European Commission

Environment & Resource Efficiency

LIFE PROJECTS 2014

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 2014: Commission funds 51 new projects in 12 countries with €56.2 million

The European Commission has approved funding for 51 new LIFE Environment & Resource Efficiency (LIFE ENV) projects under the Environment sub-programme of LIFE, the European Union's fund for environment and climate action. The grants have been awarded to beneficiaries in 12 Member States, and will cover pilot and demonstration projects in five thematic areas: air; environment and health; resource efficiency; waste; and water. The projects are led by 'beneficiaries', or project promoters, based in Belgium, France, Germany, Greece, Italy, Latvia, the Netherlands, Poland, Portugal, Spain, Sweden and the United Kingdom. In total, they represent an investment of €103.3 million, of which the EU will provide €56.2 million.

LIFE Environment & Resource Efficiency in 2014

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. Of the 677 proposals received under the call for proposals 2014, the Commission selected 51 projects for funding from a wide range of public and private sector organisations.

The selected projects, situated in 12 Member States, represent a total investment of €103.3 million, of which the EU will provide €56.2 million.

Under this component, the Commission will contribute to the following thematic areas: some €15.6 million is allocated to waste (12 projects), with a total budget of 33.7 million; €14.8 million will support resource efficiency (14 projects) with a total budget of 25.2 million; €13.5 million is to be attributed to water (15 projects), with a total budget of 23.7 million; €9.9 million will be provided for environment and health (eight projects), with a total budget of 16.7 million; and some €2.4 million goes to air (two projects), with an overall budget of some 4 million.

Background

The LIFE programme is the EU's new 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 LIFE 2014–2020 is set at €3.4 billion in current prices, administered through the Environment and Climate Action sub-programmes. The Environment strand of the LIFE programme covers three priority areas: Environment & Resource Efficiency; Environmental Governance & Information; and Nature & Biodiversity. The 'Climate Action' strand covers: climate change mitigation; climate change adaptation; and climate governance and information. The Commission launches one call for LIFE project proposals per year.

LIFE Environment & Resource Efficiency (sub-programme for Environment) is similar to the former LIFE+ Environment Policy & Governance strand (but no longer covers climate change related projects). It will co-finance action grants for pilot and demonstration projects, including development and demonstration of innovative technologies and solutions to environmental challenges, suitable for being replicated, transferred or mainstreamed. Projects will contribute to the implementation, updating and development of EU environmental policy and legislation, including the integration of the environment into other policies (e.g. with respect to the link between environment and health, and in support of resource efficiency-related policy and legislation), thereby contributing to sustainable development.

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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	LIFE14 ENV/ES/000849 LIFE SIAMEC	Integrated anaerobic system for wastewater reclamation at ambient temperature in European climates
	LIFE14 ENV/ES/000852 LIFE SEACAN	Reducing the pressure of fish canneries on the marine environment with new effluent treatment and ecosystem monitoring
	LIFE14 ENV/ES/000860 LIFE EFFIDRAIN	Efficient Integrated Real-time Control in Urban Drainage and Wastewater Treatment Plants for Environmental Protection
SWEDEN	LIFE14 ENV/SE/000047 LIFE-GOODSTREAM	Good ecological status of an agricultural stream - introducing Integrated Buffer Zones in a holistic approach
	LIFE14 ENV/SE/000258 DURAPULP for LIFE	Demonstrating an innovative production process of a unique and green substitute for plastic materials
THE NETHERLANDS	LIFE14 ENV/NL/000029 LIFE PCR	Pure Copper Recovery (PCR) from WtE bottom-ash - An innovative heap leaching and solvent extraction process
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	LIFE14 ENV/UK/000344 LIFE 2014 CRMRecovery	Critical Raw Material Closed Loop Recovery

LIquidation of Full Emission and Noise levels while GARBage collection with Hydrogen!

LIFE14 ENV/BE/000415
LIFE 'N GRAB HY!

Beneficiary:

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Duration of project:
49 months (01/09/2015 – 30/09/2019)

Total budget in euro:
2,740,385.00

EU contribution in euro:
1,644,229.00

Project background

Traditional heavy duty transport vehicles such as waste collection lorries run on diesel. Oxidation of that diesel in internal combustion engines produces about one quarter of the CO_2 emissions from all road transport, corresponding to five per cent of the EU's total greenhouse gas (GHG) emissions. Moreover, a significant part of the particulate matter found in the air is generated by diesel engines. Very small particle air pollution can have serious acute and chronic health effects, which are exacerbated by NOx and CO emissions as well as the combustion output of diesel engines. Heavy duty vehicles, especially garbage trucks, tend to produce high noise levels, which are especially disturbing in densely populated areas.

Hydrogen as an energy vector in mobile applications may provide a suitable response to these issues. When used in a fuel cell, electricity is generated, which can power a clean and quiet powertrain/driveline.

Project objectives

The overall objective of LIFE'N GRAB HY! is to demonstrate two hydrogen-electric hybrid garbage trucks as a zero-emission and low-noise alternative for waste collection in 10 different sites. The project will also create public awareness of hydrogen energy as a sustainable energy carrier.

The project will be carried out in the following stages:

- Phase 1 - Two 26-tonne hydrogen-electric hybrid garbage collectors will be manufactured. These will combine a silent garbage press with a hydrogen-electric hybrid driveline for traction and energy delivery;
- Phase 2 – A large-scale demonstration action will be organised in three phases:
  - The trucks will be tested under real-life circumstances in two different case studies for a year. This will include a purely urban environment characterised by very short drives and intensive use of the garbage press, and a second case study in a rural collection area with long drives at higher speeds and less intensive use of the garbage press;
  - Both demonstrator trucks will be put into operations in three other sites – in Antwerp, Rotterdam and Cologne. Each of these demonstrations will include at least two weeks of full operations on-the-spot, preceded by a series of communication actions to disseminate the results of the tests; and
  - The actions of the project's demonstration phase will be re-organised in 8-10 new hydrogen centres in France, Germany and eventually in Scandinavia.
- Phase 3 - The experiences will be summarised in a book to be presented at a conference to highlight the project achievements. This is intended as a guide to the deployment of hydrogen electric hybrid technology in garbage collection, including links with other relevant heavy duty applications.

Expected results

- Two hydrogen electric hybrid garbage collectors will be manufactured and fully operational for at least three years. The targeted daily energy use is 6-8 kg hydrogen/day for a full working day;
- Over a three-year period, energy savings of 250 MWh will be achieved, along with preventing the production of 125 t of CO_2, 1 075 kg of CO, 2.5 t of NO_x and 51 kg particulate matter; and
- The two demonstration trucks will be introduced and operated in ten different cities.

LIFE STIMUL: Seed Treatments to keep Inputs at Minimum Use Level

LIFE14 ENV/FR/000493
LIFE STIMUL

Beneficiary:

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Duration of project:
48 months (01/08/2015 – 31/07/2019)

Total budget in euro:
3,656,143.00

EU contribution in euro:
2,153,485.00

Project background

The extreme toxicity of certain pesticides causes risk to human and animal health through direct exposure (e.g. industrial workers producing pesticides and operators using them) or indirect exposure (e.g. food consumers). Chronic exposure leads to effects such as carcinogenicity, mutagenicity and genotoxicity, or adverse effects on the immune or endocrine systems of mammals, fish or birds. Concerning risks to the environment, spray drift, leaching or run-off lead to pollution of soil and water, with indirect effects on ecosystems (e.g. loss of biodiversity).

As a consequence, the EU established rules for the sustainable use of pesticides to reduce risks and impacts on people's health and the environment (Directive 2009/128/EC). Around 70% of freshwater consumed is directed towards agriculture, especially irrigation (roughly 90% of agricultural usage). As the demand for freshwater increases and water scarcity increasingly constrains human and agriculture development, there is a growing need for improved and more efficient water usage.

Project objectives

The overall aim of LIFE STIMUL is to develop an innovative and ecological seed treatment solution that will enable farmers to reduce their use of fertilisers and water by 15%. The solution consists of a seed coating that will enhance the root growth at the very early stage of plant development. The coating corresponds to a naturally-derived polymer that is already industrially produced. The treatment will be beneficial to plants, helping them to get additional nutrients and/or water when needed. This improved uptake offers an alternative to spraying.

Specific project aims are to:

- Demonstrate that the new seed treatment can be used in combination with existing seed treatments and can be processed in existing seed treatment facilities; and
- Demonstrate that using this combination of treated seeds delivers reductions in fertiliser and water usage.

Expected results

The treatment of 7 000 tonnes of seeds by the end of the LIFE STIMUL project should bring the following expected results:

- The use of the seed treatment should allow agricultural practices that will induce a reduction of nitrogen fertilisers for corn and wheat by 15%, of pesticide for soyabean, corn, wheat and rapeseed by 15%, and of water consumption for irrigated corn by 15%; and
- In terms of economics, farmers should benefit from higher revenues due to crop yield improvements and the cost-efficient seed treatment process, with an initial estimate on yield giving a €60-100/ha benefit.

INADAR - Innovative and ecological approach for dam restoration

LIFE14 ENV/DE/000851
INADAR

Beneficiary:

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Ralf KLOCKE

Duration of project:
42 months (01/08/2015 - 31/01/2019)

Total budget in euro:
1,417,105.00

EU contribution in euro:
655,100.00

Project background

Dam restoration activities mostly consist of replacing the old concrete, without improving the environment for flora and fauna. When dams have to be elevated the dam becomes broader on the landside, which increases land consumption and has an impact on the floodplain forests. The approval procedures are time-consuming and the cost for restoration and elevation of dams are quite high.

Due to climate change, torrential rains and flooding are expected to occur more frequently. This makes it even more important to maintain dams in a reliable status and restore them in time. In some cases it might even be necessary to elevate the dams to match the consequences of climate change. The European Floods Directive for flood risk management has to be implemented to avoid major hazards for citizens.

Project objectives

The INADAR project will demonstrate a new approach for dam restoration by implementing 'eco-berms' – a sediment and erosion control measure - in two locations in Germany: Offingen and Oberelchingen. Eco-berms make it possible to carry out restoration while elevating the dam in line with the Floods Directive and the improvement of the ecological potential as demanded by the Water Framework Directive (WFD). This increases the efficiency and cost effectiveness of the measures.

The eco-berms are suitable for all dams, where the capacity of the river is not critical for flood protection, for example in the water storage areas at hydroelectric power stations or at inland waterways. It is estimated that some thousands of kilometres of dams in Europe could be suitable for the INADAR approach.

For both demonstration sites, detailed implementation plans will be developed with stakeholders. At the water storage area in Offingen, eco-berms will be implemented on more than 500 m length. In Oberelchingen, the dam at the water storage area will also be restored and moreover elevated by 70 cm on a sector of more than 500 m.

Evaluations will focus on dam stability and safety, the development of a good ecological potential and the economic efficiency of the approach. Finally, recommendations will be developed for the future organisation of approval procedures for the implementation of eco-berms.

Indicators will be defined, under which conditions simplified processes can be applied or a full planning approval procedure is necessary. Additionally, indications will be presented, where eco-berms are not a suitable solution. The recommendations will be disseminated to relevant stakeholders at the regional, national and EU level.

Expected results

- Efficient dam renovation with or without elevation;
- Significant improvement of the ecological potential at the river banks and a better environment for fauna and flora – good ecological potential for the whole water body;
- Avoidance of impacts on floodplain forests (mainly FFH-areas) and reduced compensation measures;
- Reduction of land consumption of dams;
- Reduced used of cement and associated CO_2, since eco-berms are built mainly with natural materials;
- Lower costs for restoration and elevation reducing barriers for necessary measures for flood protection and environmental improvement; and
- Development of simplified approval processes for the implementation of eco-berms- indicators developed together with the actors involved that determine where and how this solution can be applied.

Life GreenYourMove: Development and promotion of a co-modal journey planning platform to minimize GHG emission in Europe

LIFE14 ENV/GR/000611
LIFE GYM

Project backgroun

Air quality thresholds for particulate matter, ground-level ozone and nitrogen dioxide are foreseen by the Air Quality Directive – but these thresholds are exceeded in the most densely populated areas. The Roadmap for a Resource Efficient Europe (2011) reported that a better implementation of existing legislation in combination with new science-based standards for air quality and the transition to a low-carbon economy would benefit air quality.

Project objectives

The main objective of the LIFE GreenYourMove (GYM) project is to contribute towards reducing EU greenhouse gas emissions (GHGs) by introducing a sustainable mobility strategy and by promoting environmentally optimal co-modal options for commuting and travelling.

Specific project objectives are to:

- Develop tools that will accurately measure the emissions of public vehicles circulating in the EU public transport networks under consideration;
- Develop tools that will identify the most environmentally friendly journey from any point of the network under consideration (at least Czech, Dutch and Greek locations) to another by using public transport and optimising passenger logistics;
- Develop, demonstrate and promote an integrated platform that will lead to the decrease of GHG emission production and energy consumption (per kilometre travelled, per passenger) in the European transport sector by reducing the demand for travel by car, making public transport greener, more efficient, accessible and attractive;
- Change the culture and the commuting habits of passengers by providing an easy-to-use service while raising awareness of the environmental benefits;
- Decrease the CO_2- equivalent per passenger and kilometre; and
- Introduce an innovative policy in the pan-European transport system, based on the efficient co-modality scheme and EU emission regulations.

Expected results

The main expected results include:

- An open database covering 70% of the Greek public transport network for the first time;
- New co-modal energy consumption and GHG emission calculation models for European public transport means;
- An improved modelling and solution approach for the environmental co-modal vehicle routing problem, which is the basis for energy-efficient sustainable transport;
- Demonstration of the first national co-modal environmental public transport planner in Greece in 16 major cities and of a pan-European journey planner service via a web platform and a smart phone application replicated in at least four journey planners in EU countries (Czech Republic, The Netherlands, Romania, Slovakia);
- Improved results and higher accuracy of the COPERT emission calculation software coordinated by the European Environment Agency via the adoption of GYM models;
- Change the culture of commuters and encourage them to shift their habits from using the car to using the public transport; and
- Reduction of air pollution and emissions in cities: reduction of at least 2 699 Mt CO_2 eq. during the lifetime of the project.

Beneficiary:

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Duration of project:
35 months (15/09/2015 – 15/08/2018)

Total budget in euro:
1,245,052.00

EU contribution in euro:
732,030.00

Demonstrating resource efficiency through innovative, integrated waste recycling schemes for remote areas

LIFE14 ENV/GR/000722
LIFE: PAVEtheWAySTE

Project background

The management of solid waste – particularly the disposal of solid waste – is one of the most acute environmental problems in Greece and one that calls for immediate and efficient action. Waste disposal in landfills is the most common method of managing municipal solid waste (MSW); 82% of the waste generated in Greece in 2011 was disposed of in landfills. Most of the waste dumps are located in remote areas such as mountains and islands. The target areas of the project, the municipality of Naxos and Small Cyclades islands and the municipality of Ancient Olympia, comprise remote areas facing similar problems.

Project objectives

The LIFE: PAVEtheWAySTE project aims to facilitate the implementation of the EU Waste Framework Directive in remote areas by enabling local and regional authorities to improve their municipal waste recycling performance and thus pave the way to high resource efficiency. The objective is to demonstrate an innovative, environmentally and technically feasible recycling technology for the fine separation and treatment of municipal solid waste in remote areas.

The system will be able to sort and treat different types of recyclable and organic waste in order to recover end products of high quality and purity. Companies in the recycling industry will be engaged to ensure that the end products satisfy market specifications.

Specific objectives are to:

- Establish an integrated, replicable system for source separation and treatment of MSW for remote areas;
- Treat MSW at source avoiding waste collection, transportation and treatment of MSW in central recovery facilities;
- Recover the maximum possible resources, generating more than five streams of clean materials thus contributing to diversion of waste from landfills;
- Inform and train citizens on how to sort different types of recyclable material through innovative prototype systems, operated by specially trained personnel;
- Assess the quality and marketability of end products in correlation with local/regional market specifications and industry specific standards; and
- Make recycling of waste an economically attractive option for remote areas with high transportation costs (reduction of waste management costs by 50%)

Beneficiary:

Name of beneficiary
Municipality of Naxos and Small Cyclades Islands

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Duration of project:
40 months (01/09/2015 – 31/12/2018)

Total budget in euro:
1,758,267.00

EU contribution in euro:
1,054,960.00

Expected results

- New method for recycling of MSW in remote areas developed and demonstrated;
- Increase in recycling rate for all MSW in Olympia from 9-60% and in Naxos from zero to 50%, by fine sorting and compression of different types of recyclable waste at source;
- Halving of the amount of MSW ending up in landfills in three years;
- Waste from target areas going to dumps eliminated;
- Recovery of more than 1 600 tonnes of materials that would otherwise be landfilled;
- Installation and demonstration of nine innovative prototype units in target areas able to treat 500 kg of MSW per day;
- Production of high-quality materials that will be directed to local/regional recycling markets;
- Suggestions for full-scale implementation of the proposed innovative systems for each target area; and
- Two replication studies for transferring the project findings to two other municipalities (one in Spain and one in Greece).

Innovative Electro Dewatering system for the maximisation of the urban sludge Dry Solid content

LIFE14 ENV/IT/000039
LIFE ELECTRO-SLUDGE

Beneficiary:

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Duration of project:
40 months (01/09/2015 – 31/12/2018)

Total budget in euro:
1,475,110.00

EU contribution in euro:
863,464.00

Project background

The implementation of the Urban Waste Water Treatment Directive is increasing the amount of sewage sludge for disposal and the number of small- to medium-size plants. It also requires Member States to provide collecting systems for all agglomerations with populations of more than 2 000.

Wastewater from households and industry is a significant pressure on the water environment because of the loads of organic matter and nutrients as well as hazardous substances. Given that a large percentage of the population of EEA member countries lives in urban areas, a significant amount of wastewater is collected by sewers connected to public wastewater treatment plants. In the EU, about 10 million tonnes of sewage sludge are produced after water treatment every year. A low percentage of this sewage sludge, however, is recycled in agriculture. Incineration and landfilling are the most common disposal methods, both causing significant environmental, economic and social impacts. This scenario cannot be considered a sustainable approach to sludge management in the long term.

Project objectives

The main objective of the ELECTRO-SLUDGE project is to design, develop and demonstrate an innovative electro-osmotic dewatering system that is able to dewater urban sludge from wastewater treatment plants and thus obtain a dry solid content (DS) equal to, or greater than, 30%.

The project will reduce both the volume and weight of urban sludge (drying process) and the concentration of some heavy metals in the dewatered sludge (osmotic process), leading to an increase in the amount of sludge that meets regulations for its safe use in agriculture. Consequently, the project will:

- Reduce the amount of waste directed to incineration and landfilling (which has to be phased out gradually according to EU Directive 99/31); and
- Drastically reduce sludge volumes to final disposal, limiting CO_2 emissions due to transport.

Expected results

- Increased dry solid content (up to or over 30%) comparable to that obtainable by filter presses, but without adding chemicals;
- 40 m^2 of photovoltaic panels to provide around 15% of the energy consumption of the electro-dewatering plant;
- Reduced direct CO_2 emissions during transport thanks to the lower mass of sludge hauled away for disposal;
- Reduced landfilling or incineration costs;
- Reduced concentration of heavy metals (Cr, Cu and Pb) in the sludge by 10-20%, depending on the operating conditions (pH, temperature and oxidation-reduction potential); and
- Demonstrated elimination of the bacterial load in the urban sludge after digestion.

New business model to increase efficiency of resources aimed at products great durability with use of recycled materials

LIFE14 ENV/IT/000082
LIFE M&M Man and Metal

Beneficiary:

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Duration of project:
36 months (01/09/2015 – 31/08/2018)

Total budget in euro:
2,162,997.00

EU contribution in euro:
1,243,258.00

Project background

Zinc mines are rapidly depleting throughout the world. In the EU, the situation is even more problematic, as almost all Member States (with the exception of Ireland) rely on imports. At the same time, zinc waste represents an environmental problem due to its progressive loss in the hot zinc-coating process, where molten zinc alloys are used to galvanise steel wire in order to improve its resistance to corrosion. In this galvanising process, up to 60% of the applied zinc turns to ashes and solid residues. As a result, large amounts of zinc are required.

Overall, it has been estimated that 30 million tonnes of galvanised steel wire are produced in Europe, of which 4.5 million tonnes are produced in Italy, consuming more than 1.07 million tonnes and 160 000 tonnes respectively.

The recycling or reuse of zinc chips has economic as well as environmental benefits. However, recycling is rather difficult to pursue because the hot zinc reacts with the underlying steel, forming intermetallic compounds that are difficult to recover. As a result, the most feasible process to address the problem is the reuse of the metal.

Project objectives

The main objective of the LIFE M&M Man and Metal project is to develop an innovative business model for obtaining an eco-compatible metal wire in which the traditional hot-dip galvanising treatment is replaced by a controlled application of lighter and thinner protective metals (containing a high percentage of aluminium, better known as quasi-alloys). The end result will be durable and fully recyclable products with maximum corrosion resistance. The aim is to find alternatives to zinc, thereby increasing the useful life of the product and reducing the amount of protective coating. It will have a positive environmental impact.

Expected results

- Reduction in the use of zinc by up to 90%;
- Reduction in the thickness of the protective coating by more than 40%;
- Development of a process to produce protective alloys and quasi-alloys using recovered materials containing aluminium;
- A 20% reduction in the embodied energy and in the CO_2 generated compared to traditionally galvanised wire;
- Increase in the useful life of the wire treated with the new process in comparison to the traditional process (by 250% in rural appliances and 800% in industrial appliances);
- Elimination of the formation of intermetallic compounds, maximising the recovery of useful alloys;
- Improvement of some physical properties (e.g. ductility) of the coated wire; and
- Improved surface finish and appearance of the protected surface.

Demonstration of the suitability of dredged remediated sediments for safe and sustainable horticulture production

LIFE14 ENV/IT/000113
LIFE HORTISED

Project background

Exploitation of peatlands has been steadily increasing over the last 25 years, leading to the loss of 70% of peatland areas in Europe and, in some cases, to the destruction of natural habitats. Yet, peat remains important for horticultural growing, with no reliable alternatives in sight. Tested alternative materials, such as tree bark, wood fibres, composted sludge and green waste, have not been accepted by producers as acceptable substitutes.

The recent EU Waste Directive supports the reuse of the sediments dredged in ports which, unlike those dredged from highly contaminated sites, can be reused without specific remediation actions (if they do not contain excessive levels of organic and inorganic contaminants, as determined by official methods). However, current EU legislation is unclear on the possibility of using treated dredged sediments as by-products in agriculture, and European countries rely on their own national legislation frameworks or on the regulations of local authorities.

Project objectives

The general objective of the LIFE HORTISED project is to demonstrate the suitability of dredged remediated sediments as an alternative to peat in the preparation of growing material in horticulture. It will demonstrate the potential of an innovative sediment-based growing material in the cultivation of pomegranate and strawberries, as representative plants at farm scale in Italy and Spain. Results will be compared with the typical cultivation of the same fruits grown with the use of the traditional peat-based growing material. Finally, the project will draw up guidelines for the safe and sustainable use of sediments as components of horticultural growing material.

Expected results

- An innovative technology and related protocols for more sustainable fruit production achieved with sediment-based growing material;
- Evaluation of the suitability of the sediments for growth in containers and production of two fruit species (pomegranate and strawberry), also with respect to heavy metals and other pollutants contents;
- Morphological, biochemical and sensorial characterisation of two strawberry and two pomegranate cultivars, grown on substrates containing treated sediments;
- A 10-20% reduction in the use of peat due to its replacement with treated sediments; and
- A 80-90% reduction in CO_2 emissions linked to the replacement of peat with treated sediments.

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Duration of project:
36 months (01/10/2015 – 30/09/2017)

Total budget in euro:
1,241,900.00

EU contribution in euro:
700,140.00

Recycling of textile fibres from end-of-life tyres for production of new asphalts and plastic compounds

LIFE14 ENV/IT/000160
REFIBRE-LIFE

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Duration of project:
36 months (01/09/2015 – 31/08/2018)

Total budget in euro:
1,813,648.00

EU contribution in euro:
1,070,186.00

Project background

About nine million end-of-life vehicles (ELVs) per year are recycled in the EU, while around 15% of ELV materials are still considered waste and end in landfills. End-of-life tyres (ELTs) are one of the main sources of waste of ELVs, generating in Europe around 2.6 million tonnes/year. Much of this, however, might be recovered as reusable material (39%) or energy (37%). This is in line with the revised EU End-of-Life Vehicles Directive (2011/37/EU) which now requires the reuse and/or recovery of almost all used tyres. ELT could be a source of several valuable secondary raw materials. Typically, the output of the treatment process of ELT is shredded material of various sizes and types, depending on the intended use, including rubber chips or granules, steel fibres and textile fibre.

Unlike rubber and steel materials that are currently being reused in various fields, textiles represent a special waste to be disposed of and the use of ELT in this area is quite limited due to two main reasons: first, the fibre coming from the current treatment plants contains a high amount of rubber (45% by weight) trapped between the meshes, that limits its possible reuse; and secondly, there are currently no useful and affordable applications for fibre reuse that makes recycling worthwhile.

Project objectives

The project REFIBRE-LIFE aims to overcome the two main existing barriers limiting ELT fibre recycling. Its overall objective is that 100% of the ELT fibre material is transformed into a useful secondary raw material within a 'circular economy' approach.

Specific objectives of the project are to:

- Design, construct and validate an innovative industrial pilot plant to treat, clean and process ELT fibres, making them recyclable and reusable in two applications: reinforced plastic compounds and bituminous mix for new asphalts;
- Produce new materials (plastic compounds and asphalts) that have been modified with the fibre and demonstrate their superior technical features and economic viability compared to traditional ones;
- Finalise quantitative assessment of the environmental impact of the process involving LCA and LCC, proving the cost and environmental effectiveness of the proposed new solution; and
- Assess quantitatively the environmental impact indicators by LCA and LCC in order to prove cost/environmental effectiveness of the proposed new solutions.

Expected results

- Recycling of 1 200 tonnes/year of ELT-derived fibre (100% of the material), leading to the complete elimination of recovery scraps and a net reduction of 200 tonnes/year landfill waste and 1 000 tonnes/year waste that goes to incineration;
- Savings of around 1 000 tonnes/year of CO_2;
- Savings of 13 000 kg/year of SO_2 equivalent;
- Savings of 1 600 kg/year of fine powders (PM2.5, PM5, PM10); and
- Reduced use of virgin raw materials derived from petroleum, such as polymers, bitumen, reinforcements and additives for the production of plastic compounds or asphalts. The use of recycled fibre would allow e.g. the replacement of 6 000 tonnes/year of plastic Polypropylene (PP) compounds sufficient to make about 400 000 bins with 240 litres volume for waste garbage collection.

An innovative and sustainable continuous process for the development of high quality trimethyl phosphite

Project background

Chemicals are an essential part of European Union citizens' daily lives, and the EU chemicals' sector is also a major strategic sector for the EU. However, chemicals can pose a severe threat to the environment and health. Toxic chemicals represent about 62% of total chemical production in the EU. Several specific phosphorus derivatives are used in a wide range of applications, including pesticides, flame retardants, plastics, child-care products and pharmaceuticals. Although there is no conclusive data on their toxicity for human health and the environment, their production can involve chemical intermediaries (such as specific ammines) that need to be treated and recovered, or phenol derivatives, which are all categorised as highly toxic. Additionally, wastewater produced in the process needs to be treated and neutralised.

Project objectives

The project will demonstrate a more sustainable and efficient process for the production of such compounds. The new process will avoid the use of toxic chemicals and will not produce contaminated wastewater because water use is largely avoided. The new process also uses less energy and generates by-products that are useful for other sectors such as agriculture.

Expected results

This LIFE project will:

- Set up an innovative, highly sustainable and efficient continuous process;
- Avoid the production of hazardous intermediaries and by-products and the use of toxic chemicals for wastewater treatment;
- Reduce energy consumption in the process by 20-30% as a result of the simplification of the industrial process, the 100% recovery of solvents and elimination of wastewater treatment;
- Reduce water consumption by up to 100% and wastewater production by up to 100%, compared with the current production process; and
- Increase awareness about alternative sustainable and eco-friendly chemical processes in the chemical industry.

LIFE14 ENV/IT/000346
LIFE TRIALKYL

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Duration of project:
36 months (16/07/2015 – 16/07/2018)

Total budget in euro:
2,243,969.00

EU contribution in euro:
1,346,381.00

Demonstrating Remote Sensing integration in sustainable forest management

LIFE14 ENV/IT/000414
FRESh LIFE

Project background

The compiling of Sustainable Forest Management (SFM) indicators is usually accomplished by ground surveys. This approach, based on forest inventory techniques, ensures accurate statistical assessments of forest attributes and how they change over time. However, surveying is generally expensive and time-consuming for medium to large forest management units. In addition, forest data are usually not updated within short time intervals. In order to develop more cost-effective data collection methods for large forest areas, the use of forest ecosystem inventory and mapping data obtained from remote sensors (i.e. drones) is highly recommended.

Project objectives

The project aims to demonstrate:

- The use of remote sensing (i.e. drones fitted with multispectral sensors) for forest mapping has the potential to make the compiling of indicators less expensive and time consuming than current data collection systems based on forest inventories;
- The information generated through these new techniques will help improve forest management decisions;
- The information obtained from these new techniques is extremely useful to help achieve sustainable forest management targets and forest certifications; and
- The applicability of the methodologies at a wider scale at the European Forest Data Centre (EFDAC) and, subsequently, in the European Commission's Forest Information System for Europe (FISE).

Expected results

- An evaluation of the technical and economic feasibility of integrating into forest management remotely sensed information collected by drones;
- The mapping of indicators related to the maintenance of forest resources and their contribution to carbon sequestration, forest health and biodiversity;
- A ranking of medium to large-scale forest management units according to the European Environment Agency's classification of European Forest Types (EFTs), in order to optimise the spatial estimation of SFM indicators; and
- The development of a Forest Information System that aggregates multiple indicator maps in order to support forest managers. This will address the increasing cross-sectoral complexity of the challenges identified by the new EU Forest Strategy (COM (2013) 659) and EU Biodiversity Strategy (COM (2011) 244).

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Duration of project:
48 months (16/07/2015 – 06/09/2019)

Total budget in euro:
2,854,979.00

EU contribution in euro:
1,686,201.000

Eco friendly tanning cycle

LIFE14 ENV/IT/000443
LIFETAN

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Duration of project:
24 months (01/10/2015 – 30/09/2017)

Total budget in euro:
975,506.00

EU contribution in euro:
554,867.00

Project background

The European Union leather industry, 70% of which is located in Italy and Spain, represents a significant share of global production and is an important economic sector for the whole EU. However, leather production is traditionally responsible for heavy environmental impacts. In particular, industrial leather tanning entails significant use of:

- Hazardous substances during the tanning phase which end up in wastewater;
- Fatliquoring products (used to reintroduce oil following tanning) which are generally not biodegradable; and
- Formulations containing volatile organic compounds (VOCs) or that generate persistent, bioaccumulative and toxic (PBT) substances.

In addition, there are difficulties in recycling and disposal of semi-finished or finished products containing toxic metals. The whole sector needs to significantly improve the environmental sustainability of its processes.

Project objectives

The LIFETAN project will demonstrate innovative natural products and technologies for the degreasing, fatliquoring, bating (softening), dyeing and tanning phases of leather production. It will build on the results of previous LIFE projects that substituted toxic chemicals used during the leather tanning cycle to produce significantly more sustainable products.

In particular, the project will:

- Use natural fatliquoring and degreasing products that do not exceed the legal limits for hazardous substances in leather goods;
- Obtain the European Ecolabel for the fatliquoring and degreasing products;
- Reduce contamination of wastewater by enhancing the biodegradability of fatliquoring and degreasing products;
- Recycle and use poultry waste in the bating phase of the tanning cycle;
- Design natural dyes based on lactose from waste milk serum that comply with the EU's REACH chemicals regulation; and
- Apply an innovative chrome-free tanning technology.

Expected results

- Replacement of PBTs in the tanning process with six new tanning formulations that use natural products;
- 50 sheep/goat skins and bovine leathers tanned using the natural products;
- Manufacture of 100 sample leather products using the natural products, in line with EU Ecolabel criteria;
- A reduction (20%) of pollutants in wastewater from leather production;
- A 20% reduction of water consumption during the tanning process;
- Reduced use of chlorine in the tanning cycle;
- Increased biodegradability of the molecules used;
- A 50% increase in penetration of hides by products used to treat leather, resulting in better performance of the finished product;
- A demonstration of the technical/financial feasibility of chrome-free leather tanning; and
- A demonstration that the synthetic processes for dyeing are viable at pre-industrial scale.

Shaping future forestry for sustainable coppices in southern Europe: the legacy of past management trials

LIFE14 ENV/IT/000514
LIFE FutureForCoppiceS

Beneficiary:

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Duration of project:
36 months (01/10/2015 – 30/09/2018)

Total budget in euro:
1,305,075.00

EU contribution in euro:
765,951.00

Project background

Coppicing is a traditional way of forest management that has been adopted across Europe, particularly in southern countries. In Italy, there are around 3.7 million hectares of coppice (42% of the total forest area according to the FAO definition). Coppice forests provide a number of forest ecosystem goods and services (FGS), from energy (firewood) and construction material to the extraction of tannins, mushrooms, honey, cork, fodder, fruits, pharmaceutical and aromatic plants. They also represent a favourable environment for hunting. In the past, coppice forests were heavily exploited by growing populations and emerging industries. As the use of non-renewable materials increased, however, coppices lost importance and were neglected or converted. More recently, coppicing is undergoing a renaissance because of its adaptive ecology, stability, protection function, contribution to biodiversity and its use as a source of renewable bioenergy. Forest and environmental resources, however, must be used sustainably.

Project objectives

The FutureForCoppiceS project aims to demonstrate the sustainability of different management approaches. Existing and newly collected data on consolidated sustainable forest management (SFM) indicators will be evaluated to demonstrate the value of different approaches in ensuring provision of forest ecosystem goods and services (FGS). This will contribute to the knowledge base for SFM and support resource efficiency-related policy.

The project also aims to test, demonstrate and disseminate the value of SFM indicators. FutureForCoppiceS will use consolidated SFM indicators and develop new methods for the collection and reporting of new, functionally oriented ones. This will demonstrate an indicator's ability to assess the effects of different management approaches and evaluate its applicability within the project context and beyond. This will broaden the knowledge base and strengthen the confidence in the SFM reporting. It will also demonstrate the potential effects that different approaches may have on large geographical scales. Results will be organised in relation to the distribution/extent of the concerned European Forests Types (EFT) located in Tuscany and Sardinia (Italy).

Expected results

- A database containing information about the effects of three different management approaches (traditional coppicing, natural evolution, active conversion to high forest) to coppicing at nine existing experimental sites from three EFTs and according to SFM criteria;
- New data on consolidated and newly proposed SFM indicators at nine sites (45 plots) and three 'plus' sites (18 plots), respectively;
- Six series (one for each SFM criteria) of 11 maps showing the potential effects of different management approaches at local (seven maps), regional (two maps), national (one map) and southern European (one map) level for each EFT (when present);
- Fifty-four information sheets (one per each of the nine sites and the six SFM criteria) summarising the results obtained from different management approaches at each site;
- Demonstration of how the consolidated SFM indicators work at the nine sites, in relation to the three concerned EFTs, management approaches and newly suggested indicators;
- Input for future SFM of coppice in three EFTs in Southern Europe based on their actual response to three management approaches; and
- Six field manuals (one for each SFM criterion) for newly suggested indicators, applicable at the small scale, and transferable within and beyond the project's context.

LIFE-PLA4COFFEE

LIFE14 ENV/IT/000744
LIFE-PLA4COFFEE

Beneficiary:

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Duration of project:
30 months (16/07/2015 – 15/01/2018)

Total budget in euro:
2,502,695.00

EU contribution in euro:
1,501,610.00

Project background

About 10 billion coffee capsules are sold worldwide each year (2010 estimate), generating 120 000 tonnes of waste, of which some 70 000 tonnes is generated in Europe. In Italy, 12 000 tonnes of capsules (plastic/aluminium and coffee grounds) are disposed of annually in landfills and incinerators. Capsules cannot be recycled at municipal facilities because they are composed of multiple materials.

The standard materials used in coffee capsules, such as polyethylene (PE), aluminium, ethylene vinyl alcohol (EVOH) and polyethylene terephthalate (PET), also give rise to environmental concerns because:

- Production of PET and PE for coffee-capsule production uses 15 000 tonnes of non-renewable oil; and
- PE, PET and aluminium downstream production related to coffee-capsule production generates more than 410 000 tonnes of emitted carbon dioxide.

The use of alternative solutions such as bio-based polymers has been investigated, but even the most promising, such as polylactic acid (PLA), cannot be used because of poor mechanical strength, thermal resistance and permeability.

The University of Tor Vergata has developed a new PLA product with improved properties and used it to produce coffee capsules at the Aroma Company facilities. The results were promising, but the coffee-capsule production process needs to be adapted to accommodate the new material, and the new PLA formulation needs to be fine-tuned.

Project objectives

LIFE-PLA4COFFE project will demonstrate a new improved production process for coffee capsules based on PLA as a substitute for PE, PET and aluminium. The LIFE-PLA4COFFE compostable capsules will be marketed in Europe and USA, and the material will be applicable for many other plastic products.
Specific objectives are to:

- Scale-up the use of the new PLA material and the new coffee-capsule production process to demonstration scale;
- Demonstrate how the prototype can be used for all plastic products;
- Reduce the volume of waste (plastics, aluminium) sent to landfill; and
- Demonstrate the use of the new PLA formulation capsules for composting, thus reducing fertiliser use.

Expected results
The new PLA-based formulation for the production of compostable coffee capsules will be adapted to demonstration scale and produced in a demonstration compounding plant. Injection and compression moulding technologies will be adapted to produce the PLA coffee capsules.

The project will also test the performance of the PLA coffee capsules and, more broadly, will use the coffee capsule to demonstrate performance of the PLA formulation to the whole plastics industry and to consumers.

Full industrial application of the new PLA bio-based material could enable:

- Elimination of 70 000 tonnes of waste sent to landfill or incineration in Europe;
- Saving of 15 000 tonnes of oil (or a 100% reduction in fossil-fuel feedstock) used in the coffee-capsule production process;
- Avoidance of emissions of 405 000 tonnes of CO_2 eq. related to the use of PE, PET and aluminium in the coffee-capsule production process; and
- Saving of 20 000 tonnes of bauxite and others dangerous pollutants used in aluminium production.

ECO innovative methodologies for the valorisation of construction and urban waste into high grade TILES

LIFE14 ENV/IT/000801
LIFE ECO TILES

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Duration of project:
30 months (01/09/2015 – 28/02/2018)

Total budget in euro:
1,214,300.00

EU contribution in euro:
728,579.00

Project background

Construction and demolition waste (CDW) usually comes in a complex and mixed form that is very difficult to recycle. Currently, the main option for CWD disposal is landfill. However, the construction materials manufacturing industry produces considerable amounts of ceramic-based waste as production process scraps and waste that is not recycled in large volumes at present.

Project objectives

The general objective of the LIFE ECO TILES project is to contribute to the achievement of EU 2020 goals on waste and resource efficiency, reducing emissions, waste, impacts on human health and the environment.

Specific objectives are to:

- Demonstrate an innovative methodology to produce a new generation of tiles made up to 70% with recycled materials and with substantially lower environmental impacts compared to current best-in-market products. Main innovations are: the creation of pozzolan cement made with CDW and/or construction waste precursors (15% weight of the tile); the substitution of aggregates with recycled glass (around. 50-60% of total weight); the production of high-grade precast products; and the adaptation of a patented low-energy production process;
- Demonstrate using a set of well-designed testing and validation activities on 300 m^2 of demo products the improved environmental performance in the production process of precast products, through the reuse and recycling of several streams of urban waste as well as lower energy consumption;
- Build and maintain a collection and valorisation network in the Marche region (with a focus on CDW, production of building material and glass), and
- Increase awareness of the improved eco-innovative solutions focusing on the environmental and economic advantages as well as on the technical feasibility of innovations such as LIFE ECO TILES.

Expected results

- A series of three versions of industrial precast-products (Terrazzo tiles) with up to 70% content of recycled CDW building materials (mainly ceramics) and glass waste;
- A low-energy industrial process able to manufacture the recycled Terrazzo tiles on an industrial scale, consuming 20% less than traditional processes;
- Production of 300 m^2 of demo products (equating to an average of 6-8 000 sample products of different sizes and shapes);
- Facilitate the recycling of up to 450 t/year of CDW and construction materials scrap and 3 000 t/year of glass waste, with a potential of around 1 000 times more in Europe if applied to a share of all pre-casted products;
- Produce four protocols for testing and selecting the best waste materials to realise recycled pre-casted products;
- Carry out a technical evaluation of the demonstration and monitoring of performance; environmental monitoring (including full LCA); market/stakeholders impacts (including two market replication scenarios);
- Obtain a reduction of production times and costs, thus demonstrating the applicability of recycled products in high-volume series in the Terrazzo tiles and pre-cast sector; and
- Obtain at least 8-10 agreements with waste management companies and construction products for the building of a recycling chain at local level in the Marche region and beyond, in order to ensure a constant flow of waste feedstock.

Local circular economy by an innovative approach for recycling paper industry pulper waste into new plastic pallets

LIFE14 ENV/IT/001050
LIFE ECO-PULPLAST

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Duration of project:
30 months (01/09/2015 – 28/02/2018)

Total budget in euro:
1,244,978.00

EU contribution in euro:
746,986.00

Project background

Europe is among the world's largest producers and consumers of pulp, paper, and cardboard. More specifically, the Lucca paper district is the largest European industrial cluster with an overall production of 1.2 million tonnes of tissue paper and 950 000 tonnes of paper for packaging (75% and 40% of the total Italian production respectively). A large percentage of waste paper is recycled. However, although the transformation chain is highly optimised, recovered paper contains a share of materials that cannot be reused and are discarded. This scrap makes up some 7% by weight of the recovered paper and constitutes pulp waste, which is mostly composed of mixed plastics. All pulp waste currently produced (100 000 t/year in the Lucca district alone) is disposed in landfills or burnt in incinerators with significant and unsustainable environmental and economic impacts.

Project objectives

The overall objective of LIFE ECO-PULPLAST is to reduce to zero the amount of paper mill pulp waste sent to landfills and incinerators. In order to reach this goal, the project will demonstrate the technical and economic feasibility of an innovative technology to recycle pulp waste into new plastic compounds and products, creating industrial symbiosis between the paper and the plastic sectors.

The identified technology has already shown good performance in recycling mixed plastics from other industrial wastes. Moreover, laboratory-scale tests conducted on pulp waste have produced promising results.

Specific project aims are to:

- Demonstrate the applicability of the technology at industrial scale, including the establishment and testing of a demonstration production line designed specifically for the characteristics of pulp waste;
- Produce plastic euro-pallets to be reused within the same paper district, creating a local circular economy; and
- Reduce the environmental impact due to the current transportation of pulp waste to incinerators and landfills as well as the impacts of the related disposal.

Expected results

The project expected results will include:

- The establishment of a prototype line using the innovative recycling technology for pulp waste;
- Demonstration of the following benefits:
  - Recycled material with high percentage of pulp waste (well above 50%);
  - Low level of metal impurities, below 0.1%;
  - Productivity of at least 80% of the initial target value of 600 kg/h;
  - Low processing and manufacturing energy requirements, below the needs of conventional technologies;
  - Production efficiency above 90% (processing waste below 10%);
  - Production of plastic euro-pallets with all the required physical/mechanical properties (in compliance with technical regulations); and
- The involvement of at least three plastic companies of Tuscany region in the use of the new plastic compounds.

Sustainable WATer management in the lower Cornia valley through demand REduction, aquifer REcharge and river Restoration

LIFE14 ENV/IT/001290
LIFE REWAT

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Duration of project:
48 months (15/09/2015 – 15/09/2019)

Total budget in euro:
2,278,609.00

EU contribution in euro:
1,300,639.00

Project background

The Cornia River (Val di Cornia) is one of the three main hydrographic systems of the region's water basin, part of the Northern Apennines river basin district. Due to an intensive civil and agricultural use of local water resources, the lower part of the river's alluvial plain is characterised by a severe quantitative hydrological imbalance. As a result, the aquifer's level has been gradually falling, facilitating seawater intrusion which, in turn, has lowered the ecological status of the coastal-marine waters and caused damage to adjacent terrestrial ecosystems (and in particular to the Natura 2000 site, "Padule Orti Bottagone" and the protected wetland, "della Sterpaia"). Access to good quality water for local residents, farmers and entrepreneurs is hence under severe threat, with water management costs bound to increase (due to higher energy costs linked to supply of well water).

Project objectives

The principle objective of the REWAT project is to put in place, following a participatory approach, a strategy for integrated water resources management at sub-catchment level, proposing a governance model for sustainable development of the lower Val di Cornia.

The specific objectives of the project are to:

- Create an integrated and structured knowledge base on the hydrological system of the Val di Cornia;
- Raise water users' awareness of the importance of water saving and groundwater banking and actively involving them in the project;
- Demonstrate the technical feasibility, economic viability and environmental sustainability of five solutions for the management of natural and managed aquifer recharge and for general water saving in civil water supply and in agriculture;
- Develop an integrated governance model for the management of surface and groundwater at sub-catchment scale, based on a participatory process; and
- Sign a river basin contract, involving all stakeholders of the sub-catchment.

Expected results

- A reduction of water consumption by about 10% due to water-saving intervention in the civil water supply;
- A reduction of water consumption by about 20% due to water-saving intervention in agriculture;
- A reduction of water consumption by about 20% due to intervention for the reduction and sustainable management of storm water in urban areas;
- An estimated water infiltration of at least 360 000 m^3/year due to the installation of a managed aquifer recharge facility;
- An increase of the current infiltration rate by at least 10% due to morphological restoration of a stretch of the Cornia river; and
- An improvement of the ecological status of the related water body due to geomorphologic restoration of the stretch of the Cornia river.

Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency

LIFE14 ENV/LV/000174
LIFE Fit for REACH

Beneficiary:

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Duration of project:
54 months (01/10/2015 – 31/03/2020)

Total budget in euro:
4,458,762.00

EU contribution in euro:
2,605,942.00

Project background

Some harmful chemical substances produced by industrial activities remain in the environment for a very long time once released. There, they can accumulate via the food chain and, if toxic, exert harmful effects on living organisms. These so-called persistent bio-accumulative toxic (PBT) substances can also be transported long distances from their original emission source, causing significant damage to ecosystems. PBT contamination is a recognised problem in the Baltic Sea region. The most effective way to prevent the entry of these hazardous substances into the environment is to prevent the pollution at its emission sources, avoiding the use of these substances in the first place, and finding substitutes.

Project objectives

LIFE Fit for REACH aims to offer user SMEs a full 'chemicals' management package', including capacity building in line with the CLP regulation (Classification, labelling and packaging of substances and mixtures) and MSDS (material safety data sheet) guidelines, information on chemical inventories and general management practices, guidance on how to follow legal obligations on specific substances (SVHC), and proposals on how to implement substitution as a core action to reduce environmental impacts from the use of chemicals in their own products and processes, possibly also realising resource efficiency gains.

Substitution will be used as an entry point to companies and as pilot cases to illustrate all elements of chemicals' management at SME level, including the assessment of alternatives, socio-economic evaluation, and an analysis of the social motivation for substitution. The aim is to prepare user SMEs to face the future challenges for chemicals' management. This means understanding today, any future restrictions i.e. making Baltic SMEs 'Fit for REACH'.

Specific objectives are to:

- Develop online tools to assist in the management of chemicals among SMEs – e.g. for identifying substances based on their CAS number or to check MSDS;
- Carry out a socio-economic impact assessment of the pilot cases and an assessment of motivations for, and barriers to, taking the decision to substitute the chemical;
- Contribute to the SUBSPORT database by entering the Baltic cases and translating international cases to the Baltic languages, thus making them accessible to Baltic SMEs;
- Carry out policy dialogue: round tables on implementation and enforcement of REACH/CLP in the Baltic states; international seminar on new developments in REACH and CLP directives; and
- Carry out society dialogue: greening industry, greening procurement, greening consumption.

Expected results

- Minimise the exposure to hazardous substances. Some six in-depth and 50-80 light substitution cases will be implemented;
- Some 50% of the target SMEs EEA (250), LV (300) and LT (400) will be informed about the project. A smaller group (10%) will have expressed interest in cooperation and concluded cooperation agreements;
- Guidelines for hazardous-substance-free procurement will be drafted and tested by several companies;
- A web platform and its tools will be developed;
- The impacts of the project actions on the environmental problem as well as the costs and benefits of chemical risk reduction measures will be assessed; and
- Substitution cases from Baltic states will be published on SUBSPORT.

Proecological pilot installation of fabrication of asphalt emulsions modified by nanostructural waste polymers

LIFE14 ENV/PL/000370
LIFE EMU-NEW

Beneficiary:

Name of beneficiary
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Duration of project:
48 months (01/08/2015 – 31/07/2019)

Total budget in euro:
4,445,095.00

EU contribution in euro:
2,628,123.00

Project background

The EU Waste Framework Directive (2008/98/EC) and the Packaging and Packaging Waste Directive (94/62/EC) place emphasis on reuse and recycling of plastic waste. It is calculated that in the EU27 in 2008, 25 million tonnes of plastic waste were produced, including 12.1 million tonnes (48.7%) of stored waste. While the target was to recover 12.8 million tonnes (51.3%), just 5.3 million tonnes (21.3%) was recycled. According to estimates for 2015, the level of mechanical recycling will increase to 30% (from 5.3 to 6.9 million tonnes). But waste storage and incineration with energy recovery will remain the dominant method of waste management. In Poland in 2012, only 25% of plastic waste was recycled, 17% was used for energy recovery and 58% of plastic waste was deposited in landfills.

The growth of plastics' production is proportional to gross domestic product, and as a result the general growth of plastic waste production in 2008-2015 is expected to reach 5.7 million tonnes (23%). This increase is mainly due to a 24% increase in the size of packaging sector and is consistent with an overall Europe-wide increase in this waste. With no improved methods of product design and better waste management, the amount will continue to increase in the EU along with production.

Project objectives

The overall objective of the project is to develop innovative pilot technology for producing bitumen emulsion modified with polymer recyclate and mineral nanofillers that can be used in the production of asphalt. The technology has been studied and verified by the beneficiary at laboratory scale, and key process parameters have been established.

This technology will be tested in a pilot plant consisting of four phases:
1. Modified asphalt production station;
2. Nanofibres' production station;
3. Waste polymer liquefying, purifying and modification station; and
4. Emulsion production station.

In addition, the project will improve the eco-efficiency indicator by lowering the material-consumption rate of the production. The plant is expected to require less asphalt for the production of asphalt emulsions, because these nanoemulsions achieve additional durability by being reinforced with nanofibres from the chosen groups of polymer waste and mineral nanofillers. The project also aims to expand the lifespan of the products.

Expected results
- A pilot plant for manufacturing of bitumen emulsions modified with polymer recyclate and mineral nonofiller;
- Treatment of 176 tonnes of waste polymer/year; If upgraded to industrial scale this amount could reach 1 119 tonnes/year of waste diverted from landfill, translating into savings of 50 000 tonnes of crude oil per year; and
- Reduction in the use of asphalt by 8-10%, with the consequent saving of crude oil. From reduced asphalt use alone, this technology could save around 100 000 tonnes of crude oil per year, if replicated at national level.

Management of biomass ash and organic waste in the recovery of degraded soils: a pilot project set in Portugal

LIFE14 ENV/PT/000369
LIFE No_Waste

Beneficiary:

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Sónia RODRIGUES

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

Total budget in euro:
1,384,481.00

EU contribution in euro:
830,688.00

Project background

Mining operations are a cause of soil degradation. They are associated with a legacy of abandoned metalliferous mine wastes and acid mine drainage, which contributes to around two per cent of soil contamination in Europe. There is therefore, an urgent need for sustainable site redevelopment strategies and remediation technologies that are effective, both in decontaminating and in preserving soil functions, at affordable costs. Low-cost technologies for the recovery of degraded mining areas increasingly use ash from combustion processes as a resource for the remediation of contaminated soils. A total of 175 degraded mining areas (including 114 metallic sulphide mines) were identified throughout Portugal. There is also between 150 000 and 200 000 tonnes of biomass ash generated annually in the country that is typically disposed of in landfills, which could be used to help recover degraded soils in former mining areas.

Project objectives

The LIFE No_Waste project aims to evaluate, demonstrate and disseminate the sustainable use of ash (from forest biomass residues combustion) combined with organic waste materials (sludge from the pulp and paper industry or compost) to regenerate degraded soils from mining areas, in compliance with the EU 'Thematic Strategy for Soil Protection'.

The project also aims to reduce the impact of wastes from the pulp and paper industry on the environment, while making better use of valuable resources according to the 'end-of-waste' criteria, while also contributing to the mitigation of greenhouse gas (GHG) emissions. A pilot-scale application of soil additives, produced by the mixture of ash with organic waste materials, will demonstrate soil recovery in three degraded mining areas (on a total of 12 test plots of 100 m^2 each) located within the Iberian Pyrite Belt in Portugal.

Expected results

Through the production, testing and application of soil additives, composed of ash from biomass combustion, paper mill sludge and/or organic compost, to regenerate degraded soils in mining areas in Portugal, the following specific results are expected:

- The neutralisation of soil acidity (increased pH from 2.5-3.5 to 5.5-6.5);
- A 300-400% increase in soil organic carbon stock;
- A 100-300% increase in the available pool of plant nutrients (Ca, Ma, Na and K);
- A 90-100% decrease in available pools of potentially toxic elements;
- Up to 100% reduction of soil erosion rates;
- A 40-70% increase in soil water-retaining capacity;
- Up to 80% increase in plant biomass production;
- Up to 100% increase in microbial biomass;
- Up to 100% increase in enzymatic activity; and
- Up to one tonne of CO_2 sequestered per 40 tonnes of ash applied to soil.

Additional expected achievements of the project include:

- Up to 100% reduction in the consumption of other expensive soil ameliorants (e.g. fertilisers, lime);
- Up to 100% reduction in diffuse pollution from the mining areas (e.g. Cd, Zn, Cu and Pb);
- Supporting the circular economy and accomplishing 'end-of-waste' criteria for biomass ash; and
- Contributing to the sustainability of important economic sectors in Portugal (i.e. pulp and paper industry, energy production, waste management and mining).

Smart Water Supply System

LIFE14 ENV/PT/000508
LIFE SWSS

Project background

Water Supply Systems (WSS) are large-scale systems that collect, store, treat and transport water over wide geographical areas to consumers. Safe and efficient operation is crucial for these systems. WSS can have major environmental impacts due to the substantial amounts of energy consumed, as well as through the emission of greenhouse gases (GHGs) and water leakages. This means that saving water will also save energy. Current control systems are designed to deliver water, not to provide water efficiently. Moreover, water network management still relies on the utilities' accumulated experience, rather than on efficiency technologies. Water utilities face a double challenge to simultaneously save water and energy. This is particularly relevant in the WSS sector, where energy is mostly generated from non-renewable sources.

Project objectives

The LIFE SWSS project aims to demonstrate and disseminate an innovative management and decision-support platform for water supply systems (called a Smart Water Supply System: SWSS). The SWSS platform will be composed of five modules: Predictive, Hydraulic simulation, Assessment, Leakage, and Optimisation, which together will support the water companies in their efforts to improve energy efficiency and water efficiency. The SWSS modules are based on previous developments from consortium partners of the project, which will be integrated into one single platform. The project will be implemented on three demonstration water supply systems (AdA, AdC and AdO) under real working conditions. In these three demonstration WSS, the objectives are to reduce energy consumption, GHG emissions and water leakage by implementing the SWSS platform and the reverse-pump for energy recovery (renewable energy) in gravity systems.

Expected results

- Energy consumption: reduction of 15% in the energy consumption of each demonstration system: 0.75 GWh in AdA; 0.45GWh in AdC; 1.35 GWh in AdO (2.6 GWh in total);
- CO_2 emissions: reduction of 15% in CO_2 emissions for each demonstration system: 354 tonnes CO_2 eq. in AdA, 252 tonnes CO_2 eq. in AdC; 637 tonnes CO_2 eq. in AdO (1.243 tonnes CO_2 eq. in total); and
- Water losses: reduction in average water losses in the three supply systems from 2.6% to 1%.

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Duration of project:
36 months (01/09/2015 – 31/08/2018)

Total budget in euro:
1,389,800.00

EU contribution in euro:
802,747.00

Improving current barriers for controlling pharmaceutical compounds in urban wastewater treatment plants

LIFE14 ENV/PT/000739
LIFE Impetus

Beneficiary:

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

Total budget in euro:
1,492,452.00

EU contribution in euro:
855,589.00

Project background

Pharmaceutical compounds (PhCs) are emerging contaminants of environmental-health concern that, if not checked, could adversely affect drinking water sources and reuse projects, two key issues of sustainable water management.

To develop water reuse and ensure the preservation of drinking water supplies in Europe, it is thus important to eliminate these compounds during wastewater treatment. Wastewater treatment plants (WWTPs) are crucial barriers against PhCs, but many of these compounds are resistant to conventional treatments. In the logic of resource efficiency, cost-effective solutions based on the existing infrastructure (many recently built) are essential, as new investments are limited in the near future due to economic constraints.

Project objectives

LIFE Impetus aims to demonstrate measures for improving PhC removal in urban WWTPs with conventional activated sludge (CAS) treatment. As CAS is the most common biological process in urban WWTPs, the solutions may be easily transferred to wastewater treatment across Europe.

The project will carry out a three-year field test in two Portuguese CAS-WWTPs in water-stressed regions (Lisbon and Algarve). These will assess performance, using benchmarking tools and chemical enhancement measures easily implemented in the current treatment lines. The project will thus provide, for several European wastewater quality scenarios, guidelines for reliable and sustainable improvement of PhC removal in conventional WWTPs with minimum energy consumption. New adsorbents from local vegetal wastes (carob and cork) and biopolymer coagulants will be compared with commercial products.

A complementary objective is to produce valuable knowledge for water resource protection from PhCs and associated environmental policy. This includes PhC occurrence and concentration, control in WWTPs, bacterial antibiotic resistance and bioaccumulation in clams, a key product in many local economies.

Expected results

- A low-cost investment (CAPEX) and easy-to-implement solution for improving PhC control in conventional wastewater treatment, while keeping operating costs (OPEX) to a minimum and maximising recovery of resources and energy efficiency;
- Data on occurrence of PhCs in urban wastewaters, which could be used in decision-support systems, such as risk assessment, and future EU policy and legislation on PhC limits in urban wastewater;
- Innovation in methods/practices for improved PhCs control in two CAS aeration regimes (two WWTPs) – operating strategies identified using benchmarking tools;
- Good performance indices, covering technical and economic aspects of treated wastewater quality, operating conditions (incl. energy efficiency) and removal efficiencies;
- Chemical enhancement strategies using two new eco-friendly adsorbents (from local wastes) and two natural coagulants;
- Development and validation of a procedure for PhC analysis in biological samples (clams);
- Analytical monitoring of PhC accumulation in clams (three campaigns and 150 samples); and
- PhC analytical monitoring capacity-building of the consortium and the water sector (around 1 000 samples analysed for 24 PhCs during a three-year period); and
- Cost-benefit analysis using an innovative integrated approach.

Spreading ugLy Fruit Against food Waste

LIFE14 ENV/PT/000817
FLAW4LIFE

Project background

In Portugal, a million tonnes of food are wasted every year, amounting to 17% of the total food production. The reasons are numerous and occur along all the food supply chain: intensive production models, inadequate storage and transportation, expiration dates that are too tight and sale discounts that encourage consumers to buy unreasonably. Another reason is the preference for fruit and vegetables that are 'perfect' in terms of shape, colour and size, which ultimately restricts food consumption. This food waste has also environmental implications, since it involves the unnecessary use of resources in their production (soil, energy and water).

Project objectives

The FLAW4LIFE project aims to change food consumption habits and create an alternative market for 'ugly' (or less than perfect-looking) fruit and vegetables. It aims to bring about the equal marketing of all quality fruits and vegetables regardless of their size, colour and shape.

The project will achieve this goal by replicating nationally an innovative methodology (called Fruta Feia or Ugly Fruit), which has already been tested in Lisbon.

Fruta Feia's methodology consists of buying weekly from local producers the small, big or misshaped products that they cannot sell in the regular market and then selling these products to Fruta Feia's associated consumers, who pick them up at the end of the day at fixed delivery points. The project will increase the number of delivery points in Portugal to 10, thus avoiding 460 tonnes of waste annually.

During the first phase, the pilot project will be optimised and a business plan drawn up. Based on the results and lesson learned in the pilot project, eight new delivery points will be set up. With the support of local authorities and target groups, a nationwide network of farmers, local coordinators and consumers will be established.

Furthermore, the FLAW4LIFE project will established the resources required to foster an international network of associations and other entities involved in food waste management. It will provide support to associations, transferring the know-how and the comprehensive results in Portugal. A best practices' handbook will be published.

Beneficiary:

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Duration of project:
36 months (14/09/2015 – 13/09/2018)

Total budget in euro:
574,396.00

EU contribution in euro:
320,600.00

Expected results

- A reduction of food wastage: 10 tonnes/week and 460 tonnes/year;
- An increase in efficiency of farms due to better use of production resources (energy, water and soil): evaluation of energy use and water saving of around 181 000 m^3 per year;
- A reduction of GHG emissions from food decomposition: 878.65 tonnes CO_2 eq. avoided/year.
- An increase in the number of delivery points, revitalising local associations: 10 delivery points throughout the country;
- An increase in the involved farmers' productivity: 320 farmers accounting for around €161 000 per year;
- An increase of consumers of quality fruit and vegetables at a reduced price: 2 000 fruit consumers involved;
- An increase of local coordinators, creating eight new jobs throughout the country;
- An increase in number of volunteers, capitalising on the feeling of belonging to the project: 160 volunteers involved per year; and
- Awareness of locals including schoolchildren of food wastage and consumption patterns.

Environmentally efficient use of pesticides by localized irrigation systems

LIFE14 ENV/ES/000119
LIFE_IRRILIFE

Project background

In many countries, rising demand for food has resulted in the expansion of irrigation for agriculture and the increased use of fertilisers and pesticides in order to achieve and sustain higher yields. Since the Second World War, there has been a rapid increase in the use of synthetic organic compounds to control weeds, insects and different pests.

High levels of pesticide use can result in pollution of water resources, which can ultimately undermine agriculture, which is the main user of freshwater resources. While proper use of plant protection products minimises the impact of such pollution, excess pesticides can enter air, water, soil and biological chains, reaching even remote areas.

Project objectives

The LIFE_IRRILIFE project will develop a more environmentally-friendly system for the distribution and dispensing of plant protection substances (pesticides and other phyto-regulators). The project will test this new method in a localised irrigation system in the municipality of L'Alcudia (Valencia, Spain). The project will also carry out an environmental assessment of the new process, and will assess its performance and environmental impacts compared with current pesticide application techniques.

The pesticides to be used will be selected according to the features of the new dosing system and according to the pests targeted. An economic evaluation of the entire process will be carried out.

Expected results
The following environmental benefits, compared to current techniques, are expected from the new system:

- A 90% reduction in the exposure of farmers to pesticides;
- An 80% reduction in pesticides released into the atmosphere;
- A 50% reduction in pesticide content in the soil;
- A 50% reduction in the presence of pesticides in aquifers;
- A 50% reduction in the presence of pesticides in air;
- A 50% reduction in the presence of pesticides in fruit;
- An 80% reduction in the persistence of pesticides used on soil (current persistence varies between three to 10 months);
- A 30% reduction in plant protection costs; and
- A 30% reduction in pesticide application costs.

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Duration of project:
39 months (01/10/2015 – 31/12/2018)

Total budget in euro:
1,334,259.00

EU contribution in euro:
784,325.00

Synergic TPAD and O3 process in WWTPs for Resource Efficient waste management

LIFE14 ENV/ES/000150
LIFE STO3RE

Beneficiary:

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Duration of project:
40 months (01/09/2015 – 30/12/2018)

Total budget in euro:
1,957,874.00

EU contribution in euro:
1,093,762.00

Project background

Pollution from agriculture is a major pressure on Europe's freshwater resources. Nutrients (nitrogen and phosphorous) from fertilisers, pesticides, organic material, pathogenic micro-organisms in sediment and micro-pollutants are washed into waterways. This is especially the case in areas with intense rainfall and poorly drained soils. In some river basins, the high nitrate concentration levels can even promote eutrophication in receiving coastal waters.

The EU Nitrates Directive (91/676/EEC) was adopted to protect waters against pollution caused/induced by nitrates from agricultural sources. However, nitrate pollution of water bodies remains a problem. According to Eurostat data (2009), although nationally averaged nitrate concentrations were well below the Nitrates Directive limit (50 mg/L), the value was exceeded at approx. 13% of the measuring points.

Project objectives

LIFE STO3RE will implement an innovative and cost-efficient technology to protect aquatic environments against pollution caused by diffusion of nitrates and micropollutants. The technology will allow conversion of manure and sludge from wastewater treatment plants (WWTPs) into a high environmental quality biofertiliser.

The technology is called CavO3+DAG-TPAD (dual acid-gas temperature phased anaerobic digestion configuration coupled with ozone oxidation and hydrothermal cavitation). It was developed in a previous R&D project (Sludge4Energy), carried out by FACSA and co-funded by Spain's Competitiveness and Economy Ministry. STO3RE will test this technology in a newly-developed demonstration plant that will centralise the treatment of secondary sludge from small WWTPs and cattle manure from surrounding farms. The facility will be located in Totana (Murcia, Spain) and be able to deal with sewage sludge from five surrounding WWTPs (Aledo, Librilla, Alhama, Mazarrón and Puerto Lumbreras) and several farms, covering an area of about 2 700 square kilometres. The total amount of sewage sludge treated in the demonstration plant is expected to reach 5-10 cubic metres of mixed substrate per day.

Expected results
The project expects to produce the following main results:

- A reduction of uncontrolled nitrogen pollution of water bodies, and therefore a reduction in eutrophication episodes;
- A reduction in waste generation from farms and small WWTPs, because of the use of by-products for obtaining energy and biofertiliser; the volume of waste generated will be cut by 20%, and the dehydration capacity of sludge will be increased by 15-25%, reducing reagent and logistics costs associated with sludge management;
- The CavO3+DAG-TPAD technology will enable an increase in the elimination ratios of basic contaminants (salmonella, clostridium perfringens and e-coli) in sewage sludge treatment. The removal of these pollutants will increase by 50%;
- Through the use of the new biofertiliser, soil quality will be improved and a 50% increase in crop yield is expected; and
- A reduction of greenhouse gas emissions due to: (i) natural biogas emissions from stored manure will be avoided because of its treatment in the demonstration plant (300 kg CO_2- eq./tonne cattle manure); (ii) the biogas obtained will be used as a substitute for fossil fuels for supplying heat and power to the demonstration plant (2.61 kg CO_2- eq./litre of diesel).

Early detection and advanced management systems to reduce forest decline caused by invasive and pathogenic agents

Project background

The forests of the Basque Country are a fundamental pillar in the environmental and socio-economic development of the region. Forests cover around 68% of the surface area of the Basque Country and are mainly composed of pine and eucalyptus plantations. However, according to the 'Fourth National Forest Inventory', approximately 40% of these trees are damaged.

Project objectives

The main aim of the LIFE HEALTHY FOREST project is to design, apply and monitor advanced methodologies to achieve more sustainable forestry management at EU level; especially to prevent forest decline caused by invasive and pathogenic agents, taking into account both environmental and socio-economic impacts.

The specific objectives are:

- To develop an innovative and unique integrated system for the early detection and evaluation of the impact of forest decline through a combination of expertise areas, from molecular biology to remote sensing techniques;
- The implementation of the system in large-scale demonstration plots, to give a comprehensive overview of the status of forest health;
- The implementation of accurate and cost-effective sustainable forest management techniques based on the results of the innovative early-detection system, adapted to different pathogenic organisms and scenarios of forest decline;
- The development and implementation of GIS infrastructure, focused on the combined use of diagnostic methods, remote sensing, silvicultural treatments and biological control, to reduce damage caused by invasive and pathogenic organisms. This will consist of a web-based information system for technicians of the forestry administration and technical staff of forest owners' associations, as well as software tools for forest health researchers;
- The provision of baseline data and information on the status of forest decline at different scales of analysis in relation to the main invasive and pathogenic agents;
- The involvement of public and private stakeholders to achieve replicability and transferability at EU level, as well as to increase awareness of the general public about the importance of sustainable forests; and
- The contribution to the objectives of the New EU Forest Strategy and the EU Biodiversity Strategy to 2020.

LIFE14 ENV/ES/000179
LIFE HEALTHY FOREST

Beneficiary:

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Duration of project:
42 months (02/11/2015 – 30/04/2019)

Total budget in euro:
1,487,960.00

EU contribution in euro:
892,776.00

Expected results

- An improvement of 35% in detection capacity and diagnostics. The combination of optimised techniques and protocols will enable substantial progress, by increasing the capacity to evaluate impacts, identify pathogens and define the sustainable management cost per hectare;
- An increase in the production and quality of wood is expected (c.15%), as well as the botanical and fauna diversity (10-20%); An improvement in the forest health conditions and management of ≥25% by means of an early detection system taking into account the reduction of the environmental and economic impact resulting from both the attack of invasive and pathogenic agents and the inappropriate application of management strategies; and
- A reduction in overall costs of around 20%, and an increase of 25% of the environmental, economic and social benefits.

Sustainable and low energy wastewater treatment for warm climates

LIFE14 ENV/ES/000203
LIFE CELSIUS

Beneficiary:

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Duration of project:
36 months (01/10/2015 – 30/09/2018)

Total budget in euro:
732,049.00

EU contribution in euro:
436,377.00

Project background

Two of the main environmental problems caused by water pollution are eutrophication (excessive nutrients) and hypoxia (oxygen starvation), which result from nutrient pollution of water bodies. They promote excessive plant growth and decay, and cause severe reductions in water quality. The EU Water Framework Directive (WFD) requires Member States to take measures to combat such pollution, but implementation is lagging in some countries. Many southern European countries have not taken sufficient measures to achieve good water status in their water bodies.

In the countries of southern Europe with warm climates, and in non-EU countries with similar climates, conventional wastewater treatment systems could be implemented and/or upgraded to tackle water pollution problems. However, these conventional systems are currently characterised by high energy consumption.

Project objectives

The CELSIUS project will develop and demonstrate a low energy consumption wastewater treatment system for warm climates. The system combines two innovative treatment processes: an anaerobic membrane bioreactor (AnMBR) and partial nitrification/Anammox (anaerobic ammonium oxidation) treatment. The first process removes organic matter; while the second eliminates nitrogen.

The project will assess the effectiveness of a pilot plant that will be suitable for treatment of wastewater from warm-climate areas where energy resources are low or access to energy is limited.

The project's specific objectives are:

- To make organic matter removal more energy efficient through the optimisation of the AnMBR;
- To make nitrogen removal more energy efficient through the development of advanced control systems and operational strategies for the partial nitrification/Anammox process;
- To optimise the system as a whole in order to contribute to the removal of organic matter and nitrogen from the wastewater; and
- To evaluate the feasibility of full-scale deployment of the optimised system in warm-climate areas such as South America, India, Africa and EU Mediterranean basin countries (Spain, Portugal, Italy and Greece).

Expected results

- A 60% reduction in the energy consumed in the organic matter removal process, compared to conventional treatment;
- A 60% reduction in the energy consumed for nitrogen removal, compared to conventional treatment. This would also result in lower greenhouse gas emissions from lower energy consumption. The carbon dioxide saving is estimated to be 0.163 kg/CO_2 per cubic metre of treated wastewater;
- Elimination of 90% of the organic matter and 90% of the nitrogen from incoming wastewater, resulting in a significant impact in terms of prevention of eutrophication and hypoxia in the areas where the treatment system is implemented; and
- A full technical evaluation of the system will be carried out, and an economic analysis will be done taking into account the capital and operational costs of the technology. Following on from this, a list of locations where the system could be implemented successfully will be produced.

Production of quartz powders with reduced crystalline silica toxicity

LIFE14 ENV/ES/000238
SILIFE

Project background

Prolonged inhalation of crystalline silica particles can cause lung inflammation and the lung disease known as silicosis. Total European usage of crystalline silica (i.e. quartz and crystobalite) is measured in thousands of millions of tonnes per annum. It is used in many manufacturing industries such as the cement, ceramics, steel, glass, mineral wool, aggregates, mortar and concrete sectors. Hence, a vast number of European workers, around four million (European Trade Union Confederation, 2007), are potentially exposed to Respirable Crystalline Silica (RCS) in the workplace. Although it is not possible to substitute crystalline silica in many of the sectors where it is used, it is possible to nullify its toxicity by treating it with certain substances.

Project objectives

The main objective of the SILIFE project is to produce commercial quartz powders that have very little or zero RCS toxicity. This new coating technology would be replicable in any industry that uses separate dry quartz powders as raw materials.

Specifically, the project aims to:

- Design a pilot plant for the treatment of commercial quartz powders that has the capacity to treat 500 000 kg of quartz per year (considering 8 000 working hours/year); and
- Demonstrate that the treated powders exhibit much less toxicity than the untreated quartz. (The treated quartzes will be demonstrated in the manufacturing processes of five quartz end-users belonging to other sectors than ceramics.)

Expected results

- 75% reduction RCS toxicity of quartz treated in the pilot plant in comparison with untreated quartz;
- Identification of at least two treatments for the above reduction in quartz toxicity, whose associated treatment costs amount to less than €0.025/kg; and
- Production of around 10 000 kg of treated quartzes for the end-users to test in their manufacturing processes.

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Duration of project:
49 months (07/09/2015 – 27/09/2019)

Total budget in euro:
1,666,059.00

EU contribution in euro:
995,581.00

Valorization of iron foundry sands and dust in the ceramic tile production process

LIFE14 ENV/ES/000252
LIFE FOUNDRYTILE

Beneficiary:

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Name of contact person
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Duration of project:
36 months (03/09/2015 – 31/08/2018)

Total budget in euro:
1,205,363.00

EU contribution in euro:
722,884.00

Project background

France, Germany, Italy, Spain and Turkey generate around 4.1 million tonnes of iron foundry sands and dust wastes every year. In spite of the various treatments on the market, a high proportion of this waste ends up in landfill. In Spain, for example, an average of around 67% of waste by volume is land filled (2013). More valorisation options for these materials are necessary in order to reduce the environmental impact of this type of waste.

Project objectives

The LIFE FOUNDRYTILE project aims to demonstrate the valorisation of iron foundry sands and dust wastes in the ceramic tile production process, thus contributing to the implementation of Waste Framework Directive (2008/98/EC) and the goals of the Roadmap for a Resource-Efficient Europe. The new applications will have three main benefits: the preservation of natural resources, the increase in foundry waste valorisation and environmental footprint reduction.

The project will first obtain and characterise the samples according to various factors (i.e. mineralogical and chemical composition, moisture, etc). It will then develop different treatment solutions (a total of 16 solutions combining six different by-products) according to the sample characteristics and the production requirements of four different ceramic tiles. The project will produce 60 tonnes of different ceramic tiles and test them according to different quality parameters (i.e. mechanical resistance, water absorption, etc.). The best performing prototypes (mixtures) will be used to produce a sample of 800 m^2 of wall tiles and porcelain tiles. The project results will be used to revise Best Available Techniques Reference Documents (BREFs) for both foundry and ceramic sectors (BREF codes SF and CER).

Expected results

- Definition of an industrial process for the production of ceramic products from foundry dusts and sands, which reduces the consumption of raw material by 4.1% (translating to 366 000 tonnes in Spain);
- Creation of four small-scale prototypes of different ceramic applications and production of two batches of around 800 m^2 of wall tiles and porcelain tiles;
- Development of a database of foundry by-products information and acceptance criteria;
- Gathering of foundry waste characterisation data and definition of raw material (RM) requirements for different ceramic products; and
- The production of Environmental Economic and Human Health Risk viability assessments of the proposed solutions.

Recycling of citrus industry scrap into natural additives for food industries

LIFE14 ENV/ES/000326
LIFECITRUS

Beneficiary:

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Duration of project:
35 months (16/09/2015 – 31/08/2018)

Total budget in euro:
886,397.00

EU contribution in euro:
531,836.00

Project background

European citrus fruit production is concentrated in the Mediterranean region. Spain accounts for nearly 60% of the EU's total production and Italy around 30%; the remaining 10% comes from mainly Cyprus, Greece and Portugal. Spanish production is concentrated in the regions of Murcia and Valencia.

The process of obtaining the desired fruit generates a significant amount of waste, mainly low-quality fruits and those parts with little commercial value. At best this waste matter is used as animal feed, but adequate ways to manage the huge volume of citrus waste are required.

Project objectives

The project aims to demonstrate on a semi-industrial scale an innovative industrial process for obtaining natural food ingredients from discarded parts of citrus fruits (lemon, orange, grapefruit and tangerine). The final product will be a natural gelling ingredient to be used in the food industry. The gelling agents obtained in the proposed process react in the absence of sugar unlike usual additives.

The process is based on physical operations only, with no need for dissolvent or chemical agent. It allows for the effective recovery of hesperidin, essential oils, sugars etc. with minimum water consumption. It is expected to reduce waste by 80% in terms of mass and volume. This new process will me installed in Molina De Segura (Murcia) in a processing plant owned by the project beneficiary that will be enlarged and upgraded to semi-industrial scale.

The project will also organise training courses on the operation of the semi-industrial plant, mainly focused on agro-food industries technicians. Finally, the project will assess the suitability of this process for the residues of other fruits and those from vegetable processing industries.

Expected results

- An enlarged CTC pilot plant optimally performing an innovative process on a semi-industrial scale;
- Quantified and qualified demonstration of the proposed process and the obtained ingredients – more than 10 000 kg of residue processed with a waste reduction capacity of 80% in volume. A minimum of 12 different foodstuffs will be tested, and some samples of each product, ingredient and proportion will be characterised;
- Quantified demonstration of the economical balance of the process and its feasibility;
- At least 50 regional companies belonging to the target sectors directly contacted and informed. At least 20 of these companies will participate in workshops and at least 12 of these companies will perform test or demonstration sessions at the pilot plant; and
- At least 30 technicians, students, graduates and scientific and technical environment professionals participated in the three calls of the scheduled training course.

Integrated business model for turning Bio-waste and sewage sludge into renewable energy and agri-urban Fertilizers.

Project background

Turning waste into a resource is part of 'closing the loop' in circular economy systems and is one of the main pillars of the 'Roadmap for a Resource-Efficient Europe'. The EU states that compost and digestate from biowaste are under-used materials. In this sense, biowaste and sewage sludge are two kinds of biodegradable wastes with high potential to be converted into a resource through the recovery of minerals and nutrients.

Project objectives

The LIFE In-BRIEF project aims to develop and implement a new business model for the resource-efficient management of certain biodegradable waste, increasing its use for bioenergy and in bioproducts. This will be done through an integrated management model for processing different biowaste generated by agri-food enterprises, and sewage sludge from urban waste water treatment, transforming it into renewable energy and high quality fertilisers.

Specific objectives of the LIFE In-BRIEF project include:

- The development of a new management model of biowaste and sewage sludge through complete treatment in a biogas plant, without any rejections or by-products and 100% energy self-sufficiency;
- The demonstration and validation of the transformation process for turning biowaste into valuable resources, such as minerals and nutrients. This will be done with the development of an industrial-scale prototype (capacity: 10 m3/day of digestate) for turning biowaste from the food industry and sewage sludge into agri-urban fertilisers, which will be tested over a 12-month period to demonstrate technical performance and economic viability;
- The production and validation of a new economically-competitive organic liquid fertiliser, based on humic substances extracted from biowaste;
- A reduction of the operating costs of a biogas industrial plant by recovering more than 80% of thermal energy surplus;
- Mitigation of soil and water pollution, by avoiding the incorrect application of digestate generated in biogas plants; and
- The promotion of the use of biogas plants for biowaste management, to reduce their carbon footprint and greenhouse gas emissions.

LIFE14 ENV/ES/000427
LIFE In-BRIEF

Beneficiary:

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Duration of project:
31 months (01/09/2015 – 31/03/2018)

Total budget in euro:
1,396,758.00

EU contribution in euro:
787,951.00

Expected results

The project's expected results include:

- A new business model that enables the self-financing implementation of a valorisation process transforming waste into fertilisers;
- Reduction of 3 000 tonnes of total treated biowaste and sewage sludge being sent to landfill or incineration during the project;
- Increasing the production of biogas per tonne of biowaste by 20% compared to the standard ratio, equivalent to more than 600 kWh/t of biowaste processed and 400 kWh/t of sewage sludge processed;
- Recovery of more than 215 kWh/t of biowaste processed, generating more than 260 MWh of renewable energy during the project; and
- Formulation and production of at least four new fertiliser products, for both agricultural and urban application, with at least one product sent to the Ministry of Agriculture for its approval.

Demonstration of the recovery of critical metals such as indium and yttrium by recycling discarded flat panels

LIFE14 ENV/ES/000450
LIFE RECUMETAL

Beneficiary:

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Claudio FERNÁNDEZ

Duration of project:
42 months (01/09/2015 – 28/02/2019)

Total budget in euro:
881,520.00

EU contribution in euro:
486,432.00

Project background

The amount of Waste Electrical and Electronic Equipment (WEEE) generated in Europe is about 13 million tonnes per year (13% of municipal waste). Studies predict this amount will increase by around 3-5% annually over the next decade. For example, approximately 150 000 tonnes of flat screens are collected annually in Europe, of which 120 000 are LCD and 30 000 are plasma. These represent a major challenge to the recycling industry. At the European level, the WEEE Directive (2012/19 /EU) aims to prevent the generation of this type of waste, by encouraging its reuse and recovery. An additional factor is the demand for valuable materials used to make flat display screens, which is growing faster than supply due to a growing number of applications.

Project objectives

The main objective of the LIFE RECUMETAL project is to demonstrate the recycling of flat panel displays (FPDs) to recover valuable metals such as indium (In) and yttrium (Y), and to reuse them as high-quality metals for new applications. This will help to reduce European dependence on rare earth (RE) and other critical metals (mainly imported from China), and to implement the European Communication concerning imports of RE and the WEEE Directive.

The project will design and develop a demonstration pilot plant with a treatment capacity of 200 kg/h for discarded flat panel displays (FPDs). The aim is to build a recovery capacity of up to 80% for indium, yttrium and other metals. The pilot plant will be divided into two lines; the first will focus on disassembling processes and mechanical processes to separate and recover valuable fractions, and the second on chemical processing of certain fractions obtained in the first line for the recovery of yttrium, indium and other valuable metals such as silver. The demonstration of the plant's performance will involve organising FPD waste collections in the Navarre region, with the aim of recycling around 100 tonnes of FPDs on the mechanical processing line to obtain 1.5 kg of indium and 3 kg of yttrium in the chemical treatment line.

Expected results

- Development of a pilot plant capable of recycling up to 80% indium and yttrium content, achieving a purity higher than 95%;
- Obtaining up to 70% of recyclable fractions, such as iron, aluminium or plastic, by traditional methods;
- Recovery of up to 80% of other valuable metals such as silver contained in some types of FPDs;
- Recycling of 100 tonnes of FPDs during the demonstration phase, recovering 1.5 kg of indium, 3 kg of yttrium and 1.5 kg of silver;
- Reduction of the European dependence on Chinese RE and other critical metals by recycling FPDs discarded at the end of their lifecycle;
- Reduction of the environmental impact associated with the primary extraction of RE from mines;
- Reuse the recovered indium, yttrium and other valuable metals, such as silver, as high quality products for different applications;
- Adaptability of the plant to different FPDs from different sources and with different characteristics; and
- Achievement of a technology applicable in different sectors and located in strategic places to recycle discarded FPDs, to obtain recycled indium, yttrium and silver as high added-value metals to be used for a wide variety of common applications.

Integrated and sustainable management of cork waste generated in the cork industry

LIFE14 ENV/ES/000460
LIFE ECORKWASTE

Beneficiary:

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Duration of project:
40 months (01/09/2015 – 31/12/2018)

Total budget in euro:
1,903,898.00

EU contribution in euro:
1,087,756.00

Project background

The cork industry generates large quantities of forestry waste. Some two to four per cent of cork panels are defective and sent to landfill. At cork-stopper factories, over 30% of cork is used for stoppers and packing rings and the rest (70%) is triturated (processed). Around 30% of this triturated material is deposited at landfill (sometimes incinerated without energy recovery), the rest is transported to be recycled. If the closest recycling plant is situated too far from the cork factory, it is a common practice to also send this triturated material to landfill, in order to avoid excessive transport costs.

Project objectives

The primary objective of ECORKWASTE is to demonstrate the technical, environmental and economic feasibility of a cork waste valorisation system, according to the cork waste particle size. Cork waste of a certain particle size will be used as absorbent material in wetlands or for the elimination of organic compounds in winery wastewater treatment systems. Other cork waste, such as used cork stoppers and cork powder will be used as substrate for energetic valorisation in a gasification process.

Specific projective objectives are to:

- Demonstrate an innovative hybrid constructed wetland system (pilot scale) based on the use of cork waste as granular material, for the treatment and reclamation of agro-industrial wastewater (winery wastewaters). The wetland will be set up on the grounds of cava producer CODORNIU. It will eliminate BOD and the cork waste will absorb the recalcitrant organic compounds (polyphenols) from the wastewater;
- Carry out an analysis and quantification of cork waste generated in the cork industry at several European factories (producers and users of cork products);
- Carry out a study on cork waste absorption of selected contaminants and cork waste physical properties for gasification purposes;
- Construct a gasification pilot plant based on a fluidised bed system with a treatment capacity of 10 kg/day and with energy recovery. The aim is to demonstrate the use of cork waste as an adequate substrate for syngas production by gasification in fluidised bed systems and the generation of energy. This will contribute to the implementation of the Renewable Energy Directive (2009/28/EC);
- Reduce water consumption in the winery industry, fostering the reuse potential within the production system, while achieving higher effluent quality due to wetlands implementation (Directive 2008/105/EC); and
- Compare the innovative and sustainable wetland and gasification systems against alternative current practices using the same indicators.

Expected results
The main result expected is the development of a plan for the sustainable management of the waste generated in the cork industry. The aim is to reach a total reuse and valorisation of cork waste which currently is sent to the landfill or used for applications without added value. With the results of the experimentation in gasification and wetland pilot plants, an integrated waste management plan for the cork industry will be drafted.

Innovative fully biodegradable mulching films & fruit protection bags for sustainable agricultural practices

LIFE14 ENV/ES/000486
LIFE MULTIBIOSOL

Beneficiary:

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Duration of project:
40 months (01/09/2015 – 31/12/2018)

Total budget in euro:
2,036,680.00

EU contribution in euro:
1,222,002.00

Project background

For over half a century growers/farmers have been using plastic materials in agriculture, also known as agro-films. The best-known type of plastics used for agricultural films are low and high density polyethylene (LDPE and HDPE respectively). Conventional non-degradable polymers after single-use become plastic waste, creating a serious problem of waste management since it is time-consuming and expensive to recycle. This plastic waste is usually abandoned, incinerated or taken to a landfill. These practices have serious consequences for the environment.

Project objectives

This project will develop and demonstrate an innovative, economically viable and fully biodegradable plastic that eliminates waste completely. There are three specific objectives:

- Development of new biodegradable plastic films with very low carbon footprints: conventional agricultural plastic films have an enormous environmental impact in terms of CO_2 emissions during their lifecycle. The project will significantly reduce this impact because its biodegradable polymers and additives will be made from renewable raw materials that are not petroleum-based and do not compete in food markets. Also, biomass for these biodegradable plastics will come from trees and crops that extract CO_2 from the atmosphere as they grow;
- Elimination of waste management: the Multibiosol bioplastics will break down naturally (with OK biodegradable SOIL certification) so removal and transportation of the waste will no longer be needed. Costs of management for farmers/growers and the environmental problems associated with landfills and incineration will be eradicated; and
- Improvement of soil and product quality: conventional agricultural films have toxic components and contaminate the soil in a number of ways. Multibiosol bioplastics will not only avoid these harmful components, they also will add value through oligo elements (trace minerals as natural fertilisers) and micro-perforation functionalities that contribute to agriculture à la carte and help improve the health of the soil and the quality of the final product.

Expected results

- The development of cost-effective and biodegradable 'third generation' plastic films for agriculture that allow for sustainable and efficient farming practices;
- A 100% waste reduction due to the complete biodegradability of plastics (OK biodegrabable SOIL label) after being tilled on soil;
- Reduction of CO_2 emissions of 50%, since the biodegradable plastics will not use fossil fuels as raw materials and emit fewer carbon emissions during production. This number also takes into account the cuts in transportation and incineration related to waste management, as well as carbon capture from trees and crops which extract CO_2 from the atmosphere as they grow;
- Competitive market solution for biodegradable plastics: the price of the plastics will be competitive, particularly when taking into account that there will be significant savings for farmers in waste management and that demand for biodegradable plastics are expected to increase as its costs lowers. Furthermore, farmers will be able to tap into a growing demand for sustainable products;
- A 15% improvement in soil quality since oligo elements will act as natural fertilisers and petrochemical plastic contamination will be avoided; and
- A 10% improvement in crop quality due to the improved fertility and quality of soil.

Dry anaerobic digestion as an alternative management & treatment solution for sewage sludge

LIFE14 ENV/ES/000524
LIFE-ANADRY

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Duration of project:
42 months (01/09/2015 – 28/02/2019)

Total budget in euro:
1,549,598.00

EU contribution in euro:
927,559.00

Project background

Sewage sludge generated in urban wastewater treatment plants (WWTPs) must undergo some treatment in order to reduce its volume, improve its characteristics (e.g. odour elimination and organic matter content reduction) and reduce associated health problems.

The Urban Waste Water Treatment Directive (91/271/EC) stated that urban centres of more than 2 000 inhabitants should have introduced treatment of wastewater by 2005. This produced an annual increase in sewage sludge production of around 50% for the period 1992-2005 in the then EU-15. Therefore, it is important to set up the basis for sustainable and environmentally friendly management of sewage sludge in EU in small to medium-size urban WWTPs, where there is a need for viable and feasible solutions for sewage sludge treatment and disposal.

Project objectives

The project LIFE-ANADRY will test Dry Anaerobic Digestion (AD) technology under thermophilic (55°C) and mesophilic (35°C) conditions as a more effective treatment method for the sewage sludge produced in WWTPs. The implementation of dry AD of sewage sludge at semi- or pre-industrial scale has not been carried out to date. The project will test this technology in a 20 m^3 pilot plant to be installed in the urban WWTP of Mula (Murcia, Spain).

The process will offer:

- Enhancement of biogas production with a concomitant reduction in energy use;
- Reduction of the operating costs in the WWTPs;
- Sludge stabilisation and hygienisation;
- Reduction of carbon emissions due to the minimisation of the use of inorganic fertilisers (recycling sludge as fertiliser); and
- Comprehensive data that support the attractiveness of the technique for full-scale application.

Expected results

- An innovative solution for sludge treatment that will resolve the environmental problem the EU is facing in the wastewater treatment sector, resulting in the demonstration of the technical and financial feasibility of high-solid anaerobic digestion technology;
- Sludge stabilisation (volatile solids 40-60% at the effluent);
- A 30% reduction in transport costs and therefore environmental impacts linked to transportation – around 0.225 kg CO_2/km emissions avoided;
- Improvement in the quality of sludge produced with an expected reduction of 50-99% in pathogen content;
- An 80% reduction of reactor volumes compared to conventional wet digestion;
- A Reduction in GHG emissions in sludge stock deposits due to the reduction of quantities of sludge generated and the process applied;
- Resource recovery from organic matter as green energy: the biogas produced contributes to the energy self-sufficiency of the WWTP. It is estimated that 376 000 kWh of electricity and 446 760 kWh of thermal energy will be produced by a facility that treats 2 500 m^3/day;
- A 70% substitution of inorganic fertilisers thanks to the use of sludge recycled in agriculture and reduction of carbon emissions associated; and
- Operating cost reduction in the WWTP.

Re-utilisation of drainage solution from soilless culture in protected agriculture. From open to close system

LIFE14 ENV/ES/000538
LIFE DRAINUSE

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Duration of project:
36 months (01/09/2015 – 31/08/2018)

Total budget in euro:
993,596.00

EU contribution in euro:
596,157.00

Project background

Modern agriculture focuses on increasing crop yield and its quality, which requires an intense use of water and fertilisers. One of the advances of modern agriculture is the use of soilless culture, which allows further increases in productivity. Open hydroponic systems, a type of soilless culture, are widely present in Europe. In the Netherlands, hydroponics accounts for more than 90% of agricultural production, while in other countries it is around 20%. However, in open hydroponic systems, drainage represents an environmental hazard. Drainage water is typically composed of nitrates (31%) and potassium (48%) applied as fertilisers, with the associated pollution and eutrophication of land and water.

The EU has addressed these concerns in several regulations – e.g. the Nitrates Directive (91/676/EEC) and Groundwater Directive (2006/118/EC), which were both integrated in the Water Framework Directive (2000/60/IEC). The Groundwater Directive aims to preserve groundwater as the most sensitive and the largest body of freshwater in the EU, and it identifies a maximum of 50 mg/l of nitrates while the soilless drainage waters contains between 500-1 000 mg/l.

Full re-circulation systems, also known as closed systems, are an environmentally friendly alternative to open hydroponic systems – but the percentage of European producers that use them in their greenhouses is very low, mainly because these systems need to be specifically designed and adjusted to the specific conditions where production is taking place.

Project objectives

The project will design, construct and demonstrate a full re-circulation pilot system of drainage reuse that is easily adaptable to most agricultural scenarios in southern Europe. The pilot system will be tested in a 500 m^2 greenhouse (0.05 ha) housing 952 tomato plants at the Experimental Greenhouse of CEBAS-CSIC, a governmental research facility in Murcia, southern Spain.

The pilot system proposed here will be able to collect drainage stemming from the normal irrigation of the tomato plantation. It will then disinfect the drainage water and adjust its nutrient concentration, pH and electrical conductivity with a view to making it re-usable in a new irrigation cycle. The project will also propose a legal and regulatory framework for drainage re-circulation to Mediterranean regulatory bodies in Europe.

Expected results

- Demonstration of the feasibility of the transformation of open soilless production farms into closed soilless production farms;
- 1 700 m^3 of water per ha/year reused (19 040 tomato plants/ha x 1l/tomato plants/day = 19.04 m^3/ha/day – x 30% drainage on average = 5.7m^3/ha/day x 300 days of crop/year);
- 165 000 kg crop production/ha in line with open soilless cycle;
- 30-46 kg crop production/m^3 water (which represents an increase in Water Use Efficiency of 20-50%);
- A 35% of saving of nitrogen fertiliser used per ha;
- A 20% of saving of phosphorus fertiliser used per ha;
- A 17% of saving of potassium fertiliser used per ha;
- Reduction in the operating costs of the production farms, demonstrating the feasibility of closed soilless systems in the south of Europe; and
- Reduced contamination and higher protection of the aquifers and ecological areas from eutrophication.

Enhanced Reclaimed wAter quality through MainStream anaErobic treatment using Supported biomassgrowth

LIFE14 ENV/ES/000621
LIFE RAMSES

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Duration of project:
36 months (16/07/2015 – 15/07/2018)

Total budget in euro:
1,158,391.00

EU contribution in euro:
694,906.00

Project background

European water legislation, in particular the Water Framework Directive, emphasises the need to include in legislation, tools for addressing the problem of water shortages and possible solutions, such as the promotion of efficient technologies for obtaining treated water of sufficient quality for reuse in high-value applications.

In Spain reclaimed water accounts for only a small percentage of the total water demand, but in some areas, such as the Canary Islands, Murcia and Valencia, this percentage is much higher, indicating that water has become a strategic resource.

Project objectives

LIFE RAMSES aims to demonstrate a water treatment process that enhances the quality of reclaimed water, thus enabling it to be reused for irrigation and agricultural purposes. The proposed process consists of an anaerobic digestion phase using supported biomass growth followed by biological treatment. In order to improve the overall sustainability, the project will couple a co-digestion process using organic residues from regional agro-food industries (mainly canned food industries) to the anaerobic reactor. This phase will improve the biogas production and contribute to achieving a self-sufficient energy process.

The project will be carried out in a new scalable pilot plant of 300 m^3 capacity to be constructed in the wastewater treatment plant (WTTP) of the municipality of Blanca (Murcia, Spain). Blanca's WWTP is designed to treat 2 000 m^3/day, serving a population of 8 570 inhabitants.

Expected results

- Improved quality of treated water, thus increasing the amount of reclaimed water available for reuse and reducing the amount that it is discharged – more than 90% of the organic matter and suspended solids of the wastewater are removed before the biological treatment;
- A 30 % reduction in the current volume of sludge produced in the biological treatment, and an increase in the value of this sludge (currently considered waste) enabling its reuse as fertiliser due to its high organic content;
- Improved stability of the process by means of using supported biomass growth;
- A 25% decrease in the volume of the reactor in newly built facilities, as the amount of biomass involved in the process (for the same volume) is increased and highly specialised.
- Reduced CO_2 emissions since the biogas produced by co-digestion is used to cover the energy demand of the WWTP;
- A 50% cost reduction of treated wastewater (per m^3) due to a reduction in energy consumption, a better strategy for sludge management and the lack of any further chemical treatment (coagulation, flocculation) once reclaimed water is produced in the biological treatment;
- A strategy for managing organic waste from nearby industries (canned food industries) to facilitate the co-digestion process;
- Guidelines for full-plant design with RAMSES technology;
- A report on the environmental and socio-economic benefits of the project; and
- Awareness of the project and the transfer of knowledge and best practices to stakeholders.

Two-Stage Autotrophic N-removVal for maINstream sewaGe trEatment

LIFE14 ENV/ES/000633
LIFE SAVING-E

Beneficiary:

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Duration of project:
42 months (01/10/2015 – 31/03/2019)

Total budget in euro:
1,169,068.00

EU contribution in euro:
672,645.00

Project background

Currently, urban wastewater treatment plants (WWTPs) consume at least 8-15 kilowatt hours/inhabitant/year of energy in order to meet legal requirements on discharges of organic matter, nitrogen and phosphorus. This means a significant economic cost and is associated with substantial greenhouse gas emissions.

Project objectives

The SAVING-E project will demonstrate how urban WWTPs can be redesigned so that they become energy producers rather than energy consumers. The performance of the redesigned WWTPs will compare favourably to current standards.

SAVING-E technology works by using most of the organic matter that enters a WWTP for biogas production. Wastewater passes through a biological treatment step with low oxygen consumption and high biomass production. The biomass produced in this step has very favourable methane production potential, greater than that achieved by the current generation of urban WWTPs.

In a second step, SAVING-E technology biologically removes nitrogen from wastewater without the need for organic matter. SAVING-E uses the autotrophic biological nitrogen removal (BNR) process for this, but with a novel two-step approach. This consists of two reactors: an aerobic partial nitritation reactor followed by an Anammox (anaerobic ammonium oxidation) reactor. The application of autotrophic BNR significantly cuts aeration costs compared with current urban WWTPs. The novel two-step approach to autotrophic BNR represents an improvement compared to one-step autotrophic BNR because it can work stably at very low temperatures (10ºC).

The SAVING-E technology will be tested at pilot scale. The pilot plant will be installed in the Rubí (Barcelona) urban WWTP. The pilot plant will operate for 30 months at different temperatures, including 10ºC to demonstrate the stability of the process. A technical and economic analysis of the impact of the implementation of the technology in different types of urban WWTPs will also be carried out.

Expected results

The project will demonstrate that the use of SAVING-E technology compared to current WWTP technologies will result in energy savings, reduced carbon dioxide emissions, and reduced operational costs.

Compared to current WWTP technologies, SAVING-E will generate the following benefits:

- A 50% increase in biogas production;
- A 10% reduction of nitrogen discharges;
- Some 30% energy savings in the nitrogen removal process;
- Some 40% energy savings in the overall treatment process; and
- A 20% reduction in greenhouse gas emissions.

Integrated pig manure digestate processing for direct injection of organic liquid fertiliser into irrigation systems

LIFE14 ENV/ES/000640
LIFE Smart Fertirrigation

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Duration of project:
40 months (01/09/2015 – 31/12/2018)

Total budget in euro:
2,628,126.00

EU contribution in euro:
1,491,973.00

Project background

Spain is Europe's second largest producer of pork with 99 561 pig farms and more than 26 million pigs that generate 70 million kg of manure per day (2.7 kg/animal per day). Pig manure can have significant benefits for agriculture, if treated correctly and in an environmentally respectful way. It is a valuable fertiliser rich in organic nutrients that become available to crops immediately after application.

The excess of manure available in intensive pig breeding areas, however, along with a lack of land to spread it on, needs addressing. Many anaerobic digestion plants have nevertheless been established to convert the enormous number of pig slurries into biogas and digestate. Biogas can be transformed into renewable energy, while the digestate has untapped potential.

Project objectives

LIFE Smart Fertirrigation aims to demonstrate the environmental and economic feasibility of innovative pig manure digestate treatment at biogas plants in order to produce liquid and solid biofertiliser. It proposes to optimise the treatment of both manure liquid and solid fraction so that after internal recycling of nutrients, the liquid fraction can be directly injected into irrigation systems as organic fertiliser. By replacing mineral fertilisation in a cost-efficient way, opportunities for biogas producers and farmers will be created. Reducing the use of mineral fertilisers will also cut greenhouse gas emission and prevent soil acidification and eutrophication.

The digestate treatment process is made up of three main phases:

1. Mechanical separation of the digestate's solid and liquid fractions;
2. Extra filtration of liquid fraction to remove suspended solids and prevent clogging, making it suitable for direct injection into the irrigation system; and
3. Drying out of the solid fraction with the excess heat from the biogas production process and later ammonia treatment in an innovative pilot biological treatment plant.

In addition, the project aims to reduce phosphorous levels in pig manure at source by adding phytase enzymes to the pig feed. Due to pigs' inability to digest phosphate present in pig feed, about 90% of phosphorous content is released in their manure. Innovative phytase enzymes can significantly reduce excreted phosphate in manure thus preventing over enrichment.

Expected results

- Prevention of 3 600 tonnes of CO_2 emissions during the project implementation;
- A 20% increase in the nutrient absorption capacity of the plant in comparison with inorganic fertilisers, leading to the reduction of nitrogen and phosphorous in the ecosystem;
- A 30% reduction of phosphorus in tested pig manure in comparison with manure from conventionally bred pigs (along with a reduction of 3 400 kg of phosphorus in tested pig manure);
- Reduction in the costs of the treatment of the wastewater due the reduction of the organic load in the pig manure;
- Production of 50% cheaper liquid fertilisers than inorganic fertiliser; and
- A 70% substitution of inorganic fertilisers in the project area.

Mitigation of environmental impact caused by DWOR textile finishing chemicals studying their non-toxic alternatives

LIFE14 ENV/ES/000670
MIDWOR-LIFE

Beneficiary:

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Duration of project:
36 months (01/09/2015 – 31/08/2018)

Total budget in euro:
961,850.00

EU contribution in euro:
554,608.00

Project background

DWOR (Durable Water and Oil Repellents) are textile-finishing products made of long chain fluorocarbon polymers. They repel water, oil and dirt from fabrics. These chemicals are persistent and bioaccumulative. Many perfluorochemicals are already classified as dangerous to human health and the environment. For example, perfluorooctane sulfonates (PFOS) are listed under Annex B of the Stockholm Convention on Persistent Organic Pollutants, and perfluoroalkyl carboxylic acids (PFCA) and perfluorooctanoic acids (PFOA) are included in the Candidate List of Substances of Very High Concern under the European Union's REACH Regulation.

Project objectives

The main objective of MIDWOR-LIFE is to mitigate the environmental/health and safety impacts of current and future Durable Water and Oil Repellents (DWOR). The project will assess the environmental impacts, toxicology and technical performance of two conventional fluorocarbon based repellents (DWOR) and seven alternatives. The information obtained from the tests (LCA, risk assessment, conformity with European standards etc) will then be summarised and made available as a web tool. The project will also produce policy recommendations for the promotion of less toxic and more effective DWOR alternatives to fulfil the EU REACH Regulation.

The demonstration at technical scale is divided into four main parts:

1. Selection of the finishing additives and textile materials - whereby repellent finishing products available on the market and their alternatives will be assessed;
2. Pre-industrial demonstration of the finishing applications - validating the technical performance of the selected finishing processes on various fabrics;
3. Industrial demonstration of the finishing applications – results obtained from the pre-industrial tests will be confirmed at industrial scale in six textile manufacturing companies. Industrial padding machines will be employed to reproduce the finishing processes carried out at laboratory scale. In these processes, at least 50 m of fabric will be impregnated and squeezed between the rolls of the machines. The fabrics will then be inserted into an industrial stenter with temperature ranges of 100ºC to 180ºC. The tested fabrics treated will similarly be assessed for conformity with European standards, as with the applications obtained in the laboratory; and
4. Validation on site at industrial scale of the risk assessments of the proposed applications.

Expected results

Expected specific outcomes will include:

- Estimates produced of the environmental impacts of two conventional DWOR repellents and of seven DWOR alternatives;
- An innovative software tool for European textile finishing/manufacturing companies to increase knowledge on perfluorochemicals and best available alternatives. This will include good practice guidelines for DWOR repellents usage, selection and disposal;
- Contribution to European environmental policy and legislation on chemicals i.e. the proposed update to the REACH requirements to fill information gaps relating to chemical safety assessment of DWOR substances;
- Risk assessments of two conventional DWOR repellents and of seven DWOR alternatives; and
- A socio-economic impact assessment of the project actions locally.

Innovative Circular Businesses on Energy, Water, Fertilizer & Construction Industries towards a Greener Regional Economy

LIFE14 ENV/ES/000688
LIFE iCirBus-4Industries

Beneficiary:

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Duration of project:
65 months (16/07/2015 – 16/12/2020)

Total budget in euro:
2,287,270.00

EU contribution in euro:
1,366,283.00

Project background

Sewage sludge from wastewater treatment plants is identified as a hazardous waste in the European Union and its management is a major undertaking. However, it is also an alternative source of phosphorous and other nutrients and contains valuable organic matter that is useful when soils are depleted or subject to erosion. The organic matter and nutrients are the two main elements that make this kind of waste suitable for spreading on land as a fertiliser or an organic soil improver. Sludge used on agricultural land must meet certain requirements. The environmental quality limits for the sludge, especially relating to heavy metal content, have been much debated, with many EU countries establishing more stringent national limits than those in the EU Sewage Sludge Directive. For this reason, it is necessary to identify policies and practices that enable the use of sludge on agricultural land under more stringent conditions, and that will harmonise the EU-level restrictions and reduce impacts on soil and water.

Project objectives

The LIFE iCirBus-4Industries project will demonstrate the use of fly ash from forest biomass power plants as an adsorbent agent for heavy metals and other organic materials in sewage sludge. This will make the sludge suitable for the production of low-impact fertiliser. In a second stage, the project will also demonstrate the viability of a further use in recyclable construction materials of the used biomass that contain heavy metals and organic pollutants from sewage sludge.

The project will first characterise the sewage sludge and the forest biomass fly ash. Then, the two-phase sludge treatment to reduce the presence of heavy metals and other contaminants will be validated at laboratory scale. The project will then scale up the process in a prototype sewage treatment plant with a capacity of 100 kg/hour of clean sludge.

Overall, the project expects to produce:
- 500 kg of low impact fertiliser; and
- 17 000 kg of recyclable construction materials.

Expected results
- 100% of fly ash produced in biomass power plants will be suitable for use as an adsorbent agent for heavy metals, leading to a 100% reduction of fly ash disposed in landfill sites;
- 90% of fly ash after the adsorbent process will be suitable for use as an inertising agent for recyclable construction material;
- 100% of treated sewage sludge will be suitable for use as fertiliser, leading to a 15% reduction of hazardous pathogens in soil compared to current practices of direct disposal of sewage sludge onto agricultural land;
- Use of fly ash in recyclable construction materials will lead to a replacement of 35% of cement weight;
- 15% reduction in emissions from transport of wastes and from landfill sites; and
- 10% energy, water and other resource saving in the production of construction materials and compost fertilisers compared to current practices.

Sustainable Urban FUrniTURE: Tool design to perform environmental assessments in the green procurement framework

LIFE14 ENV/ES/000703
LIFE FUTURE

Beneficiary:

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Duration of project:
30 months (01/10/2015 - 31/03/2018)

Total budget in euro:
605,496.00

EU contribution in euro:
340,613.00

Project background

Green Public Procurement (GPP) is an important instrument to accomplish the general goal of sustainable development, since it enables public authorities to address current challenges relating to legislation and sustainability. GPP criteria can contribute to reductions in energy consumption, greenhouse gases and waste production, and can promote the use of renewable resources and eco-design.

GPP is of crucial importance to the Europe 2020 Strategy, since it is a market-based instrument for accelerating the shift towards a resource efficient and low-carbon economy, while improving framework conditions for business to innovate in green technologies. However, in terms of sustainable urban furniture (street furniture), there are barriers to be overcome, for instance, due to insufficient knowledge of the products by personnel and the lack of standard criteria.

Project objectives

The main objective of the LIFE FUTURE project is to develop a tool – the Green Urban Furniture (GUF) Tool – to perform an accurate and simplified environmental analysis of urban furniture to facilitate GPP. The GUF Tool will be based on the methodology of Life Cycle Assessment (LCA). The project will study different elements of urban furniture, focusing on two categories selected to validate the functionality of the tool. Moreover, the tool will be used by public bodies for real-life procurement processes to demonstrate its effectiveness and practical applicability for GPP, with at least 200 urban furniture items being acquired using the GUF Tool. The use of the tool will help ensure a range of environmental benefits, for example, in terms of climate change, eco-toxicity and resource depletion. In particular, the project will:

- Help users to understand GPP criteria;
- Aid in the selection of the best solutions in terms of GPP; and
- Encourage public bodies to include green procurement clauses, based on GUF Tool results, in their tenders.

Expected results

- Updated analysis of GPP for urban furniture in the EU, in particular focusing on Spain and Croatia;
- Validation and demonstration of the economic advantages of the proposed system for analysis and evaluation (GUF Tool); and
- Reduction of the environmental problems of urban furniture using the GUF Tool. The average environmental impact benefits of urban furniture after applying eco-design criteria are predicted as follows:
  - Global warming: 26.5% (reduction of 1 870 kg CO_2 equivalent per urban furniture item);
  - Acidification: 28.7% (reduction of 51 kg SO_2 equivalent per urban furniture item);
  - Eutrophication: 25.5% (reduction of 0.9 kg PO_4 equivalent per urban furniture item);
  - Energy consumption: 15.5% (reduction of 27 000 Megajoule per urban furniture item); and
  - Amount of waste: 10.8% (reduction of 116 kg of waste per urban furniture item).

New generation of eco-friendly asphalts with recycled materials and high durability and acoustic performance

LIFE14 ENV/ES/000708
LIFE-SOUNDLESS

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Duration of project:
41 months (15/09/2015 – 28/02/2019)

Total budget in euro:
1,448,377.00

EU contribution in euro:
869,025.00

Project background

Noise pollution significantly affects the quality of life of inhabitants in urban areas, through direct and indirect effects on health. Road noise plays an important role in this issue, and is a predominant source of noise with vehicle speeds higher than about 50 km/hour. For this reason, one of the most effective measures to reduce noise pollution in urban environments with speeds over 40 km/h is to reduce the noise emission from road surfaces.

Project objectives

LIFE-SOUNDLESS aims to demonstrate the effectiveness of innovative noise-reducing asphalt mixes, used in SMA (Stone Mastic Asphalt)-like thin layers using waste materials. The project will also encourage public bodies to integrate environmental factors into their calls for tender in street construction.

General objectives are to:

- Reduce noise pollution from roads in densely-populated areas by means of innovative noise-reducing asphalt mixes with the same durability as conventional mixtures;
- Improve the environment in urban areas by implementing eco-friendly, long-life and cost-effective road surfaces;
- Validate a feasibility initiative for the reuse of rubber, plastic and fibre waste, and to facilitate a new and wider market for these wastes;
- Improve knowledge and supply data for the development of recommendations on the use of low noise surfaces, and therefore to contribute to the adoption of European specifications for noise-reducing asphalt roads; and
- Assess the evolution of the acoustic performance of these types of mixes in Mediterranean countries, which are subjected to atmospheric conditions different from those of the northern European countries where experience in their use is highest.

Expected results

- A reduction of at least 3 dB in noise level, compared to reference surface type AC16, both in close proximity and overall noise;
- A reduction of at least 6 dB in noise level compared with the current situation in the demonstration road sections;
- The reuse of 2.3 tonnes of nylon fibre waste, 7.5 tonnes of industrial rubber wastes, and 3.7 tonnes of recycled agricultural plastic;
- High water and aging resistance, provided by the aggregate quality used, the thick and homogeneous binder film, and additives in the mix;
- High fatigue resistance, provided by binder and the use of fibres and other additives;
- Good resistance to crack propagation, provided by the high binder content and the use of additives such as rubber, plastic materials and fibres; and
- Very good skid resistance due to the surface's macrotexture.

Integrated anaerobic system for wastewater reclamation at ambient temperature in European climates

LIFE14 ENV/ES/000849
LIFE SIAMEC

Project background

EU policy-makers and institutions are committed to developing new strategies that encourage efficient use of water resources. The European Innovation Partnership on Water, (EIP Water), created in 2012, has identified priority areas in order to overcome the main environmental problems related to water: scarcity, unsustainable wastewater treatment and the impact of untreated wastewater on water bodies.

Project objectives

The LIFE SIAMEC project will demonstrate the anaerobic treatment of municipal and industrial wastewater at ambient temperature in European climates in order to obtain a technology that consumes less energy, produces less biomass and has a lower integrated footprint for wastewater reclamation. This technology will overcome the main drawbacks associated with anaerobic wastewater treatment at low temperature – namely, greenhouse gas emissions and nitrogen removal – since the dissolved methane present in the effluent is used as a source of carbon for denitrification in both a membrane and a non-membrane based post-treatment.

The project will demonstrate the technical feasibility of applying basic and advanced reclamation processes to the effluents of both prototypes for agricultural, industrial, environmental and urban water reuse while reducing associated costs and environmental impacts in comparison to the conventional wastewater treatment schemes currently applied.

Expected results

- A 50% reduction of the energy consumption in comparison with conventional activated sludge systems;
- A 30% reduction of the energy consumption in comparison with conventional systems followed by tertiary treatment (UV) commonly used for municipal wastewater reclamation;
- Recovery of 1-2 Kwh/m^3 treated wastewater;
- A 50% reduction of sludge production;
- An 80% reduction of total nitrogen without external carbon source addition and thus minimal treatment costs;
- A 90% reduction of methane emissions associated with anaerobic treatment at ambient temperature;
- Demonstration of the feasibility of a non-membrane based post-treatment for anaerobically treated wastewater at ambient temperature in European climates. Verification of biomass retention and nitrogen removal capabilities;
- Quantification of the economic and environmental benefits of the proposed treatment scheme;
- Identification of the optimal operational strategies and modelling of the process;
- Identification of the main technical and economic motivations and constraints;
- Determination of the potential transferability of the technology to other European regions and/or climate conditions as well as different wastewater profiles;
- Collaboration for the achievement of EU challenges in the water sector, through policy making, technical solutions, management of solutions and social responsibility; and
- Fostering water reuse initiatives, through dissemination of results and knowledge transfer to end users identified through the project.

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Duration of project:
36 months (01/09/2015 – 31/08/2018)

Total budget in euro:
2,165,515.00

EU contribution in euro:
1,299,306.00

Reducing the pressure of fish canneries on the marine environment with new effluent treatment and ecosystem monitoring

LIFE14 ENV/ES/000852
LIFE SEACAN

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Duration of project:
42 months (01/09/2015 - 28/02/2019)

Total budget in euro:
1,722,373.00

EU contribution in euro:
1,033,123.00

Project background

Galicia (Spain) is highly dependent on fisheries, with fishing (including shellfish), aquaculture and related activities accounting for 10% of gross internal product. The region accounts for the highest production of transformed fish products in Europe and in some cases in the world (e.g. mussel canning).

The southern Galician estuaries are considered one of the world's most biodiverse marine ecosystems. However, the intrinsic nature of the canning industry (e.g. small family-run companies) and the difficulty in treating the generated effluent has threatened the ecological and environmental integrity of the Galician estuaries in recent decades. As an example, a medium-size fish cannery can release, on average, around 51 tonnes of nitrogen, six tonnes of phosphorous and 143 tonnes of organic matter into the environment. Therefore, there is a need for effective solutions to reduce the environmental impact of these activities.

Project objectives

The LIFE SEACAN project will demonstrate the feasibility of applying biofilm-based wastewater treatment systems to reduce the impact of the effluents generated from fish canneries located in coastal zones.

In particular, the project will test and compare two biofilm-based processes: biomass grown in carriers and biomass grown as granular sludge. These technologies will be tested in a fish cannery through a newly-built pilot wastewater treatment plant, with a capacity ranging from 4-8 m^3/h. It will be divided into two units: a packed bed reactor, where biofilm will grow attached to carriers; and a granular sludge reactor, where biofilm will grow in the form of granules. The two biofilm systems will operate in parallel, allowing for a direct comparison. The demonstration period will take into account the time needed to monitor biodiversity change around the cannery site and to quantify the environmental impact associated with the implementation of this technology.

The project results will be used to produce a good practice manual with regard to wastewater treatment in the fish canning industry.

Expected results
The project expects to develop an effluent treatment process with a 25% lower environmental footprint in comparison with conventional treatment processes implemented in fish canneries. In particular, this new process will produce the following concrete environmental benefits:

- Improvement in fish canneries effluent quality, in terms of nitrogen removal up to 90% and COD (chemical oxygen demand) reduced by 95%, achieved by implementing biofilm-based treatments;
- Reduction of the energy input needed to perform the effluent treatment, by at least 20%, in comparison with conventional treatments;
- Quantification of the reduction of the environmental pressure in terms of biodiversity analysis;
- Identification of the possible improvement of benthic assemblages affected by the biofilm-based treatment process in comparison with the original wastewater treatment process;
- Identification of the main technical and economic motivations and constraints for the adequate treatment of the effluents generated in the fish processing industry; and
- Assessment of the replicability of the technology to other European areas facing similar problems.

Efficient Integrated Real-time Control in Urban Drainage and Wastewater Treatment Plants for Environmental Protection

LIFE14 ENV/ES/000860
LIFE EFFIDRAIN

Beneficiary:

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Duration of project:
48 months (01/10/2015 – 29/03/2019)

Total budget in euro:
2,169,735.00

EU contribution in euro:
1,286,691.00

Project background

Combined Urban Drainage Networks (UDNs) collect and convey both wastewater and storm water. This mixed water is sent to wastewater treatment plants (WWTPs) before being released into the environment. During heavy-rain events, UDN and WWTP capacities can be easily exceeded, causing untreated water discharges, known as combined sewer overflows (CSOs). To avoid this, modern UDNs include infrastructure such as tanks, gates and pumps, which can provide storage during heavy rain and release water gradually to the WWTP.

Real-time control (RTC) based on model predictive control (MPC) has been shown to be efficient for the management of UDNs. However, RTC is based on managing flows and does not take into account the polluting load (quality) of the water, which varies considerably depending on the rain events and storage periods. Similarly, the efficiency of WWTP processes depends on both the quantity and quality of the treated water. Untreated water may be refused at different by-pass points, leading to CSOs. Until now, UDNs and WWTPs have been managed separately. It is clear that integrated and coordinated management of quantity and quality in both systems is required in order to optimise overall efficiency and maintain the quality of waters into which treated water is discharged, as required by the EU Water Framework Directive (2000/60/EC).

Project objectives

The LIFE EFFIDRAIN project will demonstrate an integrated real-time control (RTC) strategy for UDNs and WWTPs to minimise the discharge of pollutants into receiving waters. The strategy will be tested in Bordeaux (France) and Badalona (Spain) and will:

- Demonstrate integrated RTC management of the wastewater systems at the pilot sites during a range of rain events;
- Assess and quantify the benefits of the proposed solution compared to the control strategies currently in use; and
- Validate the applicability of the proposed solution in a variety of urban areas.

LIFE EFFIDRAIN will install sensors at the pilot sites to generate data that will be used to create a database of environmental scenarios taking into account weather conditions, real control actions and their effects on the different subsystems. It will also provide operational quality forecasts for both pilot sites, covering total suspended solids in sewer systems. Once the capability to monitor and forecast quality parameters in the sewer system and the WWTP is in place, procedures to compute optimal control strategies for water quantity and quality will be developed.

Expected results

LIFE EFFIDRAIN will result in:

- A new approach to real-time joint management of UDNs and WWTPs in order to protect receiving waters. This approach will be applicable in a wide variety of wastewater systems. The project will demonstrate at least a 40% reduction in the total yearly polluting load of receiving waters caused by CSOs;
- The implementation of the procedures at the Mediterranean pilot site in Badalona (Spain) and the Atlantic pilot site in Bordeaux (France);
- A cost-benefit analysis of the LIFE EFFIDRAIN approach taking into account socio-economic and environmental aspects;
- Guidelines for transferability and replication; and
- Guidelines to help the development of relevant EU environmental regulations.

Good ecological status of an agricultural stream - introducing Integrated Buffer Zones in a holistic approach

LIFE14 ENV/SE/000047
LIFE-GOODSTREAM

Beneficiary:

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Duration of project:
72 months (30/09/2015 – 30/09/2021)

Total budget in euro:
2,023,750.00

EU contribution in euro:
991,772.00

Project background

Drainage of agricultural land is most often a prerequisite for food production. Tile drains and ditches, however, directly connect fields with receiving waters and act as subsurface highways for nutrients. End-of-pipe solutions have an obvious potential. This calls for a shift of paradigm towards the development of new, cost-efficient technologies to mitigate site-specific nutrient losses in agricultural drainage systems.

Project objectives

The LIFE-GOODSTREAM project will implement and document a holistic approach to agricultural management on a catchment level that includes new and innovative cleaning methods of drainage water to demonstrate the potential of drainage filters as cost-efficient measures for:

- Reducing nutrient losses to the aquatic and marine environment;
- Reducing peak flow events from agricultural drainage systems; and
- Viewing the leaching nutrients as a resource instead of waste by increasing the possibility of re-circulation of retained nutrients.

The first phase will be to identify sites for site-specific facilities using GIS, innovative technologies (e.g. Hexacopter) and data from current monitoring and landowner knowledge. This phase will include a range of information and awareness-raising actions to involve the landowners in the project.

The second phase will be to construct integrated buffer zones, level wetlands and optimised constructed wetlands with the aim of reducing nutrient losses from arable land to the stream and retaining the water in the landscape. To further reduce flood risks in the lower part of the catchment an urban storm water pond will be established.

To simultaneously improve biodiversity and landscape connectivity, creotopes will be introduced as a general measure at all sites. Furthermore, a special bio-passage will be constructed to connect the entire stream that is currently split into two parts by a migration barrier. Sites for facilities for nutrient retention will be located according to topography and drainage systems. Habitat enhancements and measures for increased landscape connectivity will be located and designed according to species distribution and habitat isolation.

The hydrological function of the facilities and the results on nutrient transport and biodiversity will be demonstrated and documented to get reliable data on the effects of the facilities/measures.

Expected results
The project results will include:

- 30 integrated buffer zones;
- Two level wetlands;
- Six optimised constructed wetlands;
- 60 creotopes (created biotopes) including 30 small amphibian ponds;
- 500 nest boxes (focus on birds, bats and insects, chosen according to environment and population data;
- A bio-passage in the stream (removal of last migration barrier);
- A field information centre;
- Lowered phosphorous level in the stream to 50 microgrammes/litre;
- Improved continuity due to removal of migration barrier;
- A 10% increase in salmonide density; and
- A 20 % reduction in flood risk in Trönninge village.

Demonstrating an innovative production process of a unique and green substitute for plastic materials

Project background

In Europe there are roughly 60 million tonnes of plastics consumed today. Global plastic production increased from 1.5 million tonnes per year from 1950 to 245 million tonnes in 2008, of which 60 million tonnes were produced in the EU. An estimated 66.5 million tonnes of plastic will be placed on the EU market in 2020 (if no action is taken) and global plastic production is estimated to triple by 2050.

The global packaging market is estimated to be worth €450 billion with plastic accounting for nearly 40% of the market share, followed by paper and board with 30%. With a growth rate of about 6%, the European market for food trays is expected to amount to 10-12 billion trays in a few years, the equivalent of around two million tonnes of plastic. In many cases, the packaging gives the product a significantly longer life span, which means that food wastage is reduced. This suggests that there will always be a need for food packaging.

The demand, however, for replacing plastic with fibre-based packaging is growing steadily. If production of a fibre-based packaging that creates an oxygen-free atmosphere can be achieved, then there is the potential to break into the market for packaging of fresh food. However, existing paper converting processes struggle to compete with cheap plastic converting processes. The need for developing new converting techniques for fibres that are competitive is clear.

Project objectives

The main objective of DURAPULP for LIFE is to successfully demonstrate the production of 3D formed fibre-composite products based on an innovative and green material called DuraPulp, through the use of Airlaid conversion technology.

Specifically the project aims to:

- Validate the market potential using commercial reference products with chosen potential customers and actors in the value chain. Initial results show a potential for commercialisation of DuraPulp within two years of the completion of the LIFE project; and
- Further knowledge of Airlaid technology for biocomposites and establish a platform in the value chain for Airlaid thermoforming of high-performance 3D products.

LIFE14 ENV/SE/000258
DURAPULP for LIFE

Beneficiary:

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Duration of project:
40 months (01/09/2015 – 31/12/2018)

Total budget in euro:
3,793,697.00

EU contribution in euro:
2,131,380.00

Expected results

- Demonstration of a highly innovative and patented material, DuraPulp, which is renewable and biodegradable, and demonstration of Airlaid technology combined with in-line thermoforming for the production of products based on DuraPulp for a range of industry segments;
- Energy savings by up to 80%, compared to traditional converting techniques such as wet moulding fibre technology;
- Reduction of global-warming potential (GWP) compared to fossil-based products by at least 65%;
- At least six products from various end users (and different product segments) validated in the pilot plant;
- A lifecycle assessment study (LCA) performed on DuraPulp compared to plastics that will aid the measurement of the environmental impact of the material across all lifecycle stages; and
- Verification of the recyclability options of the material including incineration, recovery by industrial composting (according to the European norm EN 13432) and material recycling in the hydro-pulping process.

Pure Copper Recovery (PCR) from WtE bottom-ash - An innovative heap leaching and solvent extraction process

Project background

Copper is a raw material of high economic importance in the EU. However, copper mining has a significant negative impact on the environment through particulate matter, sulphur dioxide (SO_2), sulphuric acid aerosols and other emissions. To meet demand, the EU is therefore highly dependent on the refining and smelting of imported copper concentrates, as well as on the recycling of production scrap and end-of-life products. Nearly all copper products can be recycled repeatedly without loss of product properties. The average global end-of-life recycling rate of copper from 2000 to 2010 is 45%.

Project objectives

The overall goal of the LIFE PCR project is to prevent the use of 'virgin' copper, through the increased availability of (upcycled) copper on the European market, thereby reducing the adverse environmental impacts of copper mining. Its specific goal is to demonstrate the Elemetal (i.e. the name of one of the associated beneficiaries) Copper Recovery (ECR) process, an innovative technology for the recovery of copper from the bottom-ash produced by Waste-to-Energy activities ('WtE bottom-ash'). Copper recovery from WtE bottom-ash is traditionally done by mechanical methods such as eddy current separation, which leads to a copper recovery of around 40% with relatively low quality of the recovered copper as an output. This process is placed at the end of the ash treatment chain, before the bottom-ash is used as construction material. Because ECR treats the bottom-ash using a wet process, potentially the ageing step in the bottom-ash processing chain could be shortened or omitted in future.

Lab tests with the ECR process have shown a copper recovery rate up to 90%, leaving little to no copper in the WtE bottom-ash. Besides, the process produces high purity copper cathodes (99.993% purity), giving the process a significantly lower CO_2 footprint compared to traditional methods of secondary copper recovery and mechanical recovery. Another advantage compared to primary copper production (from mines/ore) is that the ECR is a closed loop process, with few emissions to the surrounding environment. It also utilises an innovative and more environmentally-friendly extraction process.

The project will test the ECR technology during one year at a large household waste incineration plant in Moerdijk, the Netherlands.

LIFE14 ENV/NL/000029
LIFE PCR

Beneficiary:

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Duration of project:
35 months (16/07/2015 – 30/06/2018)

Total budget in euro:
11,699,262.00

EU contribution in euro:
2,699,557.00

Expected results

The implementation and testing of the ECR technology expects to achieve the following:

- The treatment of a total of 124 500 tonnes of WtE bottom ash. An expected minimal copper recovery rate of 0.3% (based on dry weight of WtE bottom ash). This will result in the recovery of approximately 373.5 tonnes of copper during the PCR project demonstration period;
- Production of copper of at least 99.993% purity at a constant quality level ;
- Reduced loss of chemicals and reagents in the bottom ash processing; and
- Equal/better quality for reuse in construction material of leached bottom-ashes compared to non-leached bottom-ashes.

The project will also conduct a life-cycle analysis (LCA) of the environmental impact of the ECR process in comparison with primary and/or secondary copper production, as well as compared to state-of-the-art copper recovery from WtE bottom-ash.

European Sustainable Clothing Action Plan

LIFE14 ENV/UK/000257
LIFE ECAP

Project background

The UK Defra Waste Strategy (2007) showed the importance of carbon savings from textile reuse and recycling compared to incineration. The global carbon footprint of UK clothing consumption alone is 38 million tonnes, or 1.5 tonnes of CO_2 eq. per household. Extrapolated across the EU, this is around 317 million tonnes of CO_2 eq.

Project objectives

The overall objective of the ECAP project is to adopt a circular approach to divert over 90 000 tonnes/year of clothing waste from landfill and incineration across Europe by March 2018, and to deliver a more resource efficient clothing sector. ECAP will set targets aiming to scale up these savings by 2020 to over 540 000 tonnes/year (€111 million), and by 2030 to over 700 000 tonnes/year (€144 million).

The project will achieve its aim by developing a sectoral approach, based on the principles of the proven UK Sustainable Clothing Action Plan (SCAP), to provide an EU-wide framework to encourage circular business thinking and economic growth. This will reduce the environmental impacts of clothing production and consumption. The ECAP actions will demonstrate the business case for reducing clothing waste by systematically addressing the key challenges in production, consumption and disposal.

The ECAP framework will measurably:

- Reduce the waste, water and carbon footprints of EU clothing;
- Prevent waste in the clothing supply chain, and the use of domestic and work clothing by business, consumers and governments;
- Ensure that less low-grade clothing and textiles goes to incineration and landfill; and
- Encourage innovation in resource-efficient design and service models to stimulate business growth in the clothing sector and its supply chain.

This will help meet European policy directives on waste and sustainable production, and EU ambitions for developing low-carbon circular approaches to economic growth.

Expected results

From a baseline year of 2012, UK Sustainable Clothing Action Plan (SCAP) signatories have committed to:

- A 15% reduction in carbon footprint;
- A 15% reduction in water footprint;
- A 15% reduction in waste to landfill; and
- A 3.5% reduction in waste arising over the whole product life-cycle.

In the UK alone, meeting SCAP targets are forecast to save annually, by 2020:

- More than 1.2 billion tonnes CO_2 eq;
- Some 420 billion m^3 of water; and
- Over 64 000 tonnes of waste.

The reduction is measured per tonne of clothing. The carbon and water impacts are measured as footprints over the whole product life-cycle.

ECAP will use the same methodology to generate European-wide impacts from the project actions. It will develop appropriate European baselines and targets in conjunction with participants based on available data. Across nine countries (including the UK), the project will target 20% of the European total market in order to generate sufficient momentum beyond the project lifetime.

Beneficiary:

Name of beneficiary
The Waste and Resources Action Programme (WRAP)

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Duration of project:
42 months (07/09/2015 – 06/03/2019)

Total budget in euro:
3,539,877.00

EU contribution in euro:
2,123,926.00

Critical Raw Material Closed Loop Recovery

LIFE14 ENV/UK/000344
LIFE 2014 CRMRecovery

Project background

The UK has identified electrical and electronic equipment (EEE) as priority products due to their high embodied carbon and their environmental impact as a waste stream. Each year around 9.9 million tonnes of WEEE is generated in the EU. Only 30% of WEEE generated is reported as properly collected and recycled.

Many modern electrical and electronic products contain metals which have been classified as critical raw materials (CRMs) by the Commission. The supply and economic viability of CRMs are at risk in the EU, and these materials have higher impacts than other raw materials. Most CRMs are virtually unrecovered from WEEE. The high losses of CRMs are attributed to the current collection and recycling arrangements. In the UK, WRAP has explored the viability of recovering CRMs from the EEE waste streams and highlighted the need to find a wide-reaching solution.

Project objectives

The CRMRecovery project aims to demonstrate viable approaches to increase the recovery of target CRMs by five per cent within the project lifetime.

- The target product categories are: display, consumer electronics, ICT and small household appliances; and
- The target materials are graphite, cobalt, antimony, tantalum, rare earths, silver, gold and platinum group metals (PGMs), but the project will not be limited to these materials.

These targets have been selected because previous work by all partners has indicated that these are the CRMs with the highest value and concentration and these are the product categories where they are found in greatest volumes.

Supporting objectives are to demonstrate:

- The environmental, economic and social benefits that an innovative circular economy for CRMs could deliver for the EU;
- Innovative collection, reuse, recycling and other forms of recovery of WEEE;
- Key inputs to a European infrastructure plan for collection and recovery of products, parts, components and CRMs from WEEE;
- Innovative methods to support the 7th Action Programme, to improve the evidence base for environmental policy and citizen support to improve the transparency of the end result of end-of-life products, parts, components and materials; and
- How through positive price mechanisms WEEE shipped to non OECD countries can be reduced.

Beneficiary:

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Duration of project:
43 months (01/09/2015 – 29/03/2019)

Total budget in euro:
2,104,439.00

EU contribution in euro:
1,262,662.00

Expected results

- The development of a European wide model of the flow of WEEE through the recovery system;
- A completed collection assessment matrix for each of the host countries prioritising the collection mechanism to be trialled;
- Comprehensive trial reports that outline the methodology and approach used, all the data associated with the trial and a cost/ benefit analysis of the individual trial;
- A minimum of 100 tonnes of product collected across 10 collection trials and reprocessed through reuse, component recovery and recycling operations as defined during the project;
- A suite of possible nation-specific policy intervention routes and an EU policy options document; and
- EU infrastructure development recommendations that outline the required collection and recovery infrastructure to secure resources and value in the EU.

In the long term this project aims to increase the recovery of target CRMs by five per cent by weight by 2020 and by 20% by 2030. This will result in a 20% increase in value as reuse will also deliver high values.

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Cover photo: LIFE08 ENV/E/000148/NEEMO EEIG/Justin Toland
The ECO-VITRUM-TRC project applied a new integrated management model and technology for CRT televisions and computer monitors that enables their reuse as raw material for the development of new products.

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