- THE LIFE PROGRAMME -

GOOD PRACTICE ON WASTE MANAGEMENT AND THE CIRCULAR ECONOMY

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Abstract

The LIFE programme was established in 1992 and is the EU's funding instrument for the environment. 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 pilot or demonstration projects.

With regards to waste management and the circular economy, LIFE has continuously co-funded innovative projects that promote waste prevention, improve waste recycling and boost reuse technologies and processes in a wide range of sectors all over Europe. Out of the 4 306 initiatives supported by LIFE to date, 667 have been exclusively on waste, with over €433 million allocated. In fact, waste management is the theme most widely tackled by the programme.

In particular, LIFE has focused on demonstrating innovative technologies for recycling specific materials from waste streams, such as hazardous, agricultural or municipal waste. Linking waste management to other environmental topics, such as climate change or the protection of water resources has been another issue much covered by the programme. Finally, LIFE has also actively contributed to waste prevention by raising public awareness, promoting the exchange of knowledge and developing information tools for better waste management.

Project examples

Below you can find some examples of LIFE projects on specific waste-related themes:

Management of specific waste streams:

. Plastic: The POLYMIX project demonstrated the feasibility of using polymers waste in asphalt mixtures, helping to reduce the environmental impact of road construction. Tests were carried out using 20 tonnes of recycled polyethylene, polypropylene polystyrene and end-of-life tyres for asphalt mixes on 1.6 km of road. One of the project's main results was the improvement in the plastic deformation (rutting resistance) of the POLYMIX asphalt mixes, compared to conventional ones. This made the new mixes especially resilient to extremely high temperatures combined with heavy traffic, resulting in less maintenance costs due to their increased lifetime. Furthermore, two of the new mixtures (polypropylene and end-of-life tires) could be used to reduce the total asphalt pavement thickness in lower-traffic situations, potentially saving on raw materials, such as natural aggregates and bitumen, with reductions in CO_2 emissions from the manufacturing process. The POLYMIX asphalt holds high replicability potential as it complies with both national and European regulations.

. Glass fibre: The Composites Waste project developed a solution to recycle composite waste into glass fibre products for the automotive, building and construction industries. This technology was able to process glass fibre waste into shape(s) that can be converted further into new products. In particular tests were carried out for the fabrication of insulation bats, non-woven e-glass fibre and material to be used in car exhaust silencers, producing promising results. Furthermore, the project looked into waste sources and markets, and developed a business platform for handling the waste and products on a commercial basis. Findings confirmed that this waste fraction is largely unregulated in the EU. It is not hazardous and does not necessarily include organic components (which could be banned from landfills) but is difficult to treat and reuse. The environmental benefit of the project lies in the fact that each kg of recycled fibres substituting virgin fibres represents 48 MJ energy and emissions of 2 kg CO_2, 9 g SO_x, and 3 g NO_x. Around 40 000 tonnes of this waste could be recycled annually in the EU using the proposed technology, reducing energy consumption and related environmental impacts from the production of virgin glass fibres.

. End-of-life vehicles (ELVs): The ELVISUSTECH project demonstrated a cost-efficient technology able to separate ELV waste with more precision than the current mechanical systems. The proposed technique used a series of sensors (a magnet, an eddy current and inductive sensors) that enabled the plant to treat the 'fluff' (a waste fraction that is currently sent to landfill) and break it down in valuable parts: ferrous metals; non-ferrous metals such as copper and aluminium; and a mixture of plastics. This last fraction is used to produce high quality WDF (waste derived fuel) that can be used in cement kilns. Implemented on a large scale at the beneficiary's facilities, this technology is expected to reduce by up to 50% the current landfill disposal rate as well as increasing the recycling rate of ELV material from 80% to 91%. By including the materials removed before fragmentation (wheels, batteries, etc.) the recycling rate will allow the company to fulfil the requirements of the European Directives foreseen for 2015 – i.e. a 95% recycling rate of ELV material. This process is economically viable and can be installed in a plant, either to complement the existing equipment or to replace it. In addition, the plant configuration is sufficiently flexible to be able to treat other types of residues.

. WEEE: The IDENTIS WEEE project aimed to improve the separate collection of WEEE. The project developed four types of innovative and easy-to-use containers, designed to collect different categories of WEEE equipped with electronic devices for waste data collection. In particular, the devices used user recognition and WEEE identification technology to track the waste from delivery in the container to recovery. The containers were placed on roads, squares, retail outlets, service centres and waste collection facilities. The main environmental benefit of this technique is the separate collection of WEEE diverting more devices away from landfills and incinerators. Overall, the project managed to collect some 53 tonnes of WEEE in Italy and Spain. The tests involving the containers were a huge success: in areas where the containers were tested, the percentage of the separate collection rate of WEEE increased by nearly 100%. The IDENTIS WEEE is ready to be replicated in any other European city.

. Medical waste: The MEDWASTE project demonstrated the efficiency of microwaves as a technically, economically and environmentally feasible alternative to traditional methods of medical waste management to disinfect medical waste. In particular, the project used industrial generators of microwaves – magnetrons to destroy the pathogens. The device, which has a capacity of 60L/45 minutes, treated the waste at a temperature of 100 degrees. Once the pathogens are destroyed the final product can be safely handled and treated by traditional waste management methods. The Business plan confirmed that the prototype is financially attractive compared to the other methods of treatment that are currently used in medical units. For example, if one compares the cost of using a microwave disinfection device with that of an incinerator and its processes, the difference is significant: a one-off cost of €7200 for the microwave disinfection device versus a cost of €52,800 a year for an incinerator.

. Manure: The PODEBA project developed a treatment for creating deodorised poultry manure (DPM P120) and using it as an environmentally friendly and cost-efficient chemical agent for leather bating. The environmental benefits of this new agent include, among other, the reduction in ammonia and sulphur compounds emissions by 96 and 90% respectively, the improvement in the quality of the wastewaters produced in the tannery as well as significant energy savings. The tests carried out on the technical and physical characterisation of the leather treated with DPM P120 demonstrated that their quality complies with both the recommended values for footwear manufacturing and with the Eco-Label standards. The quality of the samples produced is appreciable and exactly like the commercial products: they have an adequate appearance, fullness and firmness, with a soft and pleasant feel. The technology also proved to be cost-efficient and is market-ready. It was estimated that replacing just 10% of common industrial bating agents by DPM P210 would lead to annual savings of around €300 000 in Italy and €600 000 across Europe. Estimates establish the cost of DPM P210 at €0.46 per kg, a reduction of €5.9 per tonne of salted leather compared to the industrial product, entailing an economic saving of 30.9%.

Decision support tools for better waste management: The FENIX project developed a user-friendly and flexible software tool to help municipalities and other territorial bodies improve their packaging waste management systems. The tool developed used a life cycle thinking (LCT) approach that allowed the model to be adapted to real situations. Users can choose a range of parameters including: the amount of waste generated; the type of truck used for transport; the number of containers; the distance between containers; the distance between the municipality and the treatment plant; the percentages allocated to each collection and treatment option (separate collection, commingling, incineration, landfill, etc.), and the efficient rate of sorting plants. The tool is available free of charge from the project's website in English, Portuguese and Spanish. The project produced a user manual and a video providing the necessary guidance for its effective use. The FENIX tool is highly transferable to other municipalities and regions and can definitely help them comply with EU collection and recycling targets.

Waste Prevention:

. The Plastic ZERO project developed a series of tools to prevent and manage plastic waste at local level. It looked at the existing technologies for the sorting and collection of plastic waste and developed a manual for green public procurement on plastic waste prevention. The project also tested innovative techniques and methods for sorting and collecting plastic waste. In particular, the project carried out 14 pilot tests on waste collection, mainly focusing on household plastics but also plastics from the construction sector and textile waste. One particularly successful test, worth noting, was the collection of rigid plastic at one recycling station in Copenhagen. This is now being permanently implemented in all recycling stations in the city. Today 90% of the apartment buildings in the city have rigid plastic collection bins and the system will soon be expanded to family houses. With regards to waste prevention, the project estimated that if all demonstration projects were to be implemented on a city-wide scale in the project sites, the prevention potential would be 200 tonnes of plastic waste per year, equivalent to savings of 600 tonnes of CO_2 emissions. The instruments developed and the findings obtained by the project are of great interest and hold high transferability potential to all EU municipalities.

. The EWWR+ (European Week for Waste Reduction) project launched a number of awareness-raising programmes aimed at reducing the amount of municipal waste generated in Europe through the involvement of citizens, authorities, businesses and other stakeholders. Since 2009 the project has organised more than 38 000 initiatives such as trainings, information campaigns, recycling workshops and clean-up days in the EU and beyond. In 2016, the EWWR will take place from 19-26 November. Applications can be submitted at: http://www.ewwr.eu/en/take_part/info

Management of municipal solid waste: The DRYWASTE project designed, developed and demonstrated an innovative, flexible and compact home drying system for organic waste. The device consists of a ceramic vessel with a capacity of about 4 kg of bio-waste. The thermal plate inside the device raises the temperature to 70 ºC while the contents are aerated by a centrifugal fan and a water vapour and leachate collector is positioned below the basket containing the bio-waste. The device is optimised to minimise noise and odours. The project demonstrated that the device was able to reduce household biodegradable food waste by 67% by weight. The LCA proved the positive environmental, social and economic benefits that could be achieved from the application. In fact the purity of the final residue (over 99% pure) makes it suitable for further exploitation as biomass for energy production, compost, and other potential uses. By reducing the volume of waste, the device helps cut the municipal costs for collection, transportation, reuse and disposal of bio-waste and reduces methane emissions and toxic leachates in landfills.

More information on the featured projects and the other 4 306 projects co-funded to date is available from the LIFE project database: http://ec.europa.eu/environment/life/project/Projects/index.cfm