European Commission

Environment & Resource Efficiency

LIFE PROJECTS 2015

LIFE Environment

Environment

EUROPEAN COMMISSION
ENVIRONMENT DIRECTORATE-GENERAL

LIFE (*"The Financial Instrument for the Environment and Climate Action"*) is a programme launched by the European Commission and coordinated by the Environment and Climate Action Directorates-General. The Commission has delegated the implementation of many components of the LIFE programme to the Executive Agency for Small and Medium-sized Enterprises (EASME).

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LIFE Environment & Resource Efficiency 2015: Commission funds 56 new projects in 10 countries with €71.9 million

The European Commission has approved funding for 56 LIFE Environment & Resource Efficiency projects under the LIFE programme, the European Union's fund for the environment and climate action. The action grants have been awarded to 'beneficiaries', or project promoters in 10 Member States. The projects are led by beneficiaries based in Belgium, France, Germany, Greece, Italy, The Netherlands, Portugal, Spain, Sweden and the United Kingdom.

LIFE Environment & Resource Efficiency in 2015

LIFE Environment & Resource Efficiency co-finances pilot and demonstration projects developing, testing and demonstrating policy or management approaches, best practices and solutions to environmental challenges. The 56 projects selected for funding will be led by a range of public and private sector organisations.

The projects involve a total investment of €142.2 million, of which the Commission is providing action grants worth €71.9 million.

These projects cover actions in five thematic areas: air, environment and health, resource efficiency, waste and water. The 21 resource efficiency projects alone will mobilise €43.0 million that will facilitate Europe's transition to a more circular economy.

The nine waste projects will have a total budget of €34.6 million; the total budget for the 15 water projects is €31.9 million; five air projects will have a total budget of €19.3 million; and a total of €13.4 million will go towards six environment and health projects.

Background

The LIFE programme is the EU's funding instrument for the environment and climate action. The general objective of LIFE is to contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value.

The budget for the LIFE Programme for 2014–2020 is set at €3.4 billion in current prices, administered through the Environment and Climate Action sub-programmes.

The Climate Action sub-programme will provide €864 million in co-financing for climate projects between 2014 and 2020. Its main objectives are to:

- Contribute to the shift towards a low-carbon and climate-resilient economy;
- Improve the development, implementation and enforcement of EU climate change policy and legislation;
- Support better environmental and climate change governance at all levels; and
- Support the implementation of the 7th Environment Action Programme.

More information on each LIFE Environment & Resource Efficiency project is available at:: http://ec.europa.eu/environment/life/project/Projects/index.cfm

Contact details for the relevant national authorities can be found at: http://ec.europa.eu/environment/life/contact/nationalcontact/life_env.htm

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Location	Project number	Title of project
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Location	Project number	Title of project
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Production of fully recyclable and reusable green composites based on bioresins and natural fibres

LIFE15 ENV/BE/000204
LIFE RECYSITE

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Duration of project:
36 months (01/07/2016 – 30/06/2019)

Total budget in euro:
2,073,656.00

EU contribution in euro:
1,233,391.00

Project background

The benefits of components and products designed and produced in fibre-reinforced composite materials to substitute metals are well recognised by many industries. The higher strength, lower weight and reduced maintenance requirements of these materials has led to many engineering applications in the transport industry and in the construction sector.

Thermoset composites are more widely used than thermoplastic composites because they enable easier fibre impregnation and therefore easier processing, higher thermal stability, stiffness, strength and resistance to creep. However, these thermoset composites present two major environmental problems. Firstly, recycling or reuse of conventional thermoset composites is extremely difficult as they cannot be remoulded, reshaped or dissolved. Secondly, current composite applications mainly use non-renewable petroleum-based resources. On the other hand, strategic sectors, such as the transport industry, require more sustainable materials and need to fulfil European regulation in terms of waste management. Solutions are needed to reduce the problem of composite disposal and to avoid incineration or landfill.

Project objectives

The RECYSITE project aims to develop thermoset eco-composites from renewable resources: natural fibres from biowaste (linseed fibres) and resins from natural resources (linseed oil and humins). The project will optimise the treatment of two bio-materials - fibres and resins - in two pilot plants that are used to produce cost-efficient and 100% recyclable eco-composites. It will then validate the proposed solutions in two different sectors: transport and construction. In particular, the project will validate the composites in a refrigerated swap body for the transport industry and modular façade walls for the construction sector. These two sectors have been chosen due to their importance to the European economy. They involve more than 15% of the jobs and GDP in Europe, which will help boost the transferability of the results.

The project will contribute to the implementation of the Roadmap to a Resource Efficient Europe and its goal of turning waste into resources, and the End-of-Life Vehicles Directive, establishing that the design and production of new vehicles facilitates their dismantling, reuse, and the recovery of components and materials.

Expected results

- Development of innovative processes for the recycling of new biomaterials, via the recovery of the fibre and matrix;
- Production of individual components from composites with a 100% recyclability rate, and cost-effective substantial weight reduction;
- In the transport sector, the selected demonstrator will be built with a target curb weight reduction of 30-50% and reduced raw material consumption of up to 30% with respect to the current metallic parts;
- In the construction sector, the use of conventional composite materials will target decreases in the production, due to the use of sustainable lightweight composite materials having at least 20% lower carbon footprint than the conventional cement;
- Processing of 100 tonnes/yr of natural fibre and 40 tonnes/yr of bio-based thermoset resins;
- Evaluation of the project's impact on the environmental problems identified and on the socioeconomic conditions; and
- Preparation of support documents for Spanish, French, Belgian and Dutch governments for the recycling strategies and methodologies in transportation and construction.

REFRESHMENT – Pilot for enviRonmEntally FRiendly, Efficient, Sustainable and Healthy products developMENT

LIFE15 ENV/BE/000267
LIFE REFRESHMENT

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Duration of project:
30 months (01/07/2016 – 31/12/2018)

Total budget in euro:
2,312,910.00

EU contribution in euro:
834,792.00

Project background

The brewing process generates large amounts of by-products and wastes. Spent grain is the most abundant by-product, accounting for around 85% of the total generated brewing by-products.

Due to its high protein and fibre content and abundance throughout the year, several alternative uses for spent grain have already been explored. However, there are a number of barriers to the large-scale adoption of some of these alternatives. First, the spent grain contains a high amount of water, which leads to significant costs and environmental problems associated with transport and/or drying procedures. Secondly, due to its high moisture and fermentable sugar-content, the spent grain spoils quickly and thus needs to be used within a few days.

As a result, the spent grain by-product is currently mainly used as animal feed, while its application as raw material in food, energy production and biotechnological processes is still underdeveloped and its nutritional value untapped.

Project objectives

The main objective of LIFE REFRESHMENT is to develop an innovative method for the re-use of spent grain as a raw material for the production of two types of non-alcoholic beverages. The first will be a clear organic fermented and carbonated drink. The second will be a healthy cereal-based breakfast drink, containing fibre and probiotics. Moreover, the by-products generated during the production of the healthy beverages from spent grain could also be re-used for the production of cereal bars.

The project will be implemented initially on a demonstration scale, then on full industrial scale at the Stella Artois brewery in Leuven, Belgium. The concept process will be adapted to different natural flavours in the beverages. This technique will also increase resource efficiency and reduce and valorise the waste generated during the brewing process. Some 30% of all produced spent grain could potentially be further processed using this new technology. The project therefore has a potential global impact, contributing to a shift towards a circular bio-based economy, with a reduced ecological footprint.

In addition, the project technology also offers good prospects for replication, and thus is in line with the goals and priorities of the 7th Environment Action Programme. It also contributes to the implementation of other EU policy and legislation, including the new EU Circular Economy Package and the Waste and Water Framework directives.

Expected results

- Resource efficiency: around 42 000 tonnes of spent grain produced in the Leuven and Magor breweries will be re-used on site;
- CO_2 reduction: around 14 472 tonnes CO_2 reduction associated with transport as the spent grains will be re-used on site;
- Water usage: due to the high amount of water in the spent grain, water usage efficiency will be 50-75% higher compared with the current process used in the cereal-based beverage industry; and
- Development of a new 'green' economic activity encouraging the creation of new jobs in the brewing industry.

Fire and Ageing Resistant Biocomposite for Transportation industrY

LIFE15 ENV/FR/000412
LIFE FARBioTY

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Duration of project:
36 months (01/09/2016 – 31/08/2019)

Total budget in euro:
1,440,182.00

EU contribution in euro:
855,061.00

Project background

The transportation sector is the largest industrial source of CO_2 emissions in Europe. One of the reasons for this high figure is the widespread use of glass fibre composite materials, whose production uses large amounts of non-renewable sand, water and energy; compounded by the poor recyclability of carbon and glass fibre reinforced epoxy. The current production of composite materials therefore goes against ecological priorities set in the Roadmap to a Resource Efficient Europe, the Circular Economy Package and the Roadmap to a Single European Transport Area. The latter sets objectives regarding all aspects of transportation, with the aim of reaching a 60% reduction in transport emissions by 2050. A key area of innovation for reaching this target is materials and design. The development of alternatives to lightweight glass fibre composite materials, especially using natural fibres that have equivalent qualities, would significantly reduce environmental impacts – e.g. by being more recyclable, biodegradable and less energy-consuming during their production. However, the potential of such materials has yet to be fully exploited, with combustibility being a particular concern.

Project objectives

FARBioTY aims to reduce the environmental footprint of the transport industry by increasing the volumes of flax fibres used for producing composite materials. New techniques of integrating the materials into resins will be used to produce new composite materials with good (equivalent) mechanical properties. Crucially, the project will implement a new solution to make these natural fibres pass European fire standards, given that they cannot be used in transport applications otherwise. Flax fibres adoption has the potential to reduce fibre glass production and the exploitation of raw materials (sand, petroleum-derived materials and water). Flax is a natural and abundant resource, which can be sustainably managed to provide the natural fibres needed. The project therefore contributes to the Roadmap for a Resource Efficient Europe and the Circular Economy Package. The project will demonstrate the new material in the railway sector by measuring environmental impact and mechanical performance in situations where the innovative composite material is used instead of glass fibre reinforcement. The results will be compared with data available for currently used composite materials through a life-cyle assessment (LCA).

Expected results

- A demonstration for railway sector applications that shows that one tonne of flax fibre can replace 0.58 tonnes of glass fibre, so contributing to the avoidance of sand consumption, reducing water consumption by 30%, non-renewable energy consumption by 30%, and CO_2 emissions by 56% per functional unit produced;
- A complete preliminary study;
- The detailed technical specifications for the flax fibres and resins to meet standards of the railway sector;
- Technical and functional specifications of the railway beacon to be produced;
- A step-by-step description of the production process;
- The new treated biocomposite material;
- One sample of the new railway beacon;
- Data on environmental benefits of the whole fabrication process, compared to the one employing glass fibres through LCA;
- Technical data on the composite material and railway beacon performances during the year-long demonstration period, with a focus on meeting fire standards, and a longer term view through simulations; and
- Exploitation plan and recommendations for replicating the technology in other transport sectors and for meeting the standards required for use in the naval and aeronautic sectors.

Cropping hyperaccumulator plants on nickel-rich soils and wastes for the green synthesis of pure nickel compounds

LIFE15 ENV/FR/000512
LIFE - AGROMINE

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Duration of project:
48 months (01/07/2016 – 30/06/2020)

Total budget in euro:
2,730,456.00

EU contribution in euro:
1,582,800.00

Project background

The worldwide demand for nickel (Ni) is experiencing an unprecedented growth under current industrial and economic pressures. The European Innovation Partnership (EIP) classified Ni as a raw material with high economic importance. However, mine production mainly takes place outside of the EU, which represents only 8.6% of total world production.

Nickel-rich soils, such as ultramafic or serpentine soils have been abandoned by local farmers, but they have a high potential for metal recovery with application in metallurgical processes. Technologies are lacking to exploit primary sources in which Ni is present at significant levels but where extraction by conventional mining processes is not economically viable. New means of metal extraction, recovery or recycling are therefore urgently needed to reduce the dependence on imports. Phytomining or agromining is a non-destructive approach with good potential for the recovery of high-value metals from sub-economic ores.

Project objectives

LIFE - AGROMINE aims to demonstrate a non-destructive phytomining approach for the recovery of high-value metals from sub-economic ores. The project's approach will use plants to accumulate trace metals from soils and transport them to their shoots, which can then be harvested. Phytomining or agromining therefore offers an eco-efficient alternative to classical pyro- or hydrometallurgical processes.

Specific project objectives are to:

- Provide ecosystem services through agro-ecological phytomining cropping systems;
- Recover recycle valuable metals from Ni-rich soils and industrial wastes;
- Utilise by-products generated through the metal recovery process to improve soil fertility;
- Show the environmental benefits of nickel phytomining through life-cycle assessments, energy balance, monitoring of greenhouse gas emissions, carbon storage and the monitoring of the invasiveness of serpentinophyte plants and impacts on local biodiversity;
- Demonstrate the socio-economic viability of phytomining;
- Improve soil quality and function, and carbon storage, after implementing phytomining cropping systems; and
- Conserve rare and endangered metallophyte species after their introduction into cropping systems through the constitution of germplasm banks and the careful use of native and adapted wild species at agricultural and land remediation sites.

Expected results

- Five field trials established across Europe (Albania, Austria, Greece, Spain and France), covering distinct climate and soil conditions;
- A complete evaluation of the phytomining cycle;
- Demonstration of additional ecosystem benefits that can be obtained during the phytomining cycle through monitoring actions and training;
- Beneficial effects for different parameters demonstrated, such as a 10-50% increase in organic soil content and a 10-30% increase in water retention;
- The potential for using harvested biomass from each target plant species for Ni-products and energy provision demonstrated; and
- The economic viability of the phytomining process quantified.

Isobel - Integrated SOlutions for BEd Load management

LIFE15 ENV/DE/000162
LIFE+ - Isobel

Beneficiary:

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Duration of project:
42 months (01/07/2016 – 31/12/2019)

Total budget in euro:
1.812.231.00

EU contribution in euro:
1.087.338.00

Project background

River segments with hydropower facilities are usually considered as 'heavily modified water bodies' under the Water Framework Directive. A natural river continuously carries bed load material downstream, forming gravel and shallow water areas. These structures are important spawning grounds and nursery areas for many species. Barrages disrupt this process by keeping the bed load in the retaining area, which eventually silts up. This is the case for the river Iller (Germany), which is heavily influenced by water power facilities. Between Altusriedz and Lautrach, five power plants with barrages stop the natural bed load transport of the river.

The riverbanks are steep and mounted with large rocks. Many of the barrages already have bypasses to enable fish to pass the barrier. However, key habitats are still missing for several species that lived in this part of the river before the barriers were present. Therefore, despite the existing fish bypass structures, no natural development of the river banks and the alluvial zones is possible. Current bed load management techniques play a key role in the process of establishing these key habitats. However, they are not 100% effective and still disrupt the environment.

Project objectives

The LIFE+ ISOBEL project will demonstrate an innovative and environmentally friendly approach to revitalising the free-flowing parts of the river Iller and to reaching the good ecological status of all water bodies requested by the Water Framework Directive. The project's integrated bed load management system will be accompanied by guidelines for its implementation in rivers throughout Europe. The proposed system will much less disruptive to the river and river banks than current techniques, and also generate less noise and demand less transport and energy.

The project aims to:
- Define the 'good ecological status' for the targeted water body;
- Develop and implement target-orientated, minimally invasive, bed load management that generates the desired water structures;
- Establish suitable near-natural habitats for the flora and fauna (e.g. spawning and nursery grounds, protection against drifting at high water levels), by replacing existing rock mountings by flat riverside structures;
- Make the ecosystem more robust and climate resilient;
- Connect river, river banks and alluvial zones;
- Evaluate the water structure development, the effects on biodiversity and socio-economic impacts; and
- Develop guidelines to boost the replication and transferability of project results.

Expected results
- Diverse river and riverbank structures providing key habitats for the target species;
- Reduced overall demand for bed load material compared to conventional measures;
- Improved quality and quantity of habitats in the river, the river banks, the riparian zones and the bypasses, especially for rheophilic fish species;
- Improved biodiversity self-sustaining populations of many endangered species (e.g. *Hucho hucho, Cottus gobio, Triturus cristatus*);
- Monitoring of the impact of the activities (before, directly after, and one year and two years after), including the ways fish use the bypasses;
- Improved ability of natural habitats to adapt to climate change and improved landscape for recreational activities;
- Transferable guidelines for effective bed load management; and
- Results disseminated to all relevant target groups at regional and EU level.

Food for Feed: An Innovative Process for Transforming Hotels' Food Wastes into Animal Feed

LIFE15 ENV/GR/000257
LIFE-F4F (Food for Feed)

Project background

The food and drink value chain is responsible for 17% of the EU's direct greenhouse gas emissions and 28% of material resource consumption. European consumption of animal protein and water have global impacts; it is estimated that 90 million tonnes of food waste is produced every year, equivalent to 180 kg per person. In some EU countries, especially those in the south, the majority of food waste ends up in landfill. In Greece, for example, more than 95% of food waste went to landfill in 2013, either directly or indirectly.

The EU Landfill Directive (1999/31/EC) sets as a target a 35% reduction of biodegradable municipal waste going to landfill on the 1995 disposal level by 2020, and the Circular Economy Package foresees a binding target to reduce landfill to a maximum of 10% of municipal waste by 2030. It also foresees that measures will be taken so that foodstuff and by-products from the food chain are used in feed production without compromising safety.

Project objectives

The main aim of the LIFE-F4F (Food for Feed) project is to evaluate though a pilot-scale demonstration, an innovative and simple technology, and a low-emission process that enables the safe transformation of food waste – mainly from hotels and more generally from the hospitality industry and restaurants – into animal feed. The aim is to collect 150 to 200 tonnes of food waste during the project, and it is anticipated that 2.5 to 3.0 tonnes of food waste will produce 1.0 tonnes of feed.

Food will be processed using solar energy to pasteurise and dry food waste, a process that has not been tested or applied previously. The F4F process will address the need to reduce waste food going to landfill, and will support the implementation of separation schemes at source for food waste to create valuable raw materials for the production of feed. This re-use process will transform a waste management process into a feed producing one. As it utilises solar power, it is also a low energy and low carbon emission process. The project aims to influence EU legislation on waste, the Circular Economy Package and the Roadmap to a Resource Efficient Europe.

Beneficiary:

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Duration of project:
42 months (01/09/2016 – 28/02/2020)

Total budget in euro:
2,580,619.00

EU contribution in euro:
1,459,227.00

Expected results

- At least one full-scale industrial unit implementing the F4F process;
- A source separated food waste collection system that does not affect the quality of the collected food waste, especially in relation to the presence of non-food waste.
- A hand sorting, grinding and solar drying/pasteurising pilot unit, able to produce at least 50 tonnes/yr of acceptable quality feed;
- A detailed feed production manual based on the operational data of the pilot unit and the extended evaluation of the end product;
- A series of manuals such as design, construction, business and marketing plans that would provide all the technical, operational and economical details;
- An environmental assessment of the process; and
- Feeding of results into the EU legislation on waste, the Circular Economy Package and the Roadmap to a Resource Efficient Europe.

New desulphurisation technology for SOx reduction with positive net environmental impact based on MgO reagents

LIFE15 ENV/GR/000338
LIFEPOSITIVEMgOFGD

Beneficiary:

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Duration of project:
42 months (01/07/2016 – 31/12/2019)

Total budget in euro:
2,333,817.00

EU contribution in euro:
1,129,690.00

Project background

The EU Industrial Emissions Directive defines emission limit values for a wide variety of industrial activities. Permits for industrial activities are granted under the IED on the basis that installations implement best available techniques for their sector, which are described in best available technique reference documents (BREFs).

Magnesium oxide (MgO) production has increased in recent years in the EU, generating emissions of sulphur dioxide (SO2), nitrous oxides, carbon monoxide and carbon dioxide. The SO_2 emissions derive mainly from fuel combustion, which is needed to generate sufficient thermal energy to produce MgO. Production of magnesium oxide is covered by a BREF on cement, lime and magnesium oxide (CLM), however the effectiveness of the sulphur dioxide abatement techniques in the CLM BREF has yet to be proven for magnesium oxide production.

The CLM BREF references flue gas desulphurisation as the main technique for SO_2 emissions abatement. This involves wet scrubbing with reagents that neutralise the SO_2. The technique is efficient in reducing SO_2 emissions but consumes high volumes of water and has other disadvantages. An alternative is dry desulphurisation, but this involves use of hazardous absorbers and generates low-added value solid waste.

Project objectives

The LIFEPOSITIVEMgOFGD project will demonstrate that a new dry technology based on magnesium oxide reagents can be an effective desulphurisation solution for magnesite processing, especially for facilities located in areas with limited water resources. The project will test at full scale a technique to treat the combustion gases of a magnesite calcination rotary kiln located at the beneficiary's site in northern Greece, an area of limited water availability. The technique will generate waste in the form of a mixture of magnesium sulphate and magnesium oxide powders, which will be used to produce fertilisers and construction materials.

Expected results
The LIFEPOSITIVEMgOFGD project will prove the efficiency of a new dry flue gas desulphurisation technology, with the following quantitative results:

- A total reduction in sulphur oxides of 1 000-3 500 miligrammes per normal cubic metre (Nm^3), to reach an SOx level below 1 500 mg/Nm^3;
- A recovery rate of at least 75% of magnesium oxide sub-product from old mining waste;
- A recovery rate of at least 90% of the generated solid waste, which will be used for the production of fertilisers and construction materials;
- A reduction of at least 40% in energy consumption, compared to wet technologies;
- A reduction of at least 80% of the use of water, as compared to wet flue gas desulphurisation;
- Operation of a full-scale pilot installation, which will allow technical specifications and operating parameters for optimum performance to be determined, so that the technique can be considered as a best available technique when the CLM BREF is revised;
- A demonstration that the dry technology can be replicated in other plants because of the reduced investment requirements and operating costs. The technique also permits easy retrofitting of current installations, and produces a re-usable by-product;
- A life-cycle analysis to demonstrate the environmental and socio-economic benefits of the new technology; and
- Promotion of the project's results to the magnesia sector and to other energy-intensive sectors that rely on fuels that contain sulphur.

MOnitoring ozone injury for seTTing new critical LEvelS

LIFE15 ENV/IT/000183
LIFE MOTTLES

Beneficiary:

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Duration of project:
48 months (01/07/2016 – 30/06/2020)

Total budget in euro:
1,838,406.00

EU contribution in euro:
1,079,093.00

Project background

Climate change and air pollution are interlinked, representing a challenge for the management of forests. European standards for the protection of ecosystems, including forests, have been defined through experiments carried out under controlled conditions. Yet, research has highlighted the need to also conduct 'open-air' experiments and epidemiological investigations based on observations with high temporal resolution (e.g. one hour intervals). The monitoring of ozone (O_3) concentrations (the most phytotoxic air pollutant for trees) is difficult at remote forest sites and the use of passive samplers is unavoidable. Moreover, such monitoring systems suffer from low temporal resolution (e.g. two weeks to one month), making it impossible to correlate O_3 data with epidemiological observations. Most European countries carry out forest monitoring, but the different approaches used make comparisons problematic. Therefore, there is a need for a harmonised and up-to-date European forest monitoring scheme for O_3.

Project objectives

The LIFE MOTTLES project aims to define scientifically based thresholds and critical levels for the protection of forests from O_3 in the changing climate scenario. To do this, it will set up an integrated system of monitoring stations for the continuous measurement of parameters affecting the sustainability of European forest ecosystems. The system will be tested across three European countries. These tests will support the drawing up of recommendations and adaptive management strategies for sustainable forest management and stimulate the development of usable legislative standards for protecting forests against O_3.

Expected results

- An innovative network of monitoring stations across Europe, for the continuous investigation of parameters affecting the sustainability of forest ecosystems, in particular the O_3-induced diseases on vegetation;
- The creation of open-access data for complete integration of the new network with the European Forest Data Centre and the Forest Information System of the European Commission;
- Increased knowledge on air pollution effects on forest resilience to support the drawing up of adaptive management strategies;
- Efficient and effective integrated policies and measures for practical implementation of a sustainable forest management to maintain a healthy forest environment;
- Scientifically-based thresholds and critical levels to be considered as new legislative standards for protecting forests from O_3 pollution and for a long-term monitoring strategy;
- Guidelines for sustainable forest management;
- An assessment of EU regions' exposure and vulnerability to the effects of O_3; and
- Incorporation of the outputs into policy and management processes for forest protection, in particular through the adoption of an integrated monitoring system, and through support for future EU air quality decision-making.

S.O.S. 4 LIFE - Save Our Soil for LIFE

LIFE15 ENV/IT/000225
SOS4LIFE

Beneficiary:

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Name of contact person
Claudia CASTELLUCCI

Duration of project:
40 months (01/07/2016 – 31/10/2019)

Total budget in euro:
1,788,749.00

EU contribution in euro:
1,060,551.00

Project background

The vital functioning of soil is prevented by sealing, the covering of the ground by an impermeable material and a major cause of soil degradation in the EU. Soil sealing often affects fertile agricultural land, puts biodiversity at risk, increases the risk of flooding and water scarcity and contributes to global warming. The Soil Thematic Strategy highlights the need to develop best practices to mitigate these negative effects while, the Roadmap to a Resource Efficient Europe proposes that by 2020 EU policies take into account their impact on land use with the aim of achieving no net land take by 2050. A working group was set up to focus on European Guidelines on Best Practices to Reduce, Mitigate and Compensate Soil Sealing, though current studies suggest that soil sealing is nearly irreversible.

Project objectives

SOS4LIFE is a demonstration project that aims to implement European regulations on soil protection defined by the European guidelines on best practices to reduce, mitigate and compensate soil sealing. The main objective of the project is to implement a viable regulatory framework and planning tool to achieve, at municipal level, the 'no net land take' target and promote de-sealing interventions as a way of compensating for newly urbanised areas and improving urban resilience to climate change.

SOS4LIFE aims to address the lack of tools and appropriate urban regulations for municipalities to counteract land take. The specific objectives of the project are to:

- Evaluate ecosystem services provided by urban soils and quantify costs and impacts caused by land take and soil sealing, both in urban and rural contexts;
- Define a viable regulatory framework and operational tools for achieving, at the municipal level, the no net land take target and for promoting urban regeneration;
- Promote and practice de-sealing interventions as a way of compensating newly urbanised areas and improving urban resilience to climate change through practical case study applications;
- Give methodological bioclimatic criteria for the redesign of the de-sealed open spaces;
- Develop a Urban and Soil Decision Support System (US-DSS) to be adopted by municipalities and regions for monitoring land use change, soil-sealed areas, urban regeneration processes and soil ecosystem services;
- Transfer regulatory frameworks, tools and methods to other municipalities and local authorities both in Italy and elsewhere in Europe to allow for replication; and
- Raise awareness of the need to safeguard our soils among decision-makers, technicians and local citizens.

Expected results

- Definition and adoption by the three partner municipalities of a viable urban regulatory framework for achieving the no net land take target through a binding soil compensation system;
- Implementation of three de-sealing demonstration actions in urban areas for a total amount of de-sealed surface of 10 750 m^2;
- Guidelines for topsoil removal and placement: in each area, a plot of de-sealed soil will have been preserved and used for monitoring activities;
- Implementation of an US-DSS for the evaluation and monitoring, at municipal level, of land-use change, soil ecosystem services and disused areas;
- Development of a benchmarking method, at national and European level, for the evaluation of ecosystem services provided by urban soils and for the assessment of economic/environmental impacts caused by land take and soil sealing; and
- Definition of guidelines for the management of urban soils and best practices to improve their ecosystem services.

Noise Efficiently REduced by recycleD pavEments

LIFE15 ENV/IT/000268
LIFE NEREiDE

Beneficiary:

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Duration of project:
43 months (01/09/2016 – 31/03/2020)

Total budget in euro:
2,764,673.00

EU contribution in euro:
1,118,799.00

Project background

Noise pollution is a growing environmental concern. The Environmental Noise Directive requires the adoption of action plans to prevent and reduce environmental noise. Urban noise is, in fact, one of the main problems reported by citizens, and the World Health Organisation has repeatedly pointed out the health risks associated with exposure to noise. The Noise in Europe 2014 report highlights road traffic as the dominant source of environmental noise, with an estimated 125 million people affected by noise levels greater than 55 dB(A). One of the most popular solutions for mitigating noise pollution in urban areas is the use of soundproofed porous asphalt pavements as road surfaces.

Project objectives

The overall LIFE NEREiDE objective is to demonstrate the use of new porous asphalt pavements and low-noise surfaces made of recycled asphalt from pavements and particles of rubber from scrap tyres. These materials will be mixed with binders to produce road surfaces with the following specific benefits:

- Reduced disposal of waste materials, by using recycled materials, and a reduction in the use of new materials in line with the Circular Economy Action Plan and the Roadmap to a Resource Efficient Europe;
- Improved sound performance compared with material currently available;
- Improved safety in urban areas by good textured surfaces and improved drainage; and
- Less air pollution through the improved laying of asphalt.

The new road surfaces will be laid in two selected urban areas in Tuscany and tested with innovative device for measuring absorption. The effectiveness of the new road surfaces will be evaluated by measuring surface characteristics and acoustic properties and by taking user surveys. A secondary objective is to develop new techniques for monitoring performance of the new surfaces in order to improve the reliability of results. The effectiveness of the new asphalts will be monitored with reference to the response to noise before and after the tests.

The tests will lead to the development of specific guidelines to be used by road authorities in preparing specifications for the construction of new porous asphalt, low-noise and low-carbon footprint surfaces. Guidelines will be developed in order to upgrade and to improve the methods currently available for assessing the effectiveness of low-noise surfaces in urban areas.

Expected results:

- The recycling of around 24 000 kg of rubber from end-of-life tyres (around 4 800 tyres) for the production of at least 4 000 m of new asphalt pavements;
- Additional recycled rubber derived from the use of porous elastic road surfaces for a 400 m stretch of the new pavements;
- The use 25-50% of reclaimed asphalt pavement material in the production of the new road surfaces;
- Reduction of urban noise pollution in the selected sites by at least 5 dB(A) compared with traditional road surfaces, and 2 dB(A) compared to other traditional porous asphalt surfaces;
- Increased surface friction (more than 20%) with improvements in safety;
- New asphalt surface shown to be laid at temperatures of 30-40°C less than the temperatures used for rubber modified asphalts, reducing by 30% the emissions of polluting polycyclic aromatic hydrocarbons; and
- A life-cycle assessment of the new materials, their efficiency and effectiveness in terms of noise and air pollution reduction.

BrennerLEC - Brenner Lower Emissions Corridor

LIFE15 ENV/IT/000281
LIFE BrennerLEC

Beneficiary:

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Duration of project:
56 months (01/09/2016 – 30/04/2021)

Total budget in euro:
4,018,005.00

EU contribution in euro:
1,922,772.00

Project background

Road transport is responsible for around 60% of nitrogen oxides (NOx) emissions. For the regional section of the A22 highway in Italy, it causes 41% of NOx emissions. The EU's ambient Air Quality Directive provided for the development of plans to limit NOx emissions by 2015. Sustainable mobility foresees the implementation of different components that are essential for meeting air quality standards, such as the creation of low emission zones (LEZs). New concepts of high-impact LEZs represent not only a concrete answer to local air quality issues, but they can also contribute to climate change mitigation.

Dynamic road capacity and integrated traffic management measures address the optimisation of traffic flow on the highway, and even on other neighbouring road networks, with the goal of minimising associated energy consumption and greenhouse gas emissions. The objective is to reach a new overall equilibrium within a road transport system that is able to ensure the same levels of mobility freedom, but with a significantly lower carbon footprint.

Project objectives

The long-term objective of the LIFE BrennerLEC project is to apply a holistic concept of a low emission corridor (LEC) for the A22 highway. The project aims to implement and validate a set of measures to provide clear environmental benefits. It will also carry out extensive monitoring to consolidate a knowledge base and the development of environmental policy and legislation in highway environments. After the creation of the pilot-scale Brenner LEC, the project team will determine speed limits in the area based on forecasts of pollutant concentrations and traffic flows. Such pollutant forecasts will be carried out using an innovative meteorological and pollutant dispersion model, while forecasts of traffic flows will be done with transport flux models. Specifically, the project aims to:

- Manage speed limits applied to light vehicles as a function of the current and predicted air quality conditions;
- Manage road capacity by opening a temporary third lane during peak traffic conditions; and
- Manage integrated traffic based on current and predicted conditions.

Expected results

- Recommendations for extending the LEC approach to the Alpine corridor of the A22 highway and from there to the whole alpine corridor transiting through the Brenner Pass from Affi to Kufstein;
- Adoption of dynamic speed limit management measures: reduction of NOx emissions by about 20%; reduction of CO_2 emissions by about 10%; average reduction of NO_2 concentrations of about 5%; reduction of noise levels by about 1-2 dB; and improvement in the state-of-art efficiency of existing measures;
- Adoption of dynamic road capacity management measures: reduction of air pollutant emissions and greenhouse gases by up to 40% for light vehicles and 60% for heavy vehicles;
- Adoption of dynamic integrated traffic management measures: if jointly evaluated with the balance of the city, emissions reductions expected to be of the same order of magnitude as foreseen for dynamic road capacity management measures;
- Development of an LEC system that can be scaled up to the whole Alpine BLEC;
- Definition of an executive plan that indicates how the verified measures can be replicated in the whole Alpine LEC; and
- At least 70% of highway users respecting the measures.

Industrial pilot plant for semisolid process route with eco-compatible feedstock materials

LIFE15 ENV/IT/000303
LIFE CRAL

Beneficiary:

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Duration of project:
42 months (01/07/2016 – 31/12/2019)

Total budget in euro:
3,227,341.00

EU contribution in euro:
1,850,700.00

Project background

Lightweight vehicles have a strategic role to play in EU environmental policy. Lightweight aluminium alloys the current frontier for light components, are becoming more widely adopted. Massive and complex-shaped components are produced by cast aluminium, which competes with the heavier cast iron and more commonly nowadays with magnesium alloys, which though much lighter require the use of gases, such as sulphur hexafluoride, in the casting process. This gas is an extremely potent greenhouse gas that is also risky and expensive for industries. While automakers are pushed by stringent EU policies to produce light vehicles for reducing emissions, there is no evidence to suggest that light components reduce total CO_2 emissions over their entire life-cycle. The environmental costs of the aluminium and magnesium casting process completely nullify the environmental benefits of a lightweight component.

Project objectives

The LIFE CRAL project's main objective is to design and create a pilot line on a pre-industrial scale, which is able to produce high-quality, lightweight components from recycled low-purity (<95%) aluminium and the new eco-magnesium (ECO-Mg) alloys in a safe and clean manner. For the first time in the automotive sector, the pilot line will introduce the semisolid technology for metal casting based on a more sustainable process. The specific objectives of the project are to:

- Design, build, set up and monitor an innovative pilot line for producing braking system components using semisolid technology for casting;
- Substantially reduce the emissions caused by the production of alloys by using recycled aluminium and ECO-Mg;
- Completely avoid highly polluting gases in the magnesium casting process;
- Conduct analyses of the environmental technology impacts and a life-cycle assessment, in order to evaluate the entire 'cradle-to-exit' environmental impacts of the project's process; and
- Influence eco-labelling legislation.

Expected results

- Production of samples of braking system components, by using recycled low-purity aluminium with the same or superior mechanical performance as conventionally cast products, in order to achieve tensile strength and ductility of new components that are equal or better than series components;
- Parts for vehicles produced with the new ECO-Mg processed with semisolid technology;
- Elimination of the potential for acidification of any chemicals currently used in primary aluminium production;
- Elimination of Photochemical Ozone Creation Potential, which is produced by the reaction of NOx and volatile organic compounds under the influence of UV light;
- Reduction of the water scarcity footprint;
- Reduction of at least 85% of the CO_2 emissions associated with Al alloy and at least 60% of those associated with ECO-Mg alloy;
- A contribution to the introduction of the demonstrated technology in other industries and the raising of awareness of policy-makers of the environmental costs of the metal alloys in terms of cradle-to-grave life-cycle as outlined in the EU Circular Economy policy package.

Pilot technology for aerobic Biodegradation of spent TMAH Photoresist solution in Semiconductor industries

LIFE15 ENV/IT/000332
LIFE BITMAPS

Beneficiary:

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Duration of project:
30 months (01/07/2016 – 31/12/2018)

Total budget in euro:
1,676,923.00

EU contribution in euro:
1,003,753.00

Project background

The European Union's Water Framework Directive (WFD) states that its "ultimate aim is to achieve the elimination of priority hazardous substances and contribute to achieving concentrations in the environment near background values for naturally occurring substances". Some of these substances are synthetic organic chemicals that come from industrial activities.

A large amount of wastewater containing tetramethylammonium hydroxide (TMAH) is generated each year in Europe by electronics and semiconductor manufacturers. Because of the toxic properties of TMAH, the current limit of 7 milligrammes per litre (mg/L) is considered too high for adequate protection of aquatic ecosystems. Industrial streams containing TMAH require further treatment before they can be discharged into drainage systems. Current approaches to treatment of wastewater containing TMAH entail high costs for companies and negative environmental impacts.

Project objectives

The BITMAPS project will establish a pilot plant that will demonstrate a new and never-before attempted process for the treatment of effluents from electronics and semiconductor manufacturing.

The project will contribute to the implementation of the WFD by introducing more efficient treatment technologies that will help reduce TMAH pollution at source. By recycling wastewater, it will also demonstrate the application in practice of the circular economy priority of water re-use and savings in industrial processes. Moreover, in proposing a more efficient, effective and innovative solution for industrial wastewater treatment, the project will also contribute to one of the priority areas of the European Innovation Partnership on Water.

The project's specific objectives are to:

- Design, construct, and validate a pilot plant for treatment of effluent from electronics and semiconductor manufacturing that contains photoresist/TMAH (PR/TMAH), ammonium fluoride solution, and nitric, acetic and hydrofluoric mixed solutions;
- Demonstrate the use of microorganisms to facilitate TMAH biodegradation;
- Demonstrate the financial viability of the process using a life-cycle costing method;
- Demonstrate more-efficient water management and evaluate the re-use of treated wastewater in the industrial plant;
- Increase awareness of environmental issues among electronics and semiconductor manufacturers, influencing industrial investments in innovative and safer technologies.

Expected results

- Demonstrate biodegradation of PR/TMAH with an overall efficiency target of 99%;
- Demonstrate reduction of the TMAH level in wastewater by a factor of almost 20 (from 7 mg/L to 0.4 mg/L);
- Treat at least 500 m^3/year of wastewater containing PR/TMAH, 20 m^3/year of ammonium fluoride and 5 tonnes/year of acid mixture;
- Show a reduction in site water consumption from 6 000 m^3/year to 1 500 m^3/year;
- Realise operational savings from a 100% reduction in TMAH waste disposal costs, and a halving of the cost of reagents; and
- Propose new quality standards and guidelines for wastewater discharged from electronics and semiconductor manufacturing plants - helping policy-makers to fill the regulatory gaps on TMAH emissions.

New model of circular economy that also predisposes the use of waste materials in other industries

LIFE15 ENV/IT/000369
LIFE ECLAT

Beneficiary:

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Duration of project:
36 months (01/10/2016 – 30/09/2019)

Total budget in euro:
3,488,453.00

EU contribution in euro:
1,815,451.00

Project background

Hard-wearing countertops and tiles for kitchens and bathrooms are manufactured from ceramic or polymeric/composite materials. Both materials, however, present environmental problems. The use of ceramic produces large amounts of waste, while countertops made with composite materials – i.e. crushed stone bound together by a synthetic adhesive (e.g. epoxy and polyester resins) – are barely recyclable because their basic components cannot be separated. Both manufacturing processes require large amounts of natural stones (marbles and quartz). In 2007, the overall volume of stones used in the EU was some 1.1 billion m^2, an increase of more than 18% on the amount used in 2005. The waste generated in the manufacture of one square metre of composite countertop is estimated to be 1.3 kg of resin-contaminated waste, 3 l in finishing operations and 4 kg of cuttings from sizing operations.

Project objectives

The LIFE ECLAT project's main objective is to close the loop of the manufacturing cycle of ceramic countertops and tiles in line with the Circular Economy Action Plan and the Roadmap to a Resource Efficient Europe. This starts with the incoming atomised powders, leading to the finished products by means of mechanical and thermal processes, and finally to the recycling of end-of-life products through re-use by deconstruction operations.

The project will introduce an innovative forming process using belt-pressing of atomised powders that have undergone prior decoration using a dry inkjet-system. Once the initial ceramic slab is formed, it is cut to size and polished before firing. So, any possible waste generated during machining operations can be directly re-used in the same manufacturing process. A simple 'green cutting' operation (using diamond-coated pure steel tools) brings the slab to the desired size and the excess parts can be used in other formats, or directly recycled on site. The reverse side of the new ceramic slabs will be smoother which will facilitate both installation and dismantling. Packaging will also improved to avoid any generation of waste or additional use of resources.

Expected results

- A reduction of 0.9 kg/m^2 of cutting and polishing sludge (on a dry base) and around 2.5 kg/m^2 of fired scraps (broken during cutting, or defective slabs);
- A saving of 0.8 m^3 water/m^2 of slabs;
- Lower energy consumption, estimated at less than 50% in cutting and polishing, with at least 40% longer diamond wheel life and 90% longer mole life;
- Up to 40% usage of recycled raw materials, including reclaimed end-of-life products from dismantling of existing installations (9.2 kg/m^2, equivalent to 358.8 tonnes/year);
- Complete recyclability of the final product and its re-use in the manufacturing process, requiring only milling operations;
- Full recycling of powders generated during cutting and polishing, by simple remixing and re-pressing in the basic material;
- 30% increase in productivity during the cutting and polishing operations, due to the lower wear-resistance of the pressed slabs;
- A 40% cost saving in packaging for an average 1x1 m slab; and
- Fewer CO_2 emissions of an estimated 13.74 kg/m^2 of slab (430 tonnes of CO_2/year).

All figures are calculated on a pilot demonstration line of 130 m^2/day operating 300 days/year.

Reliable and innovative technology for the realization of a sustainable MARINe And coastal seabed management PLAN

LIFE15 ENV/IT/000391
LIFE MARINAPLAN PLUS

Beneficiary:

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Duration of project:
39 months (01/10/2016 – 31/12/2019)

Total budget in euro:
2,519,245.00

EU contribution in euro:
1,452,807.00

Project background

Harbours and tidal inlets on coastal areas are subject to a gradual deposition of littoral materials. Without maintenance of the seabed, they become unsuitable for commercial use. Traditional management involved the mechanical withdrawal of the sediments or the construction of marine infrastructure, such as entrance banks and seawards, in order to stabilise the seabed. The use of dredging equipment is the most common solution adopted, since it ensures improved navigability. In the EU, around 200-250 million tonnes (dry weight) of material is dredged in the marine environment every year. Dredging, however, has a high environmental impact on marine flora and fauna, and contributes to the mobilisation of contaminants and pollutants. It is also costly. Innovative solutions are thus required in order to ensure the seabeds of port inlets are sustainably maintained.

The port of Cervia in the Italian region of Emilia-Romagna undergoes cyclical inlet silting. Relevant data on port bathymetries (underwater depth) is available, in particular from 2009 onwards. Earlier technological solutions, such as seasonal dredging and sand handling through boat propellers and lengthening of the docks (completed in 2009), have not solved the problem. The Integrated Maritime Policy seeks to provide a more coherent approach to maritime issues, promoting increased coordination among different policy areas, such as blue growth, marine data and knowledge, maritime spatial planning, integrated maritime surveillance and sea basin strategies.

Project objectives

The main aim of the LIFE MARINAPLAN PLUS project is to scale up an innovative and environmentally sustainable technology for marine and coastal management. This technology has been designed in order to avoid the traditional collection of littoral materials near the entrance of harbours, through the use of submerged and static devices called ejectors, which are fed by pressurised water. Ejectors deliver a mixture of water and sediments through a pipe to suitable areas where sediments do not represent an obstacle to navigation. As a result, no turbidity or re-suspension is produced both near the ejectors and at discharge pipeline outlets, in compliance with the Water Framework Directive (WFD), which aims to prevent the deterioration of aquatic ecosystems including coastal water areas. Plant discharge pipeline outlets are located in marine currents in order to enable the natural removal of the sediment. Therefore, the ejectors simply move the sediments that are naturally transported by marine currents from a critical position to another one where sediments can be taken by the same current to somewhere where sediments do not constitute an obstruction to navigation..

Expected results

- An industrial scale modular plant for the maintenance of the seabed;
- A demonstration industrial-scale plant for seabed maintenance in the port of Cervia;
- A management plan that has been drawn up to pay particular attention to the potential replicability of the system. This plan will promote the sustainable management of the sediment, avoiding physical losses and physical damage and reducing disturbance, in particular underwater noise;
- Guaranteed access for boats to the port throughout the year;
- A 55% reduction of the yearly costs of maintaining the seabed; and
- Environmental and economic benefits: the demo plant will be monitored to verify its impact on marine flora and fauna (a sea floor integrity assessment and undersea noise measurements will be carried out). The target is to obtain a reduction of about 3.5 tonnes CO_2/yr.

VITiculture Innovative Soil Organic Matter management: variable-rate distribution system and monitoring of impacts

LIFE15 ENV/IT/000392
VITISOM LIFE

Beneficiary:

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Duration of project:
42 months (01/07/2016 – 31/12/2019)

Total budget in euro:
1,971,711.00

EU contribution in euro:
1,178,912.00

Project background

In Europe, there is a general lack of knowledge about the diverse functions of soils, and in particular about the best available measures for their improvement and conservation. In the specific case of vineyards, which have both economic and landscape value in Europe, there are several soil management problems that are often not adequately addressed at local or national level. These include erosion, decrease of organic matter content, compaction, contamination and restoration of carbon soil content. Modern viticulture is responsible for organic matter decline in vineyard soils, with transitions to intensive farming systems causing an increase in mechanisation and a reduction in row spacing that result in greater soil compaction.

Project objectives

The objective of the VITISOM LIFE project is to introduce an innovative organic fertilisation system as a strategy to enhance vineyard soil protection, in line with the EU Thematic Strategy for Soil Protection. The project aims to support sustainable soil management in the viticulture sector, through the development of a variable-rate technology for organic fertilisation in vineyards. The project also aims to provide cost-effective solutions for the improvement of existing viticulture practices in order to promote the conservation of the environmental functions of soils. Its methodology supports the transition to more sustainable farming, as well as the prevention of soil erosion and organic matter decline in the viticulture sector. The main specific objectives are to:

- Construct and implement five prototypes, each adapted to a specific pilot context and tested using different organic matrices (e.g. compost, manure, digestate);
- Improve the quality of vineyard soils in terms of soil structure, organic matter content and biodiversity, to help prevent erosion, compaction and organic matter decline;
- Increase vine production and upgrade grape and wine quality, with a possible positive economic impact owing to improved soil fertility;
- Reduce greenhouse gas (GHG) emissions from vineyard soils, in particular in terms of N_2O emissions, due to the increase of soil carbon sequestration; and
- Define a complete framework for vineyard organic matter management and the exchange of best practices.

Expected results

- Design and assembly of five innovative fertilisation prototypes for the distribution of organic matter in vineyards and their testing in five pilot areas with different environmental and agricultural conditions;
- An average increase at the end of the project of 5% of the organic matter in the soils where the prototypes are tested;
- An increase of soil biodiversity of about 5%;
- Around 10% reduction in GHG emissions from vineyard soils compared to chemical fertilisers;
- Around 10% reduction in odour emissions from the distribution of organic fertilisers;
- A reduction of costs of at least 20% related to organic matter distribution;
- Evaluation of the socio-economic impacts of the project;
- Quantification of the pilot vineyards' carbon footprint;
- Publication of a manual on good practices in vineyard organic matter management, and a green paper on a European strategy for vineyard soil and ecosystem protection; and
- Increased awareness of sustainable viticulture, with at least 100 European farms, 10 public authorities and about 5 000 wine consumers reached.

Bioremediation and revegetation to restore the public use of contaminated land

LIFE15 ENV/IT/000396
LIFE-BIOREST

Beneficiary:

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Duration of project:
36 months (01/07/2016 – 30/06/2019)

Total budget in euro:
1,710,267.00

EU contribution in euro:
968,274.00

Project background

Contamination by hazardous substances is one of the main causes of soil degradation and loss of terrestrial ecosystem services. In the European Union, there are 42 potentially contaminated sites and 5.7 contaminated sites per 10 000 inhabitants. Around 340 000 sites require remediation. So far, only 15% of known contaminated sites have been remediated.

The most common soil contaminants in Europe are heavy metals, mineral oils, polycyclic aromatic hydrocarbons (PAHs) and mixtures of benzene, toluene, ethylbenzene and xylene (BTEX). Mineral oils, PAHs and BTEX make up 45% of the inventory of contaminants in Europe. Contamination from these three categories is widespread in all EU countries, particularly Belgium, Hungary, Italy, Lithuania and the Netherlands, and in non-EU country Montenegro. Contamination is mainly linked to sites used for service stations and by the oil industry. Excavation of contaminated soils and disposal in landfills is currently the most common remediation technique.

Project objectives

The LIFE-BIOREST project aims to provide a viable method that uses fungal and bacterial strains for the in situ bioremediation of contaminated sites. The approach will be used to bioremediate soil from a site at Fidenza in northern Italy, reducing the presence of contaminants to within threshold limits for residential and public use, while restoring the ecological functions of the site. The project will also assess the cost effectiveness and replicability of the remediation methods, and will demonstrate the feasibility of scaling up to industrial level the production of micro-organisms that are used for bioremediation.

The project will also produce bioremediation guidelines, enabling the transfer to other locations of the techniques used; it will promote awareness of microbiological remediation of contaminated sites.

LIFE-BIOREST is in line with the EU Soil Thematic Strategy, which, among other things, calls for research into, and development of, operational procedures and technologies for soil protection and restoration. It also has the potential to contribute to the EU Biodiversity Strategy for 2020, which includes a target related to the restoration of degraded ecosystems. In addition, it will contribute to the implementation of circular economy principles by using agricultural waste and by-products from biogas production to promote microbial action at contaminated sites.

Expected results

- Establishment of a collection of bacterial and fungal strains that are able to degrade alkanes, PAHs and BTEX, in combination with use of organic by-products;
- Scaling up to industrial level the production of micro-organisms for the treatment of polluted sites;
- Demonstration of bioremediation of about 400 cubic metres of soil from the Fidenza site;
- Guidelines on the use of micro-organisms for the remediation of contaminated land, enabling transfer of the approach to other sites polluted by petroleum-related hydrocarbons;
- Demonstration of a reduction in the concentration of soil pollutants to levels compatible with residential or public use;
- Re-establishment of vegetation on the treated soil, showing that it can be used for the cultivation of different plant species; and
- Chemical, microbiological and eco-toxicological indicators of the quality of remediated soils.

A new environment-friendly manufacturing approach for marine antifouling coating

LIFE15 ENV/IT/000417
LIFE Paint-it

Beneficiary:

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Duration of project:
42 months (01/10/2016 – 31/03/2020)

Total budget in euro:
5,712,506.00

EU contribution in euro:
1,288,163.00

Project background

Fouling is the unwanted growth of biological material - such as barnacles and algae - on surfaces of structures immersed in water, such as the hulls of ships. If not properly treated, ship hulls become covered with numerous organisms, and this undesired colonisation has severe consequences. The main effects on ships are surface deterioration, speed loss, reduced manoeuvrability and an increase in fuel consumption, which results in a global environmental impact that has been estimated at about 384 million tonnes of CO_2 eq. and 3.6 million tonnes of SO_2 emissions per year.

A secondary effect of fouling is the displacement of unwanted foreign species into non-native habitats. Standard maintenance and prevention techniques currently use anti-fouling paints, which are mainly based on a continuous release of biocides and most commonly contain copper compounds. These paints therefore release chemicals into the sea, with strong repercussions for the environment. The leaching copper from anti-fouling paints has been estimated at around 5 000 tonnes per year. In addition, a large amount of toxic anti-fouling paint residues and waste is generated during the repairing and dismantling of ships. Market support for the growth of biocide-free alternatives is urgently needed.

Project objectives

The objective of the LIFE Paint-it project is to demonstrate a new manufacturing process at the pre-industrial scale capable of producing safe and innovative high-quality, anti-fouling paints for naval applications. The project intends to completely eliminate the use of biocides in favour of a physical anti-fouling mode of action, instead of chemical action, with positive environmental benefits for the marine environment. The project aims to overcome the complex synthesis of amphiphilic painting materials, thus demonstrating the effectiveness of a new approach to their manufacture through the use of hybrid organic/inorganic resins. The amphiphilic surface is a combination of hydrophobic and hydrophilic surfaces and is capable of disorienting the growth of marine species on ship hulls. The project will also avoid a large amount of toxic anti-fouling paint residues and wastes that are generated during the ship repairing and dismantling processes.

Expected results

- Demonstration of a new paint on ship hulls that does not have the same adverse impact on the maritime ecosystem;
- The elimination of biocides, with the avoidance of toxic biocide waste and copper entering the marine environment as a result of hull maintenance activities;
- Reductions in CO_2 emissions of up to 19.2 million tonnes CO_2 eq.;
- Savings of up to 112 500 litres of fuel per year for a single vessel of 30-40 metres;
- An analysis of the European market to define all fields of application of the innovative solution and the socio-economic impacts of its wider replication;
- Development of a new generation of amphiphilic materials with effective environmentally safe anti-fouling features;
- Implementation of a new pilot plant to manufacture large batches of anti-fouling formulation;
- Production of prototypes of anti-fouling paint without using chemicals; and
- Testing of the innovative anti-fouling materials in close-to-real environmental conditions.

Smart water and soil salinity management in agro-wetlands

LIFE15 ENV/IT/000423
LIFE AGROWETLANDS II

Beneficiary:

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Duration of project:
46 months (01/09/2016 – 30/06/2020)

Total budget in euro:
939,431.00

EU contribution in euro:
559,591.00

Project background

Wetlands are highly productive yet fragile ecosystems. They are used as a source of water for irrigation in agriculture, leading to increased pressure on wetlands and salinisation (the accumulation of soluble salts) of wetland soils.

In Mediterranean regions, wetlands are particularly vulnerable to salinisation. First, wetlands are generally located in low-lying areas, where drainage is restricted and salts concentrate in aquifers. Second, the arid to semi-arid Mediterranean climate is characterised by high evapotranspiration and low precipitation, which increases the evapo-concentration of salts. Increased water and soil salinity in coastal wetlands areas has direct effects on agriculture and on natural habitats. Effects include reductions in and changes to plant biodiversity, reductions in wetland dry biomass, and habitat loss.

Project objectives

The LIFE AGROWETLANDS II project will test an innovative technological solution – the SMART-AGROWETLAND management system – to reduce water and soil salinisation in agricultural wetland ecosystems. The system will be applied in a pilot area located on the northern Italian Adriatic coast that is affected by a high degree of soil salinisation. The site is located near two Natura 2000 network site areas that are part of the regional Park of the Po Delta, and is also listed in the Ramsar Convention on Wetlands.

By applying the technology, the project will contribute to the objectives of the EU Soil Thematic Strategy and the EU Water Framework Directive, preventing soil degradation, increasing the efficiency of water use, reducing the vulnerability of water resources to climate change, reducing soil salinity and protecting wetlands and the aquatic ecosystem.

In the pilot area, the project will:

- Conserve water used for irrigation and minimise salinisation of soils and water while maintaining agricultural productivity;
- Design and implement a wireless sensor network (WSN) to control (i) the amount and salinity of irrigation and drainage waters; (ii) soil salinity and water content; and (iii) water-table depth;
- Design and implement a web-based decision support system that automatically scans data from the WSN and provides irrigation recommendations; and
- Demonstrate that the technology is transferable to other areas used for irrigation that are threatened by salinisation.

Expected results

- Implementation of a decision support system for sustainable water and soil salinity management, which will help farmers and water managers adopt the most adequate irrigation plans;
- Increased production of crops with medium-high salt tolerance;
- Reduced soil salinity by 20%, reaching a range adequate for the conservation of wetland habitats;
- 15% reduction in the amount of water used for crop production;
- 30% reduction in the costs of acquisition and operation of sensors; and
- Scaled up water management to irrigation sectors, taking into account water quality and the impact on the surrounding environment, and resulting in a 20% reduction in the related water footprint.

Boosting Regulatory Advantages Vis à vis Emas Registration

LIFE15 ENV/IT/000509
LIFE B.R.A.V.E.R.

Beneficiary:

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Duration of project:
36 months (01/10/2016 – 30/09/2019)

Total budget in euro:
1,720,075.00

EU contribution in euro:
1,027,244.00

Project background

Eco-Management and Audit Scheme (EMAS) is an EU-level management tool designed to help registered organisations enhance their environmental performance and credibility. EMAS operates through incentives that reward organisations that make commitments to sustainability. The European Commission has initiated a process to improve and simplify existing environmental legislation. One aim is to encourage more organisations to join voluntary environmental certification schemes such as EMAS. This approach was previously applied in the B.R.A.V.E. project (LIFE10 ENV/IT/000423); B.R.A.V.E.R. is a continuation.

Project objectives

The main objective of the LIFE B.R.A.V.E.R. project is to support the full integration of EMAS into EU environmental legislation, by reducing and simplifying the administrative costs and burdens of EMAS-registered companies. B.R.A.V.E.R. will increase measures for regulatory relief to support EMAS adoption in more countries and regions and in cases where no EMAS simplification activities or regulatory relief measures have to date been implemented. In particular, the project aims to test and disseminate a new approach to EMAS, outlining new opportunities to promote the adoption of 'soft instruments' among companies. This new method is based on evaluating new regulation and regulatory relief proposals, and assessing their feasibility and their cost effectiveness for organisations and institutions. Tests will be carried out at both regional and national levels, and will refer to specific socio-economic contexts.

Specifically, the project aims to demonstrate that:

- 'Better regulation' in environmental policies is possible if voluntary certification schemes are effectively and proactively used in the development and revision of legislation;
- These measures are feasible for all EU Member States and practicable at the EU regulatory level;
- The adoption of an environmental management system can foster compliance with environmental legislation;
- Organisations that apply voluntary certification schemes, such as EMAS, deserve administrative regulatory relief and incentives;
- The implementation of better regulation and regulatory relief can lead to benefits and advantages both for companies and for public bodies involved in policy-making and implementation; and
- A virtuous cycle can be created, in which companies are strongly incentivised to adopt voluntary schemes.

Expected results

- The official adoption of at least 16 EMAS regulatory relief measures in the legislation of the five countries;
- The testing of at least 25 proposals;
- The drafting of at least 70 EMAS simplification proposals relevant to the legislative systems;
- The creation of eight consultation boards that foresee the involvement of national and regional governments to discuss the simplification proposals;
- The constitution of nine working groups (five regional, three national, one at EU level) to draw up better regulation and regulatory relief proposals;
- An extensive online survey to collect regulatory relief expectations of EMAS-registered companies (at least 300 EMAS organisations to survey);
- A regulation analysis for the development of new legislation and the revision of existing legislation; and
- A report on the results of the testing, containing revised proposals for better regulation and regulatory relief.

LIFE DOP - Demonstrative mOdel of circular economy Process in a high quality dairy industry

LIFE15 ENV/IT/000585
LIFE DOP

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Duration of project:
54 months (01/09/2016 – 01/03/2021)

Total budget in euro:
3,691,795.00

EU contribution in euro:
2,083,547.00

Project background

The dairy sector in Lombardy is responsible for more than 37% of Italian milk production. In the Po Valley region, nearly 97% of the total ammonia emissions come from the agricultural sector, the bovine dairies contributing some 32% of this share. As a result, around 30% of the PM_{10} emissions in Lombardy are related to ammonia from the agricultural sector. In addition, about 100 000 tonnes/year of nitrogen-based fertilisers are used, producing a total emission of CO_2 eq. of about 350 000 tonnes/year.

Project objectives

The project aims to promote the transition to a circular economy along the whole value chain of the dairy sector. The project will evaluate a new model, and apply it to the production of two protected designation of origin (PDO) cheeses: Grana Padano PDO and Parmigiano Reggiano PDO. The project will integrate all the phases along production chains (from livestock rearing to production), in order to re-use all of the waste products/materials generated. This not only promotes a circular economy, but it also reduces PM_{10}, ammonia, NOx and CO_2 emissions. In turn, the re-use of slurry as fertiliser will decrease ammonia emissions and increase soil organic content. Specifically, the project aims to:

- Combine good practices to implement a circular economy model for dairy production chains, to comply with the Nitrates Directive through the recovery of livestock slurry for biogas production, application of manure on soils for better nutrient management, rearing livestock according to sustainability criteria, and defining the composition of feed rations to reduce ammonia emissions;
- Establish a sustainable production territorial model (VIRGIL: VIRtous or Green and Sustainable Dairy Production);
- Define an LCA model to help guide the entire value chain towards a more sustainable approach and to define its product environmental footprint (PEF);
- Develop a circular economy model, based on the Grana Padano value chain, that is replicable in other countries;
- Promote resource efficiency along the entire value chain by introducing interlinked processes of waste re-use and greenhouse gas emissions reduction;
- Implement measures to improve soil quality; and
- Develop a monitoring and evaluation model for innovative techniques for the pre-treatment of slurry/manure and its use in biogas plants.

Expected results

- At least 75 000 tonnes/yr of manure (liquid/solid) delivered to end user;
- At least another 10 anaerobic digestion plants in the area and at least 50 buyers of organic fertilisers in manure market trading operations engaged in the project;
- 20-30 local companies with a volume of treated and transported liquid manure of 150 m^3 a day involved;
- Substitution of 70% of corn used in two biogas plants with about 150 tonnes/day of pre-treated animal slurry in biogas plants;
- Increased methane potential of pre-treated manure compared to standard manure, moving from a productivity of 45-50 Nm^3/tonne to 60-65 Nm^3/tonne;
- Sharp decrease in the addition of mineral fertilisers in agronomic trials;
- Decrease in total nitrogen load introduced into the system by 40% (from 450 kg to 280 kg);
- Reduction in nitrates in underground waters by 20%;
- Reduction of ammonia emissions by 40-60%;
- Reduction of nitrogen load from livestock and/or 30% increase in the number of heads;
- Reduction of methane emissions by 40% due to the new manure management approach;
- Development of an operational plan that engages at least six farms; and
- Involvement of at least 200 technical experts and 150 college students to increase knowledge and awareness.

Methodologies fOr Noise low emission Zones introduction And management

LIFE15 ENV/IT/000586
LIFE MONZA

Beneficiary:

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Duration of project:
46 months (01/09/2016 – 30/06/2020)

Total budget in euro:
1,745,829.00

EU contribution in euro:
942,661.00

Project background

Noise pollution is a growing environmental concern. It is a major environmental health problem in Europe, with an estimated 125 million people affected by high noise levels that cause serious health problems and stress. The EU has introduced the concept of low-emission zones (LEZs), but this was mainly devised in the context of improving air quality. Consequently, many ongoing projects and initiatives related to LEZs are primarily concerned with reducing particulate matter (PM_{10}) and nitrogen oxides (NOx) emissions, without taking into account problems related to noise pollution. There is no complete and integrated methodology for the management of noise in LEZs.

Project objectives

LIFE MONZA will evaluate a new methodology for noise management within an LEZ, which will be applied in a pilot area in the city of Monza, Italy. The methodology should be easily replicable and will contribute to the implementation of the EU Environmental Noise Directive (END), which requires noise management plans to be drawn up. The directive does not provide a definition of LEZ in relation to noise pollution; the LIFE MONZA project aims to provide this definition, and will inform the criteria for noise management plans set out in Annex V of the directive.

The LIFE MONZA project will:

- Create a low-noise LEZ in the Libertà district in Monza (where around 15 000 people live); this will involve measures such as traffic management and infrastructure improvement;
- Reduce average noise levels in the Libertà district, with positive complementary effects on air quality;
- Engage the local community in an active management system of lifestyle choices, that will contribute to the reduction of noise and the improvement of health and air quality in their living and working environments; and
- Develop a mobile app for noise and air quality measurement.

Expected results

- Develop a procedure that will be easily replicable across the EU, with related guidelines, for the definition and management of low-noise LEZs, which will contribute to meeting the goals of the END;
- Establish a restricted-traffic zone in the Libertà district of Monza, which will cut heavy vehicle traffic;
- Impose a lower speed limit in the district (50 km/h) and modify the layout of one road to reduce lane width and create two pedestrian crossings with safety islands;
- Re-lay a road surface using low-noise asphalt;
- Promote take up of cycling, walking and carpooling;
- Reduced road traffic by 5% and thus improved local air quality;
- Create IT tools to help residents make lifestyle changes and measure the results; and
- Achieve noise reductions in the pilot area of: -3 decibels (dBA) from low-noise paving; -1/1.5 dBA from restrictions on trucks and reductions in traffic speeds; -1 dBA from application of good practices to reduce traffic; and -3 dBA close to schools from use of IT tools.

CHIMERA – CHIckens Manure Exploitation and RevAluation

LIFE15 ENV/IT/000631
LIFE CHIMERA

Project background

Over the past decades, the poultry sector's move towards intensification and geographical concentration has given rise to various environmental concerns at national and EU level. Poultry manure contains considerable amounts of nutrients such as nitrogen, phosphorus, and other excreted substances including hormones, antibiotics, pathogens and heavy metals, which are introduced through the animal feed. Leaching and run-off of these substances can contaminate air, surface water and groundwater resources. In addition, poultry manure disposal – not considering transport - releases large amounts of greenhouse gases (25 million tonnes/year in EU-27), ammonia (0.48 million tonnes/year), and heavy metals (100 kilotonnes), with disposal costs ranging from €10-20 per tonne.

Project objectives

The main objective of the LIFE CHIMERA project is to set up a pilot plant to demonstrate an innovative sustainable treatment for poultry manure that can be done on a farm's premises (hence avoiding transport). The new technology will convert the manure into valuable fertilisers, producing at the same time thermal and electrical energy and tackling problems related to disposal, transport and gas emissions. By closing the nitrogen cycle inside the farm, and by using the poultry manure to generate energy and fertiliser, the project helps to implement the Circular Economy Package which promotes 'waste to energy' and 'waste to fertiliser' initiatives.

The project aims to significantly reduce carbon dioxide (CO_2), ammonia (NH_3) and methane (CH_4) emissions, in compliance with the provisions of Clean Air Policy Package, the Air Quality Directive and the National Emissions Ceiling Directive. It will also help in the implementation of the Industrial Emissions Directive, which integrates different approaches to manage pollution from industrial facilities, including intensive rearing facilities for poultry or pigs.

Another important target of the project is to enhance replicability, which will be pursued through the establishment of an Extended Users Advisory Board (EUAB), encouraging stakeholders to foster rapid uptake of the developed technology.

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Duration of project:
42 months (01/07/2016 – 31/12/2019)

Total budget in euro:
2,422,463.00

EU contribution in euro:
1,294,458.00

Expected results

- Construction of a demonstration plant with a capacity of 2 000 tonnes/year, validated for a working period of at least 6 053 hrs/year;
- Treatment of 1 500 tonnes/year of poultry manure produced by the associated beneficiary's poultry livestock (200 000 head);
- Elimination of 60 tonnes/year of NH_3, 280 tonnes CO_2 eq./year of CH_4, and 223 tonnes CO_2 eq./year of N_2O from the pilot farm site;
- Maximum production of thermal and electrical power equal to 4.5 GWh/year, depending on poultry feed and related manure composition; and
- Production of 120-160 tonnes/year of ash, corresponding to 260-320 tonnes/year of bio-fertiliser.

Innovative approach to soil management in viticulture landscapes

LIFE15 ENV/IT/000641
LIFE+ SOIL4WINE

Beneficiary:

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Duration of project:
36 months (01/01/2017 – 31/12/2019)

Total budget in euro:
1,613,328.00

EU contribution in euro:
914,999.00

Project background

The vineyard landscapes of the North Apennines are affected by various soil threats, such as erosion, decline of organic matter, local and diffuse contaminations, sealing, compaction, decline in biodiversity and landslides. Soil management practices take into account the radical changes in farming practices and cultivation techniques that have occurred in recent decades. The abandoning of land and the gradual introduction of mechanisation has led to profound changes in land use and management. In particular, the standard floor management strategy adopted in the vineyards of the Emilia-Romagna region mostly relies upon tillage as the main weed controller. In addition, increasing adoption of mechanical harvesting has led to a season-long maintenance of grass sward in the vineyard. The excessive use of tillage creates several other problems, including topsoil erosion (leading to landslides and soil fertility loss) and the worsening of several chemical and physical soil properties.

Project objectives

The LIFE+ SOIL4WINE project aims to prevent various soil threats affecting the vineyard landscapes of the North Apennines. It will achieve this aim within four protected areas of western Emilia-Romagna: Parco dei Boschi di Carrega, Parco del Taro, Parco dello Stirone and Parco della Val Trebbia. The specific objectives are to:

- Achieve better soil management in the whole vineyard system, while preventing erosion and increasing the content of soil organic matter;
- Develop and test an innovative decision-making tool that helps vineyard farmers to assess their specific soil and environmental problems, apply the best management practices and evaluate the results;
- Define the social, economic and environmental constraints of the proposed viticulture practices and of the soil ecosystem services in the pilot areas, and use this information to design innovative soil conservation policies based on PES (payment of ecosystem services); and
- Promote a participatory approach in order to facilitate the replicability of the project across Europe and set up local agreements on soil, biodiversity and ecosystem services.

Expected results

- A database of the main soil threats and the related environmental problems (REPs) in at least 100 vineyards of the pilot areas;
- Distribution of a questionnaire on soil threats across the EU (at least 300 questionnaires answered);
- Guidelines for good soil health practices to efficiently address soil threats and REPs in vineyards (10 guidelines drawn up);
- Design of a decision-making tool to guide grape growers to evaluate their soil threats and implement the best solutions;
- Increase of soil quality in the pilot farms (increase of organic matter content by 10%, increase of water aggregate stability and microbial activity (QBS-ar) by 50%, decrease of soil compaction by 10% and soil nitrate content by 25%);
- Data on the social and economic constraints that may affect farmers' decisions to introduce the new solutions proposed by the project (20 farmers involved);
- Data on the technical and economic viability of large-scale introduction of the proposed soil management solutions, and economic evaluation of the soil ecosystem services and indirect effects on the landscape value generated by the project activities (four pilot farms involved); and
- Feasibility study of a PES to ensure the continuation of the soil conservation practices (at least four PES options considered).

Production of Leather making BioPolymers from biomasses and industrial by products, through Life Cycle Designed processes

LIFE15 ENV/IT/000654
LIFE BIOPOL

Project background

The leather industry consumes large volumes of water and chemicals. The chemicals used are mostly petrochemical-based, due to the easy availability of such materials and to their chemical stability. In accordance with the European Dangerous Substances Directive almost 31% of the volume of the chemicals used by the European leather industry are hazardous substances. Of those, 62% are used in Italy. The BREF (Best Available Techniques Reference) document and IPPC (integrated pollution prevention and control) Directive both highly recommend the reduction of water consumption in the leather-making process, and the identification and use of efficient and sustainable non-hazardous substances and more environmentally-friendly products.

Project objectives

The LIFE BIOPOL project aims to demonstrate the technical performance and economic viability of an innovative process for producing new biopolymers ('green chemicals') to be used in the tanning industry. These will be produced by recycling waste biomass from the related tanning process and agro-food industries. By doing so, the project is helping implement the EU Directive on Industrial Emissions (IED), the BREF document, and REACH, which recommend that industry should decrease water consumption and the use of hazardous chemicals and pollutants such as heavy metals, formaldehyde, chromium, chlorinated paraffin, VOCs (volatile organic compounds) and inorganic salts.

Specific objectives of the project are to:

- Design, construct and validate an innovative industrial pilot plant to treat and process animal waste biomass generated by the leather treatment process and vegetable biomass waste from the agro-food industry, thus implementing the concept of industrial symbiosis as foreseen by the EU Circular Economy Package;
- Produce new biopolymers, making them usable in tanning and fat-liquoring applications;
- Finalise quantitative assessment of the environmental impacts of the process, by applying the product environmental footprint (PEF) method, and validating the cost and environmental effectiveness of the proposed new solution; and
- Assess quantitatively the environmental impact indicators in order to prove cost and environmental effectiveness of the proposed new solution.

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Alessandra TORTORA

Duration of project:
39 months (01/07/2016 – 30/09/2019)

Total budget in euro:
3,879,018.00

EU contribution in euro:
2,147,863.00

Expected results

- An increase of waste biomass re-used by around 80-90%;
- Reductions of 70-90% in the hazardous substances normally found in conventional chemicals agents used in the tanning process;
- Reduction of the discharged leather-process effluents (namely, 20-30% of COD, 50-60% of inorganic sulphates and chlorides salts, and 100% of chromium III salts);
- Reactivity enhancement of the new biopolymers in the range of 30-40% when compared to the conventional leather application process;
- Reduction in the range of 20% of the water used in the leather process when compared to the conventional process; and
- Reduction in the range of 70-80% of the PEF of the new biopolymers when compared to the current tanning agents.

Material Match Making Platform for promoting the use of industrial waste in local networks

LIFE15 ENV/IT/000697
LIFE M3P

Beneficiary:

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Name of contact person
Roberto VANNUCCI

Duration of project:
36 months (01/10/2016– 30/09/2019)

Total budget in euro:
1,503,883.00

EU contribution in euro:
885,709.00

Project background

By not recycling, the European economy currently still loses a significant amount of potential secondary raw materials, such as metals, wood, glass, paper and plastics. Only a limited share (36% in 2010) is recycled, with the rest landfilled or burned. If industry re-manufactures, re-uses and recycles, and if one industry's waste becomes another's raw material, waste is eliminated and resources are used in an efficient and sustainable way (industrial symbiosis). Improved waste management also helps to reduce health and environmental problems, decrease greenhouse gas emissions and avoid negative impacts at the local level.

Project objectives

The LIFE M3P project aims to promote and develop industrial symbiosis by connecting SMEs or clusters of SMEs to foster alternative uses of their wastes in line with the EU Circular Economy Package and the Resource Efficiency Roadmap. It aims to close the loop by identifying and characterising industrial waste, and turning it into a resource for another industry through the use of a digital online platform at the European level. This management tool, called M3P (Material Match Making Platform), will address the lack of information about the industrial waste produced in a given local area. It will adopt a systematic approach, focusing on product life-cycles and the material chain needed to make them. LIFE M3P will also demonstrate the feasibility of a more efficient use of raw materials by the systematic application of eco-design techniques to facilitate the recovery and re-use of parts that would previously have become waste. Specific project objectives are to:

- Close the circle and turn waste into a resource based on its characterisation;
- Match up companies to promote a local network that encourages material exchange;
- Demonstrate the usefulness of an operational web-based platform to foster the overall efficiency of industrial processes through the increased use of waste; and
- Promote two highly innovative instruments, namely product environmental footprint (PEF) and environmental technology verification (ETV), which are currently still at the pilot development stage.

Expected results

- One web-based platform (M3P) developed and implemented under real operating conditions in the four industrial districts by at least 10 SMEs;
- A waste database;
- A report on the main aspects and problems to be addressed to develop a local waste management system;
- At least 230 SMEs involved/interviewed (Lombardy: 100; Flanders: 100; Asturias: 10; West Macedonia: 25);
- At least 500 waste streams identified (Lombardy: 250, Flanders: 200; Asturias: 15; West Macedonia: 30), 100/120 material/scraps/waste investigated, 24 wastes deeply characterised, three sectors involved, 10 pilot cases, 40 companies implementing the proposed solution and four business cases implemented;
- At least 40 young designers involved during the product concept development phase;
- 72 new product concepts (16 for each area);
- At least four start-up studies (one in each area);
- Reduction of waste production at the target cluster of SMEs;
- Improvement of investments by companies engaged in the socio-economic aspects, such as training activities; and
- At least two industrial areas/clusters in the EU, other than the partner ones, involved in the transfer of the web-based platform M3P.

PAYT - Tool to Reduce Waste in South Europe

LIFE15 ENV/PT/000609
LIFE PAYT

Project background

Municipal waste management practices are failing to achieve EU targets for recycling rates in several southern European countries. The Waste Framework Directive requires Member States to increase the re-use and recycling of waste materials, such as paper, metal, plastic and glass from households, to a minimum of 50% by weight overall by 2020. Recycling rates of these waste streams in Greece, Cyprus and Portugal are currently around 20%, well below the target and the current European average (35%). One cause of this is inefficiency in the selective collection of materials: less than 15% of all lightweight packaging is presently recovered and valorised, while the remainder is sent unsorted to mechanical and biological treatment (MBT) and to landfill. The overall low rates of segregation at source and recycling mean higher treatment costs at MBT facilities and an inefficient use of resources. Since private citizens and businesses engaged in source-segregation and recycling pay the same fee as those who do not sort or recycle, they do not feel rewarded and this can weaken their commitment.

Project objectives

The LIFE PAYT project will implement an integrated, cost-efficient and highly replicable PAYT (pay-as-you-throw) system in five southern EU municipalities: Lisbon, Condeixa and Aveiro (Portugal), Vrilissia (Greece) and Larnaka (Cyprus). LIFE PAYT has four main objectives: reduce residual waste from household and commerce; increase recycling rates for packaging materials; demonstrate changes in local decision-making that contribute to the implementation of EU environmental strategies and targets; and promote the replication of the concept in other southern European municipalities. To achieve these aims, the project will use strategies to link waste producers with the amount of waste they discard. For instance, the project will modernise and optimise residual waste collection by introducing software and hardware tools (RFID, ID cards, monitoring collection), and design fair and equitable waste tariffs.

LIFE PAYT will use a participatory approach to maximise municipal stakeholders' involvement and raise awareness – e.g. by creating specific training courses for decision-makers. The project's development support tools will boost transferability, with the involvement of stakeholders from Bulgaria, Croatia, Malta, Romania and Spain.

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Name of contact person
Celia FERREIRA

Duration of project:
40 months (01/09/2016 – 31/12/2019)

Total budget in euro:
2,517,571.00

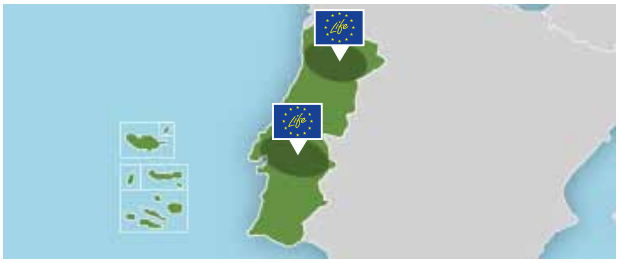
EU contribution in euro with %:
1,351,945.00

Expected results

- Establishment of a PAYT system that works as a cost-effective model (under €50 per tonne for residual waste collection) to ensure economic and environmental sustainability of the project municipalities;
- Reduction of household residual waste by 30-40% at the target sites;
- Increased recycling rates for packaging waste to 15-30% at the demonstration sites (currently 6.3-21%);
- Increased home composting: 10% of all detached houses take up home composting, with 200 kg per year of household bio-waste diverted from landfill;
- Modernised and optimised residual waste collection with an expected reduction in CO_2-eq emissions through direct reduction in fossil fuel consumption;
- Increased awareness through a citizens' portal;
- Increased commitment of the research and technical communities: a web portal will provide scientists and municipalities with insights into current status at the demonstration sites;
- Evaluation of the project's environmental, social and economic impact over its lifetime; and
- Development of a framework of guidelines and specifications for PAYT implementation targeting local authorities, and the establishment of a dedicated PAYT network.

Development of an Integrated Exposure – Dose Management Tool for Reduction of Particulate Matter in Air

LIFE15 ENV/PT/000674
LIFE Index-Air



Beneficiary:

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Name of contact person
Susana Marta LOPES ALMEIDA

Duration of project:
42 months (01/10/2016 – 31/03/2020)

Total budget in euro:
1,369,071.00

EU contribution in euro with %:
792,401.00

Project background

The health effects of air pollution have been the subject of intense study in recent years. Exposure to pollutants such as airborne particulate matter (PM) has been associated with increases in mortality and hospital admissions due to respiratory and cardiovascular disease. PM is a complex mixture of microscopic particles derived from anthropogenic and natural sources. It is still a major environmental problem in several EU countries. While strategies for controlling anthropogenic emissions in European urban areas have greatly improved, the quantitative result of changes in human exposure to specific toxic particle compounds is largely unknown with respect to each of the emission sources.

Project objectives

The main objective of LIFE Index-Air – by incorporating a database of outdoor and indoor air quality and a package of models – is to develop an innovative and versatile policy tool that will establish a correlation between exposure to PM compounds and emission sources. Specific objectives are to:

- Develop a method for producing a versatile decision-making tool for public authorities;
- Create a database on chemical constituents of $PM_{2.5}$ and PM_{10} sampled indoors and outdoors in EU cities;
- Develop an exposure assessment system and an operational platform for PM dose calculation to be incorporated into the tool;
- Identify the health end-points associated with exposure to PM;
- Determine the contribution of emission sources to human exposure to PM and evaluate control strategies capable of underpinning the sustainable development of expected changes anticipating climate change and long-term changes in the atmosphere; and
- Consolidate the knowledge base to help authorities to implement the Thematic Strategy on Air Pollution and to formulate air quality action plans.

Expected results

- A management tool to identify efficient emission control strategies;
- A database on chemical constituents of PM from indoors and outdoors in European cities;
- An exposure assessment system;
- A platform for particle dose calculation;
- A platform for health impact assessment;
- A geographic information system (GIS) database covering population data, land use, micro-environments' distribution for five European cities;
- Mapping of human exposure for five European urban areas at high spatial and temporal resolution, covering PM_{10}, $PM_{2.5}$ and elements regulated by EU legislation;
- Detailed dose calculations for individual subjects;
- Meta-analysis of selected health end-points associated with the selected chemical and PM exposures;
- Identification of the impact of the current emission sources to human exposure levels;
- Identification of efficient abatement strategies to decrease human exposure to PM chemicals;
- Publication of 14 technical reports, covering time activity patterns, PM chemical characterisation in different micro-environments and sources' identification, setup of the air quality modelling system, setup of the exposure model, model evaluation exercise, air quality and exposure modelling results, dose calculations for children, burden of disease associated with the target chemicals, five independent reports with guidelines for action plans (for Lisbon, Oporto, Kuopio, Athens and Venice), affecting an estimated 290 000 children (5-9 yrs), socio-economic impacts of the project; and
- Training materials produced and several courses/seminars organised.

Solutions through the new use for a waste of banana crop to develop products in aquaculture and plastics sector

LIFE15 ENV/ES/000157
LIFE BAQUA

Beneficiary:

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Mario MONZÓN

Duration of project:
36 months (01/07/2016 – 30/06/2019)

Total budget in euro:
1,667,663.00

EU contribution in euro:
1,006,597.00

Project background

Bananas represent 33% of the total agricultural production of the Canary Isles, which produces more than half of Europe's bananas. Each year 400 tonnes of bananas are produced, with 9 000 ha under cultivation, creating employment for more than 27 000 people. But banana production generates organic waste (pseudostem) that is usually left on the plantation once the fruit has been harvested. Since this waste has no nutritional value for the soil its accumulation poses a problem for future harvests. It generates various micro-organisms, affecting other crops because clogged streams can accumulate in water and result in fungi growth. While various studies demonstrate the significant benefits of banana plant waste due to the high content of fibres and compounds such as antioxidants, its full potential has not been realised.

Project objectives

LIFE BAQUA aims to make optimum use of an organic waste product that is usually landfilled: the waste from banana crops. The project will create green business opportunities by valorising this waste into products with market value, contributing to the goals of the EU's 7th Environment Action Programme of the creation of a resource-efficient, green and competitive low-carbon economy. Specifically, the project aims to:

- Extract the waste's natural fibres and use them as natural additives to reinforce 100% bio-based and 92-98% biodegradable plastics;
- Use the antioxidant-rich pulp produced in the fibre extraction process in the manufacture of fish feed; and
- Reduce waste during harvesting and final consumption.

Importantly, the project makes a special contribution to the new EU Circular Economy Package, as it actively contributes to two of its five priority areas: plastics and bio-waste. The reuse of this waste will also help by cutting GHG emissions from agriculture, in line with the EU's Energy Roadmap 2050 towards a low carbon economy.

Expected results

- Production of 1 000 kg of natural fibres and 10 000 kg of pulp per year;
- Production of new bio-based and biodegradable plastics for the production of covers for UV protection and bags for fish feed conservation and transport, among other uses;
- Reduction of CO_2 emissions in the manufacture of plastics;
- 100% reduction in N_2O emissions as a result of re-using banana crop waste;
- Improvement in fish feed quality by testing seven different fish feed diets.
- Support document for the Canary Islands government that uses project results to encourage co-financing for an industrial-scale plant for extracting fibre and pulp.

High quality methylal from non-recyclable plastic waste by an improved Catalytic Hydro-Gasification Plasma(CHGP) process

LIFE15 ENV/ES/000208
LIFE ECOMETHYLAL

Beneficiary:

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Duration of project:
36 months (01/09/2016 – 31/08/2019)

Total budget in euro:
2,039,142.00

EU contribution in euro:
1,031,678.00

Project background

According to Plastics Europe 9.6 million tonnes of post-consumer plastic waste was disposed in European landfills in 2012. This number accounts for 38.1% of the total post-consumer plastic waste generated. Depositing plastic in landfills is a very inefficient use of resources. Though the trend in recent years has been for less landfilled plastics further action is needed to reach the EU target of eliminating plastic waste sent to landfill by 2020. Recycling reduces the amount of plastic waste sent to landfill, reduces the need for non-renewable raw materials, namely petroleum, and saves on energy. However, conventional recycling is not possible for all types of plastic waste, such as waste containing mixed plastics, or contaminated or severely degraded plastics. There are other technologies that can potentially valorise this non-recyclable plastic waste (NRPW), such as gasification or pyrolysis for chemicals and energy production, but they may still pose environmental problems.

Project objectives

LIFE ECOMETHYLAL will test the valorisation of NRPW that is currently landfilled – especially heterogeneous plastic waste – using Catalytic Hydro-Gasification with Plasma (CHGP), a more environmentally friendly technology than the ones currently used. The project will recycle NRPW from the automotive, electric-electronic and packaging sectors to produce a valuable chemical agent called methylal. The market for methylal is estimated to be worth about €5.2 billion/year. It is used in various industries due to its low toxicity, low viscosity and especially its power as a solvent, making it a sustainable alternative to petrol-based solvents. Therefore, the project addresses two major problems: the recovery of 'difficult' plastic waste and the dependency on fossil fuel-derived materials. The proposed technology, which has not previously been used for treating NRPW, will be demonstrated at a pilot plant installed in the facilities of the associated beneficiary ACTECO in Spain. The plant will operate continuously, increasing efficiency and reducing energy consumption. Another one will be built in Croatia to test replicability potential, which should be high due to the plant's compact and modular configuration. The methylal produced will be marketed as an eco-material in various sectors (e.g. plastics, chemicals and automotive). LIFE ECOMETHYLAL will contribute to the implementation of the Roadmap for a Resource-Efficient Europe, the Action Plan for the Circular Economy and the European directives: Packaging and Packaging Waste; Waste Electrical & Electronic Equipment; End-of-Life Vehicles; Waste Framework; and Landfill of Waste.

Expected results

- Reduction of around 3.6 tonnes plastic waste sent to landfill (accounting for 0.28 tonnes CO_2 eq. or more than 304 MJ eq. per pilot plant) during the project period;
- Production of 2.88 tonnes methylal through waste resources (thus saving virgin fossil resources), leading to a reduction of 2.07 tonnes CO_2 eq., more than 107 300 MJ eq. per pilot plant;
- Implementation of a cleaning process for plastic recovery;
- Improved economic and environmental efficiency of the recycling companies in order to achieve EU zero waste targets (thereby improving competitiveness);
- Job creation: an average of 15 jobs per industrial plant; and
- A replicable strategy for recovery of plastic waste in other EU countries.

Tackling international airline catering waste by demonstrating integral and safe recollection, separation & treatment

Project background

To date, most airlines recycle very little waste, which is typically low quality due to multiple mixed fractions. Cabin waste is usually compacted and incinerated or disposed in landfill. It can be divided into two categories: Cat. 1 refers to catering waste coming from outside the EU, while Cat. 3 is catering waste generated on EU flights. Cat. 1 is subject to much stricter regulations, as it is considered as animal by-product: a high-risk waste fraction. Airlines have increased their efforts in recent years to tackle the issue of cabin waste, but these efforts are usually fragmented and lack a comprehensive approach. Currently, landfilling is the most common practice in Spain. In cases where no distinction is made between international or EU flights, all the waste is treated in the same way. As a result, much remains to be done, especially regarding Cat. 1 waste.

Project objectives

LIFE Zero Cabin Waste aims to create an integrated model to reduce, re-use and recycle (including energy recovery) waste collected on airplanes, and to establish the basis for other airlines to replicate this approach. The project will focus on recoverable (light packaging plastics, cans, cartons, glass and paper) and municipal solid waste (the organic fraction mixed with other inseparable fractions), from both Cat. 1 (international flights) and Cat. 3 (EU flights).

The project will be implemented at Madrid's Barajas airport, where Iberia's caterer Gate Gourmet currently accumulates around 6 000 tonnes of waste per year (4 000 of which is Cat. 1). In particular, the project will train crew and staff, implement equipment adjustments, execute a collection and separation protocol, process waste fractions, and implement a pilot treatment for Cat. 1 waste. Transferability will be boosted by replicating the project's model at Heathrow airport during the final year. Specifically, the project aims to:

1. Demonstrate that with good management practices, stakeholders' engagement and coordination, a large amount of cabin waste can be separated on-board;
2. Prove that Cat. 1 waste can be dealt with without health risks. (The project aims to show that current legislation is overprotective and wasteful, and it aims to be a driver for policy change);
3. Contribute to the reduction of the high carbon footprint associated with the generation and inadequate management of cabin waste; and
4. Set the basis for replication through standard protocols.

LIFE15 ENV/ES/000209
LIFE Zero Cabin Waste

Beneficiary:

Name of beneficiary
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Duration of project:
40 months (01/09/2016 – 31/12/2019)

Total budget in euro:
2,583,338.00

EU contribution in euro:
1,481,712.00

Expected results

- Waste reduction of 5% by minimisation measures, such as the redesign of menus and the use of lighter, re-usable cutlery;
- Recovery, after this reduction, of 80% of the total cabin waste diverted from landfill (50% recoverable, 30% MSW);
- Lowered costs of disposal (avoiding landfill) and increased waste purity due to separation and recycling (including energy recovery);
- Treatment of a fraction of Cat. 1 waste with different methods to prove it is safe;
- Scale the treatment of Cat. 1 waste to industrial levels and measure its impact (LCA);
- Develop, in collaboration with relevant national and EU authorities, integrated best practice guidelines on catering waste management;
- Reduction of greenhouse gas emissions, estimated at 4 340 t CO_2 eq. per year.
- Consortium members will initiate the first replication of the model - in the UK where currently all cabin waste is incinerated; and
- 10 million passengers per year and a total of 1 000 stakeholders reached through dissemination activities.

Integrated Management of Multilayer PVC/PE Packaging Waste

LIFE15 ENV/ES/000231
LIFE rPack2L

Beneficiary:

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Duration of project:
31 months (01/09/2016 – 15/04/2019)

Total budget in euro:
2,806,865.00

EU contribution in euro:
1,261,483.00

Project background

The Waste Framework Directive sets a 50% target for recycling and re-use by weight of plastic from households by 2020. The amount of multilayer or complex sheet packages has increased significantly over recent years. These plastics account for 20% of waste from the food packaging industry, and 30% in weight of household waste. There are three types of multilayer waste, according to their origin: post-industrial waste from extrusion processes, post-industrial waste from thermoforming processes, and domestic waste. In the case of single-layer waste from extrusion and thermoforming processes, these wastes can be reintegrated into the process as raw materials by the producer or original manufacturer. However, this re-use process is not feasible for multilayer waste, due to the different physicochemical characteristics of each layer. The necessary treatment for one layer is not valid for another, and therefore multilayer waste is sent to waste managers with around 90% destined for incineration or landfill.

Project objectives

LIFE rPack2L proposes a solution for recycling multilayer plastic waste, thus diverting it from incineration or landfill. It will develop an integrated scheme to recover valuable PVC and polyethylene terephthalate (PET) for re-use as raw materials for packaging or recycled plastic-based products. The project will test the new technology at a unique semi-industrial scale plant in Austria. At present there is no recycling process for multilayer packaging anywhere in the world that enables these plastics to be recovered. The main actions of the project will be to:

- Separately collect multilayer plastic waste, by creating a stakeholder network and implementing collection points for post-industrial waste in at least one plastic film manufacturer and one packaging manufacturer;
- Separate the different layers of the waste at the pilot plant by designing an innovative and flexible packaging delamination process for different specifications of PVC/PET-based multilayer film and waste streams; and
- Analyse the final materials obtained and adapt the process to meet the quality requirements of potential users – in particular, PVC for manufacturing recycled multilayer packaging, and PET for industrial applications (e.g. agriculture and automotive) or valorisation to produce fuel via pyrolysis.

Expected results

- Recycling of 1 836 tonnes of multilayer plastic waste during the project;
- A recycling rate of 90% for the multilayer plastic waste collected;
- A 20% reduction in the CO_2 emissions associated with the separation process;
- A ratio of 20% recycled material to virgin material;
- A 15% decrease in the amount of waste going to landfill;
- A life-cycle analysis (LCA) for PVC/PE packaging, to enable a full assessment of the implementation of the technology at European level and its effects;
- A Good Practices Guide on recycling and re-use of multilayer packaging; and
- Development of a potential market for recycled PVC and PE, thus creating a new green economic activity able to produce wealth and create jobs.

Intelligent marine LittEr removal and management for local Authorities

LIFE15 ENV/ES/000252
LIFE LEMA

Beneficiary:

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Duration of project:
36 months (01/09/2016 – 01/09/2019)

Total budget in euro:
2,159,103.00

EU contribution in euro:
1,229,465.00

Project background

The United Nations Environment Programme defines marine litter as any persistent, manufactured solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter is a global and cross-boundary issue; it is found in all seas and oceans, and accumulates on the surface, seafloor and seashore. The presence of marine litter causes numerous impacts on the environment, biota, local economy and public health. It is perceived as one of the main threats to the marine environment by the general public.

Nevertheless, only 15% of litter entering the sea reaches the shore; while another 15% remains floating on the surface, and 70% gets entangled and sinks to the seabed. Most of the scientific literature on marine litter has focused on defining the concept, and its origin and abundance in different seas, as well as the development of reporting protocols and monitoring guidelines. The next step is to reduce it and achieve "good environmental status" as defined by the European Marine Strategy Framework Directive. Adequate management by local authorities, prevention and public awareness programmes are a key part of this process.

Project objectives

The objective of the LIFE LEMA project is to define a management service for local authorities to select sustainable approaches for tackling the problem of floating marine litter (FML) before it arrives at shore areas that are difficult to access, or it sinks. The service, which will initially be implemented in two transnational regions in the Bay of Biscay (Gipuzkoa and Pyrénées-Atlantiques), will include tools and management plans. The replicability of the service will be assessed for the areas of Marseille and Bilbao. Most previous initiatives on FML have focused on defining amounts, source and composition, to assess environmental pollution. LIFE LEMA goes a step further by proposing an integrated protocol through which optimised solutions can be derived in order to manage marine litter. Specific objectives are to:

- Draw up ocean-meteorological models to predict movement and accumulation hotspots of FML;
- Develop an IT tool to integrate different data, including available FML methods (vessels, barriers) and their efficiency, as well as FML operational detection and forecasting models, in order to estimate the environmental impact and cost of FML management actions;
- Draw up management plans for the prevention and reduction of FML;
- Demonstrate sustainable collection actions at sea, including energy audits and retrofitting of two fishing vessels and three sea-cleaning vessels with eco-designed FML collection technology;
- Install a floating barrier for FML collection;
- Use innovative detection methods including HF radars, thermal cameras and aerial drones; and
- Establish a European network on marine litter to ensure transferability of results.

Expected results

- The removal of at least 100 tonnes of FML;
- Total collection rates of 55 tonnes/year in France and 35 tonnes/year in Spain three years after the project end;
- One fuel-saving measure implemented on board each vessel (five in total), reducing greenhouse gas emissions by up to 10% compared to current practices;
- Implementation of the IT tool and management plans by two local authorities;
- 5% reduction of the current collection and management costs of FML located at sea and on beaches;
- Six people trained, and creation of four new jobs; and
- A guide to FML sustainable management.

Development of membrane devices to reduce ammonia emissions generated by manure in poultry and pig farms

LIFE15 ENV/ES/000284
LIFE AMMONIA TRAPPING

Beneficiary:

Name of beneficiary
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María MONCADA SARACIBAR

Duration of project:
36 months (01/10/2016 – 30/09/2019)

Total budget in euro:
1,724,165.00

EU contribution in euro:
1,032,413.00

Project background

In Europe, the farming and livestock sectors contributed 94% of the total ammonia (NH_3) emissions in 2011 (EEA, 2014). Although this figure showed a reduction of 26% from 1990 to 2011, more effort is required to reduce these emissions. In some countries, such as Spain, they have actually increased. Ammonia emitted to the air, soil and water causes environmental problems, such as eutrophication and acidification. The Directive on National Emission Ceilings (NEC) for certain atmospheric pollutants established ammonia as a priority concern. According to various investigations, it has been estimated that a 50% decrease in ammonia emissions, by means of range of technologies, could greatly benefit human health.

Project objectives

The LIFE AMMONIA TRAPPING project will develop an innovative and sustainable solution for reducing ammonia emissions from animal husbandry excretions. In particular, the project will implement an anaerobic digestion and composting process, using devices that capture ammonia, to produce nitrogen fertiliser. The process will also decrease the energy necessary to ventilate the installations. The technology, which has a high potential for replication, will be demonstrated on farms by treating pig slurry (raw and digestate) and hen excretions. The project contributes to the implementation of the Nitrates Directive, the Water Framework Directive, the NEC Directive and the Directive on ambient air quality and cleaner air for Europe under which ammonia is considered a particulate matter precursor.

Specific project objectives are to:

- Design and construct two mobile prototypes that absorb ammonia using gas-permeable membranes, a pioneering technology developed and tested at laboratory scale by the Universidad de Valladolid (UVA) and the Instituto Tecnológico Agrario de Castilla y León (ITACYL);
- Determine the environmental, technical and economic viability of the prototypes;
- Characterise the concentrations of purified streams (gas and liquid), to check that air quality and effluents have improved;
- Evaluate the economic and commercial viability of the added-value fertiliser produced;
- Develop an action plan to transfer the results to other European countries with intensive livestock industries;
- Monitor the prototypes from environmental, social, technical and economic points of view; and
- Develop tools for boosting the transferability of the technology.

Expected results

- A sustainable excretion-management solution for the livestock sector by reducing ammonia and particulate emissions, reducing eutrophication potential in rural areas, and by exporting nitrogen surpluses from areas with high livestock density to areas with high demand for nitrogen fertilisers;
- Defined installation protocols and operation manuals for the prototypes to facilitate further installations;
- 60-80% reduction in the concentration of ammonia in liquid manure (with potential reductions in the emissions of ammonia), catching between more than 150 mg NH_4+/litres per day, for a concentration in the liquid manure between 1 000 and 300 mg NH_4+/l;
- Reduction of more than 70% in ammonia content of anaerobically co-digested liquid manure;
- More than 70% concentration of gases (porcine and poultry installations, and composting process), with rates of ammonia trapping of 1.3 gm^{-2}/day; and
- Fertiliser production: 214.3 l from swine manure, 571 l from digestate, 20.8 l from poultry litter and 20.8 l from composting (785.3 l in total from the liquid manure and 62.4 l from the gas).

Prevention and Integral management of high polluted effluents from Food SMES to urban sanitation systems

LIFE15 ENV/ES/000373
LIFEVERTALIM

Beneficiary:

Name of beneficiary
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Pedro María BARREIRO ZUBIRI

Duration of project:
42 months (01/07/2016 – 31/12/2019)

Total budget in euro:
1,957,998.00

EU contribution in euro:
1,052,412.00

Project background

Spain is one of the EU countries subject to serious water scarcity and subsequent water quality problems. It also has a large fish canning industry that consumes a lot of water during its production phases, including boiling, canning and cleaning. It moreover generates large amounts of wastewater that contain especially high levels of organic matter, fats and oils, nitrogen, phosphorus, salts and suspended solids – the organic and salt content is 15-50% higher than for urban wastewater. This makes wastewater treatment difficult, particular given that joint management is impossible due to the irregular geographical distribution of fish canning plants. Consequently, the treatment of these effluents is mainly carried out by urban wastewater treatment plants (WWTPs), which are often not prepared for the correct management of these effluents; the high salt concentration inhibits efficient biological treatment. In addition, the production of canned seafood is seasonal, creating unmanageable load peaks and discharges into the sea or other water bodies. It is thus difficult to achieve the 'good ecological and chemical status' set for all water bodies by the Water Framework Directive.

Project objectives

The main objective of LIFEVERTALIM is to demonstrate an integrated approach to the treatment of food industry wastewater in urban sanitation systems. It will implement a series of eco-efficient measures (the '3-barrier' system) in the canning industry to reduce the wastewater volume and the different pollution sources. In particular, it will prevent waste generation and reduce water consumption. It will also reduce the wastewater pollutant load and develop a monitoring tool to evaluate the efficiency of the implemented measures and better manage the wastewaters internally. The project will develop a decision-support tool to optimise the organic and salt loads from the fish canning industry entering WWTPs. This decision-support tool will consist of a virtual simulation platform, integrating pre-treatment systems, the water collection network and centralised plant wastewater treatments. It will model and help optimise fish canning effluent loads to the benefit of the sewage system WWTP operation.

The project system will be tested under real conditions in Artibai (Bizkaia, Spain) by three SMEs located in an industrial area that share water and wastewater management infrastructure. It will also be tested in another SME located in the urban area of the town. The proposed system has a high potential for replication in other European regions and other food sectors. The project will thus involve stakeholders from two other similar regions: Douro River (Portugal) and Sicily (Italy).

Expected results

- Prevention of discharges to the environment (30%), a significant reduction of food losses (10%) and an increase in productivity (1%);
- Considerable water savings (30%);
- Reductions in high organic loads (40%) to the sewage system, so that SMEs can fulfil obligations under current environmental policy.
- Improved performance of WWTPs (around 20%), by reducing the pressure on water sanitation infrastructure (40-70%);
- Measures to ensure that treated effluents are discharged properly;
- The integration of food SMEs' sewage into the urban treatment system without damage to the sewage network or WWTPs.
- Reduction in eutrophication potential of wastewater (95%) from the food SMEs; and
- Reduction (3%) in water stress in the river basin.

Modelling, Measurement and Improvement of the water management's environmental impact in the food industry

LIFE15 ENV/ES/000379
LIFE MCUBO

Beneficiary:

Name of beneficiary
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Javier SANTOS

Duration of project:
36 months (01/09/2016 – 31/08/2019)

Total budget in euro:
911,747.00

EU contribution in euro:
526,747.00

Project background

One of the largest environmental impacts of the agro-food industry in Europe arises from excessive water consumption, in particular, for meat and drink production, and fruit and vegetable canning. In Spain, the food sector accounts for 11% of all water consumed by industrial activities, according to the Spanish Ministry for Agriculture and Environment (2015). Excessive water consumption is due to several factors, including low usage of control and monitoring tools for industrial processes, the large diversity and complexity of such processes, and low uptake of water reuse and recycling technology. The relatively high cost of these technologies is a barrier to their implementation. In Spain, the food sector re-uses and recycles only 2.4% of the water it consumes (compared to 8.9% for manufacturing industries generally). There is a need for innovative concepts and technologies to achieve a more efficient use of water resources and to lower the overall environmental footprint of agro-food industries.

Project objectives

The objective of the LIFE MCUBO project is to minimise environmental impacts related to water use in the three food industry subsectors with highest water consumption (meat, juices and canned vegetables). This will be achieved through the demonstration at three industrial production plants of an integrated management system based on:

- The implementation of a new low-cost, wireless monitoring technology (Plug&Lean system), using sensors to measure the companies´ production processes for at least one year;
- The development of detailed mathematical models for each of the three company´s processes, to provide information on water and energy consumption, and water quality, to help decision-makers streamline the processes; and
- Integration of water management into companies´ continuous improvement processes (ISO 14000 or EFQM standards) and environmental management systems.

The project will boost the transferability potential of the system via a replication guide. By reducing energy and water consumption in the food sector, the project directly contributes to the objective of the EU's 7th Environment Action Programme of creating a resource-efficient, low-carbon economy.

Expected results

- Water consumption reductions at the three demonstration companies of:
  - 30% for the meat industry,
  - 26% for the juices industry, and
  - 25% for the canned vegetables industry;
- Electric energy consumption reductions at the three companies of:
  - 5% for the meat industry,
  - 7% for the juices industry, and
  - 5% for the canned vegetables industry;
- Thermal energy consumption reductions at the three companies of:
  - 18% for the meat industry,
  - 20% for the juices industry, and
  - 15% for the canned vegetables industry;
- Improved decision-making processes based on a new indicator relating to both energy and water consumption;
- Industrial processes modelling to enable European-scale replication; and
- Contribution to the writing of the new edition of BREFs by providing data on the relevant agricultural subsectors to the Joint Research Centre in Seville.

Duckweed technology for improving nutrient management and resource efficiency in pig production systems

LIFE15 ENV/ES/000382
LIFE LEMNA

Beneficiary:

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Duration of project:
39 months (01/10/2016 – 31/12/2019)

Total budget in euro:
1,298,994.00

EU contribution in euro:
779,396.00

Project background

Diffuse pollution affects 90% of river basin districts, 50% of surface water bodies and 33% of groundwater bodies across the EU. Manure nutrients, especially nitrogen (N) and phosphorous (P), are among the main pollution sources, especially in high-density farming areas. Agriculture and livestock (especially manure) are responsible for over 50% of the total nitrogen discharged into surface waters. This contributes to eutrophication, a key threat preventing good ecological status for EU surface waters under the Water Framework Directive. The Nitrates Directive was created to protect water against nitrate pollution from agricultural sources. To this end, a number of technologies have been developed to solve the problem of excess of N and P in manure, but they are often high energy and/or chemically demanding processes. Duckweed (*Lemnaceae*) is a small floating macrophyte with a high capacity for removing dissolved nutrients from water. It produces biomass with high nutritional value. Duckweed has been used for the uptake of nutrients from non-agricultural waste, but it has yet to be applied to animal manure on an industrial scale in the EU. Laboratory-scale tests have shown promising results, and an industrial-scale demonstration is now needed.

Project objectives

The main objective of the LIFE LEMNA project is to demonstrate the feasibility of an innovative nitrogen and phosphorous recovery technology, to improve nutrient management and reduce the environmental impact of animal farming. This biological, energy-efficient system will involve the sustainable treatment of anaerobically digested manure through a duckweed (aquatic plant) production system. Duckweed biomass will be processed to obtain new bio-based products for local consumption, mainly bio-fertilisers and animal feed; it will also feed an existing biogas plant in the same location, which will allow the system to run 100% on green energy. The new technology will be tested in a 250 m^2 duckweed production prototype with a treatment capacity of 3 m^3/day, which will be installed and operated over a period of 21 months on a pig farm in Castilla-La Mancha (Spain). Specific objectives are to:

- Reduce manure nutrient pollution of water bodies in farming areas by implementing an innovative and resource-efficient duckweed-based technology;
- Demonstrate the efficiency and sustainability of the technology to achieve high rates of nutrient recovery;
- Reduce the carbon footprint and other environmental problems of animal protein production; and
- Improve resource efficiency and close mineral cycles in animal farming systems by integrating duckweed production and bio-based related products within a low-input value chain inspired by the circular economy concept.

Expected results

- Duckweed-based technology showing 95-100% nutrient (N and P) recovery efficiency rates from anaerobically digested pig manure;
- Demonstrated advantages from low energy consumption, low water usage, and being 100% renewable and self-sufficient requiring no chemical reagents;
- At least two duckweed strains selected for their high growth rate and nutrient recovery;
- New duckweed products obtained, including a nitrogen and phosphorous rich bio-fertiliser (> 6% amino acids) to replace traditional products, and safe, high-quality sustainable animal feedstock to replace soya or other vegetable protein products;
- Animal protein produced at the demonstration farm, showing at least a 20% reduction in carbon footprint;
- An assessment of the socio-economic benefits for the local economy; and
- Methodologies and an electronic tool to enable future replication.

RunOff Water Purification from Pavements: A Novel Integral System of Pervious Concrete Pavement & Insitu Water Treatment

LIFE15 ENV/ES/000394
LIFE DrainRain

Beneficiary:

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Duration of project:
36 months (16/09/2016 – 31/08/2019)

Total budget in euro:
1,431,147.00

EU contribution in euro:
854,177.00

Project background

Urban development over recent decades has rendered land increasingly impermeable, as the soils of agricultural lands and woodlands have been replaced by asphalt and concrete. When rain hits these paved/sealed areas, water gathers pollutants that have accumulated on their surface to generate a polluted runoff stream. This type of contamination is known as non-point source, or diffuse pollution. It has an intermittent flow and a heavily polluted first flush runoff stream generated within 30 minutes of a rain event. This often causes flooding during heavy rains, as a result of inadequate or failing urban drainage systems. Uncontrolled discharge of runoff and stormwater in urban watersheds lowers the quality of receiving waters, making it difficult to keep concentrations of pollutants below levels set by the Environmental Quality Standards Directive, and to achieve good status of water bodies. To tackle this problem, Sustainable Urban Drainage Systems (SUDS) are being adopted.

Project objectives

The LIFE DrainRain project aims to mitigate the environmental impact of runoff in water bodies. Currently, SUDS only drain runoff water but the project will couple SUDS to treatment systems for diffuse pollution. In particular, the project will implement pilot systems of pervious photocatalytic concrete pavements to decrease uncontrolled water runoff and concentrations of priority substances. The pilot runoff sustainable drainage and treatment system will consist of several components including:

- A pervious concrete photocatalytic pavement with organic pollutants first treated on the concrete's surface by the photocatalyst titanium dioxide;
- A drainage and distribution system in which water is collected by pipes made from anti-microbial materials;
- A hydrodynamic separator that utilises centrifugal energy generated by the water flowing inside to separate suspended solids and oils (SS);
- A filter that comes after the complete retention of SS by a pre-filter to avoid clogging; and
- An anti-biofouling storage tank, which has been constructed using anti-biofouling high-density polyethylene (HDPE), for storing the regenerated water in a way that ensures microbiological quality.

The project will demonstrate the system in two pilot plants in Spain with different climates (Oceanic and Mediterranean) to promote its wider replication. One area is 900 m^2 of pervious concrete surface area in the seaport of Ferrol (Galicia) and the other in Calasparra (Murcia) covers 150 m^2 of road hard shoulder.

Expected results

- Reduction in the microbial load of runoff water due to the antifouling and antimicrobial treatments;
- 95% decrease in the concentration of oils in the water;
- Improved groundwater quality by increasing the drainage of inorganic pollution-free runoff water;
- Re-use and recycling of runoff water for uses such as irrigation, car washing and cleaning of public walkways;
- Reduction of direct discharges of polluted water into marine environments;
- Minimisation of the risk of flooding and its impacts by reducing runoff flow rate;
- Promotion of the development of sustainable drainage separate systems, through the inclusion of a runoff water treatment system independent of centralised wastewater treatment systems, and thus increased performance of those by reducing peak flow rates;
- Reduction of the air pollution by capturing Volatile Organic Compounds and nitrogen oxides and thereby also improving air quality by photocatalysis; and
- Mitigation of the heat-island effect in urban areas.

Efficiency in the use of resources for the improvement of sustainability of vine and wine sector at Priorat region

LIFE15 ENV/ES/000399
LIFE PRIORAT+

Beneficiary:

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Duration of project:
48 months (01/07/2016 – 30/06/2020)

Total budget in euro:
1,529,153.00

EU contribution in euro:
909,670.00

Project background

Viticulture (especially fertilisation) and packaging (especially with glass bottles) are the most significant processes contributing to the wine sector's carbon footprint. The sector also impacts significantly on water quality and quantity. In addition, biocides and fertilisers negatively impact soil and water ecosystems. The EU is the world's leading producer and exporter of wine. It represents 20% of total agricultural employment in the EU, though it is overwhelmingly composed of small producers. In the past 30 years, the Priorat region (Spain) has developed an internationally-renowned model for producing high-quality wines. This model is grounded in the economic development and sustainable management of a unique agriculture landscape. The Priorat wine sector is formed by 170 wineries that are facing major challenges, such as the impact of climate change on the quantity and quality of the wine produced, and increased market competition from third countries. Grape growers and winemakers in the region need more than ever to improve efficiency, while at the same time preserving the quality of soil, water sources and biodiversity.

Project objectives

The LIFE PRIORAT+ project aims to demonstrate a model of sustainable wine production that is replicable in other EU wine-producing regions, along with the application of a set of methodologies for efficient resource use. The project will determine the environmental footprint of wine production and focus on its key aspects, such as the use of fertilisers and pesticides, water scarcity, energy consumption and packaging. The project's innovative model will integrate sustainability actions in all of these areas. This addresses the need for a harmonised EU methodology for the green performance of wineries. LIFE PRIORAT+ will promote the substitution of synthetic pesticides by more environmentally friendly chemicals and non-chemical compounds, in line with the Directive on the Sustainable Use of Pesticides, as well as EU regulation defining maximum residue limits of pesticides in food. The project will also contribute to the implementation of the EU Single Market for Green Products Initiative, by demonstrating the applicability of the Product Environmental Footprint Category Rules (PEFCR) and by calculating the Product Environmental Footprint (PEF) of wine products. The LIFE PRIORAT+ model will moreover help to develop the green economy in the wine sector, creating new job opportunities.

Expected results

- At least 20 representative wineries providing data for the calculation of the environmental footprint of the average wine produced in the Priorat region;
- At least 20 wineries involved in raising consumer awareness, with at least 1 500 wine tourists reached;
- 10% reduction in water consumption per tonne of grape produced for irrigating 400 ha of vineyards;
- 25% reduction of the life-cycle environmental impact and 15% of the economic costs associated with pest and disease treatments applied on 250 ha;
- At least 20% reduction of chemical fertilisers used in 400 ha of vineyards;
- 10% reduction of the environmental impacts and economic costs of the production of grapes in Priorat;
- 15% reduction in the environmental impacts and economic costs of winemaking processes through the optimisation of the use of resources (energy, water and materials);
- Identification of at least 10 strategies to reduce the life-cycle environmental footprint of the wine produced in Priorat;
- At least 40% of vine growers (around 580) and winemakers of the region directly informed and trained on the recommended sustainable production techniques; and
- At least 150 additional wineries reached by activities to promote transferability of the results.

COMputational tool for the assessment and substitution of Biocidal Active substanceS of Ecotoxicological concern

LIFE15 ENV/ES/000416
LIFE - COMBASE

Beneficiary:

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Duration of project:
36 months (03/10/2016 – 30/09/2019)

Total budget in euro:
1,135,015.00

EU contribution in euro:
680,705.00

Project background

Biocides not only kill targeted pathogens, but can also kill non-pathogens. This can have undesirable side-effects for human health and the environment. Such risks have yet to be sufficiently investigated for most biocides on the EU market because in different environmental compartments (e.g. soil, groundwater and air) active substances undergo degradation to metabolites that may be more toxic than the original compound. In this context, novel tools are necessary for the identification and substitution of biocides of ecotoxicological concern. Computational toxicology is a subdiscipline of toxicology that aims to use mathematics, statistics, chemistry and computer modelling to predict the toxic effects of chemicals on human health and the environment. Predictive toxicology is of increasing interest due to new legal requirements imposed by the Biocides Product Regulation (BPR). Under this legislation, a large amount of animal (*in vivo*) testing is needed to demonstrate the safety of new chemical compounds, requiring much time and cost while also raising ethical questions. The use of alternative non-animal methods (e.g. computer models), as foreseen under the BPR, would reduce the need for animal testing. The availability of such methods would allow the screening of many chemicals in a simplified way, and would particularly help SMEs identify metabolites of ecotoxicological concern to facilitate the registering of biocides under the BPR.

Project objectives

The LIFE-COMBASE project will demonstrate a new computational tool for assessing and reducing the impact of biocides of ecotoxicological concern, and it will promote their substitution with safer substances. This flexible, open-source, online decision-support tool, for assessing the ecotoxicity of both biocidal products and their metabolites, will be based on a series of predictive *in silico* (computational) models, building on previous initiatives (namely, the projects ANTARES, CALEIDOS and PROSIL LIFE). The tool will enable simulations to be performed on the ecotoxicity potential of new candidate chemicals before their synthesis in a safe, residue-free and environmentally friendly way. Its operability and effectiveness will be demonstrated at four trophic levels: bacteria, algae, common water fleas (Daphnia) and fish. Project results will be communicated to the Biocidal Products Committee (BPC) of the European Chemicals Agency (ECHA), in order to boost replicability. The project will make a special contribution to the EU Biocides Product Regulation, especially regarding the precautionary principle (taking into account metabolites of ecotoxicological concern); the promotion of low-risk substances (depending on their ecotoxicological profile); and the reduction of animal testing (in common with Directive 2010/63/EU, which revised Directive 86/609/EEC on the protection of animals used for scientific purposes).

Expected results

- A platform based on an open-access modular decision-support tool to assess the ecotoxicological properties of biocides and their potential metabolites;
- Identification of 10% of the most critical biocides based on PBT (persistent, bioaccumulative and toxic) and CMR (toxic for reproduction) criteria;
- Identification of molecular features responsible for the ecotoxicity of the most critical biocides;
- Identification of safe moieties (a part or functional group of a molecule), which can be used within the planning of safer biocides;
- Raised awareness about the use of biocidal products, targeting consumers for the responsible and sustainable use of biocides; and
- A structured compendium of free webinars and workshops to support the training of end-users and stakeholders for the sustainable use of biocides.

Glass bottles reuse in southern Europe wine sector

LIFE15 ENV/ES/000437
LIFE-reWINE

Beneficiary:

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Duration of project:
40 months (01/09/2016 – 31/12/2019)

Total budget in euro:
995,309.00

EU contribution in euro:
594,541.00

Project background

Although recycling of packaging waste has been increased in the EU in recent years, the situation varies significantly between Member States; some countries such as Spain still recycle less than a third of their packaging waste. A large part of this waste stream is thus still being disposed of in landfills and waste incinerators, causing significant emissions of greenhouse gases and toxic gases. In Catalonia, glass beverage waste, notably of wine and cava bottles, is an area of particular concern. The region produces 180 million wine bottles and 200 million cava bottles annually. However, only 57% of these bottles are recycled – with the rest, some 63.3 million bottles/ year, sent to landfill.

Project objectives

The main objective of LIFE-reWINE is to design and implement a pilot system to boost bottle re-use in the wine sector of Catalonia. The project aims to prove that re-use is environmentally and economically feasible, and preferable to current management alternatives. The project aims to:

- Carry out studies on:
  - Stakeholders involved in wine bottle production and consumption markets: wineries, household waste recycling centres (HWRC), restaurants, and food and wine retailers; and
  - The potential for wine bottle re-use in the Catalan market.
- Develop a re-use system for wine bottles in Catalonia comprising:
  - A collection network for used bottles from municipal HWRC, restaurants, food stores and wineries;
  - A cleaning process for used wine bottles, which will be less energy-intensive and consume less water and chemicals (thus generating less wastewater) than current techniques; and
  - A labelling system for re-used bottles, using a water-soluble label.
- Develop an incentives system to foster the use and return of (re)used bottles:
  - HWRC users: a discount on the municipal waste tax according to the annual visits bringing waste to HWRCs; and
  - Grocery store consumers: Free bottle of wine to consumers who return 20 empty bottles to stores.
- Carry out a life-cycle analysis of the system.

The project will also implement a series of communication and awareness-raising actions to foster waste prevention and to promote the use of the LIFE-reWINE system. The project system is highly replicable and contributes directly to the implementation of the EU legislation and policy on waste.

Expected results

- Development of a glass packaging re-use system, making use of existing technology;
- Demonstration of the transferability and up-scaling potential of the project;
- Processing of 1 500 bottles under the new system;
- Generation of economic benefits to stakeholders by reducing operating costs;
- Deeper understanding of glass bottle re-use by regional and national administrations;
- 500 civil society organisations in Catalonia, Spain and elsewhere in Europe informed on the LIFE-reWINE system, along with up to one million citizens in Catalonia;
- Creation of new jobs;
- Contribution to decreased CO_2 emissions in the wine sector (to be assessed by LCA); and
- Dissemination of project results and the creation of a network of stakeholders interested in promoting glass bottle re-use.

Demonstration of an innovative recycling scheme to increase the water efficiency in the petrochemical industry

LIFE15 ENV/ES/000480
LIFE REWATCH

Beneficiary:

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Duration of project:
40 months (01/09/2016 – 31/12/2019)

Total budget in euro:
2,645,765.00

EU contribution in euro:
1,586,556.00

Project background

Protection of water resources is a cornerstone of environmental protection in Europe. Clean water demands careful management to protect ecosystems, society and industry. However, water scarcity affects at least 11% of Europe's population and 17% of EU territory. Poor or unsuitable water quality reduces its availability by restricting its possible uses and increasing supply costs. The industrial sector is the second largest consumer of water after agriculture, with the petrochemical industry being a major water user (cooling and processing); it generates 1 750 MT of wastewater per year in Europe. Efficient techniques for recycling and reclaiming this water are necessary. The Water Framework Directive identifies water re-use, recycling and the promotion of water-efficient technologies as an important measure for EU action in the field of water policy. The European Innovation Partnership on Water also identifies water recycling as its top-listed priority. Furthermore, the EU's Blueprint to Safeguard Europe's Water Resources includes the maximisation of water re-use and recycling as one of its core actions.

Project objectives

The main objective of LIFE REWATCH is to decrease the environmental impact of the petrochemical industry by demonstrating an innovative water recycling system based on a combination of existing biological and separation processes. To achieve this aim, the project will analyse and characterise the wastewaters produced by different European petrochemical plants. It will then design and build a prototype plant in the facilities of a petrochemical complex in Tarragona (Spain). A key innovation of the new process will be its high versatility, making it capable of treating wastewater of different qualities to the standards required for various re-use applications. The project will evaluate the environmental benefits and the economic feasibility of the technology, based on its operation in the pilot plant, using life-cycle analysis (LCA) and life-cycle cost (LCC) procedures, and water footprint calculations. Finally, the project will develop a decision-support tool to boost the transferability of the technology, which will enable other petrochemical industries to design water treatment procedures based on their own wastewater compositions and the water quality needed for local re-use. This demonstration will be an important step towards sustainability in the European petrochemical industry.

Expected results

- A versatile water recycling scheme for the treatment of petrochemical wastewater streams (at least 65% water recovery);
- Treatment of at least 20 000 m^3 of wastewater, providing 12 600 m^3 of reclaimed water;
- Effluents obtained that could be re-used in different points of the petrochemical industry;
- A decision-support tool to predict the performance of the new process and to encourage other petrochemical industries to implement the new water recycling scheme;
- Decreased environmental impact related to water management in petrochemical plants. The project expects that a full-scale implementation will be able to decrease the water footprint by 15%, decrease energy consumption by 15% and decrease CO_2 emissions by 10%, relating to water management in petrochemical plants; and
- Decreased economic impact related to water management in petrochemical plants by at least 10%.

Demonstration of a new agro-silvo-pastoral land use to improve farm profitability in mountain areas

LIFE15 ENV/ES/000506
LIFE + POLYFARMING

Beneficiary:

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Duration of project:
60 months (01/07/2016 – 30/06/2021)

Total budget in euro:
1,135,787.00

EU contribution in euro:
672,863.00

Project background

Mediterranean mountain ecosystems are characterised by low production capacity, mainly due to three factors: climatic conditions, difficulties using machinery and low organic matter content of the soils (low fertility). These factors have led to the abandonment of traditional multifunctional management, which has contributed to soil degradation, disappearance of open spaces in forests and therefore loss of biodiversity, and the development of high-density forest areas that increase the risk of fires. In Europe, around 271 000 km^2 of Mediterranean mountain ecosystems (31% of the total area) have degraded soils. In order to improve soil productivity in these mountain areas and therefore increase productivity, adequate management systems are required.

Project objectives

The objective of the LIFE + POLYFARMING project is to test an innovative and cost-efficient multifunctional agro-silvo-pastoral system, in order to halt the abandonment of multifunctional agriculture in the Mediterranean mountains. This system will help to reverse the adverse environmental and socioeconomic impacts of land abandonment. The new system adapts different techniques for improving the structure, fertility and water retention capacity of the soil, and defines a new way of interrelating these techniques at farm scale to facilitate an improved land use with the following components:

- Integrated forest management based on the use of by-products (e.g. from thinning and cleaning of understory) as a resource for other farm activities and, in particular, the improvement of soil organic matter;
- Management of cattle through programmed intensive grazing, which is also an important tool for forest management (e.g. improvement of fertility);
- Multiple management of fruit trees with the production of grasses to meet the needs of livestock; and
- Self-sufficient management of mountain orchards using forest resources.

The project will demonstrate the proposed agro-silvo-pastoral system on a pilot farm. The techniques will be disseminated among farmers to ensure its replicability in the territory. The project will create an opportunity for putting abandoned farms back into production, with subsequent benefits for the local economy, in particular job creation. The project's model will contribute to the implementation of the Soil Thematic Strategy and the 7th Environment Action Plan that prioritises increasing soil organic matter.

Expected results

- An increase in soil organic matter from the current level of 2% to 4%, thus improving soil water retention capacity and decreasing fire risk;
- A pilot farm of 80 ha managed following the new agro-silvo-pastoral method;
- 15 ha of forest managed with the new methodology;
- 7.5 ha of new open woodland managed following holistic management;
- Livestock managed according to the management plan;
- 7.5 ha of fruit trees with multiple production of pasture and soil management with cattle;
- One self-sufficient no-tillage orchard of 1.6 ha;
- Demonstration that the project creates an economically viable alternative for the recovery of abandoned farms of Mediterranean mountains;
- A guide for the application of this new agro-silvo-pastoral integrated management in other farms;
- Practical training for 100 students;
- Nine practical advisers on other farms;
- Communication with the European Agroforestry Federation and farmers' associations to raise awareness and help farmers convert to agro-silvo-pastoral systems; and
- Job creation, with an expected increase to three permanent field workers.

Low energy treatment technology for leachate valorisation

LIFE15 ENV/ES/000530
LIFE LEACHLESS

Beneficiary:

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Duration of project:
39 months (01/10/2016 – 31/12/2019)

Total budget in euro:
1,775,805.00

EU contribution in euro:
1,041,237.00

Project background

Although recycling rates have increased in Europe much waste is still landfilled, especially in Mediterranean and Eastern European countries. Landfills present long-term threats to soil, air, groundwater and surface water. This is mainly due to leachates, the liquid fraction continuously produced from solid waste that is dispersed when rainfall percolates through it. Around 10 m^3 of leachate is generated per 115 tonnes of solid waste, and landfills can keep producing leachates up to 50 years after their closure. Although leachate composition varies, it is invariably hazardous to some extent – with potential ecotoxicological effects on terrestrial ecosystems and humans. In the absence of on-site treatment, leachate is circulated back into the waste, resulting in a more concentrated liquid that has a bad odour and attracts disease-spreading flies, creating bigger potential ecological and health risks and unpleasant working conditions. Without treatment, the leachate is also transported to sewer systems or wastewater treatment plants (WWTPs). Due to its high organic and ammonium concentrations, leachates cause extra loading in treatment plants, requiring additional chemical and energy consumption to comply with effluent limits. Moreover, due to the high metal content in leachate, the sludge generated may not be suitable for agricultural applications. The problems are most acute in smaller WWTPs, where leachate is less diluted with municipal sewage. Leachate treatment techniques remain expensive and technically inefficient.

Project objectives

The LIFE LEACHLESS project aims to demonstrate the technical and economic feasibility of an innovative and cost-efficient technology for leachate treatment, based on solar evaporation/condensation and forward osmosis. The project prototype will have a treatment capacity of 15 m^3/day of leachate, and will be tested in Botarell (Spain) and Athens (Greece). The new technology permits the on-site treatment of leachate, removing 100% of the pollutants and avoiding costly and energy-consuming effluent transport to municipal WWTPs. The final solid residue (sludge) will be used in the manufacture of ceramic products. The project promotes water resource management in line with the Water Framework Directive by enabling managers of landfills and waste treatment centres to achieve good qualitative and quantitative status for effluents. The project is also fully in line with the objectives of the EU 7th Environment Action Programme.

Expected results

- A high-quality final effluent obtained that is 100% free of pathogens and xenobiotic compounds and that can be re-used or discharged into watercourses;
- An 80% reduction in the cost of leachate treatment;
- 80 to 90% reduction of the environmental impact associated with leachate streams proceeding from waste disposal in landfills or waste treatment centres;
- Elimination of the need to transport leachate to municipal WWTPs;
- A technology applicable in EU countries with high volumes of municipal waste sent to landfill;
- Valorisation of 100% of the generated by-products;
- 60% reduction of the leachate storage reservoir size in landfills and waste treatment plants;
- A network of contacts for disseminating good practices and project results, and extending the project scope;
- Two replication studies for transferring the project findings in two 'follower facilities' (in Spain and Greece) and one in Pordenone's landfill in Italy;
- Authorities able to increase the competitiveness and improve environmental legislation through better management of leachate; and
- Dissemination of the project results.

Advanced nutrient solutions with electrochemical recovery

LIFE15 ENV/ES/000591
LIFE-ANSWER

Project background

Contaminants in wastewater from the brewing industry come mainly from equipment cleaning operations and treatment processes. The main pollutants are sulphates (1.2-2.0 Kg/h), bicarbonates (0.2-0.4 kg/hl) and nitrates (30-100 mg/l), which all cause severe environmental problems (especially in water bodies). The best techniques currently used for reducing pollutants in brewing industry wastewater are based on membrane processes (dead-end, cross-flow and dynamic filtration), as an alternative to conventional solid-liquid separations. These techniques reduce the presence of pollutants in effluents by 75-85%, enabling them to be discharged into river basins or used for irrigation. Other pollutant removal techniques include biological treatments (aerobic and anaerobic) and chemical oxidation. All these techniques reduce pollutant levels in wastewater from the different production stages, but they do not represent a zero-discharge solution and incur high energy costs.

Project objectives

LIFE-ANSWER will demonstrate an integrated and innovative technology for treating wastewater from breweries, and other food and drink sectors. In particular, the proposed technology will combine electrocoagulation and bioelectrogenesis microbial treatments for the complete (100%) removal of wastewater pollutants. This technology will be implemented in Alovera (Spain) in a pilot wastewater treatment plant (WWTP) able to treat 10 m^3/h of wastewater. The final dry residue will be valorised for both energy production (making the process energy efficient) and fertiliser. The project is in line with the Water Framework Directive and its objective of achieving good status for all EU water bodies.

The specific objectives of the project are to:

- Characterise the obtained treated water for each technology combination and identify its possible uses;
- Mitigate existing environmental and health impacts (diseases), as well as obtaining a reduction in the carbon footprint of WWTPs;
- Evaluate the wastewater situation in food and drink industries, assess and transfer the project results, and apply the best available technology in WWTPs;
- Assess the socio-economic impact of the demonstration plant implementation on the local economy, and also for European regions with similar water pollution problems; and
- Reach stakeholders with the benefits of using the LIFE ANSWER technology.

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Duration of project:
33 months (01/09/2016 – 31/05/2019)

Total budget in euro:
973,408.00

EU contribution in euro:
584,044.00

Expected results

- A new technology that supplies 30% of the total electrical consumption of the wastewater treatment process and 3% of its thermal needs;
- Improvement in the quality of the wastewater resulting from the purification process, allowing the tertiary treatment by reverse osmosis and the use of reclaimed water for cleaning purposes;
- Estimated prevented water loss during the project of 87 000 m^3/year, for the 10m^3/hour wastewater pilot plant, once the system is fully implemented;
- Volatile Fatty Acids (mg pollutants/L water) down to: 0.0007;
- Biological Oxygen Demand (mg pollutants/L water): 5.00;
- Chemical Oxygen Demand (COD) (mg pollutants/L water): 40.00;
- Nitrogen (mg pollutants/L water): 5.00;
- Phosphorus (mg pollutants/L water): 0.25;
- Intensity principal wastewater plant Alovera (kwh/m^3 treated): 1.85;
- An LCA of the proposed technology; and
- An overview of the wastewater treatments used in the European food and drink industry.

Development of an efficient and sustainable methodology for EMerging POllutants REmoval in WWTPs (EMPORE)

LIFE15 ENV/ES/000598
LIFE-EMPORE

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Duration of project:
36 months (01/09/2016 – 31/08/2019)

Total budget in euro:
1,783,824.00

EU contribution in euro:
1,030,407.00

Project background

Water is polluted by a myriad of chemicals from the daily activities of industries, agriculture and households. Many of these chemicals are not traditionally considered as pollutants, but are being discovered in water sometimes at higher levels than expected. These chemicals, whose effects on the environment and human health are unknown, are often without regulatory status. They are generally referred to as emerging pollutants (EPs), and are of particular risk due to their permanent discharge. Although EPs are suspected of having an adverse impact on human and animal health (e.g. endocrine disruption), only 45 of them are regulated under Directive 2013/39/EC. At present, wastewater treatment plants (WWTPs) are not designed to treat EPs, and so they are not removed or altered before reaching aquatic habitats – where they can potentially affect wildlife or be introduced into food chains with associated health effects.

Project objectives

The LIFE-EMPORE project will demonstrate an innovative, cost-efficient and highly replicable technology for the removal of EPs from urban wastewater. The pilot plant will be integrated into the WWTP of Benidorm (Spain). The mobile prototype will have a treatment capacity of 1-5 m^3/h. It will consist of four principal processing units: filtration/adsorption by columns, filtration by membrane technology, Electrochemical Advanced Oxidation Processes (EAOPs) and Advanced Oxidation Processes (AOPs). The specific objectives of the project are to:

- Demonstrate that the selected combination of four technologies reduces concentration of the priority EPs;
- Demonstrate that the combined technology is able to reduce the levels of diclofenac, 17-alfa-estradiol and 17-beta-estradiol, carbamazepine, 2-(p-isobutylphenyl) propionic acid, fluoxetine, estrone and chloramphenicol, to 99% of their original concentrations;
- Characterise EPs and their yearly variability in the Benidorm WWTP;
- Analyse the feasibility of the technologies for removing these EPs from wastewater;
- Assess the initial and final environmental situation in accordance with different organoleptic, physical and chemical parameters;
- Assess the socio-economic impact of the implementation of the demonstration plant for EPs removal;
- Disseminate among stakeholders the benefits of using EMPORE technologies for the reduction of the presence of EPs in European WWTPs; and
- Transfer the project results to other similar places in Europe.

Expected results

The following final concentrations of EPs in treated wastewater are expected:

- Chlorpyrifos-ethyl of 0.0-0.00069 µg/l;
- Trifluralin of 0.0005-0.0006 µg/l;
- 4-tert-Octylphenol of 0.0-0.005 µg/l;
- DEHP of 0.09-0.26 µg/l;
- 17-alfa-estradiol of 0.00045-0.006 µg/l;
- 17-beta-estradiol of 0.205-2.4 µg/l;
- Chloramphenicol of 0.08-0.12 µg/l;
- Carbamazepine of 0.011-0.017 µg/l;
- 2-(p-isobutylphenyl) propionic acid of 0.245-0.36 µg/l;
- Fluoxetine < 0.000195 µg/l;
- Estrone of 0.000029 µg/l-0,00015 µg/l;
- Diclofenac of 0.05-0.08µg/l;
- Chlorpyrifos, trifluralin and DEHP below the threshold established in Directive 2013/39/EC;
- Greater than 95% reduction for diclofenac, 17-alfa-estradiol and 17-beta-estradiol; and
- Greater than 95% reduction for carbamazepine, 2-(p-isobutylphenyl) propionic acid (Ibuprofen), fluoxetine (e.g. Prozac), estrone and chloramphenicol.

Spend foundry sand valorisation in construction sector through the validation of high-performance applications

LIFE15 ENV/ES/000612
LIFE ECO-SANDFILL

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Duration of project:
36 months (01/07/2016 – 30/06/2019)

Total budget in euro:
2,313,350.00

EU contribution in euro:
1,343,488.00

Project background

There are around 3 000 active foundry operations in Europe that annually generate over 8 million tonnes of waste sand, with ferrous industries the major generators. Only 25% of this Spent Foundry Sand (SFS) is recycled for a few applications, mainly by the cement industry: the remaining 75% is landfilled. The global warning potential of sand extraction (quarrying and dredging) and processing is between 92-120 g CO_2 eq. per 1 kg of dry silica sand obtained. Air pollutants are emitted by the extracting equipment (usually diesel), and noise is a common occurrence due to extraction and transportation. Sand extraction involves considerable land take and loss of soil (estimated at 0.4 ha per tonne of sand extracted), with associated loss of wildlife habitat. The re-use of foundry sand would minimise these impacts.

Project objectives

The LIFE ECO-SANDFILL project aims to demonstrate the technical and economic feasibility of using SFS as an eco-friendly fine aggregate in construction applications. The goal is to reduce the large volume of SFS annually sent to landfills. The mechanical process, will treat up to 1 500 tonnes of SFS in a pilot plant integrated into a foundry in the Spanish Basque Country. The new product will be used as fine aggregate for embankments, mortars and as Controlled Low Strength Material (CLSM). The proposed technology is more efficient at removing sand impurities than existing technologies and offers economic benefits. It is expected to reduce foundry sand management costs by 40% and construction industry raw material costs by 30%, while contributing to the green economy and creating jobs. The ECO-SANDFILL technique is suitable for all type of sands and moulding systems, and it has high replicability potential. The project's objectives are in line with the Roadmap to a Resource Efficient Europe and the 7th Environment Action Programme (EAP). The specific objectives are to:

- Demonstrate that SFS correctly pre-processed can be re-used in construction applications with a high demand for fine aggregates;
- Obtain non-hazardous sand as a waste by-product;
- Contribute to 'close to zero' main solid waste from foundries being sent to landfill and to reverse the trend of new sand excavation from virgin land; and
- Stimulate industrial activity and increase competitiveness in several sectors (e.g. casting, construction and waste management).

Expected results

- Valorisation of around 1 400 tonnes of SFS in the Basque Country during the project, with a scenario report for the potential recycling of 2 700 000 tonnes of reclaimed sand per year in Europe;
- Reduction of the volume of the annual foundry sand disposal in landfills by up to 1 400 tonnes; with an estimated CO_2 reduction of around 14 tonnes/year;
- Reduction in consumption of natural aggregates by up to 1 400 tonnes, with an estimated CO_2 reduction of over 100 tonnes/year;
- Reduction of energy use by 600 000 KWh/year;
- Production and demonstration of high performance embankments and CLSM, substituting the virgin fine aggregates with 100% SFS;
- Sand impurities removal (e.g. metal scrap, organic matter) with an efficiency of more than 95% (loss of ignition < 1.5%, fines content <3%, and pH of 6-8);
- Environmental safety of sand;
- Good practice guidelines and policy recommendations for the standard re-use of sand; and
- Detailed financial cost-benefit analysis of the technology and an LCA of the new applications, including data on carbon footprints and resource consumption comparisions.

Demonstration of polyester of footwear waste recycling into new textile products using glycolysis technology

LIFE15 ENV/ES/000658
LIFE-ECOTEX

Beneficiary:

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Duration of project:
36 months (01/09/2016 – 31/08/2019)

Total budget in euro:
1,246,048.00

EU contribution in euro:
735,827.00

Project background

Polyester is the second largest family of plastics in terms of quantity used. In the EU in 2009, half of the 1.75 Mt of polyester textiles produced were used in clothing. Due to their properties, polyester-based textiles predominate in the footwear sector, where they have been introduced in many parts of the shoe (collar, tongue, insole, lining, tip and leg). Up to 7% of high-grade polyester textiles are lost during manufacture. This waste is mainly composed of trimmings and rejections that often contain polyester mixed with other materials, including glues. For this reason, their quality might not be acceptable for recycling with traditional mechanical methods, as it is difficult to separate the contaminants from the plastic efficiently, making landfilling and incineration the only solution. Polyester waste arising from footwear manufacturing is therefore an area which requires further efforts to find economically-viable sustainable management solutions.

Project objectives

The LIFE-ECOTEX project proposes an innovative, eco-efficient and highly replicable recycling system for polyester textile waste generated during shoe manufacturing. The aim is to close the cycle for polyester material, making it possible to replace a part of the non-renewable petrochemical feedstock used to make textile polyester with rejected shoemaking material. The process starts with the chemical de-polymerisation of polyester waste generated, to recycle polyethylene terephthalate (PET), and produce bis (2-hydroxyethyl) terephthalate (BHET) by catalytic glycolysis. Once purified, the recovered BHET (having identical properties to equivalent 'virgin' material) is a suitable building block for the synthesis of fibre-grade polyesters. These recycled materials can be reintroduced to the market for footwear manufacturing or as non-woven insulators for construction. The project is in line with the EU Circular Economy Package, which establishes plastic waste as one its five priority areas. Furthermore, the project contributes to the implementation of the Waste Framework Directive and the Landfill Directive as it valorises a waste stream that was previously only landfilled or incinerated.

Expected results

- Chemical recycling of 518 kg of polyester waste after pre-treatment, producing 370 kg of BHET and 300 kg of PSF (polyester-staple fibre);
- Consumption of 300 kg of raw polyester avoided;
- Reduction in amount of waste incinerated or sent to landfill;
- Reduced greenhouse gas emissions by 1.47 tCO_2eq/t PET;
- Optimisation of the catalytic glycolysis process;
- A comprehensive LCA and viability analysis of the proposed process;
- Development of industry guidelines concerning textile manufacturing and in situ waste recycling; and
- Policy recommendations to the European Commission on textile manufacturing using chemically recycled polyester.

HALOSEP - Innovative method for recycling and reuse of waste streams from incineration plants in the EU

LIFE15 ENV/SE/000265
LIFE HALOSEP

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Duration of project:
42 months (01/07/2016 – 31/12/2019)

Total budget in euro:
5,444,693.00

EU contribution in euro:
2,275,399.00

Project background

Though incineration is preferable to landfilling, it causes environmental problems, namely the generation of flue gas waste (FGW) which contains chlorides and heavy metals. FGW is classified as hazardous waste in the European Waste Catalogue. To remove the pollutant, the polluted gas stream is brought into contact with the scrubbing liquid in a wet scrubber. However, in most cases in Denmark and Sweden, the FGW waste fails to meet the EU limit values for leaching (i.e. lead and chloride), and often the FGW from these two countries is sent to landfill. Around 200 000 tonnes of FGW is transported to landfill every year and, in some cases, alkaline treatments are needed to neutralise the acidic waste. Therefore, potential resources in the FGW are not utilised. A rough estimate showed that about 465 tonnes of zinc and 4 000 tonnes of salt were wasted in an incineration plant, even when using state-of-the-art technology. Moreover, about 45 000 m^3 of wastewater is generated from neutralising the scrubber liquid using precipitation chemicals.

Project objectives

The main objective of the LIFE HALOSEP project is to demonstrate how two waste streams from incineration plants, fly ash and liquid, can be co-treated to reduce the amount of waste going to landfill. The innovative HALOSEP process converts the waste into a salt brine product and a zinc product, and it significantly reduces the amount of flue gas residues, which improves leaching properties so that the material meets safe limits for re-use.

The new technology closes the material loops for chloride and zinc, and thereby contributes to the development of a circular economy. The main advantages are a shift from 100% disposal of flue gas waste in dedicated landfills to material recycling with a reduction of disposed amounts by about 40-60%. Cost savings of 30-40% are expected and less material will be landfilled. The project will demonstrate how the process can be integrated into existing incineration plants so that it can be replicated throughout the EU waste industry.

Expected results

- 20% reduced costs for HALOSEP fly ash treatment;
- 80% reduced chemical consumption;
- Flue gas weight amount (dry matter) 60-62% of the original fly ash input amount, a reduction of about 40%;
- HALOSEP product refined to obtain 40% zinc content;
- The salt amount is about 30% of the original fly ash input amount;
- The salt product to be recycled as a brine having has around 10% salt content;
- Amount of wastewater from the incineration plant decreased by 10-12 m^3 per tonne of salt recycled;
- Up to 2 000 tonnes of salt may be recycled and used as road salt in the winter period; and
- Less than 1% of the amount of material to be returned to the incinerators ovens.

LIFE SURE - Sediment Uptake and Remediation on Ecological basis

LIFE15 ENV/SE/000279
LIFE SURE

Beneficiary:

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Duration of project:
48 months (01/08/2016 – 31/07/2020)

Total budget in euro:
3,526,582.00

EU contribution in euro:
1,942,988.00

Project background

The natural characteristics of the Baltic Sea, namely, a long water residency time (around 30 years), a large catchment area, a population of about 90 million people, and a brackish water environment poor in species, predisposes it to harmful contamination effects. One environmental problem comes from shallowed overgrown bays, which occur when dead biota and particles accumulate at the bottom, adding to the sediments. This process is sped up by climate change and human activities, such as river straightening, leaving exposed soil in fields and paving/sealing land, which all increase the outflow of particles to shallow water bodies and contribute to further sedimentation.

Due to human activities, these sediments might contain hazardous substances and high levels of nutrients, leading to eutrophication. The removal of hazardous substances is a priority area of the Baltic Sea Strategy. Disturbance of contaminated sediments, whether physical (e.g. by dredging) or biophysical (e.g. bio-turbation by organisms), can result in the re-suspension of hazardous substances and an increase in their availability to chemical and biological processes. To prevent overgrowth of shallow waters, dredging is often necessary. However, traditional dredging causes great disturbance to the water environment. Sustainable dredging methods are available but are too expensive to employ on a large scale. Like many areas along the Baltic coast, the coastline of Kalmar is heavily affected by this phenomenon.

Project objectives

The LIFE SURE project will demonstrate a cost-effective and ecologically sustainable process for retrieving and recycling sediments in shallow eutrophic waters. Hazardous substances will be removed with a minimum of negative impact, turning such sediments into a resource. The project will demonstrate an innovative dredging concept that is mobile, cost-effective, environmentally friendly and easy to use. The new system uses an automated unit. It consists of a surface raft pulling the underwater unit, which has 18 specially-designed nozzles that pump sediments up from the seabed. The system moves slowly (1 cm/s) and therefore does not cause any re-suspension of sediments. The system can be continuously operated and supervised locally or remotely using built-in sensors.

The system moreover has great potential for replication, given that it can be handled by non-professionals and used anywhere there is a need for taking up sediments. Once sediments have been dredged, they pass through a treatment and dewatering system, which removes water and pollutants via decantation and centrifugation. Sediments are separated into three fractions: water, organic sediments and mineral sediments.

The project will recycle dredged materials for use in construction or agriculture. It will propose a solution for increasing the recycling rate of dredged sediments in the EU, which stood at just 12% in 2012 (Eurostat), helping preserve the physical and chemical features of marine ecosystems.

Expected results

- More than 70% of the dredged sediments recycled;
- 50% lower costs for the dredging, dewatering and purification process than existing techniques;
- Levels of hazardous substances and nutrients not higher during uptake of sediments than in undisturbed water areas 50 m from the site of uptake;
- Around 6 tonnes of phosphorus removed along with 400 kg of lead and 10 kg of cadmium; and
- Continuous sampling of the water and the local ecosystems made to ensure that no adverse effects arise.

BIODOLOMER - Demonstration of a unique, fully renewable green material for the reduction of plastics and packaging waste

LIFE15 ENV/SE/000315
BIODOLOMER for LIFE

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Duration of project:
40 months (01/09/2016 – 31/12/2019)

Total budget in euro:
3,113,781.00

EU contribution in euro:
1,387,384.00

Project background

Global plastic production increased from 1.5 million tonnes/yr in 1950 to 250 million tonnes/yr in 2013, and it is estimated to triple by 2050. Plastics are used extensively in product packaging, such as food, pharmaceuticals, and cosmetics. Around 30% of plastics used worldwide are used for packaging. The most common plastic compounds are petroleum-based polymers such as polystyrene. For example, around 450 billion disposable coffee cups are used per year in the EU and the USA combined (equal to 6.7 million tonnes of waste per year). These cups are often made with polystyrene and, even if the rest of the components are organic, the use of fossil-based materials makes this waste difficult or impossible to recycle. This is a common problem and in total around a half of all plastic waste in the EU is landfilled. Therefore, much energy and processed raw material is lost, instead of being recycled into new products.

Project objectives

The objective of the BIODOLOMER for LIFE project is to demonstrate an innovative 100% 'fossil-free' biomaterial, Biodolomer®, which can replace plastic in product packaging. The project will test its use in four different commercial reference products (freezer bags, cutlery, and food and drink packaging) to verify the possibility of introducing it to the European plastic and packaging industry. This new material can be treated as organic waste through energy recovery/incineration, organic recycling/composting and material recycling, thus avoiding landfilling and upgrading management practice to comply with the waste hierarchy established by the Waste Framework Directive (2008/98/EC). The new material is also cost efficient and highly transferrable, as it can be produced with plastic processing machinery already on the market. Another key innovation is that no waste will be generated during its production, making it resource efficient. Furthermore, its production process requires less energy than used for producting plastics, cardboard and aluminum, with energy consumption reductions of up to 30%. Therefore, the project is fully in line with the aim of the 7th Environment Action Programme to transform the EU into a resource-efficient, low-carbon economy.

Expected results

- 65% reduction of waste compared to plastics, i.e. a reduction of 32 500 kg waste;
- 50% less energy consumption in the production of the material;
- 50% more biogas produced from waste based on the new material;
- Up to 60% reduction of CO_2 emissions in the complete life-cycle of the new material;
- Four products based on the new biomaterial, each validated by end users; and
- A life-cycle assessment study performed on fossil-free Biodolomer®.

A future full-scale implementation of the material would mean a significant reduction in energy-intensive plastic and packaging materials within the EU. If successful, it will allow for several industrial actors across Europe to consider substituting current materials with the more sustainable green material, enabling waste-handling companies to be able to generate more biogas from the waste.

Mercury Decontamination of Dental Care Facilities

LIFE15 ENV/SE/000465
Hg-rid-LIFE

Beneficiary:

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Duration of project:
36 months (01/09/2016 – 31/08/2019)

Total budget in euro:
1,701,112.00

EU contribution in euro:
1,019,766.00

Project background

The use of dental amalgam contributes to a substantial amount of mercury (Hg) in the environment. According to BIO Intelligence Service (2012), dental amalgam is one of the main remaining uses of mercury in the EU. The demand for dental amalgam was still high in 2010, when it amounted to 75 tonnes of Hg per year in the EU. Some 75% of the dental facilities in all EU Member States are equipped with amalgam separators, but estimates suggest that about 45 tonnes Hg per year from dental practices within the EU ends up in clinic effluents. This presents risks to microbiological activity in soils, wildlife and human populations, and the integrity of ecosystems. There is a need for new techniques that reduce the mercury leaked to the environment from this source.

Project objectives

The Hg-rid-LIFE project aims to reduce emissions of mercury, by demonstrating new and improved techniques for decontamination of amalgam and mercury in the pipe systems of Swedish dental clinics. The project has potential to remove up to 50% of the mercury from the dental clinics taking part in the pilot project. In its first stage, the project aims to collect 100 kg Hg. It will do this by:

- Improving standards for sampling mercury concentration in water;
- Testing innovative and more efficient technologies for decontamination of pipe systems;
- Improving existing technology for reducing emissions of mercury from amalgam separators, and
- Developing guidelines for mercury remediation in dental clinics that can initiate or inspire national and EU-wide guidelines.

Adequate handling of dental amalgam waste is necessary to achieve goals within EU legislation. Mercury is defined as a priority substance under the Water Framework Directive (2000/60/EC) and the Environmental Quality Standards Directive (2013/39/EU). Together, these establish concentration limits for mercury and its compounds in order to attain good chemical status of surface waters in all Member States. Further emission limit values and quality standards are described in the Mercury Discharges Directive (82/176/EEC) and the Mercury Directive (84/156/EEC).

Expected results

- Development and demonstration of a new and more effective, easy-to-apply and cost-effective technology for mercury decontamination;
- Drains of 600 dental care facilities screened for mercury;
- 145 dental care facilities fitted with the new technology for mercury decontamination during the project;
- Sewage waste containing contamination corresponding to 100 kg of mercury removed from pipes in dental clinics, with the new technology having the potential to increase the volume of removed contaminated sludge by 25-50%;
- Reduced mercury leakage from examined dental clinics;
- In clinics where mercury levels exceed 1 000 µg/l in sewage waste from suction systems, mercury levels will be reduced by at least 50%;
- Increased knowledge level and know-how of how to mitigate mercury leakage from dental facilities shared with environmental officers, suppliers of dental equipment and dental technicians;
- At least 15 training seminars, several international webinars, and a web-based training tool developed regarding mercury management in dental facilities; and
- Draft proposals for guidelines based on project results, to support the development of national and international guidelines for the management of dental mercury.

Bio Guardrail 4 yoUr Safety LIFE 2015

LIFE15 ENV/NL/000173
BG4US LIFE 2015

Beneficiary:

Name of beneficiary
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Duration of project:
36 months (01/09/2016 – 01/09/2019)

Total budget in euro:
1,915,742.00

EU contribution in euro:
1,025,161.00

Project background

The production of zinc-coated metal guardrails has a considerable impact on the environment. On the one hand, the energy requirements for their production are very high, while on the other, during the lifetime of these guardrails, a considerable amount of zinc is emitted into the environment via corrosion, which leaches into soils, groundwater and surface water. Zinc adversely influences the biodiversity of plants and micro-organisms, and by accumulating in plants and animals in the food chain can cause health problems. To overcome these problems, wooden guardrails were fabricated in 2003 that met the relevant requirements, but the concept was not economically competitive. Since then, biopolymer-based pultrusion and extrusion technologies have developed as proven sustainable technologies. These have good potential for producing competitively priced solutions to replace zinc-coated metal guardrails.

Project objectives

The objective of the BG4US LIFE 2015 project is to produce a bio-based guardrail, which will be demonstrated along on a road. Guardrails are made of three parts: poles, guided rails and tongues. For the poles and guided rails, traditional metal components will be substituted with bio-composites. The project aims to optimise industrial production, using existing machines. The poles will be produced by an extrusion process, using CoFib (lignocellulose fibres made from agricultural waste or roadside grass) and Solanyl (a second-generation bio-plastic obtained as a side-product of potato processing). The guided rails will be made in a pultrusion process (continuous moulding in which fibres and resin are combined), out of a suitable bio-based resin and PaPEC tapes (produced from the same raw material as CoFib). A 25-metre guardrail prototype will be assembled and pre-tested. Afterwards, crash testing will be performed on an optimised pilot guardrail of 100 m to obtain the necessary certification. Finally, field testing will be performed on a 375 m guardrail at a demonstration site, in cooperation with the Dutch Ministry of Infrastructure and Environment. The new guardrail will provide an alternative to galvanised zinc guardrails, leading to potential zinc emission reductions of 18.8 tonnes/yr in the Netherlands alone. By increasing biopolymer production, the project aims to strengthen the competitiveness of the EU bioplastics industry, in line with the European Economic Recovery Plan, and to facilitate the substitution of hazardous chemicals in line with the Action Plan for the Circular Economy. It will also help implement the Water Framework Directive and the Soil Thematic Strategy.

Expected results

- Production of individual components needed to assemble 500 m of guardrails: 850 poles and 3 500 m of guided rails;
- Evaluation for each component, in terms of mechanical properties, heat and fire resistance, form and colour stability, recyclability and waste treatment, and potential bleeding of organic substances from the bio-based components;
- Optimal process specifications for the production of the poles, including the most suitable bio-polymer and fibre sources needed, along with the optimum ratio of biopolymer to fibre source;
- Optimised extrusion production process for the poles, including optimisation of bio-polymer and fibres;
- Optimised pultrusion production process for the guided rails, including optimisation of resin and fibres;
- Certification of the BG4US LIFE guardrail, after crash-testing trials, followed by the assembly of a demonstration rail along a provincial road or highway;
- A life-cycle analysis of the BG4US LIFE guardrail compared to zinc-coated steel guardrails; and
- A business plan for the roll out of the BG4US LIFE guardrail concept, via start-up enterprises and with the development of technology licencing.

CLean INland SHipping

LIFE15 ENV/NL/000217
LIFE CLINSH

Beneficiary:

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Duration of project:
48 months (01/09/2016 – 31/08/2020)

Total budget in euro:
8,782,973.00

EU contribution in euro:
5,108,937.00

Project background

Inland Waterway Transport (IWT) causes considerable emissions of the air pollutants NOx and PM_{10}. Many European regions are struggling to tackle air quality problems, though the often expensive measures implemented to meet air quality limit values are mainly directed at industry and road transport. However, it is increasingly recognised that inland shipping disproportionately contributes to the concentrations of NOx and particulate matter (PM), and also strongly affects the air quality of areas along inland waterways and nearby inland ports. Especially in the larger ports, the emission of NOx by inland navigation can reach up to 25% of total NOx emissions in the Netherlands. Many inland ports are situated in or close to cities, thereby directly affecting the air quality and health of populated areas. Because emissions at low height are involved, the impact on the direct surroundings is relatively high.

Project objectives

The objective of LIFE CLINSH is to improve air quality in urban areas situated close to ports and inland waterways, by accelerating IWT emission reductions. It will demonstrate the environmental impact of emission reduction technologies to facilitate the implementation and enforcement of EU policy and legislation on air quality, in particular, the Clean Air Policy Package (2013) and the Air Quality Directive. Furthermore, nitrogen deposition (eutrophication) caused by ship emissions in Natura 2000 network sites close to waterways will be reduced. The project will help facilitate a switch to lower emission levels in inland vessels, thereby helping to green the fleet. CLINSH will provide insight into the effectiveness and cost benefits of emission-reduction measures under real-life conditions, and explore the available incentives for such measures. The project will demonstrate measures for emission reduction in selected vessels over two years. In tandem, the project team will undertake air quality modelling for different scenarios to show the impact on NOx and PM_{10} concentrations, a methodology that will provide input for the further development of a Clean Shipping Index (CSI). The methodology will be disseminated to policy-makers, ship owners and suppliers, and other decision-makers, and will help to improve the competitiveness of the inland navigation sector.

Expected results

- 30 ships provided with various NOx and PM reduction techniques and monitored for NOx, PM and all other necessary parameters (plus 15 already equipped with Selective Catalytic Reduction for NOx monitoring, which initial results suggest reduce emissions by 70-80%);
- Emission reductions of 288 tonnes/yr NOx and 7.2 tonnes/yr PM;
- An onshore power supply demonstration that is expected to reduce emissions in port areas;
- An emissions inventory database, including all relevant ship information;
- Scenarios that show the expected impact on emissions depending on policy changes and/or incentives;
- Air pollution concentration maps for various scenarios based on high resolution modelling;
- A monitoring protocol leading to a CSI for financial incentives;
- A decision-making tool, enabling ship owners to make a first selection of feasible greening methods;
- Policy tools and recommendations based on possible scenarios; and
- Total emission reduction of 6k tonne (comparable to the yearly NOx emission of Malta) over the total depreciation time of the vessel/engine (on average 20 years), with vessels maintaining the technology after the project.

Upcycling post-consumer film from dirty Mechanical Recycling Facilities (MRFs)

LIFE15 ENV/NL/000429
LIFE AGANFOILS

Project background

Increasing the re-use and recycling of materials is considered a high priority for realising the vision of a circular economy within the EU. Post-consumer low-density polyethylene (LDPE) plastic foils recovered from municipal solid waste, however, are considered difficult to recycle. This plastic waste usually has a high level of contamination with dirt, organic material and adhesives, etc. It must therefore undergo intensive treatment (grinding, washing and drying) during the recycling process. As a result, in most countries, LDPE plastic waste is currently either incinerated for energy recovery or landfilled. Only a small amount of LDPE is recycled and the current state-of-the-art recycling processes do not sufficiently reduce the contamination level, adversely affecting the quality of the recycled granulates. The re-granulate does not reach the quality of virgin material and can only be used for low-quality applications.

Project objectives

The LIFE AGANFOILS project aims to demonstrate a new upcycling process for LDPE plastic waste. The project furthermore foresees a smart collection scheme that diverts LDPE away from landfills and incineration to recycling. The project also aims to demonstrate a recycling installation at which post-consumer LDPE foils from dirty Materials Recycling Facilities (MRF) are upcycled to 'as-good-as-new plastic'.

The innovative process will result in a higher quality odourless re-granulate. This re-granulate reduces the need for virgin plastic and improves resource efficiency by turning a waste product into a resource. For the first time an integrated, full-industrial scale, waste-to-resource recycling facility will be demonstrated at one location for plastic waste foil. It is largely a closed loop process in which used process water is treated and re-used, maximising resource efficiency. Furthermore, by introducing an innovative hot washing stage to the plastic foil recycling process a higher quality end-product and higher yield can be achieved compared to current plastic foil recycling facilities.

Expected results

- The AGANFOILS demonstration process tested, commissioned and fully functioning;
- Implementation of an integrated, full-scale, innovative recycling process for LDPE plastic waste foils at the Attero plant in Wijster;
- Recycling of around 9 000 tonnes of plastic foil waste, leading to about 5 900 tonnes of high-quality plastic re-granulate (75% of plant capacity), over a one-year period;
- Definition of project indicators from a technical and environmental point of view and their monitoring during the project's lifetime;
- Reduction of CO_2 emissions by up to 555 tonnes (owing to the waste not being transported from the Netherlands to Germany). Using waste heat and renewable energy coming from the waste-to-energy facility will also lower carbon emissions;
- Assessment of the socio-economic impact of the project; and
- A market analysis to evaluate the replication potential and transferability of the demonstrated technique.

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Duration of project:
36 months (01/07/2016 – 30/06/2019)

Total budget in euro:
13,029,578.00

EU contribution in euro:
3,021,554.00

Laser systems for the prevention of food chain poisoning and minimization of chemical exposure to the environment

LIFE15 ENV/UK/000386
LIFE Laser Fence

Beneficiary:

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Duration of project:
40 months (01/09/2016 – 31/12/2019)

Total budget in euro:
3,135,928.00

EU contribution in euro:
1,777,985.00

Project background

In a world with increasing demand for food and energy, effective and long-lasting animal control is crucial. Animals are drawn to agricultural areas for food, but this leads to consequences for both animals and farmers. Chemical poisons are often used to control rodent populations in areas where they destroy crops, eat livestock feed and can transmit disease. However, studies have shown that anticoagulant rodenticides contribute to the deaths of a variety of mammal and bird species. The poison accumulates in the food chain, so for animals that prey on or scavenge rodents this repeated exposure may be fatal. Meanwhile, farmers continue to lose billions of euros each year as a result of damage to crops caused by animals. A virtual fence is a promising solution for containing animals in an area or keeping them out of a defined range.

Project objectives

The LIFE Laser Fence project aims to develop an innovative technology, Agrilaser, to keep animals away from agricultural fields. It will be demonstrated in Scotland and Spain. The technology involves using a laser fence as an alternative to chemicals or harmful barriers. It addresses animal welfare concerns and will help stop the loss of biodiversity due to poisoning, in compliance with the EU Biodiversity Strategy. It also forms part of a broader strategy for creating a non-toxic environment, in support of EU Regulation REACH (No 1907/2006) and EU Regulation No 528/2012. The project's main objectives are to demonstrate:

- Reduced exposure to toxic chemicals through the application of innovative laser systems, preventing poison entering food chains;
- The use and improvement of laser systems to reduce impacts on non-target species of birds and animals in ecologically sensitive areas, where nature conservation increasingly conflicts with agriculture; and
- Cost-efficient agricultural management practices for preventing animals intruding into fields, thanks to the incorporation of non-harmful technologies such as laser fences and drones. These are becoming an accurate and cheap (e.g. low-operating costs) means of monitoring farmlands (and decreasing yield losses), especially in areas that are protected or difficult to reach over long distances. The demonstration to farmers and landowners of the positive economics of this sustainable practice will promote its upscaling and replication in other areas.

Expected results

- Demonstrate that the technology allows for the use of rodenticide to be eliminated in the two participating areas compared to the situation before the project: Scotland (0.006 kg/month) and Spain: (0.005kg/month);
- Savings of around 1 620 kg of rodenticide over three years (9 000 ha), with an anticipated 4 860 kg saved from entering the trophic chain three years after the project;
- Demonstrate that the Agrilaser technology allows for a significantly lower exposure of birds to herbicides and pesticides by 80% in the project areas;
- Enhanced ecosystem services, notably an increase in biodiversity, by preventing poison entering the trophic chain;
- CO_2 emissions reduction as a consequence of rodenticide reductions;
- Decrease in crop losses caused by animal intrusion in the protected agricultural fields by 50%; and
- Increased awareness and dissemination of alternative methods for reducing the use of chemicals to control animals damaging agricultural production, and the impact of chemicals on the environment (e.g. health, biodiversity).

KH-AT-16-001-EN-N

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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