spring of 2014. The projects were scored according to a similar set of criteria as for the LIFE ENV projects. These include: projects' environmental impact; relevance to environmentally relevant issues; quality of communication actions; multiplier effect; networking activities; innovative campaigning methods; impact on the target group; and their regional, national, or international impact.*

Photo: LIFE07 INF/F/000185

BEST LIFE ENVIRONMENT PROJECTS

BEST OF THE BEST PROJECTS

France: **The European Week for Waste Reduction**

Since the first European Week for Waste Reduction in 2009, the number of activities raising citizen awareness on how to reduce waste has increased steadily each year. A total of 12 682 activities were organised across the continent in 2013.

The EWWR implemented many innovative actions to raise public awareness of the importance of waste prevention, such as this one to communicate the concept of the 3Rs: reduce, reuse, recycle

Waste production, management and disposal are a strain on natural resources, consume huge amounts of energy and lead to significant greenhouse gas emissions. Waste also contaminates air, soil and ground water sources, at the same time costing local authorities millions of euros per year to treat, in addition to the individual cost to households (e.g. higher taxes).

The European Week for Waste Reduction (EWWR) was born out of the necessity to take action against the ever-increasing amount of waste produced every year in the EU. According to Eurostat, whereas an EU citizen produced 486 kg of waste on average in 1994, this had increased to 524 kg in 2008 – a total of 919 million tonnes of waste. The European Environment Agency believes that in 2020 as much as 558 kg of waste could be created per person.

The EU's Waste Framework Directive (2008/98/EC) defines the prevention of waste as being, "all measures taken before a substance, a material or a product becomes waste." This means reducing the quantity of waste through reuse and recycling, thus reducing potentially toxic effects on the environment and on human health at all stages of a product's lifecycle. EU Member States have been leaning towards waste prevention for the last 20 years. The EU institutions have responded to this by implementing a series of legislation concerning waste management since 1994. The Waste Framework Directive is the most recent of these and also the most comprehensive. It lays down a

five-step hierarchy for waste management with waste prevention at the top – a clear priority.

Working together to reduce waste

With households responsible for 8% of the billions of tonnes of waste produced in the EU each year, citizens have a considerable part to play in the reduction of waste. Greater awareness of the problems that all this waste causes will make citizens more likely to take measures to reduce their own personal waste. Thanks to co-funding from the EU LIFE programme, the EWWR was created in 2009 to facilitate this process. The aim is to contribute to the reduction of European waste through an annual week of awareness-raising activities across the EU aimed at citizens, authorities, businesses, schools and other relevant stakeholders.

"The EWWR was a merging of ideas from the ACR+ campaign '100 kg European Campaign for Waste Reduction' and the French Waste Reduction Week, a concept imported from Canada, with more commitment and involvement from public authorities," says Françoise Bonnet, Secretary General of ACR+, the EWWR's European Technical Secretariat. "We were approached by the French Environment and Energy Management Agency (ADEME) in 2008 because of our experience with the campaign and the project took off from there," Mrs Bonnet explains.

The coordinating beneficiary ADEME, ACR+ and three other project partners - in Spain (Agencia de Residus Catalunya), Belgium (Institut Bruxellois pour la Gestion de l'Environnement) and Portugal (Intermunicipal Waste Management of Greater Porto area) - all implemented the concept of the EWWR in their country or region of work, developed communication tools and created a network of public authorities working towards the same goals. Specifically, they committed to promoting sustainable actions for waste prevention across Europe; to raising awareness about strategies and policies for waste prevention and reduction in the EU and its Member States; to turn the concept of waste reduction into reality; to galvanise and motivate as many people as possible to take action; to demonstrate the direct impact of consumption on the environment; and to highlight the links between waste reduction and sustainable development.

As well as the project partners, a number of other actors are involved in making the EWWR an annual success. Firstly, EWWR organisers - public authorities that work in the field of waste management and who have agreed to coordinate and promote the EWWR in their country or region; secondly, EWWR project developers - stakeholders who organise and carry out the awareness-raising activities on a more local level; and finally, European citizens – participants in the events across the continent. "The EWWR has enabled all key

Over 38 000 EWWR activities have taken place since 2009

Figure 1 - Breakdown of EWWR participants					
	2009	2010	2011	2012	2013
Number of participating countries	**13**	**18**	**20**	**23**	**19**
National organisers	7	13	14	15	11
Regional organisers	12	17	18	17	20
Local organisers	1	2	2	3	3
Total number of organisers	**20**	**32**	**34**	**35**	**34**

players in waste reduction from diverse levels, institutions and countries to work together," believes Mrs Bonnet.

Reduce, reuse, recycle

EWWR project developers (administrations/public authorities, associations/NGOs, businesses/industry, educational establishments or other bodies) are responsible for organising and putting on the activities in their regions. These can range from a simple email to campaigns that cover a whole city or region and are focused on one or several of the following five themes: too much waste; better production; better consumption; a longer life for products; and less waste thrown away. Also at the core of the activities are 12 simple actions that each individual can carry out to decrease the amount of waste they generate (see box).

To ensure an activity fits in with the philosophy of the EWWR, the project developer submits a proposal to their EWWR organiser using a form especially developed for this purpose, available on the project's website. It is then evaluated by the organiser to ensure it complies with all the requirements set out in the Project Developer Participation Charter. Once approved the organiser provides the developer with the relevant communication tools, registers the activity and sends the information to the Technical Secretariat. This process enables the data from these activities to be more easily compared for reporting purposes.

12 good habits for reducing waste!

- Opt for reusable bags
- Put a "No Junk Mail " sticker on your letterbox
- Avoid food waste
- Buy in bulk or in large-size packaging
- Drink tap water
- Limit use of the printer
- Start composting
- Use rechargeable batteries
- Donate old clothing
- Borrow or hire tools
- Repair goods and appliances
- Buy eco-rechargeable or refillable products

The EWWR has grown in popularity each year. More than 14 000 awareness-raising actions were implemented in over 20 countries during the first three editions of the Week (2009-2011). A total of 2 672 actions were implemented in 2009, 4 346 in 2010 and 7 035 in 2011. "This achievement has continued beyond the three years of the LIFE project with numbers rising to 10 751 in 2012 and 12 682 in 2013," states Mrs Bonnet proudly. An independent French Research Bureau estimated that around 1 930 000 people took part in EWWR activities in 2011. Many more were reached indirectly through posters, articles and videos.

Recognising good practice

The European Waste Reduction Awards take place each spring. An important part of the project, they were included to provide an incentive for innovative ideas. The best activities are selected from a shortlist by a European panel of judges. There are a number of categories – one for each type of project organiser.

"The awards are one of the great successes of the EWWR," says Mrs Bonnet. "They bring all the stakeholders together and make the achievements of the Week real by highlighting concrete activities." The winners are considered to be a source of inspiration for others organising campaigns and for all stakeholders working on the topic of waste reduction. Forty of the best activities are presented in the project's "Guide of Good Practices" that can be downloaded from the EWWR website.

An annual conference also takes place on the same day as the awards. "It is another wonderful part of the EWWR and a great opportunity to network and discuss the theme of waste reduction with people who have the same goal," says Mrs Bonnet.

Overcoming challenges

As with any international project the EWWR has also had its fair share of challenges. Working with so many partners from across Europe can cause project implementation difficulties. Challenges include the different languages, cultures, resources

and geographical locations of the activity organisers. So, how to deal with such differences? Mrs Bonnet is quick to answer: "the structure of the EWWR definitely helps things run more smoothly but other things that help include our long standing experience with authorities, working with good project coordinators, having a common aim, and being able to remain flexible and find solutions that suit all partners."

In addition to the international and cultural differences, three other issues proved very difficult during the project: evaluating the long-term impact of the activities carried out during the EWWR each year; making sure all European countries are represented with activities during the EWWR; and making the Week self-supporting so that it can continue in the long term. All of these are being addressed in a follow-on LIFE project, Life EWWR+ (**LIFE12 INF/BE/000459**).

LIFE EWWR+ and beyond

Led by ACR+, LIFE EWWR+, which began in September 2013 and runs until 2017, builds on the success of the initial LIFE project, continuing to raise the profile of the European Week for Waste Reduction, extending its scope to the 3Rs (reduce, reuse, recycle), increasing activities implemented and countries involved and addressing the gaps identified in the earlier project. New project partners include an Italian member of ACR+ that specialises in communication and the National Waste Agency of Hungary. The next edition of the EWWR will take place from 21-29 November 2015.

New to this project are: targeted communication tools aiming at specific audiences (administrations/NGOs, schools, businesses and individual citizens); the aim to involve organisers from all 28 Member States in the EWWR (currently 23 countries are represented), and an official annual European clean-up day ('Let's Clean Up Europe!'). The latter is intended to bring a number of existing initiatives together to create a pan-European event that takes place on the same day all over the continent; involving and reaching as many citizens as possible. The first edition of the clean-up day took place in May 2014 and saw over 3 000 clean-up actions successfully implemented. The next edition of Let's Clean Up Europe! is scheduled for May 2015.

Photo: ARC

Workshop in Viladencans, Spain on how to repair bikes and household appliances

Recycled buckets were used during the "BatucaMob" event by volunteers playing Brazilian music

Photo: Bernard Blistin/NEOSTUDIO

This current project is the last opportunity for the EWWR to be funded through LIFE. After 2017 the project partners must search elsewhere for capital to render the Week self-supporting so it can continue in the long-term. Making the EWWR a permanent event on the EU political agenda is one of the goals of ACR+ and its partners. "We want to continue to raise awareness about the issue of waste reduction," concludes Mrs Bonnet.

Project number: LIFE07 INF/F/000185

Title: EWWR - European Week for Waste Reduction

Beneficiary: Agence de l'Environnement et de la Maîtrise de l'Energie

Contact: Philippe Micheaux Naudet

Email: pmn@acrplus.org

Website: http://www.ewwr.eu

Period: 01-Jan-2009 to 15-Jul -2012

Total budget: €2 147 000

LIFE contribution: €1 073 000

Belgium: **Raising standards for WEEE management**

Waste electrical and electronic equipment (WEEE) contains hazardous substances and it is vital that it is effectively managed. The WEEELABEX project introduced a comprehensive set of standards and auditing practices to ensure high environmental performance in WEEE collection and recycling.

The WEEE Forum is a non-profit association of 39 WEEE producer responsibility organisations (or 'producer compliance schemes') in Europe. The WEEE Forum, which was established in 2002, provides a platform for producer responsibility organisations to share best practices and latest thinking on the management of electrical and electronic waste. The forum carried out the WEEELABEX (WEEE LABel of EXcellence) LIFE project to develop new standards for WEEE recycling processes and to train auditors to ensure that the required standards are accurately assessed and communicated via the new WEEE Label of Excellence.

This new label is based on proprietary standards and offers considerable savings to the WEEE Forum's members, the producer compliance schemes. WEEE management is becoming an increasingly cross-border activity with significant competitive pressures. By harmonising the standards across Europe, compliance schemes can simplify the contracts that they draw up with recyclers and processors.

"Producer compliance schemes, when they become operational, need to tender documents, so they can say to their partners – the recyclers and processors – you need to recycle the following quantities of e-waste and it has to reach a set of technical requirements and standards," explains Pascal Leroy, Secretary General of the WEEE Forum.

Harmonising the set of requirements means that processors are faced with only one set of administrative and technical requirements from their WEEELABEX customers, rather than

Hans Bruyninckx, EEA Executive Director (left) and Mr Timo Mäkelä, from DG Environment (right) with the representatives of the WEEELABEX project, Pascal Leroy and Phillip Morton (middle)

Photo: EC/Patrick Mascart

a wide variety of contractual specifications. "Amongst other things, it would save resources in that there is no need in each compliance organisation for persons to update them to seek best practices and so on. The mission was also to level the playing field – to avoid situations whereby, for example, the Belgians were much more ambitious than the French," says Mr Leroy.

It is not only a time saver for the WEEE Forum's member organisations; it also saves the recyclers time. "What happens now is that each time that they sign a contract with a producer compliance scheme, they have to welcome an audit team that audits the plants, the processors, the paper trail and so forth. Such an audit can take several days.

"So if we have one set of standards and one team of auditors trained to use the same audit tools and procedures, you would have one way of auditing facilities. Five compliance schemes in a market that contract with the same recycler can choose to reduce costs by sending one common team of auditors, rather than each sending its own. Then all five would mutually recognise the outcome of the audit," he says.

High standards

The first aspect of the LIFE project was to draw up the standards, a collaborative process with WEEE Forum members and stakeholders that took 27 months. The 2002 WEEE Directive (2002/96/EC), which outlines responsibilities and targets for the collection, recycling and recovery of WEEE, was used as a starting point, but the directive doesn't go into detail about how specific waste should be treated.

"Electronic waste is not homogenous," explains Mr Leroy. "You have lamps which contain mercury and are very light

Thérèse Shryane, Technical Manager of the WEEE Forum

An audit being carried out in the "Green WEEE" plant in Buzau in Romania

and you have refrigerators that contain ozone-depleting substances but which are very heavy. You're dealing with millions of types of products." In fact, the project produced a 110-page document containing its standards on such aspects of waste management as storage, preparation of reuse, transport, handling, processing, recycling and disposal, for both WEEE in general and specific types of WEEE.

Balancing the interests of recyclers (through EERA – the European Electronics Recyclers Association) and producers – via the three main producer associations: CECED (household appliance manufacturers), DIGITALEUROPE (manufacturers of Information and Communications Technology and Consumer Electronics), LightingEurope (lamp-lighting producers) - represented a particular challenge for the project, acknowledges Mr Leroy. "We were the liaison between producers and recyclers; we had to make sure that their views converged on the standards, which were not excessively onerous for producers, but on the other hand were sufficiently realistic for recyclers also. If you lay down a new, ambitious requirement, it often means new investments for recyclers to reach this bar."

Whilst the project was being carried out, the European Commission was revising its directive on WEEE. "The EU policy-makers decided at some point that ideally the directive should mandate the standardisation bodies to write formal standards. I got in touch with them to argue that those standards should be based on WEEELABEX. They took this idea on board and it became part of the final recast directive," says Mr Leroy. The Commission mandated CENELEC to draw up standards based on the WEEELABEX standards.

Harmonised auditing

The second part of the project focused on harmonising the way that processers are audited. The project developed software and

Photo: ASTRALE EEIG/Justin Toland

WEEELABEX developed management standards for both general and specific types of WEEE

tools for carrying out 'WEEELABEX audits'. Moreover, it opened an office in Prague to train auditors to become 'WEEELABEX auditors'. These typically week-long training sessions are aimed at auditors that wish to expand their areas of competence.

"If you are a certification training company and you have a team of waste auditors and you want to expand your business and also be involved in the auditing of e-waste processing, then you will send some people in your team to such a course…It's a way of getting new business for certification companies and also for private self-employed auditors," explains Mr Leroy.

The office was set up in Prague to encourage participation from Central European countries. "The office is going to identify the plants that comply with standards, so on the website there will be a list of plants that have passed the test," says Mr Leroy.

As of July 2014, a pool of 28 trained auditors is certified to carry out WEELABEX audits. "What usually happens is that the producer compliance scheme says that it's about to make contracts with new recyclers, because contracts have come to an end, and [it wants] to have new contracts in place. And members of the WEEE Forum being contractually bound only to use WEEELABEX auditors, they can only make contracts with WEEELABEX plants. An audit needs to take place and from a pool of auditors they say who they want to send," he explains.

Formal WEEELABEX conformity verification has taken place in France, the Netherlands, Italy and Spain. Other markets are expected to follow. The standards are available in English, French, German, Spanish, Italian, Portuguese and Polish. A watch list of elements that future revisions of the standards should take into account has also been drawn up.

The WEEELABEX scheme will remain private, which is its ultimate selling point, according to Mr Leroy. "WEEELABEX is the place to be for state-of-the-art auditing and interpretation of WEEE requirements and training of auditors."

In addition, many non-EU countries have already referred to the WEEE Forum standard in developing their own e-waste standards. These include Brazil, China, Japan, Kenya, Malaysia, Nigeria, South Africa and the US. A summary of the standards was even translated into Chinese.

Project number: LIFE07 ENV/B/000041

Title: WEEELABEX - WEEE LABEL OF EXCELLENCE. European Standards for Treatment and Recycling of E&E Waste and for Monitoring the Processing Companies

Beneficiary: WEEEForum (European Association of Electrical and Electronic Waste Take Back Systems)

Contact: Pascal Leroy

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Website: www.weee-forum.org/weeelabex-0

Period: 01-Jan-2009 to 31-Dec-2012

Total budget: €1 064 600

LIFE contribution: €532 000

Spain: **Improving LIFE on the streets of Salamanca**

Improving city life through better air quality was the overarching goal of this pilot project in the city of Salamanca. Using data collected from air-quality sensors, the project showed how at low cost, municipalities can better manage urban traffic.

RESCATAME installed its air quality monitoring devices or "motes" at several sites in Salamanca

Air pollution remains a serious cause for concern in Europe. High pollution levels have a significant adverse effect on the environment and on human health, particularly in urban centres where traffic emissions are high. In Spain, for instance, a recent study on air quality carried out by the Observatory of Sustainability (OSE), showed that living in cities with high levels of pollution reduces life expectancy by between a few months and two years, as well as increasing the risk of respiratory disease. According to the 2012 study, the air quality in some Spanish cities has been "consistently exceeding" standard levels of pollution, as a result of a lack of environmental planning and periods of drought.

When addressing the problem of air quality, local authorities need to consider the design of their city centres (e.g. the width and orientation of streets) as this has been found to have a major influence on the dispersion of pollutants. In areas with pollution levels well above average, the flow of traffic and its direction, especially during rush hours, is of major importance. In most cities, exhaust from cars is the main source of air pollution. As a result, legislation has been introduced to control more and more types of pollutants and reduce the allowable limits.

The main goal of the LIFE RESCATAME project was to achieve sustainable management of the traffic in the city of Salamanca, by using a network of air-quality sensors as well as prediction models. This objective would be met through the development and practical application of the 'Instrumented City' concept, which had already been piloted in the city of Newcastle upon Tyne in the United Kingdom.

The RESCATAME development would help to define a new 'Urban Traffic Management and Control Strategy' based on the prevention of regular high pollution episodes caused by increased road traffic. Adopting such an urban traffic management model will help local authorities to achieve the goal of reducing pollution levels below the limits imposed by EU legislation[1]. It will also aid the effective organisation of city traffic, without causing excessive disruption to the transport needs of citizens.

Importantly, the Instrumented City concept allows traffic and pollution data to be analysed in real time to produce pollution predictions: It also enables the calculation of the effects of various traffic regulation scenarios and allows comparisons of the impact of those scenarios on pollution at traffic 'hotspots', with new data collected by the same measurement instruments. Thus, the pollution results enable traffic control measures to be fine-tuned in real time.

The RESCATAME project was led by the CARTIF Technology Centre, a privately-owned Spanish foundation for applied research and technology transfer, working in partnership with the European Business and Innovation Centre Network, the Municipality of Salamanca and Research Advisory Group P&G.

Why Salamanca?

Unusually, RESCATAME had two project managers as this was a job share, covering maternity leave, between Dr Dolores Hidalgo and Ms Marta Gómez. Dr Hidalgo outlines the background to the project and in particular, the reasons for the choice of project location. In common with many Spanish cities, Salamanca suffers from periods of heavy pollution, especially during rush hours, because of the high number of cars circulating. In addition, its old city, a UNESCO World Heritage Site since 1988, is characterised by tall, historic buildings and narrow streets that add to problems of dispersion of pollutants.

Salamanca was a good place in which to deploy the sensors, says Dr Hidalgo: "It has beautiful surroundings and heritage monuments, so the impact of pollution on public health and on the cultural heritage is huge." Also, she continues: "Tourism is the main income and tourists want clean air and an unpolluted city." A third factor in choosing Salamanca was its size (population approximately 150 000 in 2012): the project team believed that it would be easier to scale up the technology for other locations if the concept was proven in a medium-sized city.

Originally, the idea was to adapt the sensor technology that had already been successfully piloted in Newcastle upon Tyne. However, it quickly became apparent to the project team that it would be necessary to develop a new concept at CARTIF's technical facilities in Boecillo, Spain.

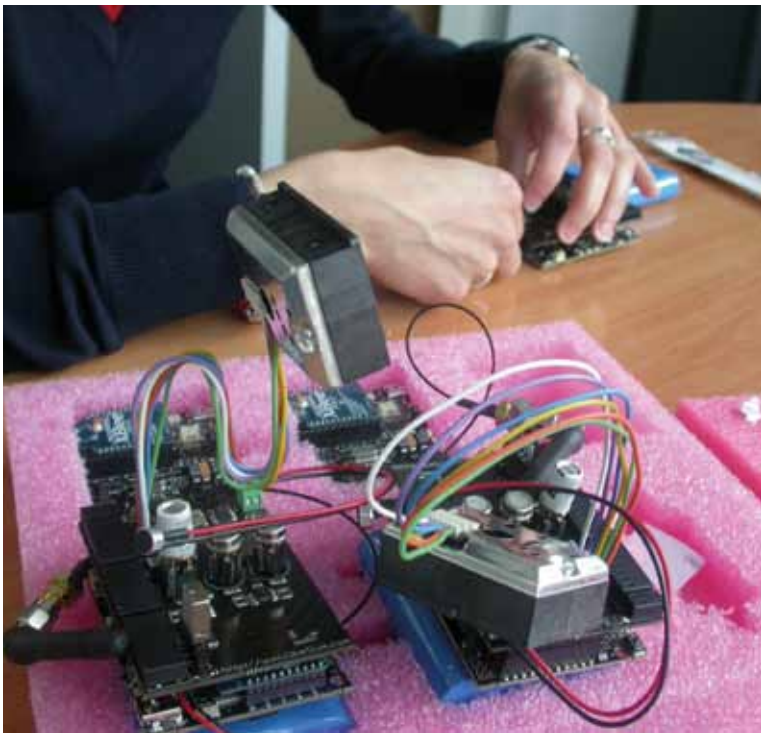
Autonomous air-quality sensors

Marta Gómez takes up the story – explaining that the project realised it wanted to use multi-sensors that would be able to measure several parameters and that could operate independently of fixed power sources such as traffic lights or street lighting. The solar powered 'motes' were developed in-house because, at that time (2010), no low-cost alternatives existed.

RESCATAME installed its motes at 35 points on two streets in Salamanca in October 2011. Each mote was equipped with seven sensors to measure carbon monoxide (CO), nitrogen oxides (NOx), ozone (O_3), particulate matter (PM), noise, humidity and temperature respectively. The motes were powered by a solar panel and an external regulator connected to a battery.

The two streets were selected from 24 problematic areas with major traffic flows, taking into account the impact they could have on the overall level of emissions. The two locations were: C. Álvaro Gil (250 metres long/10 posts) a narrow street in the old city and Avda. de los Cipreses (750 metres long/25 posts), a wide avenue on the outskirts of the city centre.

Each monitor measures carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), particulate matter (PM), noise, humidity and temperature



1 See The Clean Air Policy Package adopted on the 18th December 2013 http://ec.europa.eu/environment/air/clean_air_policy.htm

The network of air-quality sensors was used to assess the pollution levels and to monitor and control traffic. If any of the seven parameters went above a threshold, then the system analysed the information and, if necessary, sent an alarm to the traffic management centre via a central router located at the traffic lights at the intersection of the two streets.

Real-time data collection

Over the course of one year, the project collected data in real time at regular 10 minute intervals; more than two million pieces of data were gathered and processed. Based on the real-time data flow, the prediction models estimated the value that each contaminant could reach both in the next hour and in the next three hours, allowing the traffic department to foresee potential high pollution episodes and act accordingly.

This enables traffic departments to guarantee that pollution thresholds are not surpassed by such factors as changes in the timing of traffic lights, temporary blocking of a lane or traffic regulations imposed by local police officers. These models also support decision-makers by allowing the effects of various traffic regulation scenarios/alternatives to be calculated. The system implemented met very strict performance requirements concerning the parameters monitored, operational autonomy, data transmission speed, visual impact and protection from vandalism.

To ensure the latter, the project constructed posts for the sensors, rather than placing them on street lamps or traffic lights. As a result, says Dr Hidalgo, there was only slight damage to two of the posts and the only 'vandalism' involved incidences of fly-posting. As well as deterring vandals, the posts facilitated the installation of the solar panel and enabled the sensor readings to be made at the height of the average person (i.e. measuring the actual concentration of a contaminant that a pedestrian is breathing).

Ms Gómez, who is originally from Salamanca, says there was a good deal of interest from residents, especially older people, when the posts and motes were installed. At first, she recalls, "they thought we were installing more parking meters!" It was at this point that the municipality stepped in, running a very successful communications campaign targeting city residents. This, say the managers, together with the enthusiasm and support of the local government, greatly helped win support amongst local people for the project.

Patented technology

A notable innovation was the project's development of a multi-sensor technology not previously available on the market. Following on from this, CARTIF has applied for a patent for its motes.

According to the managers, the system is also very versatile and can be adapted to different spatial scales (national, regional, urban and road traffic), sectors, environments and types of pollutants. Moreover, they claim the technology is less expensive than traditional, fixed systems for measuring air pollution. Indeed, as a next step CARTIF is planning to develop a marketable prototype by modifying those aspects that were assessed as weak points. For example, it is not yet known how long the sensors will last on the streets – and this is one of the reasons they were left in-situ. Another, important, reason is to continue to measure the pollution levels on these streets.

Although still at the development stage, the scheme has already generated interest from other cities in Spain and elsewhere, including St. Petersburg, Berlin and Mexico. However, according to Ms Hidalgo, the main focus for the moment will be national – in particular, to continue developing the sensor network in partnership with the Salamanca authorities. Following the official closure of the project in 2012, close monitoring continued for another year. With the sensors still in place, the next step is to assess the possibility of extending coverage to other streets. Subject to budgetary constraints, the municipality is "interested in expanding the system" to cover the whole city, says Dr Hidalgo.

Welcome surprise

Finally, both managers admit to being pleasantly surprised at RECATAME being selected as one of the 'Best of the Best' LIFE Environment projects 2013. Ms Gomez admits that "we could not believe it when we heard a few days later we are one of the six 'Best of the Best' winners." Ms Hidalgo agrees, commenting that this is a first for CARTIF – important for the image of the centre and for dissemination: "We want to continue our research in the area of traffic pollution and to have worked as a coordinator of a successful European project means other partners are interested."

Project number: LIFE08 ENV/E/000107

Title: RESCATAME - Pervasive Air-quality Sensors Network for an Environmental Friendly Urban Traffic Management

Beneficiary: CARTIF Technology Centre

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Period: 01-Jan-2010 to 31-Dec-2012

Total budget: €2 508 000

LIFE contribution: €1 202 000

Spain: **Green Commerce benefits smaller retailers**

The Green Commerce project showed how to work effectively with small businesses in the retail sector to reduce environmental impact. It focused on personal interaction and guidance to examine the economic and environmental benefits of specific practices.

The project helped Hnos Jimenez Stationers to introduce several important energy and resource-saving measures

The retail sector produces a significant amount of waste along the supply chain, from shop-specific waste products to general waste, such as paper, boxes and plastic packaging. It also consumes large amounts of energy and water through aspects including transportation, cleaning, lighting, heating, bathrooms and air conditioning.

Improved environmental performance in relation to all these aspects can translate into important economic savings for retailers, as well as providing potential reputational advantages in the marketplace. The combined efforts of a large number of SMEs can add up to significant environmental savings.

Increasing numbers of large companies have staff devoted to environmental performance within the context of broader Corporate Social Responsibility commitments. However small and medium-sized enterprises (SMEs) often lack the capacity to follow suit. Many are not even aware of how easily they could introduce more sustainable practices bringing direct economic benefits.

Regional commitment

The Spanish LIFE+ project Green Commerce was a direct response to this challenge. Silvia Ordiñaga, Director General of Trade and Consumer Affairs in the Regional Government

of Valencia, remembers how the project started. "SMEs are very important in our local communities, where they dominate the retail sector. We had already been working with them to improve their Corporate Social Responsibility, but this has many facets. We wanted to do something specific on their environmental performance."

"We wanted to give them something to help them run their businesses, to achieve energy and water savings to benefit the environment and provide direct financial benefits to the companies," she continues. "SMEs often lack the expertise and the capacity to do this themselves. More times than not, they do not know where to start."

The methodology proposed by the Green Commerce project was to develop and use an online tool for retailers to assess their own environmental performance and identify the most appropriate interventions to improve it. Central to the philosophy of the approach was that retail SMEs work towards accreditation as a so-called Green Commerce.

Accreditation provides both a means and an end. Working through the accreditation process provides SMEs with a clear structure, with targets and suggested actions for improving performance. Having the label then demonstrates their environmental awareness and good practice to customers.

A new tool and eco-label

The project started by establishing a committee of technical experts, nominated by the different partners in the project. These experts then worked to identify the most important elements of environmental performance for SME retailers and establish what constitutes good and bad practice. These were combined and developed into a free online assessment tool.

When users register to use the tool, they are immediately provided with links to good environmental practice relevant to their sector of activity – 16 sectors are covered, including such diverse business-types as butchers, stationers, florists and gift shops. Registered users are then requested to start a diagnostic process, answering questions on their actions and practices.

The diagnostic tool encompasses 11 different sections, each covering a relevant issue of environmental importance: water; hazardous components; consumption of materials; impact and integration; odours; environmental responsibility; noise; packaging; energy; emissions; and waste. If any of the individual answers represents unacceptable environmental behaviour, this is immediately highlighted to the user.

According to the answers provided, the retailer is given a score for each section and a total score. Even if no individual answers are in themselves unacceptable, the commerce must still achieve minimum scores per section and overall. The tool highlights those areas where actions could be most effective at improving performance, directing users to the associated good practices.

Once the diagnostic tool suggests that performance is at the requisite level for all environmental aspects, the retailer can request formal accreditation. An independent technician visits the shop to ensure that the information provided was accurate and any necessary steps or interventions have been or are being implemented correctly.

The importance of outreach

One of the main lessons to be learnt from the project is that targeted outreach is essential to positively engage SMEs around improving environmental performance. "People are working hard to run their businesses and survive from day to day," explains Paco Bolo, a Green Commerce technical expert. "They can't automatically respond every time someone invites them to a meeting or asks them to fill out a questionnaire."

However, going in person to visit each shop delivers results: "When you meet face-to-face you can very quickly explain the possible benefits," says Mr Bolo. "Someone may think they are as efficient as they can be, but when you ask if

Rosa Munoz has introduced a 'curtain of air' in the doorway of her pharmacy to reduce air conditioning demand

Photo: ASTRALE EEIG/Ed Thorpe

they use energy-efficient light bulbs, or have a double-flush system on their toilets, it makes them realise how much more they could do."

The project learnt that it is not usually realistic to expect retailers to complete the assessment tool in full by themselves. There are two main barriers to this: firstly, retailers have to find the time and motivation to understand the process and complete it; and secondly, they have to be able to identify the right information that they need to complete it accurately.

"Some retailers have used the tool successfully by themselves," points out Mr Bolo. "However, in most cases they need support of a technical expert like me. We can help them understand what is being asked and to answer the questions quickly and accurately. They can see the value of completing the tool because we are able to immediately explain the connection between the information we are asking and possible savings."

Outreach has an additional benefit. "Sometimes an SME has come up with its own good idea for reducing costs and environmental impact that we hadn't thought of," highlights Mr Bolo. "Through our shop visits, we can identify these and add them to a database of good practices."

Transferring the model

During the project, 187 retailers engaged with the accreditation process and 69 achieved the Green Commerce label – 47 in Torrevieja and 22 in San Sebastián. The project cooperated with relevant agencies in the two areas to help conduct assessments of the savings made. An audit of just the 47 accredited shops in Torrevieja showed improvements had achieved annual savings of over 1.2 million litres of water and nearly 400 000 kw/h of electricity. However, beyond the immediate impact, Silvia Ordiñaga is keen to highlight that, "the best thing about the project was that it helped to create the methodology for working with SME retailers. Now its success has been demonstrated, it is easier to find the resources to train technicians and spread its application into new areas."

The Regional Government of the Valencian Community now has a specific budget line devoted to the Green Commerce methodology and has signed collaboration agreements with local municipalities. "This has enabled us to follow-up the project by implementing the programme in 31 municipalities in the Valencian Region," proudly highlights Mrs Ordiñaga.

One example is the Municipality of Calpe on the Valencian coast, where many SME retailers are active in a community that relies heavily on tourism. Calpe already has 20 businesses accredited with the Green Commerce label (out of 200 in total across the region). Hermanos Jimenez, a family stationer's is one of them. "We have improved our waste sorting and recycling system and now provide a service for the selling of second-hand books. We also introduced a new screensaver for our computers. We didn't realise how much energy that could save!" enthuses Jose Luis Jimenez.

The project hopes to develop ongoing consumer awareness of the Green Commerce label

A local pharmacy (Farmalent) has seen a double benefit from introducing energy-saving light bulbs. "Not only do we consume less energy on lighting, but the old bulbs used to produce so much heat," remembers Rosa Muñoz, the shop manager. "The more efficient bulbs mean the air conditioning system does not have to work so hard! We have seen a real decrease in our energy bill," she adds.

"It is obviously early days in terms of public recognition of the label. However, the accredited shops have already seen direct energy and water savings. And looking beyond that, we hope that the interaction between retailers and customers will provide an impetus to improved environmental awareness and performance throughout our local communities," concludes Silvia Ordiñaga.

Project number: LIFE08 ENV/E/000138

Title: Green Commerce - Compromiso para la minimización del impacto medioambiental del pequeño comercio

Beneficiary: Regional Government of Valencia – Ministry of Trade, Commerce and Innovation

Contact: Fidel Garcia Meseguer

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Website: www.lifeplusgreencommerce.eu

Period: 10-Jan-2010 to 30-Sept-2012

Total budget: €933 000

LIFE contribution: €466 000

Spain: **Creating a virtuous circle from electrical waste**

The ECO-VITRUM-TRC project implemented a comprehensive new management model for obsolete cathode ray tube (CRT) televisions and monitors, in the process turning CRT waste glass into a raw material for use in the ceramic tile industry.

Towards the end of last decade, the digital switchover and the emergence of LED, LCD and plasma screen technology made analogue CRT televisions and monitors rapidly obsolescent across Europe. For example, in Spain, some one million units were withdrawn in 2010 alone, creating a waste disposal challenge that also proved to be an opportunity.

Drawing on the results of laboratory tests carried out by project partner AIDICO, the Diputación Provincial de Valencia (DPV) identified an opportunity to reuse thousands of tonnes of waste CRT glass as a raw material in the ceramic tile industry. Spain is Europe's largest producer of ceramic tiles and some 90% of the industry is clustered in the province of Castellon, part of the Valencian Autonomous Community. The DPV supports the work of Valencia's 266 municipality authorities in a number of areas, including urban waste management. Discarded TVs and monitors are a big problem, especially for the small municipalities. To address this problem, the DPV proposed a LIFE project to implement a new management model for CRT glass that would encompass public awareness campaigns, improved storage systems, a pilot plant for converting the glass into a form that could be used in the ceramic industry (and potentially in other sectors), and, finally, proof of concept at industrial scale by a major supplier to ceramic tile manufacturers.

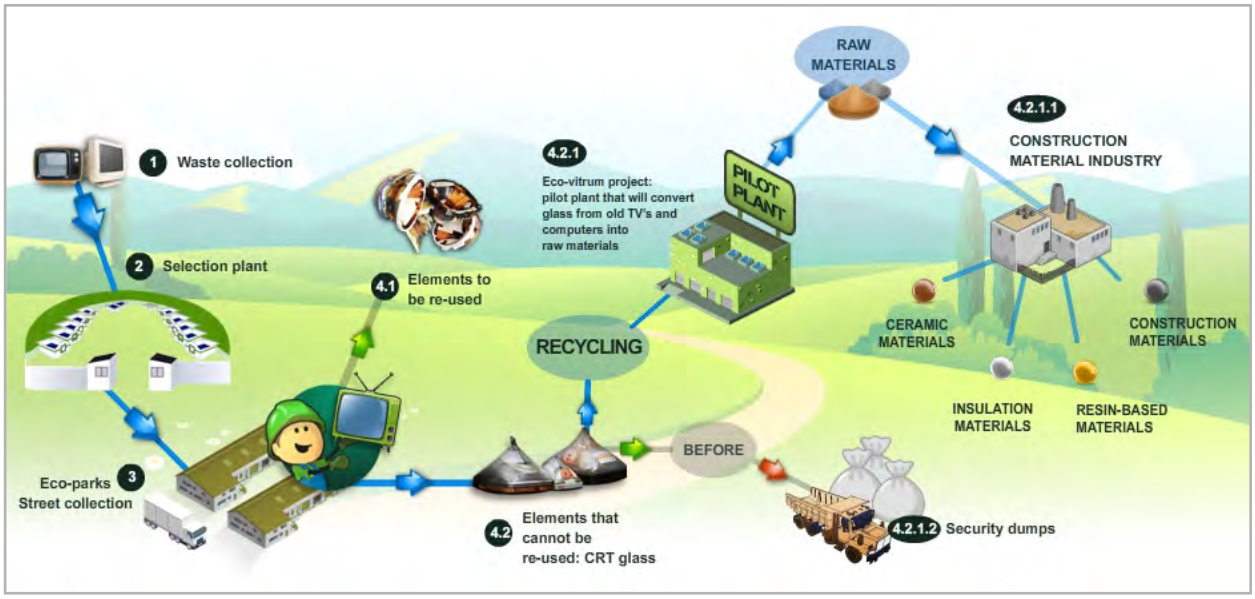
Recycled CRT glass is sorted by type and then milled for reuse in ceramic tile manufacturing

Improved handling and security

The first link in this proposed new circular economy for CRT units is the municipal collection points. The project addressed several key issues relating to the storage of televisions and monitors at these sites, including: vandalism and theft of materials; a lack of quality standards for storage; and a lack of awareness amongst the public and employees of the collection points of the importance of maintaining the CRT units in optimum condition for subsequent recycling. As the LIFE project manager, Javier Ferrer explains, the TVs and monitors used to be stored in open containers which, as well as being exposed to the elements, proved to be an open invitation to copper thieves. "In order to steal the copper they break all the glass. If they break the glass, they mix the glass, if the glass is mixed it cannot be used."

With the assistance of Hungarian project partner, Electro-Coord, the beneficiary designed and implemented a pilot container for old TVs and monitors that, when installed at municipal collection points around Valencia, minimised theft and breakage of the CRT units, thus increasing the amount of glass that could be recycled. This technical fix was supported by campaigns carried out in schools, adult education centres and municipalities across Valencia to make people aware of the negative effects of uncontrolled dumping of old televisions and monitors and to encourage greater use of the municipal collection points.

Another benefit of the pilot container, which is also being used by large retailers of electrical and electronic goods, was that it prevented damage to the electrical goods during transportation



Finding a new use for old technology: the ECO-VITRUM-TRC process

to Recytech, the waste recycling facility on the outskirts of the city of Valencia that houses the pilot CRT treatment line installed by the LIFE project. The pilot plant, capable of processing 6 000 tonnes/yr of waste glass, has been designed to facilitate the decontamination of mixed CRT glass and supply a material with suitable technical properties for use in the ceramic tile industry.

The first stage involves dismantling the TV or monitor and sorting its constituent parts (plastics, copper, electronics, etc). "We can process around 300 televisions per day," explains Recytech manager, Ricardo Martín.

The operative cuts the cathode ray tube glass into two and removes phosphorous using a vacuum. The rear glass contains lead (which was used to shield viewers from harmful x-rays when watching TV). Thus, it contains different properties to the front glass and the two types of glass must be kept separate in order to be usable further down the line.

The separated glass is cut up into smaller pieces and sent through the pilot line, where it is cleaned and foreign objects (plastics, metal, phosphorous) are removed. The processed glass is sent to a specialist company which mills the material into a fine powder for delivery to another project partner, Esmalglass.

Reusing the glass

Based in Villareal, Esmalglass is a supplier of glazes to the ceramic tile industry. Founded in 1978, the company, which is part of the Esmalglass-Itaca Group, employs around 300 people and manufactures some 4 000 tonnes/day of frits, the soluble solid materials that ceramic tile manufacturers add to the clay body to provide texture, gloss and resistance and help give tiles their distinctive look.

Javier Ferrer explains that, at the start of the LIFE project, he approached Esmalglass's general manager, Manuel Sanz with the results of AIDICO's research showing that CRT glass may be a suitable replacement for natural silicon in the manufacture of frits and engobe (the white fixative layer that sits between the clay and the glaze). Mr Sanz agreed to test the recycled material and, after establishing that it was possible to successfully use the glass prepared by Recytech, Esmalglass introduced it into its manufacturing lines at full industrial scale.

In order to use the CRT glass, Esmalglass needed to develop systems for controlling and avoiding the presence of particles of copper and iron. "It's very important to get good quality waste - well recycled and with no foreign objects: copper for us is horrible," notes Mr Sanz. "One small particle of copper from the bottom of a TV can spoil one tonne of raw material," says Mr Ferrer.

Esmalglass now uses approximately 5% CRT glass to make engobe and a smaller percentage for manufacturing frits. "For us the TV [glass] is a composition of oxides," explains Mr Sanz. "We changed from original raw materials to this glaze from the TVs and we adapted the formula – in the lab, we moved the different oxides to end up with the same formula we had before."

He notes that, contrary to initial expectations, the lead-containing rear glass is more sought after because it is easier to adjust to the standard formula needed to make frits. Furthermore, "we need large amounts of CRT glass because you cannot go changing the formula every day," explains Mr Sanz.

"We are really happy to have partners like Esmalglass because the huge quantity of raw materials that they need is for us a big solution to a big problem," says Mr Ferrer. By the end of the LIFE project, Esmalglass had reused some 3 000 tonnes of CRT glass for the production of ceramic components. With one television set containing some 30 kg of CRT glass, this meant that 100 000 obsolete units had been totally recycled.

Esmalglass continues to use recycled material from TVs and monitors, demonstrating the sustainability – for as long as CRT glass continues to be available – of the project. "Although the project is finished it is still working - without European funds. That is a strength," says Mr Ferrer. As of August 2014, 213,333 units had been recycled and 6 400 tonnes of CRT glass reused.

Project partner Recytech has dismantled more than 200 000 obsolete cathode ray tube (CRT) televisions and monitors

Photo: ASTRALE EEIG/Justin Toland

More uses for CRT glass

AIDICO's research in the course of the project highlighted potential uses for the CRT glass in other sectors, including insulation and as a coating for epoxy resin-based materials used on kitchen surfaces. It can also be used as filler, adding bulk to lower grades of cement.

Mr Sanz believes the ECO-VITRUM-TRC project was "very interesting and very important." Esmalglass became a partner because of concerns both about costs and the environment: "In the end we reduced costs for the formula of the raw materials and achieved some advantages for the environment," he says proudly.

LIFE's legacy

As a sign of the project's success, other frits manufacturers have begun demanding CRT glass. The scale of Esmalglass's operation also means that it has had to source the glass from beyond Valencia – Recytech is now processing televisions and monitors from across Spain and beyond. Ricardo Martín says the supply of CRT units is starting to drop off but Recytech expects to continue receiving them for another one to two years.

"In the beginning we were thinking of a solution to a local problem; in the end we were receiving more waste from other parts of Spain. We were able to solve our problem and give a solution for other people. And we recycled more than we were expecting to recycle when we designed the project," summarises Mr Ferrer.

Thus, in demonstrating the technical viability of an optimal take-back system for the management of CRT glass in the ceramic industry, the project not only offers lessons for ceramic tile manufacturers in other EU Member States, such as the cluster in the Emilia-Romagna region of Italy, it also provides a useful example of a cradle-to-cradle approach to resources that is examplary of the new circular economy.

Project number: LIFE08 ENV/E/000148

Title: ECO-VITRUM-TRC - Integral management model of cathode rays glass: closing the circle of recovery, recycling and reuse of WEEE'S

Beneficiary: Diputación Provincial de Valencia

Contact: Javier Ferrer Roig

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Period: 01-Jan-2010 to 30-Dec-2012

Total budget: €1 830 000

LIFE contribution: €879 000

Italy: **a European solution for greener fridges**

The ENERG-ICE project developed innovative technologies to improve the insulation performance of fridges and freezers whilst simultaneously improving productivity.

The new energy-efficient insulation process for fridges and freezers achieves a carbon footprint reduction of at least 10% from cradle-to-grave

Households account for 30% of total energy consumption in the EU, with as much as 25% of household consumption attributed to the energy demands of fridges and freezers. To promote reduced energy consumption by these cold appliances and their associated economic and environmental costs, a 1992 European directive led to the creation in 1995 of an energy efficiency label.

The labelling scheme has increased awareness of energy efficiency issues and also provided an excellent framework for stricter legislation. From mid-2010, it was no longer legal in the EU to sell new cold appliances with an efficiency rating lower than A, in July 2012 the minimum rating became A+ and as of July 2014, European legislation requires all new cold appliances on the market to be rated at least A++.

It was in this context that the LIFE+ ENERG-ICE project was developed. “We know the legislation is going to get tougher, we just do not know when or by how much. The important thing is to anticipate this trend and stay ahead of the legislation,” explains project coordinator Vanni Parenti of Dow Italia, a subsidiary of The Dow Chemical Company (“Dow”).

Specifically, the project emerged as a partnership between Dow Italia and Afros, a supplier of polyurethane (PU) equipment and part of the Cannon Group. Each brought its expertise to bear to deliver a joint solution that improved the existing method of producing and insulating cold appliances with enhanced closed-cell PU foam.

Innovative insulation

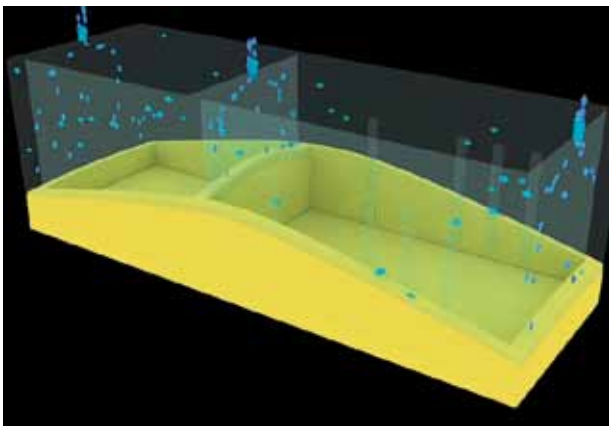
PU foam has long been used to insulate fridges. However, developments in the formulation can produce end products with very different characteristics. "At Dow Chemical, we had already developed an innovative PU foam giving improved performance within insulation panels for the construction sector," highlights Mr Parenti. "The challenge was to deliver similar improvements in the very different context of a cold appliance."

The principle of Dow's trademarked chemical innovation was to increase the reactivity of the foam, creating finer cells and thus delivering improved insulation. However, this faster reactivity was a problem in the specific application of insulating fridges with current manufacturing technology. In practice, it was not possible to simply transfer the existing solution to the new application.

Mr Parenti explains the problem: "Thin cavity walls found in refrigerators create friction for the foam flow, which becomes more critical with faster reactivity. This is not so important with thicker walls as in the bigger space of an insulation panel, but in a fridge, where the cavity geometry is complex and the walls are joined together and uneven in shape, it creates an obstacle to the complete filling and even distribution of foam within the space to be insulated." The presence of wiring and cables in the cavity only adds to the complexity.

Applying a vacuum to the fridge cavity during the injection process is thus of fundamental importance in assisting the expansion of the highly reactive foam. This made the partnership between the two companies essential to the success of the project. "Dow could increase the reactivity of the foam,

The newly developed mix-head enables the foam to be mixed accurately and allows adjustments to be made to the injection speed of the material



Applying a vacuum to the fridge cavity during the injection process assists in the expansion of the highly reactive foam

but for the practical application to work, they needed us to improve the injection technology process," explains Maurizio Corti, Technical Manager at Afros. The two technologies had to be developed hand-in-hand to deliver the final result of a better insulated fridge.

A new injection method

Afros experimented with improvements to the injection process in combination with evolving foam chemistry supplied by Dow. The outcome was a vacuum-assisted injection (VAI) technology for which the partners developed specific technological innovations: variable injection speed; a new mix head; and an innovative jig to implement the whole injection process under vacuum.

The Cannon Group submitted four patent applications related to these innovations. The starting point was to modify the injection rate as required. "We previously launched foam into the refrigerator's cavity at the same rate, but we now start with a quicker injection speed to reach the back or top of the fridge first and then reduce the speed as it starts to fill," says Mr Corti. This speed reduction happens almost instantaneously but helps significantly to overcome the restrictions on the flow of the foam within the fridge wall, as well as improving the foam distribution by making it more homogenous.

The modification also created a new challenge. "Using a standard mix-head it proved impossible to guarantee the perfect chemical mix of the new foam whilst modifying the injection speed. We had to design an innovative mix head that was able to keep the foam flow smooth and laminar at the exact mix ratio of the two liquid components, whilst adjusting the injection speed," Mr Corti adds.

Afros also developed equipment able to conduct the foam injection under vacuum. Reducing air pressure makes it much easier for a foam to expand. A vacuum thus provides optimal conditions for the foam's expansion into the whole of the

fridge wall. The result is a quicker, more efficient process with improved consistency in the foam distribution.

Mr Corti is keen to clarify that, "there were attempts to create a vacuum in the fridge wall. However, the project showed that it was more efficient to put the whole fridge under vacuum, not just the cavity."

Efficiency and productivity gains

Mr Parenti is proud to highlight that the resulting foam – with finer cells and optimum distribution - achieved the principle project objective of significantly improving the insulation performance of domestic cold appliances. Specifically, it "offers up to 10% in energy savings compared to the best-in-class appliances available today which are labelled A++."

However, this was not the only benefit of the technological advances: "We were pleasantly surprised to find that the combination of the new foam and new injection technology improved the efficiency of the process so much that we could reduce the amount of material used to insulate each fridge by 3-5%," reveals Mr Parenti.

The new jig - RotoJig - designed by Afros also provided significant productivity benefits. It was able to house two fridges simultaneously, rotating them between an upper and lower position always within their own vacuum. Once a fridge is filled at the bottom, the jig is rotated. Unloading, reloading and filling takes place underneath, by which time the jig can be rotated again with no delay.

"Previously, we could insulate one fridge every five minutes," highlights Mr Corti. "Under the new process, we can process two fridges in the same time." According to the results of a lifecycle assessment of the ENERG-ICE process, the combination of the productivity and energy efficiency improvements achieved provides an estimated carbon footprint reduction of at least 10% from cradle-to-grave.

Commercialising the process

Despite the obvious economic and environmental benefits of the ENERG-ICE process, the cost of retrofitting existing production lines remains a barrier to widespread industrial use. However, Mr Parenti is keen to stress that this barrier does not apply to new foaming line developments.

In September 2011, the Cannon Group was able to announce the first industrial mass production of domestic cold appliances using the project's technologies. The technology was sold to the Chinese company HAIER, a world leader in the production of domestic cold appliances. Two more Chinese plants had been built using the ENERG-ICE technology by 2013.

The new insulation process is also time-efficient as it enables two fridges to be processed at once

Mr Corti is proud that the project, "demonstrated and delivered a solution that can be applied in the industry, offering important energy savings and manufacturing advantages." He also recognises the importance of the financial support from the LIFE programme, "in helping European companies to lead on green innovations and to be able to compete with the biggest companies in Asia."

The success of the ENERG-ICE project is pushing both partners on to further research and development initiatives. The two companies are not tied together so each is free to pursue its own projects, potentially with new partners. One area of focus is a new production system for fridge doors, which are produced in a separate environment and then mounted on the main refrigerator body.

Dow is now the beneficiary of a new project – LIFE+ K-12 (**LIFE13 ENV/IT/001238**) - this time with the major appliance producer Whirlpool and Afros as partners. The aim of the new project is to further develop Dow's PU foam innovations to achieve even more efficient cold appliances that are able to meet the A+++ or even A++++ standard. It thus aims to anticipate and potentially facilitate yet further advances in European energy efficiency legislation.

Project number: LIFE08 ENV/IT/000411

Title: ENERG-ICE - New PU Foaming Technology for the Cold Appliance Industry Assuring a Cost-Efficient Ecodesign with Augmented Energy Saving

Beneficiary: Dow Italia srl

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Email: vparenti@dow.com

Website: www.dow.com/energice

Period: 10-Jan-2010 to 31-Mar-2013

Total budget: €2 870 000

LIFE contribution: €1 372 000

Photo: LIFE08 ENV/HU/000292/ASTRALE EEIG/Stephen Nothingham

Photo: LIFE07 ENV/UK/000943/Toby Roxburgh/2020Vision/WWF Canon

Photo: LIFE08 ENV/GR/000569

Photo: LIFE08 ENV/SK/000240

BEST LIFE ENVIRONMENT PROJECTS

BEST PROJECTS

Germany: **Producing energy and protecting grasslands**

The LIFE PROGRASS project has linked the demand for renewable energy with the need to manage the grasslands of Natura 2000 network sites, creating permanent jobs in south-west Germany and demonstrating a concept with Europe-wide potential.

The Natura 2000 sites chosen as locations for the mobile demonstration units provided representative samples of grassland types

LIFE support for the PROGRASS project gave the University of Kassel the opportunity to scale up a system for producing bioenergy from the grass cuttings that are a by-product of the management by mowing of mature and abandoned grasslands in protected Natura 2000 network sites.

These grass substrates contain a high proportion of lignocellulose and minerals, which makes them difficult to use in conventional bioenergy plants. LIFE co-funding allowed the University to assess the production chain for its new technology - known as 'Integrated Generation of Solid Fuel and Biogas from Biomass' (IFBB) - from harvesting through to energy generation. IFBB involves dividing grassland silage into two separate fractions: a solid part for combustion and a liquid one for biogas production. Lab-scale tests indicated that the combustion performance of the fuel was greatly enhanced by the extraction of minerals and easily-digestible compounds into the liquid fraction.

Tests in three countries

The LIFE project enabled the PROGRASS team to develop mobile demonstration units that were used to test representative samples of target grassland types at 18 experimental sites located in partner regions in three countries - Germany (Vogelsbergkreis), Estonia (Tartu) and the UK (Ceredigion, Wales). The demonstration plant, which was designed to fit into two standard shipping containers, was able to process up to 400 kg/day of grass silage, producing 90 kg/day of dry fuel (press cake, for use as a combustion fuel) and a biogas yield of 7kW. The spread of test sites enabled the project to analyse the combustion properties of most of the vegetation types found in Natura 2000

grassland habitats, thus allowing it to develop the IFBB technology in a way that would be applicable in most parts of Europe and to identify standardised methods for energy recovery from the many different substrates.

The project's integrated approach encompassed socio-economic and ecological aspects and the training of farmers and other stakeholders. By creating an end-use for mown grass, the IFBB technology gives farmers a financial incentive to manage their land in a way that optimises biodiversity. The PROGRASS team carried out assessments of the impact of different cutting regimes on the productivity and quality of grassland biomass and on biodiversity, as well as making cost calculations of different cultivation and extensive land use systems. These were used to identify the most suitable management options for semi-natural grasslands.

Expert opinions

The project also canvassed the opinions of experts in the three regions involved in the trials in order to identify parameters that may affect the implementation of a distributed approach to bioenergy production. Key parameters were found to include: ease of harvest and yields of particular Natura 2000 network grassland sites, costs of transporting the material to bioenergy plants, demand for grass pellets as solid fuel, potential subsidies, and the willingness of farmers and other stakeholders to invest in the system.

The project conducted seven micro-studies in partner regions, which showed that it is possible to profitably run IFBB plants either as standalone operations or in combination with a conventional biogas plant. Results indicated that some 45% of the energy stored in the grassland biomass can be transformed into available heat. Combining the IFBB-system with a biogas plant that produces excess heat can raise the value of heat provision to some 53% of the gross energy yield. The project's analysis found that combining IFBB technology with an existing biogas or wastewater treatment plant offered the greatest potential savings in terms of fossil fuel and greenhouse gas emissions. Investment calculations also showed that combining IFBB with a biogas plant resulted in improved economic efficiency of semi-natural grassland use.

The project concluded that decentralised energy generation based on IFBB technology and using grass from semi-natural grasslands could provide an alternative income stream for rural populations in disadvantaged and marginal areas of Europe, especially Eastern Europe. In addition, the preservation of semi-natural landscapes may have a further socio-economic impact in rural areas less suitable to agriculture by encouraging tourism.

The demonstration plant can produce up to 90 kg/day of dry fuel

Green jobs and skills

The lessons from this innovative LIFE project continue to resonate, in part thanks to the beneficiary's efforts to establish a permanent European PROGRASS Network. As a result of the success of the PROGRASS project, the faculty of Organic Agricultural Sciences at the University of Kassel has created three positions for researchers/trainers to conduct feasibility studies and continue to tour Europe with the mobile demonstration unit (until 2016). "It's not only about the technology, it's about capacity building and creating a Europe-wide network," explains Dr Tim Scholze, who is in charge of project management at BUPNET, one of the partners of this LIFE project.

The IFBB technology trialled in the mobile demonstration unit was also the template for a full-scale facility built in the German spa town of Baden-Baden, which employs five people on a permanent basis. "They are pioneering in the large-scale investment what we did on a mobile level," says Dr Scholze.

Project number: LIFE07 ENV/D/000222

Title: PROGRASS - Securing the Conservation of Natura Grassland Habitats with a Distributed Bioenergy Production

Beneficiary: University of Kassel

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Website: http://www.prograss.eu

Period: 01-Jan-2009 to 30-Jun-2012

Total budget: €3 231 000

LIFE contribution: €1 614 000

Spain: **Demonstrating energy-efficient, sustainable housing**

The EDEA project developed an energy-efficient methodology for the design and construction of social housing in the region of Extremadura.

In order to cut upfront costs, newly-built houses in Spain are often not as energy efficient as they could be. Their construction also has a significant impact on natural resources and health. A LIFE project, EDEA, was thus set up to demonstrate the feasibility of efficient bio-climatic housing with a view to meeting the demands of new legislation and certification in the country.

The environmental challenge for the sector is a significant one: in the EU, building construction consumes 40% of all materials used, generates 40% of waste products and is responsible for 40% of energy consumption.

The LIFE project EDEA constructed twin demonstration houses in Cáceres, Extremadura. These were built on the same plot of land, with the same geographical orientation (north-south), the same structural system and were subject to the same weather conditions.

The features, surfaces and materials used in the construction of the houses were similar to those currently used in social housing in the region of Extremadura. One house, the 'pattern house', served as a reference, and remained unchanged during the project's duration, whilst at the 'experimental house', a range of improvement measures (or 'strategies') were tested and demonstrated. It is believed to be the first time that such a full-scale demonstration had been carried out in a country with a warm climate.

A range of installations were implemented in the two houses, including a biomass heating system, a geothermal system for heating and cooling, a heat pump, a condensing boiler, a ground-to-air geothermal exchanger, and a solar thermal, solar photovoltaic and wind energy system for generating electricity. In addition, external weather conditions were measured on site (i.e. temperature, relative humidity, solar radiation and wind speed and direction). Some

The project studied a total of 15 different passive and 70 different active CO_2 reduction strategies

Photo: ASTRALE EEIG/Filipa Ferrão

300 sensors were placed on each house for monitoring and control (remote management), and a total of 15 different passive and 70 active strategies were studied.

The passive strategies were targeted at improving the construction and design of the building, whilst the active strategies aimed to improve the efficiency and lower the CO_2 emissions of energy installations. More than 5 000 energy simulations were performed using a range of different software and nine strategies were tested in the houses to assess their performance.

By measuring the real improvement generated by each strategy, it was possible to determine which passive strategies generate the best results for the reduction of energy consumption and which active strategies are the most sustainable. The results make it possible to compare several options and evaluate whether investment would be cost effective, affordable and sustainable for people on a low income. Finally, the environmental sustainability of all the 400 construction materials used in the houses was also assessed.

The tests carried out by the project concluded that windows should not be opened in winter to ventilate the house for longer than 15 minutes. It also showed that underfloor heating slabs offer a higher performance than radiators and that biomass-run boilers offer considerable economic advantages.

Far-reaching impact

More than 50 companies in the building and energy sectors were involved in the project. The monitoring system is online and accessible to interested parties on the project's website. "The methodology designed in EDEA has been transferred to the housing policy of the government of Extremadura, and the results are being transposed to the designs of existing social housing in this region," says Jose Guillermo Cobos, head of architecture and building quality at the Extremadura government. Several aspects of the project were included in the regional government's plans to improve the comfort and image of social housing.

Furthermore, the project is being used to assess subsidies for energy-efficient housing. Contacts were also established with the national housing ministry in order to spread the project results to other Spanish regions and to improve national regulations. The publication of a 'Methodological Guide on Sustainability' is expected to help to transfer the methodology to other regions with similar conditions.

The project is expected to have a beneficial economic impact on house construction and maintenance costs. The project methodology was shown to be cost effective and affordable for low-income households. It also has significant social benefits, such as improving the comfort and health impact of social housing in Spain, while raising the awareness of citizens and providing training for stakeholders in the construction, engineering, acoustics and energy sectors.

Finally, several European projects focused on energy-efficient buildings have built on the results of the project. These include E4R-Evaluation of energy efficiency in buildings, Retrofitting SUDOE space (SUDOE Programme) and EnEf-Promotion of training in energy efficiency in the building sector (Lifelong Learning Programme, Leonardo da Vinci).

Knowledge transfer is also being continued under a follow-up LIFE project, 'EDEA RENOV' (**LIFE09 ENV/ES/000466**). Moreover, the EDEA centre exhibits materials, products and equipment for efficient buildings, helping advance the technology's progress to the marketplace.

The government of Extremadura is using the EDEA methodology to design social housing in the region

Photo: ASTRALE EEIG/Filipa Ferrão

Project number: LIFE07 ENV/E/000805

Title: EDEA - Efficient Development of Eco-Architecture: Methods and Technologies for Public Social Housing Building in Extremadura

Beneficiary: Junta de Extremadura. Consejería de Fomento

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Period: 01-Jan-2009 to 30-Apr-2013

Total budget: €2 654 000

LIFE contribution: €1 178 000

Greece: **Developing tools for sustainable soil management**

The LIFE Soil Sustainability project took an integrated approach to the implementation of the Soil Thematic Strategy. This involved extensive soil monitoring and mapping, the development of decision-support tools, and a soil protection action plan.

Soil performs vital ecosystem services. It supports agriculture and forestry, acts as a sink for atmospheric carbon dioxide, filters contaminants to keep water clean, is a source of raw materials, and hosts a wide biodiversity. However, soil is being seriously degraded across Europe, due to erosion, declining organic matter content, compaction, biodiversity loss, contamination, acidification, salinisation, soil sealing, and hydro-geological risks such as floods and landslides. These threats to soil function are addressed in the EU's Soil Thematic Strategy. Demonstration projects are currently needed to show how the strategy can be implemented to tackle multiple threats through integrated soil management.

The Soil Sustainability (So.S.) project demonstrated the implementation of the Soil Thematic Strategy for the first time in Greece. Coordinating beneficiary Anatoliki S.A., the Development Agency of Eastern Thessaloniki, and five project partners developed and tested innovative tools to assess and address multiple threats to soils in pilot studies. These studies were carried out over 320 km^2 of the Anthemountas river basin in the Central Macedonian region of Greece, and took into account the area's geomorphologic, hydrological, economic and social characteristics.

Identifying areas at risk

Large-scale soil surveys were initially required, especially where baseline data was lacking. All the information obtained from extensive field sampling and laboratory analysis was fed into a GIS-based database system. From this, the project team produced a comprehensive soil map of the entire project area – the first map of its kind in Greece and one that will be a valuable land-use resource for years to come. The data were then used to produce a total of 36 thematic maps concerning soil-specific characteristics, including ones for all the main soil threats.

"The project was designed for the development of technical tools that can help land managers protect, treat and monitor risks to soils," explains Dora Paschali of Anatoliki. These user-friendly decision-support tools can also help scientists and policy-makers estimate levels of soil threats. The project proposed actions to prevent or mitigate each of the identified soil threats, in accordance with the objectives of the Soil Thematic Strategy.

Anatoliki developed a methodology, based on a mathematical model called RUSLE, to estimate risk of water erosion and built a decision-support tool to help local authorities counter erosion in mountainous and semi-mountainous areas. Soil

The SoS project developed 36 soil thematic maps to help prevent or mitigate soil threats, such as erosion

data in a pilot-study area were classified in terms of low, medium and high priority action zones. Mitigation measures were proposed for immediate implementation in high priority areas, including the stabilisation of selected riverbanks.

The Land Reclamation Institute of the Hellenic Agricultural Organisation (DEMETER), a project partner, assessed land degradation caused by erosion, salinisation and loss of organic content in a pilot study in a lowland agricultural area within Anthemountas and Vasilika municipalities. Soils were characterised in terms of their physio-chemical and hydraulic properties, with areas at risk from erosion and low organic content being identified using the CORINE and SOIL CARBON MANAGER models, respectively. A specific decision-support tool was developed for soil salinisation. Farmers have already benefitted from the project's thematic maps, showing where areas of high salinity and low organic content occur, and from guides that outline mitigation practices such as irrigation and fertilisation.

The project identified potentially contaminated soil in the municipality of Thermi, using the decision-management tool for soil contamination it had developed. A pilot study was implemented on a brownfield site, where project partner INTERGEO used the tool to identify and rank sites that were potentially contaminated and then chose three sites to implement pilot remediation activities. The methodology informed a strategic action plan, in this case for remediation work near a landfill site and in an area where soil had been contaminated with petrochemicals.

Another partner company, HYETOS, monitored and assessed soil sealing in a small urban area in Thermi. A decision-management tool for soil sealing was developed, based on detailed maps, satellite images and special software written within the framework of the project. This innovative methodology calculated sealing rates and water run-off coefficients, in order to evaluate interventions to prevent sealing, and utilised different systems for collecting and recycling rain water. The project selected simple low-cost solutions to reduce run-off and flooding, increase green areas (i.e. trees and grass) and reduce urban temperatures.

Soil protection action plan

The implementation of decision-support tools helped to identify several problems that informed the drafting of a soil protection action plan. This outlined an integrated approach for the sustainable management of the Anthemountas river basin's soil resources. "The action plan provides both measures and actions to address the problems identified by the investigations conducted in the pilot areas," says Ms Paschali, "with proposals to extend the pilot applications to the remaining areas of the basin." The inclusive discussions that led to the action plan involved farmers, local authorities and other stakeholders, as well as project partner, the Regional Development Fund of Central Macedonia. The relevant municipal councils and the management boards of local farmers' cooperatives approved the plan and committed in writing to implement it.

Soil samples were taken where baseline data was lacking. The data were then used to produce a total of 36 thematic maps

The project undertook extensive dissemination, awareness-raising and training activities, which have helped build organisational capacity and establish an extended skills base in integrated soil management. "The methodologies and tools we developed and implemented can be applied easily and reliably in any area of interest," notes Ms Paschali.

The Soil Sustainability project produced concrete policy proposals for sustainable soil management in the Anthemountas river basin, the wider Central Macedonia region, and Greece in general. It showed that, by adopting the provisions of the Soil Thematic Strategy at the river basin level, both environmental and economic benefits can be achieved.

Project number: LIFE07 ENV/GR/000278

Title: Soil Sustainability (So.S) - Soil Sustainable Management in a Mediterranean River basin based on the European Soil Thematic Strategy

Beneficiary: Development Agency of Eastern Thessaloniki 'Anatoliki S.A.'

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Website: http://www.lifesos.eu

Period: 01-Jan-2009 to 30-Jun-2012

Total budget: €1 573 000

LIFE contribution: €772 000

UK: **Towards an ecosystem approach to marine management**

The PISCES LIFE project brought together a range of stakeholders to develop an ecosystem approach to the marine management of the Celtic Sea. A key outcome was the production of guidelines for the political implementation of this approach.

Extending to the edge of the Atlantic continental shelf, the Celtic Sea is a rich ecosystem that requires effective management. It encompasses deep-water features such as seamounts and canyons, as well as varied coastal habitats, such as tidal estuaries and rocky reefs. These features and habitats support a wealth of biodiversity, including cold-water corals, sharks, cetaceans, and commercially important fin and shellfish species.

But the health of the marine ecosystem in the Celtic Sea region is threatened. It suffers from a range of external pressures, including climate change, fisheries, chemical pollution, shipping, construction and dredging, coastal development and tourism. To combat these pressures and reverse some of the damage that has occurred to the marine environment, an ecosystem approach had been widely proposed.

The PISCES project was set up to facilitate this approach through greater stakeholder involvement. “The project brought together key stakeholders across the sectors and countries of the area to consider new approaches and new ways of working together,” says Dr Lyndsey Dodds, project manager.

The first phase of the project identified relevant stakeholders and increased their knowledge of marine policy and the ecosystem approach. “The PISCES project developed a strong sense of identity, with trust and understanding between stakeholders and new networks created,” Dr Dodds explains.

A key group of 30 stakeholders was primarily engaged. These were drawn from seven different industrial sectors (including fishing and shipping) in England, Wales, Ireland, France and Spain. Stakeholders were engaged throughout the project with the aim of arriving at agreed mechanisms for implementing the ecosystem approach in accordance with EU marine policies, such as the Marine Strategy Framework Directive (MSFD - Directive 2008/56/EC).

Photo: Toby Roxburgh/2020Vision/WWF Canon

Lobster fishing off Cornwall, UK

Political guidelines

The main achievement of the project was thus the production of guidelines for implementing the ecosystem approach. The PISCES guide “represents the voice of the stakeholders; making key recommendations for governments and stakeholders on considering the ecosystem approach in policy implementation” says Dr Dodds.

These guidelines were produced primarily through a series of five workshops with stakeholders. A detailed review process

featured the contributions of 102 stakeholders to at least one step of the guidelines' development. The stakeholders then endorsed the guidelines to show their commitment to sustainable cross-sectoral management through the ecosystem approach.

The PISCES guidelines are relevant for all marine sectors and activities in Europe and include recommendations for users of the seas and for governments on the role they can play in implementing the ecosystem approach. "In the long term, the recommendations should continue to help guide managers, decision-makers and stakeholders in delivering marine policy aimed at achieving healthy sustainable seas, both in the Celtic Sea and in other marine areas throughout Europe," Dr Dodds explains.

Effective advocacy

The project's communications strategy was designed to ensure that different target audiences were effectively reached, with the project website playing a central role. Activities helped improve communication with decision-makers, and government advocacy plans were developed for each country.

Furthermore, the project reached more than 11 000 people across Europe, over 2 000 of these at 27 conferences in the last six months of the project. The guidelines have been widely cited and referred to in stakeholder networks, conferences, government meetings, reports and communications. PISCES has also provided policy-makers with a better understanding of the potential benefits of greater stakeholder participation in implementation of marine policy, and a clearer picture of the expectations of stakeholders. The UK government has pledged to develop an MSFD-specific stakeholder engagement strategy, which was a key recommendation of the project. Government stakeholders also confirmed that they will draw on the PISCES guidelines when implementing the MSFD (e.g. in developing the programme of measures) and during marine planning (e.g. through the UK Marine Management Organisation).

PISCES has also helped to further international cooperation in the Celtic Sea, particularly through improved exchange between industry sectors. As a result of the project, increased exchange and discussion among national governments (UK, Ireland and France) and within the European Commission (e.g. DG ENV and DG MARE) has occurred on related issues. Moreover, PISCES has widely championed the concept of transnational multi-sector stakeholder forums, which are increasingly acknowledged as key to enabling effective collaboration on regional seas.

Finally, an evaluation survey showed that: 92% of the stakeholders surveyed found the guidelines to be useful; 85% felt PISCES made it easier to talk about the ecosystem approach; and 89% felt more comfortable talking with others about how it fits within the MSFD. The LIFE project demonstrated how stakeholders can add value at each step of policy implementation, through assisting in monitoring, data collection, testing measures and providing social and economic evidence. Such involvement may lead to greater compliance with the MSFD and other activities benefitting the marine environment.

"The lessons from stakeholder engagement in PISCES can also be used to inform regional marine management in Europe and across the world. Building on the success of PISCES, WWF-UK is now delivering the LIFE+ Celtic Seas Partnership (CSP) project," Dr Dodds concludes.

PISCES stakeholders in a working group developing the PISCES guide

Photo: WWF-UK

Project number: LIFE07 ENV/UK/000943

Title: PISCES - Partnerships Involving Stakeholders in the Celtic sea Eco-System

Beneficiary: WWF-UK

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Period: 01-Jul-2009 to 31-Dec-2012

Total budget: €2 104 000

LIFE contribution: €1 023 000

Spain: **Using solid waste as an energy source**

The RESALTTECH project provides a sustainable and cost-effective solution for the treatment and reuse of the wastewater effluent produced in papermaking. Additionally, the technology uses the solid waste generated as an energy source.

Large quantities of water are used in the manufacture of paper and board. In Spain, the EU's sixth largest paper and board producer, the sector accounts for more than 16% of total industrial water usage. Efforts to reuse this process water have been compromised by the high saline content of the effluent. Various treatment technologies are available for the removal of the salts - providing reclaimed water that can be put back into the manufacturing process. Difficulties arise, however, in managing the concentrated saline effluent (brine) which has both environmentally and economically high disposal costs.

To address this problem, the LIFE RESALTTECH project set out to improve the overall environmental performance of the paper industry in the terms of water reuse and waste management by designing and constructing a new 'closed-loop' water system pilot plant.

Located in Catalonia, the project was coordinated by the LEITAT Technological Centre, in partnership with engineering group, TECNOMA, which developed the technology, and Spanish board manufacturer, UIPSA (Unión Industrial Papelera), the end-user of the technology. Additional support came from the Catalan Water Agency, which acted in an advisory capacity and the Consell General de Cambres de Catalunya, which led dissemination.

Less water and usable waste

The project team set out to design a system that would fulfil three main objectives: (i) Conversion of the residual flow effluent (brine) into a by-product. As a recovered product, it was planned that the salt could then be reused in other applications such as tanneries; (ii) Energy production – the technology would use the solid waste generated by the process as

The paper industry is the second biggest water consumer in Spain, representing 16.3% of total industrial water consumption

Photo: ASTRALE EEIG/Mariona Salvatella

an energy source; and (iii) Reduction of water consumption through the reuse of water in the pulping process within UIPSA's mill (the company manufactures packaging papers from recycled paper fibre – large quantities of water are needed to turn the recycled paper back into pulp and then to manufacture paperboard in an integrated process).

Once developed, a further goal was to ensure the transferability of the new technology to other industrial sectors.

The project ran from 2010 to 2012 and as planned, it designed and built a demonstration wastewater treatment system at UIPSA's paper mill, located in Pobla de Claramunt, Barcelona. This demonstration plant treated the wastewater effluent using a reverse osmosis system, which was found by tests to be the most appropriate tertiary treatment, allowing 72% of the water to be recovered. Happily it was also found that the effluent from this tertiary treatment is of a higher quality, because of its low salinity, than the water previously used for paper production at UIPSA.

In addition to reusable process water the reverse osmosis plant has a second output, a reject effluent, (the brine). Solid waste from the paper mill was used as fuel for a thermal line that dried and treated the brine, creating as final outputs salt and an inert ash. Although the project's initial goal of reusing the recovered salt in tanneries proved unviable, the salt was found to be suitable for use in other applications or products, such as for de-icing roads.

Although desalination processes are widespread, a particular innovation of the RESALTTECH project is the integration and adaptation of commercially-available equipment for treating the brine obtained from tertiary wastewater treatments and the achievement of a solid salt using an alternative energy source.

Waste can be reduced by 80-85% in weight at industrial level

Inert ashes are produced during the waste combustion process

Significant savings

Based on the performance of the pilot plant, the project calculated that fresh water savings of 89% could be achieved at full industrial scale; with total waste reduced by 80-85% by weight, decreasing overall waste management requirements. Such benefits mean that as well as being technologically viable, the RESALTTECH model should, after the significant initial investment, deliver reduced operating costs (lower costs of water treatment and less waste disposal to landfill).

If transferred to other paper mills, the project team estimates the RESALTTECH model could potentially help to significantly reduce the estimated 288 000 000 m3/yr of water consumed by the paper industry in Spain, as well as the 50 000 tonnes/yr of waste produced. The technology can also be applied to other sectors with similar problems, helping to alleviate water stress and reducing the amount of waste sent to landfill.

"LEITAT as coordinating beneficiary and on behalf of RESALTTECH's consortium is very proud to receive this award from the European Commission. The technological strategy proposed by the project provides a feasible and sustainable solution to the environmental targets proposed," says Carlos Pérez, Principal Researcher, Environmental & BIO Technologies, LEITAT.

Project number: LIFE08 ENV/E/000133

Title: RESALTTECH - Concentrated saline rejection treatment: Environmental Technology using a non profitable solid waste as energy source

Beneficiary: LEITAT Technological Centre

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Website: www.resalttech.com

Period: 01-Jan-2010 to 31-Dec -2012

Total budget: €2 028 000

LIFE contribution: €994 000

Greece: **Helping the financial sector reduce climate change risks**

An innovative LIFE project from Greece has developed a new toolkit that allows the financial sector help its business clients to become more climate-wise.

Climate change already represents a serious challenge for many parts of the EU economy. Businesses in sectors such as energy, food, construction, tourism, and insurance are considered to be particularly at risk.

Piraeus Bank is one of Greece's best-known banks and it has been responding to these new climatic conditions by implementing measures to improve its own environmental footprint. In addition, the bank believes that all enterprises, irrespective of their size, need to understand how to adapt their business model to the realities of climate change.

The bank therefore applied for LIFE funding to co-finance its work on the innovative ClimaBiz project, which successfully identified and estimated risks and opportunities arising from climate change for businesses in the Balkan region and Cyprus.

New know-how

Although climate change risks have been studied for a number of economic sectors, banking had previously received relatively little attention. The ClimaBiz project thus developed a methodology and an associated decision-support tool for quantifying, in monetary terms, the risks for banks from the exposure of their loan recipients and/or applicants to climate change.

Referring to the project's actions, the bank's General Manager, Vrasidas Zavras, says, "Piraeus Bank Group identifies and estimates the risks and opportunities for businesses that arise from climate change. With innovative tools it estimates the costs of the impacts and the benefits of climate change adaptation practices, and suggest solutions to its clients."

Results from the project indicated that climate change risks for banks and their clients are considerable. The ClimaBiz team thus recommended that decision-makers within the financial sector need to better estimate the magnitude of climate-related risks, and possibly consider these within the credit management process, and in environmental planning.

The new insights gained during the project were disseminated through a well coordinated awareness raising campaign. Central to this was a series of strategy reports that were prepared by the bank. The reports provided for the first time an overview of climate change and its impacts on various sectors of the Greek economy.

Strategic analysis investigated business risks and threats, but also emphasised opportunities in order to produce findings that highlighted investment prospects arising from climate change.

Client support

A variety of client groups were assessed during this LIFE-funded work. These included the financial and insurance

ClimaBiz gave bank staff the know-how to provide free green banking consultations to more than 4 500 companies across Greece

sectors, as well as construction (particularly in terms of energy saving), companies involved in renewable energy, the food and beverage sector, the agricultural sector (especially scope for organic farming and biofuel production), telecommunication businesses, and the tourism sector.

Methodological material was also published in a technical report that explained how the bank's new 'climate risk management model' works. This new tool can be used to estimate climate change impacts and adaptation costs for businesses. It takes account of costs associated with physical and regulatory climate risk for a specific sector, sub-sector, or individual company. Such flexibility increases the tools' utility and potential for replication elsewhere in Europe.

Additional analysis is provided through the risk management model to clarify the costs and benefits of different options that a business can undertake to reduce climate risk. Environmental footprints can also be calculated at a sub-sector and company level. These focus mainly on air pollutants, greenhouse gases, liquid waste, and solid waste.

Climate-wise businesses

Following development and testing of the new climate toolkit, Piraeus Bank embarked on its 'climate drives business' awareness-raising campaign. This aimed to help companies become more climate-wise in their actions. Specially-trained personnel were used during the campaign to establish new working relations with more than 1 000 clients and help them estimate their climate risk, plus the costs of adaptation solutions.

Vrasidas Zavras (left), General Manager of Piraeus Bank, with Hans Bruyninckx, EEA Executive Director (middle) and Timo Mäkelä from DG Environment (right)

Photo: EC/Patrick Mascart

E-learning programmes for 1 300 bank employees were also funded by LIFE, as well as 19 workshops for green banking advisors, business officers and credit analysts. In order to ensure that greening principles were appreciated and supported at all levels, some 400 senior management staff from subsidiaries in Bulgaria, Romania, and Cyprus received dedicated ClimaBiz training.

Further work to involve stakeholders was carried out via online questionnaires and workshop meetings that brought together cross-sections of private, public and third sector representatives to increase mutual understanding about how the Greek market perceives climate change threats.

A green banking portal (www.greenbanking.gr) was created to promote climate-wise business approaches. This showcased a range of good practice green business actions including case studies from organisations and companies that had introduced systems to help them become more resource-efficient (and therefore cost-efficient and climate-wise), for example, reducing energy, water, and paper consumption rates, reducing pollution, or implementing green procurement.

A series of short videos was produced for the portal (and its 'think green' social media platform) to explain how companies can become more climate-wise. These proved popular and were also played in the bank's branches.

The ClimaBiz project thus made significant strides towards its main goal of triggering the adaptation of key market segments in Greece, Bulgaria, Romania and Cyprus to climate change risks and managing the financial impacts. "In times of crisis, businesses have to become more competitive in order to survive. ClimaBiz is the tool for businesses to gain competitiveness by leveraging the new opportunities arising from climate change mitigation and adaptation," says Piraeus Bank Group's Head of Corporate Social Responsibility, Sophia Staikou.

Project number: LIFE08 ENV/GR/000552

Title: ClimaBiz - Financial Institutions: Preparing the Market for adapting to Climate Change

Beneficiary: Piraeus Bank Group

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Website: www.climabiz.gr

Period: 11-Jan-2010 to 31-Dec-2012

Total budget: €1 854 000

LIFE contribution: €924 000

Greece: **Recycling waste cooking oils as biofuel**

A Greek LIFE project developed an innovative technology for the use of vegetable oil as a biofuel and created a network for its collection.

The European Commission has proposed a 5% cap on biofuels produced from energy crops. The use of residual feedstocks such as waste cooking oil (WCO), however, represents a potential alternative. Using WCO can reduce CO_2 emissions compared to other biofuels, as well as prevent these oil wastes being disposed of in sewer systems – and their subsequent costly removal from wastewater (1 litre of WCO potentially contaminates 1 million litres of water per litre).

The BIOFUELS-2G project was thus set up "to motivate public-private partnerships for valorising waste cooking oil recycling for the production of high-quality biofuels", says project leader, Spyros Voutetakis.

The main challenge was, "to raise waste cooking oil recycling awareness by demonstrating environmental and economic incentives for both the public and private sector," he says. The innovative technology for producing second-generation biofuel from used vegetable oil, which was developed by the project, involves the catalytic hydro-treatment of WCO using renewable solar hydrogen energy produced from photovoltaic cells and electrolysers.

The end product, biodiesel, was tested for the first time in a municipal waste collection vehicle in Thessaloniki, Greece. This trial demonstrated both the benefits of using biofuel for transportation and of recycling used cooking oil. The results were impressive: around 2 110 litres of biodiesel-2G were obtained from the processing of 243 m^3 per month of solar hydrogen.

This conversion gives an overall process yield of 920 litres of biodiesel-2G from 1 000 litres of WCO (or 92%). Furthermore, the biodiesel-2G can be easily used in conventional diesel engines, and reduced fuel consumption rates were recorded. Additionally, biodiesel-2G is stable after extended storage even in the hot temperatures common to Mediterranean countries, and thus it is superior to conventional biodiesel fuels, such as FAME (fatty acids methyl esters), which are sensitive to temperature and storage.

Other environmental advantages were also demonstrated. The production process reduced CO_2 emissions by 74% compared to the production of fossil fuel diesel, with a potential additional reduction of 24.43% through the use of renewable solar hydrogen energy. The total production and consumption of the biodiesel-2G was shown to reduce CO_2 emissions by 11.44% and an additional 3.54% if solar hydrogen is also utilised for its production. It represents an overall reduction of CO_2 emissions in the order of 15% when compared to fossil fuel diesel.

Economic advantages

The project also developed a network for the collection of WCO, which was run by the municipality of Thessaloniki and the Association of Restaurant Owners of Thessaloniki. A total of 23 restaurants participated in the project. This network ensured a sustainable and economically feasible biofuel production pathway.

If WCO is poured down the drain, the cost of water treatment can increase by 25%. Oil and grease rinsed down the drainage system builds up over time and eventually blocks the entire pipe. As sewer pipes get blocked, accumulating sewage and clogged sewers may even begin to overflow,

This waste collection vehicle ran for 10 000 km on the project's biofuels

resulting in costly clean-up operations and often severe fines from national regulatory agencies.

Furthermore, the hydro-treatment method offers an economic advantage, given that it can be applied within existing refineries where it is a commonly used process. Therefore, the use of WCO as a feedstock can be integrated into the existing energy sector without high investment costs in new equipment. It has been estimated that waste cooking oil collection will provide a new feedstock for biofuels production at a price that ranges between €200-600/tonne. This figure compares favourably to the more than €800/tonne price of fresh/raw vegetable oil from the field.

In addition, the process could potentially create jobs at SMEs responsible for collecting and transporting WCO to refineries or other suitable facilities for conversion to biodiesel. Two companies were established during the project, employing a total of 10 people.

Spyros Voutetakis concludes that overall the project was a great opportunity to carry out further research on improving second generation or waste-derived fuels. "Their production was also proven to be sustainable by the use of renewable solar-derived hydrogen. The combined exploitation of these important findings is expected to contribute to the establishment of the concept of a green circular economy," he notes.

Waste cooking oil is fed into the main hydroprocessing plant at CERTH for conversion into biodiesel-2G

This modified pickup truck was used to collect WCO from local restaurants

Second generation biofuels can play an important role in helping the EU reach its target of 10% biofuel usage in the transportation sector by 2020 as outlined in the Renewable Energy Directive (2009/28/EC).

The long-term impact of the project is being maximised by keeping the website up to date and by the continued promotion of the biofuels-2G technology at fairs, conferences and meetings. CERTH is also promoting and exploring ways of integrating the WCO hydro treatment and solar hydrogen technologies in existing refineries via the SustainDiesel project, co-funded by the EU and the Greek government.

CERTH's involvement in SustainDiesel and another EU-funded project, ECO-SCP MED, is furthering WCO recycling efforts and ensuring sustainability across the supply chain of mainstream products and services.

Project number: LIFE08 ENV/GR/000569

Title: BIOFUELS-2G - Demonstration of a Sustainable & Effective 2nd Generation Biofuels Application in an Urban Environment

Beneficiary: Centre for Research & Technology Hellas (CERTH)

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Website: www.biofuels2g.gr

Period: 01-Jan-2010 to 31-Dec-2012

Total budget: €1 416 000

LIFE contribution: €655 000

Greece: **Demonstrating the benefits of precision agriculture**

Employing site-specific management and advanced proximal remote sensing, a Greek LIFE project was able to improve efficiency in the use of water, fertilisers and pesticides in the production of cotton.

Precision agriculture (or site-specific management) is an emerging approach that promises to develop more sustainable management systems. The approach recognises that agricultural fields have varying soil fertility and water availability, and thus different fertiliser and irrigation requirements.

Sustainable farming is particularly relevant for Greece and other Mediterranean countries, where water can become scarce as a result of heavy consumption by agriculture. Moreover, the use of pesticides and chemical fertilisers is often high. The challenge is to optimise crop yields, whilst at the same time protecting the soil and lowering water and energy use. Precision agriculture therefore points a way forward, and the LIFE HydroSense project was launched to demonstrate how.

The project was carried out on the Thessaly Plain, one of Greece's main agricultural areas. The plain is well known for the production of cotton and wheat. The Pinios river drainage basin occupies most of the Thessaly Plain region, and the demonstration area, the Gonni-Sikourion-Platikambos basin, is part of the Pinios watershed. Water resources (surface and groundwater), however, are minimal, and support only limited irrigation that is mainly achieved by pumping water from groundwater aquifers through private boreholes and pumping units. The aquifer levels are declining as a result.

The first step in the transition to precision agriculture was to divide each field in the demonstration area into sections based on the organic matter content of the soil. Water and nutrients would then be applied to each section according to its specific needs. In order to achieve this aim, section boundaries needed to be established, and the project set up a fixed network of remote infrared and soil moisture sensors to measure the watering needs of the crops during the growing season. From these measurements, an electronic map was constructed to show the points of the field that needed watering.

Using the Weedseeker sensing system for the targeted application of herbicides

Photo: S. Stamatiadis

Photo: S. Stamatiadis

Field training of personnel on monitoring of canopy reflectance

For precise fertiliser application, a different kind of sensory device was used. Two mobile multispectral sensors were able to detect the chlorophyll content of the canopy, and when mounted on a tractor, they were able to scan the entire field. Likewise a map of the fertiliser requirements of the field could then be produced. These maps were then passed on to the farmer. Furthermore, the project carried out plant protection by installing special traps for insect pests and a device that scans the rows of crops and sprays herbicide only on those areas where weeds are growing.

Water and fertiliser reduction

Using these devices, the project established a 'Smart Crop' system consisting of four infrared sensors per management zone and a base station equipped with meteorological instruments. In addition, a network of soil moisture sensors and evapo-transpiration devices was established, whilst a variable-rate drip irrigation system was installed in each pilot area of the field. The Smart Crop system thus represents an innovative technology for determining the stress placed on a crop by water shortages and inadequate irrigation. The system can reduce the use of water for irrigation by as much as 20% – which in Greece would translate to a considerable saving given that agriculture is responsible for 85% of annual water consumption.

Precision agriculture also allows, as mentioned, the amount of fertiliser to be reduced without affecting the yield – and, as a result, reduces costs and the impact on the environment. The HydroSense project achieved such reductions by simply calculating – using a system of portable multi-spectral sensors, GPS devices and data logging equipment – the amount of fertiliser required for each management zone in order to avoid excess usage. The results achieved during the project were: an average decrease in water use of 18%, a decrease in nitrogen fertiliser use of 35%; and a 62% reduction in herbicide use. The energy efficiency of the variable-rate of of irrigation water was also an improvement on conventional methods, reducing energy use by 20%.

"The essential challenge was to meet the technical goals of the project by managing a multi-disciplinary team of scientists towards working together and understanding each other's missions," says project leader, Stamatis Stamatiadis. "In several cases, this approach helped to reduce friction, to improve interaction and carry out key milestones successfully."

The technology demonstrated by HydroSense was showcased in an interactive exhibition hosted by the Gaia Center of the Goulandris Natural History Museum. The exhibition was visited by students and the general public over a six-month period. Moreover, four training sessions were held for stakeholders and agronomy graduates, whilst two workshops bolstered the dissemination of the project results among the scientific community.

Precision technologies were demonstrated to be a sustainable practice "even under small-acreage farming conditions prevailing in Greece," emphasised Mr Stamatiadis. Some of the demonstrated technologies can be immediately applied by other farmers in the area because they are low cost and minimal training is required.

"Economic and cultural considerations, however, are limiting factors for the rapid adoption of precision agriculture by individual farmers," says Mr Stamatiadis. He argues that the EU and regional governments could provide the agricultural sector with greater incentives to adopt the management practices demonstrated by the project.

In particular, the project organisers say that subsidies or appropriate water-pricing policies will help boost adoption of the more expensive aspects of the project. Water pricing is one of the main principles of the Water Framework Directive (2000/60/EC) for water resources. The HydroSense project weighed environmental costs of irrigation against the cost of using this natural resource in order to compare the best (low cost) and worst (high cost) scenarios. It showed that water scarcity represents a far greater cost than recovering contaminated groundwater.

Project number: LIFE08 ENV/GR/000570

Title: HydroSense - Innovative precision technologies for optimised irrigation and integrated crop management in a water-limited agrosystem

Beneficiary: The Goulandris Natural History Museum

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Website: www.hydrosense.org

Period: 01-Jan-2010 to 31-Dec-2012

Total budget: €1 748 000

LIFE contribution: €847 000

Greece: **Creating biomass energy in the fields**

The SMARt-CHP project developed a portable, combined heat and power (CHP) production unit that makes use of agricultural residues. The mobile unit enables the production of energy in rural areas.

Photo: Dimitrios Mertzis

Small-scale biomass energy plants in rural areas can reduce dependence on fossil fuels and provide a new income stream for farmers and rural enterprises

Generating energy from biomass can help the EU reduce greenhouse gas emissions, replace fossil fuels and achieve energy supply independence. However, the high costs of transporting biomass present a current limitation to take-up, especially in rural areas.

The LIFE SMARt-CHP project aimed to address this problem by designing and demonstrating a prototype, portable small-scale power production unit that would make use of the agricultural wastes generated in rural areas of the Greek province of Macedonia, where large amounts of biomass are available.

The Mechanical and Chemical Engineering departments of the Aristotle University of Thessaloniki (AUTh) coordinated the project, working in partnership with UACA, an agricultural cooperative for the municipality of Amyntaion, and DHCP, the district heating company of Ptolemaida. “If we were able to utilise all available agricultural by-products in Macedonia and other rural areas, then we could replace 10% of the energy used today with energy from biomass,” explains Professor Anastasia Zabaniotou from AUTh.

Portable production

The main concept was to apply the technology of biomass gasification, coupled to an internal combustion engine (ICE)-based generator-set for CHP production in a fully portable unit. The unit’s comparatively small size and versatility would enable it to be operated close to the place of plant feedstock origin, thus minimising transportation and logistics costs.

“Instead of uncontrolled and illegal burning of residues in the field, the target was to develop methods to exploit them in-situ, without the need for centralised management that increases the cost of electricity and the emission of CO_2,” explains project manager, Zissis Samaras, also a professor at AUTh.

Specific objectives were threefold: to demonstrate the operation of the technology through testing and application in real conditions; to promote an innovative concept to local stakeholders such as farmers and renewable energy entrepreneurs; and to gather data on small-scale, decentralised bioenergy

systems for combined heat and electricity production in rural areas. These data would be used to evaluate the potential of biomass energy and contribute to national planning.

To achieve these objectives, the project team first carried out a detailed survey of the available agricultural residues in different regions of western Macedonia. The survey took into account factors such as transportation, capital and operating costs for receiving, handling, storing, and processing the biomass. As a result of the survey, four suitable locations were identified close to the sources of the biomass feedstock origin – two in Ptolemaida and two in Amyntaion.

The project then designed and manufactured a prototype mobile CHP unit that would run on peach, olive and grape residues. It consists of a gasifier combined with a power generator set, comprising an ICE adjusted to achieve high energy and environmental performance working on producer gas. The prototype uses less than 2 kg/h of biomass and a minimum amount of propane to pilot the gas combustion in the ICE, generating approximately 3 kWel of electrical power and 8 kW of the thermal power. The gasification unit design was tailored to the specific physical and chemical characteristics of the selected biomass.

Demonstrating the benefits

During the demonstrations, several technical issues were faced and resolved, and the operation of the unit was consistently improved at each demonstration.

A detailed sustainability analysis was carried out to assess the environmental, economic and social benefits of the SMARt-CHP system. This showed that the average energy conversion efficiency of the gasification process was 62%, with a total average energy efficiency of the CHP unit of 72%. The SMARt-CHP system as a whole has a total energy efficiency of 48% (6% electrical efficiency). The analysis also indicated that commercial-scale implementation of the technology would lead to CO_2 reductions proportional to electrical power production (approx. 0.55 kg/kWh).

The project effectively disseminated its actions and results to target stakeholders: farmers, agricultural cooperatives, the biomass/biofuel sector and energy companies. Lessons learnt during the project were published in a good practice guide that will help to further promote the technology beyond the end of the project. The good practices identified also will be included in a planned 'eco school' on renewable energy that will be developed by the Kilkis education department.

The project's innovative approach – that is, of biomass energy utilisation at the place of origin, minimising transportation and logistics costs – provides a means of boosting sustainable development in rural areas, while reducing CO_2 emissions from conventional combustion, hence contributing to climate mitigation policies. The resulting incorporation of agricultural activities in the energy production sector enhances the potential for a decentralised energy market. In this way, the project offers the potential to support the creation of a number of bio-businesses in rural areas, based on mobile energy production units that will utilise by-products of agricultural or forestry activities –products that would otherwise be treated as waste.

Using less than 2 kg/h of biomass and a small amount of propane the pilot plant can generate approximately 3 kWel of electrical power and 8 kW of thermal power

Life after LIFE

Looking ahead, the After-LIFE plan aims to establish an energy cooperative body in Karditsa to organise the collection of biomass and move towards electricity production using the SMARt-CHP system. Moreover, one partner, the district heating company of Ptolemaida, is developing a bioenergy plant for the use of biomass. The other partner, UACA, meanwhile, is looking to secure funding to develop biomass utilisation units of less than 1 MW.

Project number: LIFE08 ENV/GR/000576

Title: SMARt-CHP - Demonstration of a small-scale mobile agricultural residue gasification unit for decentralised combined heat and power production

Beneficiary: Research Committee Aristotle University of Thessaloniki

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Period: 01-Jan-2010 to 31-Dec -2012

Total budget: €947 000

LIFE contribution: €450 000

Hungary: **Innovations in soil quality monitoring**

The MEDAPHON project has developed a new system for monitoring soil quality based on measurement of microfauna activity. The innovative EDAPHOLOG System provides a reliable and cost-effective means of large-scale soil monitoring.

Soil is a complex, living medium formed by mineral particles, organic matter, water, air and living organisms. The delicate balance of soil ecosystems can be destroyed by factors such as pollution and inappropriate land and river management, resulting in processes of erosion, loss of organic matter, compaction, sealing, salinisation and so on.

Soil degradation affects soil fertility and plant growth as well as destroying habitats for many species. It also negatively impacts on vital ecosystem functions such as the production of food and biomass, filtration of water and the degradation of dead organic matter and pollutants, as well as the transformation of carbon and nitrogen.

The need to protect soil quality in the face of these threats is heightened not only by the increasing negative impact of climate change but by the fact that quality soil is quickly lost but very slowly recreated. It was in this context that the European Commission launched a Soil Thematic Strategy in 2006.

Large-scale soil monitoring

One of the key challenges for improving soil management is that degradation of soils is often only apparent once the process is quite advanced, making efforts to rectify the problem significantly more difficult. The LIFE MEDAPHON project hopes to have found a successful approach to overcoming this problem by providing an early-warning system capable of detecting soil degradation processes.

The project's specific solution is a new soil environmental monitoring tool, called the EDAPHOLOG System. It delivers the first ever cost-effective and reliable method for assessing soil quality on a large scale. It is based on the measurement of various parameters of microbial activity in the soil – one of the key indicators of soil quality.

The EDAPHALOG System had to be built up from numerous complementary elements, each requiring specific solutions in the context of soil monitoring. As well as finding and developing the monitoring sensors, the project had to explore appropriate electronic circuitry, processing equipment and evaluation software to make the whole system work.

Photo: Miklos Dombos

The monitoring probe's radio antennas are camouflaged as a plant stem

To deliver the final system, the MEDAPHON project used a three-stage process: a design phase; laboratory testing; and pilot sampling in the field. Each proved crucial in developing understanding of the concept, identifying and overcoming problems and optimising performance.

A novel monitoring probe

The innovative probe developed by the project is comprised of three main elements. There is the physical trap, designed to capture microarthropods living in the soil.

Photo: Miklós Dombos

Probes buried in the soil capture and count the microfauna

There is an optical-electronic detection element, able to sense, count and even categorise the captured animals. Finally, there is a logging device, able to record the data of the animals captured and transmit it to a central server.

The probe consists of an outer and an inner PVC tube. The optical-electric sensor is contained within the inner tube. It is able to both count and estimate the size of microarthropods falling into the trap based on changes in infrared intensity. Laboratory testing was crucial for optimising the sensor's ability to accurately count animals down to 0.2 mm in size after initial tests showed decreasing reliability below 0.5 mm.

Developmental testing of the physical trap confirmed the need to avoid the accidental entry of soil particles into the sensor. The final soil pin-trap has a 15-cm-long mesh tube fitted to the upper part of the probe, around which an outer plastic sieve is filled with clay balls. Microarthropds can move freely through the gaps into the trap, but inanimate soil is prevented from passing through.

Laboratory testing confirmed that trapping performance was more or less stable over time and that the sensors could separate microarthropods into functional groups depending on their food type – bacteria, fungus, plants etc. It also confirmed that trapping did not represent a significant threat to wider population numbers.

Automated monitoring and analysis

Data is recorded, transmitted and processed through an automated system. The infrared sensor in the probe triggers an electrical impulse whose size correlates to the size of the animal. This sensor can operate reliably with no intervention for 2-3 months at which point it needs to be recharged with a contact-free inductive energy charging system.

Each probe has an antenna on the surface - disguised as a plant stalk to minimise environmental disturbance. The electrical impulse is thus transmitted to an intermediary data logger. Each logger is built inside a weatherproof electrical cabinet supplied with a 7 Ah Li-ion battery and solar panel system developed by the project.

Field tests placed 200 probes at 50 sites using a special drilling device also developed by the project. Each site – representing different habitat and soil types - had a data logger in continuous radio contact with four probes within a 50-metre radius. The loggers also maintained continuous GSM/GPRS connection with a central server providing dedicated software for the storage, GIS-mapping and analysis of the data.

The functioning of the overall system demonstrated reliable results, providing relatively low technical effort and associated costs for the sample size. It will allow the preparation of very detailed and large-scale mapping of soil quality in a very cost-efficient and smart way. The MEDAPHON project thus offers a solution to the problem of how to identify intervention needs in a timely manner, which can help to protect soil quality in the EU.

Project number: LIFE08 ENV/H/000292

Title: MEDAPHON - Monitoring Soil Biological Activity by using a novel tool: EDAPHOLOG-System - system building and field testing

Beneficiary: Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences

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Period: 31-Dec-2009 to 30-Dec-2012

Total budget: €2 065 000

LIFE contribution: €1 031 000

Italy: **Solving waste management challenges for Europe's ports**

The SEDI.PORT.SIL project has shown how to treat and reuse noxious sediment waste material that is regularly dredged from Europe's harbours.

As part of Member States' evolving focus on establishing their 'circular economies', waste is now increasingly seen as an opportunity within the European Union..

"The circular economy will be the great innovation challenge of the next decades," states European Commissioner for Environment, Janez Potočnik: "It is the challenge, and the responsibility of policy-makers to tackle the inertia of the old system to enable this revolution; to create the right framework conditions for a managed and predictable transition; to create the right signals, incentives and instruments."

LIFE projects remain at the forefront of demonstrating how Member States can make this shift towards an economy that produces low-to-zero waste. LIFE is progressing waste management issues on many fronts, including helping Europe's ports.

A good example of this is the Italian SEDI.PORT.SIL project, which achieved significant success in both extracting valuable elements from sediment dredged from the port of Ravenna and in treating this waste to allow its safe reuse.

Solving challenges

SEDI.PORT.SIL's Best LIFE Environment prize was awarded in recognition of the project's validation of new techniques for reducing the amount of port sediment that needs to be landfilled. Around 200 million m^3 of sediment are dredged each year from Europe's ports and much of this goes directly to landfill, because of a lack of means of treating it. Large volumes of water within the sediment also need to be de-contaminated by wastewater treatment plants.

Such waste management requirements involve high costs, and the LIFE project team set out to help port authorities secure long-term commercial returns by identifying economically-viable solutions for tackling this environmental challenge.

The goal of the project was to treat dredged sediment so that it could be reused as raw materials for the infrastructure sector and in environmental engineering. State-of-the-art science was also applied to the task of isolating and extracting silicon alloys, which could then be valorised to generate a net financial benefit from the innovative sediment treatment process.

Project team acquiring sediment samples with different pollution levels

The project first carried out tests in Italy using a purpose-built prototype plant. It then effectively replicated the testing at Midia on Romania's Black Sea coast to highlight the suitability of this new technology for different port authorities. The project collated its findings within a set of European guidelines explaining the treatment plant's functionality and operational requirements.

Treatment techniques

The guidelines highlighted SEDI.PORT.SIL's work with different types of contaminated port sediment. These were classified according to Italian legislation into: 'very polluted'; 'contaminated'; and 'non-contaminated'. Analysis of the physical-chemical, microbiological, eco-toxicological and mineralogical properties of the waste provided a baseline against which the efficacy of three treatments (soil washing, land-farming, and plasma fusion) could be measured.

Results of the soil washing trials confirmed that filtration systems could be applied in the treatment plant to clearly separate sediment into gravel, sand, coarse solids, mud-sludge and wastewater. The latter was able to be purified and discharged back into the sea without any environmental risks. Further treatments to render the different solid compounds inert, and suitable for reuse also produced positive results.

Land-farming proved to be a fruitful form of bio-remediation for the mud-sludge. A six-stage land-farming procedure significantly reduced the concentration of organic compounds thereby increasing opportunities to avoid it being dumped into landfills.

The third technique, plasma fusion, used a high temperature torch (up to 2 100°C) to heat and convert the filtered sediment into plasma material, from which different metal alloys can be extracted. At the same time, the thermal treatment also destroys dangerous hydrocarbon pollutants.

Resource efficiency

The project team also evaluated the commercial prospects of these trial technologies and concluded that scaling up the prototype plant could provide considerable resource-efficiency gains that would translate into financial advantages over a 20-year life cycle.

Silicon separation was the main success factor here, and the technology's approach for extracting ferrosilicon remains particularly important for the project's overall cost-benefit analysis.

The treated sediment can also be used as sand to replenish beaches, with the added advantage that it does not need to be desalinised, thus increasing its suitability for helping

Landfilling of dredged sediment was reduced by 99%

sustain important tourism economies in coastal zones. Large stretches of beach in the Ravenna region and Romagna require regular replenishment (following natural erosion) and the properties of the sediment by-product made it ideal in terms of colour and grain size.

Construction-grade materials can also be produced from the dredged sediment waste, subject to an additional desalination process. The project has identified potential commercial end uses as asphalt fillers and ingredients in plaster.

Impressive results

All in all, the LIFE team calculated that the prototype plant and associated treatments could create recycled-products and raw materials that reduced the need for landfill of dredged sediment by 99%. What's more, some 20 green jobs could be maintained by one individual treatment plant, and the project team is now focusing on commercialisation stages for the new technology.

Results such as these are a credit to the SEDI.PORT.SIL team and illustrate the LIFE programme's potential for making very useful contributions to the circular economy.

Project number: LIFE09 ENV/IT/000158

Title: SEDI.PORT.SIL - Recovery of dredged SEDIments of the PORT of Ravenna and SILicon extraction

Beneficiary: MED INGEGNERIA S.r.l.

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Website: www.lifesediportsil.eu

Period: 01-Sept-2010 to 28-Feb-2013

Total budget: €1 970 000

LIFE contribution: €931 000

Latvia: **Combating urban flood-risk from climate change**

The LIFE 'HydroClimateStrategyRiga' project provides Riga city planners with the necessary strategy to help combat flood risk, a growing problem that is expected to worsen with climate change.

Sea water surges pose the greatest flood threat to the city of Riga

An increased frequency and severity of flash floods is becoming a growing problem for the city of Riga. Such floods have caused widespread problems to certain built-up areas of the Latvian capital – its infrastructure and natural areas, including Natura 2000 network sites. In 2008, therefore, the department of development of Riga city council (i.e. the beneficiary of this project) commissioned a hydro-dynamic modelling system to calculate flood risks and trends under different scenarios. The growing trend in floods is linked with climate change. In particular, storms are increasingly pushing water from the Gulf of Riga into the river Daugava which flows through the capital.

There was a need for more integrated management planning in order to address such floods and their causes according to international, EU and national legislation. There was also a greater need for increased awareness of the relevant issues amongst the general public, local government specialists and politicians.

The main aim of the HydroClimateStrategyRiga project, therefore, was to create the necessary means to ensure that hydrological processes in Riga, intensified by climate change phenomena, were investigated and incorporated into the city's planning system. The idea was to help mitigate

the current and future impact of such floods on the city's economy, natural environment, water resources and human health. The project planned to carry out detailed studies of the hydrological processes affecting Riga and their current and potential impacts. Workshops of specialists and local stakeholders would also feed into these findings, leading to the publication of a report.

Managing other flood-risk zones

The beneficiary also hoped to learn about best practices in the identification, planning and management of flood risk zones in three other European cities facing similar challenges: Rotterdam in the Netherlands; Antwerp in Belgium; and Hamburg in Germany.

Specific goals were to define flood-protection priorities for each of the six flood-risk zones around the capital and for Riga as a whole. Possible measures and activities would be evaluated, and their cost-effectiveness assessed, leading to the creation of a 'Flood Risk Management Plan'. This would recommend protection measures and any necessary changes to the city's planning documents. Publicity and awareness-raising measures around flood risks and management would include a website, printed publications, events and media work.

Riga City Relief Model

The project started in May 2010 with the development of a 'Riga City Relief Model', which was carried out on behalf of the beneficiary by contractor, METRUM ltd. This enabled the exploration, modelling and anticipation of the effect of such hydrological processes as flooding, intense precipitation, wind surges, coastal erosion and significant changes in groundwater levels.

The information was then used for further research and served as the basis for practical suggestions and recommendations for flood prevention measures in Riga. The research showed, for instance, that the most serious flood risks to the city and surrounds are caused by wind surges in Riga Bay. Therefore, the most significant prevention measures could be oriented towards protection against this type of flooding. Other practical mitigation works included reconstruction and construction of dams or ramparts, watergates and floodgates, earthworks, improvement of rainwater drainage and strengthening of coastal protection.

The project was completed in 2012 having met all its planned objectives. These included a detailed analysis and assessment of the existing situation and future flooding trends for Riga, the results of which were published in a comprehensive report on the hydrological processes affecting the territory and of any current and potential environmental problems.

The project gathered various best practices and approaches to the identification, planning and management of flood-risk zones

One of the main project deliverables was the "Flood Risk Management Plan for Riga City". This establishes a series of measures that can be implemented to protect flood-risk areas – including the areas that were shown to be particularly high risk. Proposals include: the elevation of existing roads, and construction of new ones; increasing the height of existing earth dams, or constructing new ones; and reconstructing or building new culvert- and sluice regulators.

Another important outcome was the gathering of the various best practices and approaches to the identification, planning and management of flood risk zones including the experiences of the three other associated European cities –Rotterdam, Antwerp and Hamburg.

Finally, the project is important, not only at a local and national level but also across the Baltic States – since it is believed to be the first of its kind across the region. The results provide a model for flood risk management not only to other Latvian municipalities but also in neighbouring countries facing flooding risks similar to those of Riga.

Project number: LIFE08 ENV/LV/000451

Title: HydroClimateStrategyRiga - Integrated Strategy for Riga City to Adapt to the Hydrological Processes Intensified by Climate Change Phenomena

Beneficiary: Riga City Council

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Period: 01-Feb-2010 to 30-Nov-2012

Total budget: €662 000

LIFE contribution: €329 000

Slovakia: **Lower emissions through better quality biomass pellets**

While biomass represents a potentially cleaner alternative to the continued use of fossil fuels, poor quality pellets give rise to high levels of CO_2 emissions. The CHEFUB project has improved pellet quality and thus reduced emission levels.

Central areas of Slovakia are responsible for significant greenhouse gas (GHG) emissions, mostly the result of the burning of coal, coke and sludge for energy and heating. Switching to biomass could reduce such emissions, but doing so is a challenge: Though the material is readily available – more than 2 000 sawmills, forestry companies and wood processing firms in the region produce over 200 000 tonnes of biomass residuals, such as sawdust, each year – this biomass often contains foreign matter and has a high moisture content.

The LIFE CHEFUB project was launched to reduce this moisture content and the GHG associated with the burning of pellets for fuel. It aimed to implement innovations in biomass processing, whilst also exploring ways of obtaining high-quality sawdust for the production of pellets that meet EU standards. The end result was the development of a new system for evaluating the quality of sawdust as a raw material as well as a new a system for producing and distributing pellets.

The project was carried out by BIOMASA, the beneficiary of several LIFE projects. Its new evaluation system consists of high-quality weighing apparatus to determine the moisture content of the raw material –steps taken included the installation of five digital hygrometers for the continuous measurement of sawdust moisture on production lines.

Furthermore, the monitoring system used in boiler rooms was improved to allow it to be controlled remotely – thus obviating the need for maintenance engineers to make journeys to carry out adjustments onsite. Data collected from heat meters is automatically transmitted to a central control facility in Kysucky Lieskovec, where is evaluated and archived.

Further CO_2 reductions will result from modifications to the boilers themselves – adapting them from being run on fossil fuels to operating on wood pellets. As part of the project, 20 boiler rooms in public buildings were reconstructed with associated emission savings. In total, the project has helped reduce CO_2 emissions by around 12 250 tonnes/yr, thanks to savings from pellet production, the reconstruction of the boiler rooms and a reduction in driving by engineers.

Measuring the weight and humidity of sawdust

By the end of the project, pellet production had reached the 12 000 tonnes/yr target established at the outset (12 013 tonnes of pellets were produced in 2011 and 11 977 tonnes in 2012). The new process has thus increased the production of pellets from wood waste by some 2 000 tonnes/yr, which equates to an annual reduction in CO_2 emissions of some 3 500 tonnes. The use of high-quality pellets should also improve the efficiency and durability of the new boilers, as well as their overall operation.

Summer Biomass Camps gave young people in Slovakia a fun way to learn about the environment

Other positive outcomes of the project include the fact that, emissions, including dust, have been significantly reduced in the work place and working environments have been greatly improved. The procedures and approaches applied by the beneficiary are now considered to be some of the most advanced in the sector. These methods have also reduced water consumption in the project areas by more than 50% compared with 2008 levels.

Good communication

Such impressive results were widely communicated by the project. It created an information centre on the premises of BIOMASA and a presentation vehicle for hands-on demonstrations of the use of pellets. As well as reaching many towns across Slovakia, this travelling exhibition took results of the project into parts of the Czech Republic and Poland. In addition, the project produced two short videos, several brochures and a book entitled *With pellets against climate change*. Using seminars, excursions, conferences, training and professional exhibitions, the beneficiary was also able to engage the younger generation. An annual Summer Biomass Camp was established, which proved to be particularly successful. As a result, the beneficiary intends to continue to run the summer camp even now that the project has ended.

"The long-term impact of the project will be the increased use of biomass for domestic energy," believes project leader, Ladislav Zidek. Once oil or gas burning boilers are adapted to use biomass, the process is unlikely to be reversed. "The challenge now is to implement the results of the project on a larger, national scale," he adds.

As well as the environmental benefits, the project also offers a financial boost to the local economy and the prospect of job creation. It helped develop a creative finance programme for boiler rooms of up to 50 kW, particularly in public buildings. The aforementioned 20 boiler reconstructions took place in kindergartens, schools and municipal offices. The beneficiary believes that more effective heat production in the boiler rooms will also allow it to acquire more customers.

Summer Biomass Camps gave young people in Slovakia a fun way to learn about the environment

Project number: LIFE08 ENV/SK/000240
Title: CHEFUB - Creative high efficient and effective use of biomass
Beneficiary: BIOMASA, Association of Legal Entities
Contact: Ladislav Zidek
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Website: www.biomasa.sk/en/
Period: 01-Jan-2010 to 31-Dec-2012
Total budget: €1 369 000
LIFE contribution: €492 000

Belgium: **Towards a common approach to human biomonitoring**

A pilot study carried out in 17 European countries demonstrated the feasibility of adopting a harmonised EU-wide approach to human biomonitoring

Human biomonitoring involves collecting tissue samples – such as urine, blood, hair, saliva or nails – from volunteers and carrying out certain chemical measurements on those samples to assess the person's exposure to environmental health risks.

These measurements, or biomarkers, can highlight patterns of exposure, help discern contributing lifestyle factors, and indicate groups at risk of developing a condition or illness. Along with other data, biomarkers can help experts develop intervention strategies or early-warning tools aimed at reducing exposure to environmental pollutants.

In order to make accurate comparisons, human biomonitoring studies must use the same methodological approach. Biomonitoring is increasingly being used as a research tool for environmental health policy – the European Environment and Health Strategy, launched in June 2003 by the European Commission, recognises its value – but not all Member States have reached the same stage of development. The DEMOCOPHESII project was therefore set up to establish a coherent approach to human biomonitoring across Europe.

The LIFE project followed on from the research project, COPHES (COnsortium to Perform Human biomonitoring on a European Scale), which prepared guidelines and protocols for all tasks. Using the COPHES guidelines, the LIFE project engaged 17 European countries [1] to test a common approach for carrying out human biomonitoring surveys. These surveys produced data on the distribution of specific biomarkers and related lifestyles among defined study populations, which could be directly compared for the first time on a Europe-wide scale.

1 (UK, SK, SE, RO, PT, PL, LU, DE, CZ, CH, HU, BE, CY, IE, SI, DK, ES).

Human biomonitoring is increasingly used as a research tool and to help develop environment health policy

Harmonised testing

The project established teams in 17 countries to study exposure to mercury, cadmium, tobacco smoke and some phthalates (Bisphenol A was added as an additional substance for six of the countries), and their possible relations to lifestyle, using biomarkers and questionnaire data. According to project leader, Dominique Aerts, it was important to collect data on housing, food, hobbies and other habits of the participants to "investigate how the substances came into the body, i.e. the route of exposure."

These national teams applied the European common protocol, which describes in detail how to implement the study, whilst at the same time allowing for small adaptations to be made for cultural differences that do not compromise the comparability of the results.

The study focused on children aged 6-11 and their mothers aged 45 and under. Fieldworkers in the participating countries collected hair and urine samples from a total of 3 688 volunteers, half from urban areas and half from rural areas. The mothers were asked to provide details about their living environment, diet, smoking habits, and other information that could help to explain the levels of the biomarkers measured. The laboratories analysing the samples were selected through a strict quality assurance process. Statistical analysis and interpretation of the results was performed in each country as well as at EU level, with data being transferred to a central European database.

The demonstration study was shown to be very instructive. It highlighted clear links that could be used for policy-making at national, EU and international level. For example, the study provided support for regulating exposure to phthalates (which come from vinyl compounds in buildings, personal care products and convenience food packaging). By assessing the concentration levels of the nicotine biomarker, cotinine, in children's and mothers' urine, the project team was able to show how the EU's anti-smoking policy is being applied, with lower levels found in countries where bans on smoking in public areas have been enforced. Human biomonitoring data could also influence policy in the area of diet by, for example, looking at mercury levels in populations that consume a high amount of fish.

Knowing the impact of exposure to chemical components in food and other products could lead to healthier lifestyles in the medium-to-long-term. Moreover, biomonitoring could lead to better science-based health and environmental policy at national and EU level. Human biomonitoring has the potential to become a very important tool for decision-makers looking at maximum concentration levels for certain substances, food and consumer goods safety, and other related areas.

Collecting data on the participants' habits provided important information about exposure to environmental health risks

A European programme?

"DEMOCOPHESII has shown for the first time that a harmonised European approach for human biomonitoring is useful and feasible," says Ms Aerts. "In follow-up, the European Commission aims to explore the possibilities for a permanent European human biomonitoring programme."

In June 2014, the Commission's Directorate-General for Research and Innovation started the negotiation process to define needs, potentials and possibilities for a European programme with representatives from Member States, stakeholders and representatives of European agencies/services interested in using biomonitoring data for policy-making. "In this way a proposal for a European programme, supported by all involved, should be worked out," explains Ms Aerts. "I hope that the results of DEMOCOPHESII will thus lead to a European programme in support of policy decisions regarding REACH, pesticides, biocides, cosmetics, smoking and food safety regulations."

Project number: LIFE09 ENV/BE/000410

Title: DEMOCOPHESII - Demonstration of a study to coordinate and perform human biomonitoring on a European scale

Beneficiary: Belgian Federal Public Service Health, Food Chain Safety and Environment

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Period: 01-Sep-2010 to 30-Nov-2012

Total budget: €3 420 000

LIFE contribution: €1 705 000

Spain: **Improving vehicle recycling and reuse**

The ELVISUSTECH project in Catalonia successfully developed a pilot sorting unit for more sustainable management of scrap material from end-of-life vehicles. The goal is to improve the automotive industry's recycling and recovery rates in line with EU directives.

The project treated 1 tonne of ELV waste per hour, breaking vehicles into valuable and reusable parts

More than 14 million vehicles reach their end of life in Europe each year [1], with a consequent loss of valuable natural resources and the risk of soil contamination and other environmental problems from inefficient disposal.

In the automotive sector, recycling and recovery rates are increasing, in part thanks to the European Union End of Life Vehicles (ELV) and Waste Electrical and Electronic Equipment (WEEE) directives - 2000/53/CE and 2002/96/CE, respectively, which make the vehicle and electrical industries responsible for the collection and recycling of their products. Today, more than 85% of the weight of ELV material has to be recycled. The next step (in 2015) is to reach a 95% recycling rate. However, with existing technologies it would not be possible to meet this more ambitious target. In particular, problems persist in the treatment of dark plastics, rubber and difficult input materials such as shredder 'fluff' (the material left over after a vehicle has been shredded and the metals extracted).

Better separation, greater value

The LEITAT Technological Centre, an expert in waste treatment and reuse, secured LIFE co-funding for the ELVISUSTECH project, which brought together a consortium of partners, mainly based in Catalonia, to develop an innovative unit to increase ELV recycling rates and to promote the reuse or to derive value from different components of the shredder residues. Project partners included INSERMA (recycling, engineering and services), AutiMec (industrial engineering), AIICA (chemical analysis), TRADEBE (ELV recycling) and the regional chamber of commerce (dissemination).

1 Industry estimates, although official statistics for the number of vehicles scrapped are lower (e.g. 7 million in 2006)

The project aimed to reduce the amount of solid ELV waste currently sent to landfill. Another objective was to use suitable residues obtained from light fraction as an alternative energy source and, therefore, develop potential new markets and usage. The pilot unit would also reduce management costs for landfill and contribute to improved lifecycle maintenance.

Specific goals were to: increase scrap separation rates by 10-15% (the current rate is 80-85%) and reduce landfill disposal by up to 50%; and to create material streams for various new applications such as energy sources to supply for energy consumption, as well for the production of other new products for the plastics industry. The expected energy value for the prototype unit was between 2-3 MW with a production capacity of one tonne/hour.

Sorting the fluff

A key challenge in designing and building a pilot sorting unit capable of separating the various difficult wastes with more precision than conventional systems was to accurately sort the shredder residue obtained, the light fraction or 'fluff' (currently sent to landfill).

To this end, the project first conducted an analysis of the waste, characterising it in order to select the most effective technologies for separation. Based on this work, it was decided to use a magnet, an eddy current and inductive sensors at the pilot plant, which was installed at TRADEBE's Vallbona facility in Vallbona de Anola (Barcelona).

According to the beneficiary the innovative settings and geometric arrangements of the technology in the pilot plant has produced "great results" in the separation of a wide range of metals, non-metals, plastics, rubber and more precisely in the shredder fluff.

The ELVISUSTECH technology recycles 91% of ELVs

The pilot plant breaks down residues into valuable parts such as ferrous metals

The pilot plant achieved the goal of treating 1 tonne/hr of ELV waste, breaking the residues down into valuable parts: one containing ferrous metals, another containing non-ferrous metals such as copper and aluminium, and a third containing a mixture of plastics. The latter fraction is used to produce high quality WDF (waste-derived fuel) that can be used in cement kilns as an alternative energy source. This means that only 20-25% of the fluff stream – the fraction that cannot be converted into WDF – must go to landfill. Moreover, according to the beneficiary, the unit's compact design has improved working efficiency and reduced operational costs.

The ELVISUSTECH unit has been implemented on a full scale at the TRADEBE recycling site and an expected reduction of up to 50% of the current landfill disposal has been achieved – increasing the percentage of vehicle material being recycled from 80% to 91%. Including the materials removed before fragmentation (wheels, batteries, etc), the recycling rate will enable the company to meet the requirements foreseen for 2015 – i.e. 95%. LEITAT says the process is economically viable and can either be installed as a replacement for or a complement to existing waste-sorting equipment. The beneficiary adds that the technology is also transferable across sectors, since the design of the pilot sorting unit is flexible enough to be adapted for the treatment of other types of wastes.

Project number: LIFE09 ENV/ES/000460

Title: ELVISUSTECH - End life vehicles: innovative and sustainable technology for achieving European Directive targets

Beneficiary: LEITAT Technological Centre

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Website: http://leitat.org/elvisustech/

Period: 01-Oct-2010 to 31-Mar-2013

Total budget: €1 973 000

LIFE contribution: €965 000

France: **New technology reduces the steel industry's environmental footprint**

The LIFE ECOTRANSFLUX project successfully demonstrated an innovative process for cold-rolling mills in Europe's steel industry.

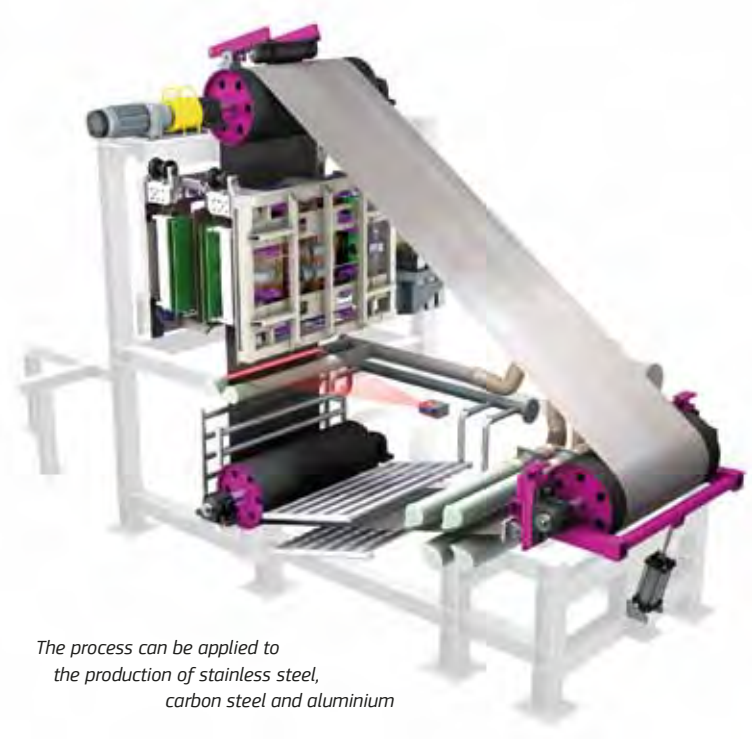
Testing the new EcoTransFlux™ inductor with LIFE assistance involved a considerable amount of innovation and led to the validation of a new induction heating transverse flux process that reduces emissions of greenhouse gases and hazardous acid waste. At the same time, the new inductor allows steelmakers to retain quality and production capacities. The process can be applied to the production of stainless steel, carbon steel, and aluminium.

Such results confirm LIFE's potential as a driver of sustainable development within European industry. LIFE programme benefits were highlighted by the European Environment Agency's Executive Director, Hans Bruyninckx, who (speaking before awarding the prizes at the Best of Environment project ceremony) said, "These projects are very innovative in their approach to some of the fundamental themes of moving into a more sustainable European future." He went on to praise LIFE projects such as ECOTRANSFLUX for their contribution to the EU's 7th Environmental Action Plan goals for a 'carbon neutral' future and 'circular economy' with 'ecosystem resistance'. Mr Bruyninckx also noted how "experimentation and innovation really needs to happen now if we want to change the fundamental systems of production and consumption that for the moment are too unsustainable and that really need to take a change in the direction towards sustainability."

Pioneering progress

Experimentation and innovation were a core part of the ECOTRANSFLUX project, which was coordinated by Five Celes, a specialist in induction heating technology and part of the Fives Group of industrial engineering companies. Fives Group's Pierre Dousselin believes that the high level of innovation and transferability demonstrated was crucial to the award of Best LIFE project status.

"Our project had a relatively modest budget compared to other LIFE projects and we still managed to achieve a lot of progress that has been recognised by the European Commission with this award," says Mr Dousselin, who points to the "exceptionally innovative" focus on improving industrial heating of metallic materials with very high speed induction heating of 200-300oC per second.

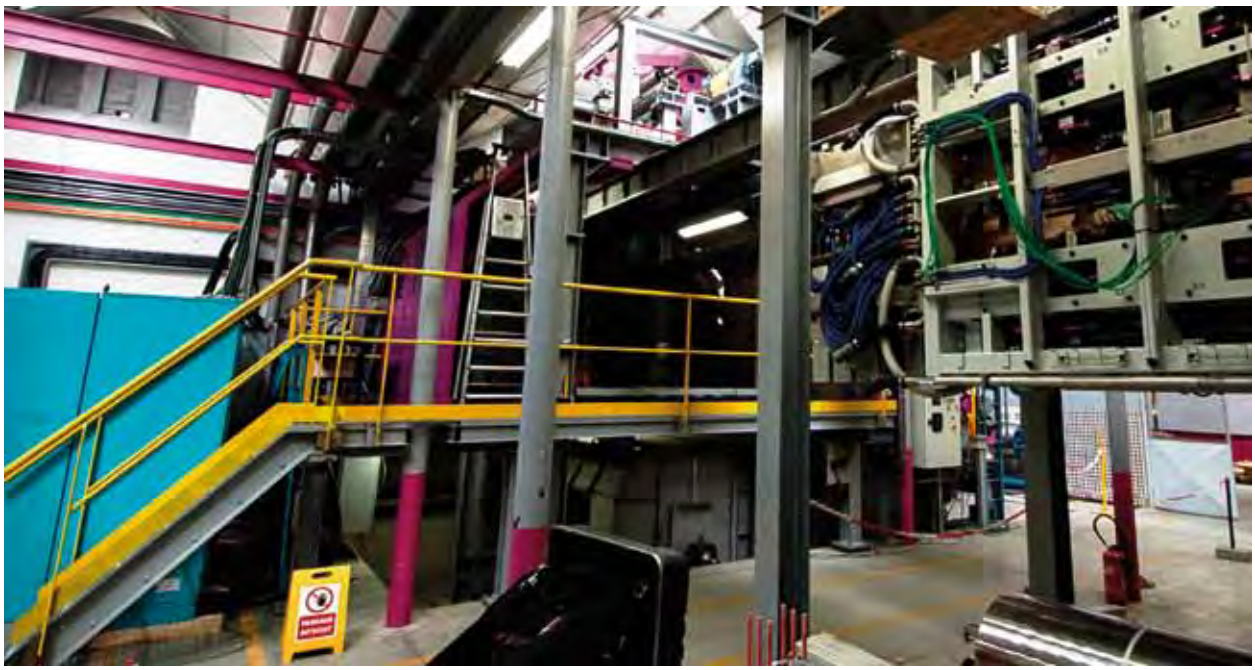


The process can be applied to the production of stainless steel, carbon steel and aluminium

This new way of using induction heating opens up "a new era for development of lower-weight and affordable steel grades," believes Mr Dousselin. Fives Group has identified potential uses for the new technology in non-magnetic stainless steel heating. "Here the techniques developed by LIFE's ECOTRANSFLUX project offer an effective alternative to traditional heating processes, and thereby significantly reduce the production of chemical pollutants in liquid and gas forms," explains Mr Dousselin.

Process improvements

Analysis carried out during the project suggested that if ECOTRANSFLUX technology was applied to 20% of the world's



A 20% substitution of current stainless steel processing lines with the ECOTRANSFLUX technology would significantly reduce nitric acid and hydrofluoric acid consumption

current stainless steel processing lines, it could reduce consumption of nitric acid by 12 000 tonnes/yr, and hydrofluoric acid (with associated sludge) by 4 000 tonnes/yr. It could also cut emissions of hydrogen fluoride gas by 3.2 tonnes/yr, carbon dioxide (CO_2) by 50 000 tonnes/yr and of nitrogen oxides (including nitrogen dioxide) by 4 000 tonnes/yr.

For the carbon steel industry, the project also predicts that a 2% global substitution of current processing techniques with the new technology would reduce CO_2 emissions by some 75 000 tonnes/yr.

There are also significant economic opportunities from the new inductor, directly linked to its positive environmental impacts. Higher production rates, improved process reactivity, and lower-weight material with improved mechanical properties are all key features of the EcoTransFlux inductor. These assets are expected to both increase the turnover of companies using the technology and to lead to the recruitment of new green economy employees.

Future prospects

Such encouraging results spurred on the ECOTRANSFLUX team, which has set its sights on ensuring that the new technology reaches its full commercial potential. "LIFE helped us to provide an industrial-scale technology and this is more useful for us because it means we can show a real demonstration of the heating equipment in action using the actual size of steel rolls that the mills produce. Hence our results are very transferable and this is another reason why we think we were selected for the LIFE project prize," says Mr Dousselin.

Five Celes developed the project without the help of major partners, which further strengthens the team's belief in its ability to continue mainstreaming the technology's benefits. "Our achievements can be used as an example for other companies who want to use EU support to develop innovative projects with European-scale significance. We have shown that it is possible to do this in ways that support European economic development goals."

Following the completion of the project in 2012, Five Celes has expanded the technology's use into other areas. "This re-confirms EcoTransFlux™ as a modern and powerful tool that is fit-for-purpose within the most efficient production of stainless steel, carbon, silicon, or even non-ferrous lines," says Mr Dousselin. "This means that productivity, energy performance, and environmental sustainability can all be fundamental and inseparable design aspects and values for the future," he concludes.

Project number: LIFE09 ENV/FR/000591

Title: ECOTRANSFLUX - Transverse Flux Induction Strip Heating Demonstrator, a technology limiting CO_2 emissions & acid wastes in Steel Industry

Beneficiary: Five Celes

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Period: 01-Sept-2010 to 30-Sept-2012

Total budget: €646 000

LIFE contribution: €316 000

Spain: **Effectively engaging farmers on climate change**

By building key relationships and delivering clear, practical messages, the CHANGING THE CHANGE project was able to convince farmers in Galicia of the benefits and value of mitigation and adaptation to climate change.

Like many similar areas, rural Galicia in north-west Spain is experiencing both a shift away from traditional agro-forestry activities and depopulation. These changes are negatively affecting the local economy, local biodiversity and also the provision of environmental services, including carbon sinks and the production of biofuels. These challenges are accentuated by the threats posed by climate change and forest fires...

The LIFE Information and Communication project CHANGING THE CHANGE started from the understanding that a major obstacle to maintaining a well-managed, healthy and sustainable agro-forestry sector was a lack of understanding amongst farmers of the interrelationship between their activities and climate change. The project's objective was thus to build this awareness in a way that was meaningful to farmers on the ground.

Developing expertise

To ensure the awareness-raising efforts had a solid factual basis, the project established a panel of experts from local universities and national and regional public administrations. The panel oversaw the work of the project and validated all outputs. More than this, it proved an excellent means of improving academic and administrative understanding of the needs of the agrarian sector in the face of climate change

An initial survey of the 'on the ground' situation of a representative sample of 2 000 farms in the region was completed through a process of mediation with technicians from the 37 local offices of the project beneficiary (the farmers' association, UPA, in Galicia). This proved an excellent methodology for identifying current attitudes, practices and knowledge gaps in the farming community. UPA's experience of representing farmers' interests helped smooth the implementation of the project.

As the project unfolded, the technicians also took on an important role in informing farmers on important legislation, available subsidies to improve environmental standards and specific guidance on how to implement good practices. The technicians engaged farmers directly and established information contact points in the local UPA offices. Nearly 7 000 information requests were recorded during the project.

Changing the attitudes of these technicians towards environmental issues and developing their role in promoting two-way communication with the farmers proved key to the success of the project. To help the technicians fulfil this role, the project provided them with four specific day-long training workshops, as well as regular and ongoing updates to pass on to farmers.

Information material and events

By combining the knowledge of the experts with the findings of the survey, the project was able to identify the most important communication needs and design its awareness-raising campaign and associated materials accordingly. It started with two strategy documents on climate change adaptation and mitigation in the agro-forestry sector and

Climate change is affecting the agro-forestry sector in Galicia, through increased droughts, storm damage and erosion

Photo: Uniòns Agrarias-UPA

specific eco-guides for the agriculture, forestry, livestock and wine sectors.

The beneficiary organised five general workshops and 16 sector-specific workshops across Galicia. All events were advertised in the local media, on panels in villages, and by SMS and they were thoughtfully planned to take place when farming activities were less intense. Attendances were high with each general workshop attracting some 100 farmers, and around 50 attending each sectoral event.

Wider public dissemination of the relatively specialist project messages was a challenge. Nevertheless, the project published articles in farming magazines and presented the project at two important rural/environmental fairs. It also directly reached 537 schoolchildren in rural communities through 16 workshops focused on "The Galician farmer in a context of climate change". These had the added benefit of increasing the pride of the children in the role of local farmers, their parents or grandparents.

A poster contest encouraged the children to consolidate their learning and ideas following the workshops. The posters now represent another interesting output of the project alongside material such as the eco guides, workshop information packs and a travelling exhibition used at all project events.

Long-term behavioural change

The project focused its messages not on high-level scientific data or idealistic 'green' concepts but on practical aspects providing attainable benefits to the farmers. Specifically, messages focused on the available subsidies and potential long-term economic advantages of more sustainable practices.

The project organised awareness days in schools under the theme "The Galician farmer facing climate change"

Photo: Unións Agrarias-UPA

"CHANGING THE CHANGE" travelling exhibition

Farmers can now adhere to a sustainable farming contract, enjoying additional advantages from the authorities.

Twice-yearly follow-up surveys during the project already identified increased use of biofuels and solar panels, less use of nitrogen fertilisers, more land devoted to agro-fuel crops and forest, and more crop rotation. For individual farms this was delivering reduced water and energy consumption and improved soil carbon content.

Only time will tell if the project's activities have created enough impetus to generate the long-term positive changes necessary to create a sustainable and climate-friendly rural economy in Galicia. Additional funding for the continuation of training and awareness raising activities would be beneficial, but the LIFE+ project can already hope to represent a turning point in how agricultural stakeholders in general, and the UPA in particular, see their role in the region.

The relationships built at different levels between scientists, rural administrators, technical advisors and farmers on the ground should continue to develop both understanding and dissemination of issues related to agro-forestry in the face of climate change.

Project number: LIFE07 INF/E/000852

Title: CHANGING THE CHANGE - LIFE+campaign 'Changing the change'. The Galician agriculture and forest sector facing climate change

Beneficiary: Unions Agrarias - UPA

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Period: 01-Jan-2009 to 31-Dec-2010

Total budget: €533 000

LIFE contribution: €266 000

Sweden: **Preparing a new generation for the environmental challenges ahead**

The COM-U project used the Swedish Eco-Schools programme to deliver training and educational materials to help young people engage with environmental issues.

Young people are continually exposed to alarming reports of environmental problems. There is evidence that Swedish children, for instance, feel anxious about global issues such as climate change, as well as local issues such as pollution. They do not always have an opportunity to discuss their fears about these issues, which appear to be beyond of their control. “There is so much happening on planet Earth,” says Monika Bloomberg, a teacher at Äppelgården Preschool, “it is important to start working with the youngest children.”

The objective of the LIFE Information & Communication project COM-U was to communicate on environmental actions with children and youth. Its aim was to create a well-informed generation of people with the knowledge and tools to think through the issues, recognise that collectively they can make a difference, and have the competence and confidence to help solve environmental problems.

The project operated within a framework of 16 practical environmental objectives to be achieved by 2020, which the Swedish government is pursuing in line with European Union policy. These objectives were used to structure awareness-raising activities in schools and pre-schools.

The role of Eco-Schools

COM-U reached 29 000 teachers and 340 000 children, and was active in 209 out of 290 Swedish municipalities. The key to the project´s success was the efficient cooperation between coordinating beneficiary Håll Sverige Rent (the Keep Sweden Tidy Foundation) and regional coordinators around Sweden, and the use of the Eco-Schools programme as a core tool.

The Eco-Schools programme started in the 1980s. In the 1990s, it became an international sustainable schools initiative run by the Foundation for Environmental Education (FEE) involving around 60 countries. In Sweden, the Eco-Schools programme is administered by the Keep Sweden Tidy Foundation. Green Flag (Grön Flagg) certification is awarded on the basis of visits to assess and raise awareness about sustainability in educational institutions. Over 3 000 Swedish schools and pre-schools proudly fly Green Flags outside their buildings.

The project contributed to 1 200 schools and pre-schools joining the Swedish Eco-Schools programme

COM-U established a national network of regional coordinators to implement the project. They helped deliver courses, meetings and personal support to schools and pre-schools. As a result, 1 200 new schools and pre-schools joined the Swedish Eco-Schools programme. “It was not very difficult to join the Eco-Schools programme,” recalls Vivi-Anne Granlund, a teacher at Härnevi Preschool. “Everyone in the staff understands what we need to do, so now everybody is trying to contribute.”

Pupils help in the management of the food waste generated in the school canteen

Valuable links were also established between educational institutions and local authorities, with participating Eco-Schools having a designated individual contact point within the municipal government to help support their environmental work.

COM-U trained and inspired nearly 30 000 teachers and other school staff, who in turn passed on their knowledge to children using the tools promoted by the project. The training focused on how to integrate environmental issues into the school curricula. "The COM-U course and the Eco-Schools programme has made us more aware of what we do and has changed the way we think and talk about our environmental work," says Vivi-Anne Granlund.

Concrete objectives

Two levels of EU environmental policy courses were delivered, both based on material provided by the beneficiary to the regional coordinators. The first course, for environmental representatives from participating schools and pre-schools, was taught on 305 occasions to around 7 000 teachers in 210 municipalities. All school personnel could attend a shorter second course, which was held 870 times, involving 14 500 teachers.

The LIFE project produced educational materials that covered the full range of environmental themes relevant to national and EU policy objectives, in ways that made them tangible to young people. "The Eco-Schools programme helps us to make the environmental objectives concrete," claims Camilla Lundmark at Arentorp School. The Waste Recycling theme, for instance, involved the creation of 'waste art' (e.g. a city made from waste). "You can make something useful out of waste," explains Monika Bloomberg, "It's all about making children aware they can reuse things - you don't have to throw everything away." Another theme was Lifestyle and Health, which encouraged children to weigh food waste generated at lunch time, compost it, and grow vegetables in the compost.

The project distributed 9 000 jigsaw puzzles to schools, linked to National Litter Picking Days 2011, and organised two competitions for schools with commercial sponsors. Printed and Internet-accessible teaching resources included a 'Guide to Energy and Climate'. Keep Sweden Tidy also produced three films (http://www.hsr.se/fakta/vara-filmer) during the LIFE project, to inspire and raise awareness among young people, to provide information about Eco-Schools tools, and to explain the benefits of the Eco-Schools programme.

COM-U reached a wider audience, including municipal school administrations, teachers' organisations and environmental groups, through lectures and seminars at educational fairs, a quarterly newsletter sent to schools, regional coordinators and international partners, as well as via the project website.

Information and experience was shared with other countries through a dissemination campaign that included a networking conference in 2011 with representatives from 10 EU Member States and Norway. LIFE COM-U was a successful national demonstration project with components that could be easily transferred to other European countries.

Overall, COM-U made an important contribution to enhancing the teaching of environmental issues in Sweden, whilst providing a practical view of how to address environmental challenges. It is hoped that the increased knowledge and awareness of young people will produce long-term environmental benefits. "The work with the Eco-Schools programme creates ripples in the water for both children and grownups. The children carry along an awareness that spreads to the parents," concludes Monika Bloomberg.

Project number: LIFE07 INF/S/000901

Title: COM-U - Communicating environmental actions to children and youth

Beneficiary: Stifelsen Håll Sverige Rent (HSR) / Keep Sweden Tidy Foundation

Contact: Lisa Adelsköld

Email: info@hsr.se

Website: http://www.hsr.se

Period: 01-Jan-2009 to 31-Dec-2011

Total budget: €2 535 000

LIFE contribution: €1 261 000

UK: **Cartoons raise kids' environmental awareness**

My Friend Boo, a cartoon created by the LIFE Eco-Animation project, successfully bought simple environmental messages to millions of children, parents and teachers across the EU. At the end of the project broadcasting deals were secured in 19 countries, in 17 languages.

Current dialogues concerning environmental issues and sustainable development tend to emphasise the need to look to the next generation. The focus is on getting adults to act now to make sure that our children are left with enough natural resources. The partners of the Eco-Animation project, however, have taken a slightly different approach. They believe today's kids are potentially tomorrow's polluters and that empowering them to adopt more environmentally-responsible behaviour is the key to a more sustainable future.

The right kind of communication is crucial to the success of this idea. Children need a greater understanding of important topics, such as where their energy comes from, why species are in danger of extinction and why water is scarce, before they can be motivated to become more environmentally friendly. Most importantly they need to be shown how their actions can have a positive effect on the environment and what advantages this will have for them. The challenge is how to communicate the complex but pressing issues to children, when they are often too complicated and just too vast for young people to identify with, or to understand. The company, Business Solutions Europa (lead partner in the Eco-Animation project), has been using animated stories to communicate European policies since 2008.

"We were the first" to work in this way with the EU institutions, recalls Luigi Petito, the company's managing director and the LIFE project coordinator. "We were looking for ways to modernise public policy communication and found that the best way to reach out to kids was through the engaging and creative format of cartoon animations." Cartoons quickly get to the point, can cross gender, age, linguistic and cultural barriers and can provide great role models for children.

My Friend Boo

Business Solutions Europa and the other project partners, WWF European Policy Office, Griffilms Ltd (UK) and EXPLORA (IT) developed the Eco-Animation project in order to encourage European children aged 5-8 to engage with simple environmental messages. The cartoon was to be produced in English and translated into three other European languages and would teach the children that small actions can improve quality of life and the future of the planet. The partners wanted to find out which messages worked best with this target group, directly engage with them through a medium they would enjoy and indirectly reach their parents and teachers.

The project was launched at the London Wetlands Centre

It took the team six-to-nine months and a unique and innovative production model to develop their cartoon. The storylines and messages were developed with the scientific support of experts and contributions from 500 children from five European countries. The process involved a pre-production brainstorming phase, a production phase and post-production dissemination and distribution. Production was the most complex phase: the Eco-Animation team worked with a number of focus groups of 5-8 year old children from Belgium, Bulgaria, Ireland, Italy and Poland, who reviewed and provided honest feedback on the characters, concepts, messages and storylines. "It was a very intense and creative international co-production," says Mr Petito.

The end product was three episodes of the cartoon My Friend Boo on the topic of water conservation and an accompanying teaching pack for teachers. The protagonist of the cartoon series is Boo, a dog who uses a magic carousel to take his friends Lucy, Ben and Jaq on adventures to show them the consequences of pollution, water shortage and waste. At the end of the project the three episodes had been distributed to broadcasters in 19 countries, in 17 languages, reaching around 25 million homes. This greatly exceeded the original target of reaching three million children and half a million adults. "We distributed the cartoon using the usual channels to reach broadcasting companies, such as the content trade fair MIPCOM," Mr Petito explains. "In addition, a member of my team had experience in the distribution of TV formats, which enabled us to achieve these incredible results."

Creating positive content

The methodology used to produce My Friend Boo can be replicated for many environmental topics. In fact, a further six episodes of the cartoon have been created. Funding from the Young Energy Savers initiative (funded by the European Commission's Intelligent Energy Europe programme) enabled the team to produce three episodes on the topic of energy conservation and financial support from the ACTIVE project (FP7) produced three more episodes on healthy living. Additional teaching packs for each theme are also available. Furthermore, the cartoon series can easily be transferred to other countries and cultures. My Friend Boo has been already been distributed to countries outside Europe.

The cartoon's characters and messages were tested using focus groups of 5-8 year olds in participating countries

"Finding the revenue for further episodes should not be a problem and there are a number of channels we can go down," remarks Mr Petito. "The resources will come if there is a clear framework and a long-term vision to innovate and promote a new communication approach involving the production and distribution of positive content for children." Project partners hope that the European Commission will help to get the ball rolling, building on the work they carried out during Eco-Animation to develop a broader communication programme that uses animated formats and new media to engage young people with all relevant EU policies.

Project number: LIFE07 INF/UK/000950

Title: Eco-Animation: a cutting edge cartoon to raise awareness on climate change and sustainable use of natural resources among European children

Beneficiary: Business Solutions Europa Limited

Contact: Luigi Petito

Email: luigi@bs-europa.eu

Website: http://www.animate-eu.com/eco

Period: 01-Jan-2009 to 31-Mar -2011

Total budget: €384 000

LIFE contribution: €183 000

Available LIFE Environment publications

LIFE Environment brochures

LIFE and Air quality (2014, 76 pp. – ISBN 978-92-79-38304-5 – ISSN 1725-5619)

LIFE and Soil protection (2014, 68 pp. – ISBN 978-92-79-38305-2 – ISSN 1725-5619)

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Other publications

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

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

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

The LIFE programme is the EU's funding instrument for the environment and climate action

Period covered 2014-2020

EU funding available approximately €3.46 billion

Allocation of funds Of the €3.46 billion allocated to LIFE, €2.59 billion are for the Environment sub-programme, and €0.86 billion are for the Climate Action sub-programme. At least €2.8 billion (81% of the total budget) are earmarked for LIFE projects financed through action grants or innovative financial instruments. About €0.7 billion will go to integrated projects. At least 55% of the budgetary resources allocated to projects supported through action grants under the sub-programme for Environment will be used for projects supporting the conservation of nature and biodiversity. A maximum of €0.62 billion will be used directly by DG Environment and DG Climate Action for policy development and operating grants.

Types of projects Action Grants for the Environment and Climate Action sub-programmes are available for the following:

> "Traditional" projects – these may be best-practice, demonstration, pilot or information, awareness and dissemination projects in any of the following priority areas: LIFE Nature & Biodiversity; LIFE Environment & Resource Efficiency; LIFE Environmental Governance & Information; LIFE Climate Change Mitigation; LIFE Climate Change Adaptation; LIFE Climate Governance and Information.

> Preparatory projects – these address specific needs for the development and implementation of Union environmental or climate policy and legislation.

> Integrated projects – these implement on a large territorial scale environmental or climate plans or strategies required by specific Union environmental or climate legislation.

> Technical assistance projects – these provide financial support to help applicants prepare integrated projects.

> Capacity building projects – these provide financial support to activities required to build the capacity of Member States, including LIFE national or regional contact points, with a view to enabling Member States to participate more effectively in the LIFE programme.

Further information More information on LIFE is available at http://ec.europa.eu/life.

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

Contact

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European Commission – Directorate-General for Climate Action – B-1049 Brussels (clima-life@ec.europa.eu).
European Commission – EASME – B-1049 Brussels (easme-life@ec.europa.eu).

Internet http://ec.europa.eu/life, www.facebook.com/LIFE.programme, twitter.com/life_programme, www.flickr.com/life_programme/.

LIFE Publication / Best Environment projects 2013

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