European Commission
Environment Directorate-General

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LIFE FOCUS / A cleaner, greener Europe: LIFE and the European Union waste policy

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editorial

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European Commission, Environment Directorate-General

summary

As Europe has grown wealthier, we have consistently produced more and more waste. In the European Union alone, we generate over 1.8 billion tonnes of solid waste each year, an average of 3.8 tonnes per man, woman and child. Most of this waste is either burnt in incinerators or dumped into landfills, which, if not properly managed, can be harmful not only to the environment but also to human health, to plants and animals.

Between 1990-1995, the amount of waste produced in Europe increased by 10% and the Organisation for Economic Cooperation and Development (OECD) estimates that by 2020 we could be generating as much as 45% more than in 1995. Major work needs to be undertaken if we are to reduce this trend.

Indeed, the Sixth Environment Action Programme of the European Union has identified waste prevention and management as one of four top priorities. The target is to reduce the quantity of waste for final disposal by 20% in 2010 and by 50% in 2050. Moreover, waste prevention and recycling is one of the seven Thematic Strategies or key environmental issues – soil protection, protection and conservation of the marine environment, sustainable use of pesticides, air pollution, urban environment, sustainable use and management of resources and waste recycling – to be tackled using a holistic approach.

The LIFE programme plays a key role in contributing to the development of innovative waste prevention and management projects. Between 1996 and 2003, LIFE-Environment funded 141 projects on different aspects of waste management and prevention ranging from industrial waste on construction sites, to community composting, to recycling of electronic and electrical waste.

This edition of LIFE FOCUS highlights 9 of the many innovative LIFE projects. These projects are proof of the LIFE-Environment programme's commitment to foster and support fully the efforts of the European Community to reach the targets set by the Sixth Environment Action Programme and make our world a healthier place to live today and in the future.

LIFE's contribution to waste management in the European Union

The LIFE programme, the Financial Instrument for the Environment, provides support for the development and implementation of the Community environment policy.

LIFE has been implemented in phases: EUR 400 million were allocated for the first phase (LIFE I, 1992-1995), approximately EUR 450 million were allocated for the second phase (LIFE II, 1996-1999), and the current phase, "LIFE III" (2000-2004) has a budget of EUR 640 million. The programme finances three thematic areas for action:

> LIFE-Environment: provides support for the development of innovative techniques and methods in industry and in the territories and for other actions that contribute to policy development and Community legislation, by co-financing demonstration projects.

> LIFE-Nature: provides funding for projects contributing to the implementation of Community nature protection legislation: the "Birds" Directive (79/409/EEC) and the "Habitats" Directive (92/43/EEC) and in particular the establishment of the "Natura 2000" network for the in situ management and conservation of Europe's most remarkable fauna and flora species and habitats.

> "LIFE-Third Countries: contributes to the establishment of capacities and administrative structures needed in the environmental sector and in the development of environmental policy and action programmes in third countries bordering on the Mediterranean and the Baltic Sea other than central and east European accession candidate countries."

One of the priority areas of work in LIFE III is the management of waste for the protection of the environment. Despite the numerous regulations adopted over the last 25 years which have been transposed progressively in Member States (Directives on packaging waste and on management of hazardous waste, for example), the amount of waste we produce in the European Union continues to rise. This results in increasing pressure on the environment. For this reason, innovative demonstration projects are crucial to identify good practices, launch new recycling methods, raise awareness and encourage decision-makers to reform non-sustainable waste management practices.

LIFE-Environment

The objective of LIFE-Environment is to contribute to the development of innovative and integrated techniques and methods, further the development of Community environment policy and foster sustainable development practices. To achieve this objective, LIFE co-finances two different types of demonstration and preparatory projects in the following subject areas:

> land use development and planning: to integrate considerations on the environment and on sustainable development in land-use development and planning, including in urban and coastal areas;

> water management: to promote the sustainable management of groundwater and surface water;

> impacts of economic activities: to minimise the environmental impacts of economic activities, notably through the development of clean technologies and by placing the emphasis on prevention, including the reduction of emission of gases having a greenhouse effect;

> waste management: to prevent, reuse, recover and recycle waste of all kinds and ensure the sound management of waste streams;

> integrated production policy: to reduce the environmental impact of products through an integrated approach to production, distribution, consumption and handling at the end of their life-time, including the development of environmentally-friendly products.

European Union waste policy

The quantity of solid waste produced within the European Union is steadily on the rise. EU waste policy provides a legislative framework to help Member States reduce and recycle waste and create mechanisms for safer final disposal.

Despite the intensive efforts of some countries to reduce the amounts of waste, the quantity of solid waste is significantly increasing within the European Union. Over 1.8 billion tonnes of waste are generated in Europe yearly, which amounts to 3.8 tonnes per/capita on average. Where municipal waste is concerned, each EU citizen produces an average of 550 kg per year. Waste management is a complex task for local authorities and the prevention of waste generation is thus one of the biggest policy challenges.

In 2002 the EU adopted the Sixth Environment Action Programme entitled: Environment 2010: Our future our choice. It sets out major priorities and objectives for environmental policy over the next five to ten years.

The strategy of the EU to cope with waste is to:
> prevent waste in the first place;
> recycle waste;
> optimise the final disposal of waste.

The four main sources or generators of waste are the construction sector, mining and quarrying, industry and private households.

Construction and demolition waste is the largest single category of waste in Europe and accounts for about 34% of all waste generated. It may contain dangerous substances, such as asbestos, which may be present in significant proportions when old buildings are demolished or renovated. Many components in this waste category are easily recyclable and have the potential to replace up to 10% of raw materials *(Source: EEA, Europe's environment: the third assessment)*. Some EU countries such as Germany, Denmark, the Netherlands, have achieved a recycling rate of up to 90% in this sector.

The second largest waste group is mining and quarrying waste, which accounts for 27% of the total waste. The disposal of mining waste can take up large areas of land and, unless properly managed, can result in detrimental impacts on air, water and soil quality. In response to the potential risks associated with poor waste management in this sector, the EU has proposed initiatives designed to improve mining waste management.

The range of industrial waste generated is as broad as the manufacturing industries that produce it, and some dominant industries can have a strong influence on the composition of waste when treated or landfilled. In general, industrial waste consists of organic materials, wood, paper, chemicals, non-metallic minerals, basic metals and other wastes.

Municipal waste accounts for approximately 16% of total waste produced in the EU countries. In 1999, 57% of the municipal solid waste was deposited in landfills but the rates for composting and recycling were on the rise.

Waste generated by the energy production sector depends on the fuel used. While hydroelectric and gas fired power stations generate almost no solid waste, large quantities of bottom ash and fly ash are generated by coal fired power stations.

A limited number of economic sectors contribute substantially to the generation of hazardous waste (such as batteries, mercury, used oils, paint). The BASEL Convention aims not only to reduce trans-boundary movements of hazardous waste but also to minimise its generation. According to figures published by OECD, hazardous waste generation appears to have increased in several countries and now constitutes 1% of overall European waste generation.

Waste generation by sector in EU countries

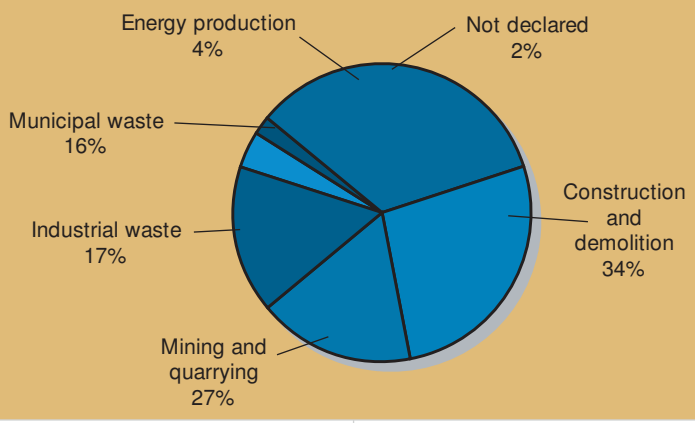

Figure 1: Contribution of different sectors to the total amount of waste generated in the EU (Source: European Environment Agency (EEA))[1].

[1] This breakdown does not include the agricultural sector, a main producer of biodegradable waste.

EU Directives on waste

In response to the growing challenges of waste production and management, the European Parliament and the Council have adopted a certain number of Directives to ensure that waste is recovered or disposed of without impairing the environment and human health. They are binding on Member States, while providing enough flexibility to enable Member States to implement the requirements within their own legal and administrative system.

The European Union generates 1.8 billion tonnes of solid waste each year.

The Waste Framework Directive (Council Directive 75/442/EEC on waste, as amended by Council Directive 91/156/EEC)

The Waste Framework Directive sets out general principles, procedures and requirements for legislation governing the waste sector. It establishes a framework for waste management across the European Union.

The main objectives of the Directive are to:

- call on Member States to take necessary measures to ensure that waste is recovered or disposed without risk to the air, water or soil, without creating a nuisance in the form of odours or noise, and without adversely affecting the landscape;
- require Member States to establish an integrated waste management strategy based on the principles stipulated in the Directive, including clearly defined time scales and responsibilities;
- require Member States to issue permits to companies engaged in waste disposal or recovery. The permits must include requirements regarding disposal techniques and methods, sites, technical requirements and security precautions;
- establish provisions for inspection and monitoring of waste management in the Member States and set requirements for reporting to the European Commission and to the public.

The Directive lays out a waste management hierarchy, the most desirable of which is waste prevention and minimisation of waste generation. This is followed by (in descending order of priority):

- re-use of waste;
- recycling of waste;
- use of waste as a source of energy;
- incineration without energy recovery;
- landfilling.

Although landfilling is considered the least desirable waste management option, it should be recognised that this practice may be a necessary component of waste management.

Youngsters help the adults sort waste in their community, Lewisham, United Kingdom.

Other EU legislation on waste

The Waste Framework Directive provides a planning and institutional framework to guide the implementation of waste sectoral regulatory instruments, which include:

- Waste Shipment Regulation (EEC) No 259/93;
- Hazardous Waste Directive 91/689/EEC;
- Landfill Directive 1999/31/EC;
- Waste Incineration Directive 2000/76/EC;
- Packaging and Packaging Waste Directive 94/62/EEC;
- Batteries Directive 91/157/EEC;
- End-of-Life Vehicles (ELVs) Directive 2000/53/EC;
- Waste from Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC.

In terms of ongoing LIFE projects, we will discuss four Directives in more detail:

Waste Incineration Directive (Directive 2000/76/EC of the European Parliament and of the Council)

The Directive on the incineration of waste provides a single legislative framework for the incineration and co-incineration of hazardous and non-hazardous waste.

The Directive lays down extensive and comprehensive requirements for permit procedures for incineration and co-incineration plants, technical and technological requirements for incineration facilities, monitoring requirements and ensuring public access to information. It also sets limit values for air and water emissions from incineration and co-facilities in the respective annexes.

Member States were required to comply with the Directive by 28 December 2002. The Directive will apply to existing plants as from 28 December 2005 and to new plants as of 28 December 2002.

Certain types of incineration and co-incineration plants are excluded from the scope of this Directive. These include facilities used exclusively for treating animal waste, vegetable waste from agriculture and forestry, waste from vegetable processing if the heat generated is recovered, wood and cork waste and waste resulting from off-shore exploration of oil and gas resources.

Packaging Waste Directive (Council Directive 1994/62/EC)

The Directive describes essential requirements packaging materials must meet to be placed on the market. One way to demonstrate compliance is through harmonized standards prepared by the European Committee for Standardization.

The Directive requires that all Member States take measures to prevent the accumulation of packaging waste, which may include national programmes and may encourage the reuse of packaging waste.

Further to the harmonisation of the standards, a proposal for amending the Directive was adopted by the Commission. The most significant changes concern the new targets to be achieved by 30 June 2006:

- quantity of packaging waste to be recovered: minimum 60%, maximum 75% by weight (currently 50% to 60%);
- quantity of packaging waste to be recycled: minimum 55%, maximum 70% by weight (currently 25% to 45%);
- minimum recycling targets by materials (by weight): 60% for glass, 55% for paper and cardboard, 50% for metals, 20% for plastics (currently each of them has a target of 15%).

The amendment gives high priority to prevention, re-use and recycling of packaging waste whilst energy recovery is considered a least-worst option, preferable only to landfilling.

End-of-Life Vehicles (ELVs) Directive (Directive 2000/53/EC of the European Parliament and of the Council)

EU Member States must set up collection systems for end-of-life vehicles and their used parts. They must also ensure that all vehicles are transferred to authorised treatment facilities and set up a system for de-registration upon presentation of a certificate of destruction. Such certificates are to be issued when the vehicle is transferred to a treatment facility.

The last holder of an end-of-life vehicle will be able to dispose of it free of charge ("free take-back" principle). Producers are obliged to cover all, or at least a significant part, of the cost of applying this measure.

The prevention of waste is the main objective of the End-of-Life Vehicles Directive. To this end, it stipulates that vehicle manufacturers and car-material and equipment manufacturers must:

- endeavour to reduce the use of hazardous substances when designing vehicles;
- design and produce vehicles which facilitate the dismantling, re-use, recovery and recycling of end-of-life vehicles;
- increase the use of recycled materials in vehicle manufacturing;
- ensure that components of vehicles placed on the market after 1 July 2003 do not contain mercury, hexavalent chromium, cadmium or lead.

EU Member States were required to implement the End-of-Life Vehicles Directive by 21 April 2002.

Waste Electronic and Electrical Equipment (WEEE) (Directive 2002/95/EC of the European Parliament and of the Council; Directive 2002/96/EC of the European Parliament and of the Council)

The objective of the WEEE Directive is to prevent the generation of electronic and electrical waste and to improve the environmental performance of the operators who are involved in the treatment of this type of waste.

To achieve this, the Directive promotes the recovery, recycling and re-use of WEEE through the following:

- Member States are required to set up a system allowing final holders and distributors of electrical and electronic equipment to return these items free of charge;
- the producers of electrical and electronic waste are required to put in place waste treatment centres, including the selective treatment for certain materials and components;
- producers are responsible for financing the collection, treatment, recovery and environmentally sound disposal of WEEE.

The Directive lays out a series of specific targets for collection and recovery, re-use and recycling to be met by 31 December 2006. New targets for recovery, re-use and recycling will be established by 2008.

The End-of-Life Vehicles Directive calls on the automotive industry to produce cars that are easy to dismantle, with easily recyclable parts.

Information technology provides a useful tool for tracking salvageable car parts.

LIFE-Environment's contribution to waste prevention and recycling

The LIFE programme supports actively the implementation of the waste Directives by co-financing innovative projects that seek to make it easier for Member States to transpose these Directives in the different contexts that contribute to the richness of the European Union.

This brochure presents a selection of 9 projects which illustrate the exciting work being done to reach the European Union targets in the waste sector and make our environment a safer and healthier one.

A major field

In the waste sector, the projects that have received LIFE-Environment financing from 1996-2003 can be broken down into the subject areas illustrated in Table 1.

As Table 1 illustrates, 141 projects out of 853 (16,5%) LIFE II and III projects are related to one field of waste or another. The total investment planned by those projects (many are ongoing) is MEUR 279,415 for a Community contribution of MEUR 86,821 that is 31% on average. The "leverage" capacity of this type of project is especially important, as EUR 1 invested by the EU will be matched by over EUR 2 from other private and public funds.

Clearly identifiable containers help residents sort waste.

The management of industrial or other special waste draws the highest number of projects (26), which reflects the diversity of problems created by many industrial processes. The second main field is that of biodegradable waste (20 projects), covering projects related to animal slurry, waste from forestry exploitation and agriculture, etc. Recycling of plastic and wrapping waste is the third major field of activity (18 projects) and work in this field has been growing steadily in recent years.

Recycling of packaging and wrapping waste is the 3rd major field of LIFE projects.

It is noticeable that some fields such as the management of household waste are decreasing in importance through the years, probably because solutions have been identified for the main problems. However new fields are emerging, such as the recycling of WEEE (Waste Electronic and Electrical Equipment), with a first project just underway on the recycling of disused mobile phones, a new area with waste problems related to emerging technologies.

Table 1:
Waste management projects financed by LIFE-Environment from 1996-2003

Waste sector	Breakdown of projects 1996-2003	Number of projects financed	Total cost of funding in EUR	Total Community funding in EUR
Construction and demolition	Projects related to construction and demolition waste	10	14,267,748.63	4,568,689.24
Mining and quarrying	Projects related to mining and quarrying	8	16,973,581.26	7,295,638.00
Industrial waste	Management of industrial or other special waste	26	46,905,641.12	12,054,101.39
	Treatment and recycling of metallurgical industry	5	9,704,417.91	2,272,811.94
	Management of liquid residuals (in vehicles maintenance)	3	9,257,786.84	1,497,687.89
Municipal waste	Projects related to biodegradable waste	20	34,588,698.81	8,853,816.78
	Recycling of plastics and wrapping waste	18	59,567,422.52	14,544,483.99
	Management of household waste	11	27,595,457.60	5,882,041.48
	Projects related to landfills/leachate	9	12,462,894.24	4,061,932.00
	Projects related to treatment of sludge	7	17,781,978.97	4,225,395.20
Energy production	Incineration related projects	6	9,937,588.63	3,032,368.24
	Treatment and recycling of hazardous waste	5	8,606,358.57	1,935,519.72
Miscellaneous	Recycling of WEEEs	6	8,428,848.21	3,410,786.88
	Recycling of car parts	4	14,946,431.06	2,032,526.60
	Recycling of batteries	3	6,674,669.43	1,474,758.44
Total		**141**	**279,415,221.97**	**86,820,501.05**
Average			**1,981,668.24**	**615,748.23**

Support for innovation: LIFE in action

One of the key roles of LIFE is to support innovative initiatives that aim to facilitate the effective implementation and enforcement of environmental legislation in all EU countries. This brochure presents a selection of 9 ground breaking projects that offer economically viable, sustainable and transferable solutions to today's environmental challenges:

> **In France** (p.10), a large construction company developed an effective on-site waste management and recycling system that includes training for workers. This system, pilot tested on 15 different construction sites, reduced the quantity of on-site waste produced by 3 times, and the cost of waste disposal by 50%.

> **In Italy** (p.12), a group of fruit and vegetable producers formed a consortium to find a solution to the fast-growing problem of packaging waste. The consortium created a comprehensive system which includes the production of recyclable crates and boxes, setting up processing centres throughout Europe for cleaning and recycling the boxes, and an electronic network to track their movement and status.

> **In Sweden** (p.13), Svenska Retursystem further developed the concept of recyclable packaging by creating an integrated logistics system that works for not only transporting produce, but also for other commodities such as dairy products, meat and poultry.

> **In Belgium** (p.14), the port authority of Antwerp developed an integrated monitoring and management tool for seaport waste management based on an electronic mapping system that monitors waste flows in Belgian ports throughout each phase of port and port related activities.

> **In Germany** (p.15), a company specialising in the transformation of waste raw materials into new products, has found a way to clean Europe's beaches by collecting the flotsam and jetsam along the coast of Denmark and transforming it into natural products such as poured heat insulation. The company works in partnership with research and regional technology institutions, tourism associations and SMEs throughout the European Union.

> **In Italy** (p.17), an SME specialising in research and development for innovative environmental technologies designed waste-based reinforcement materials (WBRM), a process which transforms the fine fly ash produced in the waste incineration process from a toxic substance into a powerful reinforcing material for textiles, cement and plastic products.

> **In Finland** (p.20), Tampere University Hospital created the first model in the country for recycling plastic used in hospitals, in collaboration with 3 other hospitals in the country, a regional solid waste management company and with experts from the plastics industry.

> **In the Netherlands** (p.21), Achmea SchadeService, the country's largest insurance company, set up "green repair", a second hand car component and logistics system to manage the handling and availability of used car parts and quality insurance while decreasing the volume of waste from end-of-life vehicles.

> **In Belgium** (p.23), the Ministry of the German-speaking Community, in partnership with a group of charitable associations, developed a network to create a more cost-effective bulky household waste disposal system in the region. The project also provided a social service for youth, the handicapped and the unemployed, and created an opportunity for the disadvantaged members of the community to purchase good quality second-hand items at minimal cost.

The diversity of projects illustrates the range of problems that the LIFE waste projects are attempting to resolve with innovative and creative solutions. Although the policy component of EU intervention is essential, it must be complemented by support to new ideas and initiatives.

These projects have been selected because they present real innovations. Moreover they take into account not only the environment, but other facets of sustainability such as economic competitivity or social issues. In this way, they are contributing to the durability of the European model of development.

Seaweed cleared from beaches is transformed into heat insulation.

LIFE-Environment project in France

One-stop shop: On-site construction waste management and recycling

Faced with the challenge of environmentally safe disposal of waste generated on construction sites, a French construction company took matters in hand and created an effective on-site waste management and recycling system.

Smaller containers for sorting different types of hazardous and electrical wastes.

Construction workers receive on-site waste management training.

In France, the building and public works sectors generate approximately 24 million tonnes of waste each year, somewhat more than the amount of waste generated by households. The environmental problems posed by these large amounts of waste and hazardous components are generally not given enough consideration.

Faced with the problem of how to safely dispose of the large volumes of waste generated in the construction sector, Giraud S.A., a French company specialising in the construction of building foundations, decided to take action and find a sustainable solution to manage and reduce the waste produced on-site.

In partnership with an environmental studies office (IDE Environment), a social economy company (CISAME) and an Internet site development company (HORUS), Giraud selected 15 construction sites to test different waste management methods. Activities at each site included carrying out an evaluation of the quantity of waste produced, training for staff and follow-up of waste produced. The results of the activities at the 15 test sites would be used to produce a reference manual on good on-site waste management practices to maximise recycling and improve the sorting of special waste – such as timber, window grates, cables, core iron, inert materials – to the appropriate disposal facilities.

The project programme, which ran from 1 October 1998 to 1 April 2002, was thus based on three components. The first centred on training. This involved the production of a training manual for the construction site waste management trade. This document described the post profile, competencies and aptitudes required for assuring the correct sorting and recuperation of construction site waste and a training programme.

The second component comprised the organisation of the 15 pilot sites, including construction, rehabilitation, housing, expansion and demolition sites. Each site underwent:

> a preliminary audit;

> was assigned a selection of external service providers to carry out the management activities;

> received information and awareness-raising activities for the construction site staff.

Sorting at the construction site was carried out according to different methods depending on the function and scope of the construction site.

Large containers facilitate sorting of special waste such as timber, window grates, cables and iron.

These included:

> sorting by the construction workers;

> sorting by a designated person from the site or by an external party;

> installation of an on-site mini-waste disposal unit, etc.

Finally, regular follow up and control checks were carried out for the duration of the project.

The third part of the programme centred on the production of a practical, operational methodological manual entitled “Good practices for waste management on construction sites” (http://www.giraudbtp.com/life/gb/CADREprinc.htm).

This manual provides guidance on:

> distinguishing the different kinds of waste;

> waste management;

> waste management follow-up;

> verification of good waste management.

Upon completion of the project, Giraud carried out a technical review of the experiences on each of the construction sites. The main findings were that the quantity of waste produced by industrial building construction sites can be reduced by 3 times; recycling of materials can only be carried out on the premises of large construction sites; special waste (such as timber, window grates, cables, core iron, inert materials) can be sorted in large quantities.

In terms of the environmental benefits of the project based on the experiences of the 15 construction sites, the results were resoundingly positive. The new measures put in place according to the project guidelines cut the cost of waste disposal by 50%, a modest savings of 0.5% on the overall cost for the construction sites.

The pilot sites proved that the quantity of construction site waste can be reduced by 3 times.

Each site underwent a preliminary audit and was assigned a team of external service providers to carry out the management activities.

Reference: LIFE98 ENV/F/301
Total eligible cost: EUR 1,026,472.56
LIFE contribution: EUR 307,941.77
Beneficiary: Giraud S.A.

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E-mail: giraudmp@wanado.fr
Website: www.giraudbtp.com

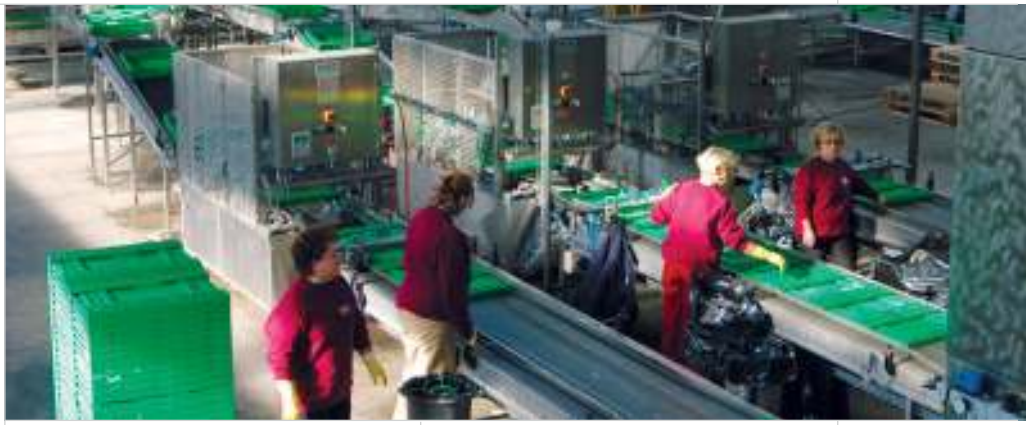
Duration: from 1 October 1998 to 1 April 2002.

EU legislative reference: Waste Incineration Directive 2000/76/EC; COM (1996) 399 Final - Communication on an updated "Community strategy for waste management"; Waste Framework Directive 75/442/EEC.

LIFE-Environment project in Italy

Using and… re-using fruit and vegetable packaging: An environmentally-friendly approach to a growing challenge in Europe

A group of fruit and vegetable producers in Italy joined forces and created the "CPR system" to decrease the waste generated by fruit and vegetable packaging and reduce consumer prices.



Each year, Europe produces approximately 7 million tonnes of waste generated by packaging for transporting fruit and vegetables. This means mountains of crates, plastic, boxes, trays, padded sheets, and various other types and shapes of containers are generated, with a disposal cost of approximately EUR 0,09 per kilo, or EUR 630 million per year.

There are two main reasons for the large amounts of waste and high disposal costs in this sector. First of all, the packaging materials vary a great deal in composition and secondly, most of the packaging materials are produced on a throwaway principle.

In Italy, which produces approximately 2,5 of the 7 million tonnes of packaging waste, a group of fruit and vegetable producers formed a consortium to find a solution to this problem, which was not only growing in scope, but was also increasing costs for consumers.

The consortium developed a comprehensive system that tackled the packaging waste problem from three angles. First, they produced special recyclable boxes, which can be folded and re-used for up to 30 round-trip journeys; secondly, they set up "processing centres" in Italy and throughout Europe for the re-use, sanitation and recycling of the boxes. The third part of the system involved the creation of a computer network to track systematically the movement of the boxes at all stages. The computer tracking system provides an effective support tool for the processing centres, whose job it is to keep an up to date record of the status of each box (empty, filled, clean, or dirty), its position and location (waiting to be filled, with the distributor, on the road, etc.).

So how does the CPR system actually work? The Consortium purchases the special boxes and then rents them to participants in the scheme. The empty boxes are then filled by the fruit and vegetable producers, and delivered to retail markets. After use, the market operators send the empty boxes back to the fruit and vegetable producers, and when the boxes become dirty from repeated use, the producers send them to the processing centre for cleaning and recycling the boxes and then send them back to the producers…

When the project began in November 1999, there were 47 stakeholders, and by the close of the project in May 2002, this number had increased to 355, with 3,100,000 boxes in circulation. Each box was re-used on approximately 30 round-trip journeys and the waste produced by packaging was reduced dramatically.

The success of the CPR system led the members of the cooperative to create "Sistema Italia per l'Europa". Sistema is part of CPR, yet is not restricted to the produce sector and can be applied to any business where packaging is required.

Reference: LIFE 99 ENV/IT/000034
Total eligible cost: EUR 1,220,645.88
LIFE contribution: EUR 610,322.94
Beneficiary: CPR System

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Duration: from 25 November 1999 to 25 May 2002.
EU legislative reference: Packaging and Packaging Waste Directive 94/62/EEC.

LIFE-Environment project in Sweden

"Clean, green" transport of commodities in Europe

Two years after the CPR system was developed, the Svenska Retursystem AB, Sweden, took the challenge of reducing packaging waste a step further and created an integrated logistics system not only for transporting produce, but for meat and poultry, dairy products and other everyday commodities.

Each year, approximately 280 million pallets transport 8 billion crates of goods to 250 000 commodity stores throughout Europe. As with fresh fruit and vegetable produce, the pallets and crates for meat, poultry, and dairy products are usually thrown away after each use. These discarded crates and pallets are a growing burden in landfills and incineration plants. Currently there are no common standards for the transport of produce, thus each business or manufacturer runs its own system. According to these businesses and manufacturers, problems in the Reusable Transport Items (RTI) can be attributed to a considerable waste of transport capacity, complex logistics caused by the need to transport empty cases, and the persistence of different standards.

Svenska Retursystem, a Swedish non-profit association for grocery manufacturers, developed a plan to replace the total flow of non-reusable crates and pallets. The objective was to carry out a full-scale pilot project and evaluation of the functionality and efficacy of the Svenska system for reusable transport items. This pilot project would run for two years in the Skåne area of southern Sweden and in the Stockholm region. Their target was to decrease packaging waste by 25% or 28 000 tonnes annually and reduce empty lorry return trips by 260 000 kilometres per year.

And they succeeded: Svenska Retursystem developed pallets and crates in different sizes to accommodate a variety of every day commodities (fresh produce, meat and poultry, cheeses and other dairy products). Made of polythene, a durable, solid material, the crates and pallets have a long life cycle – the crates last for approximately 10 years and the pallets for about 15 – and can be reused hundreds of times before being recycled. To date, 1,753,000 crates and pallets are already in circulation. In addition, these sturdy crates and pallets reduce the incidence of damaged goods.

Svenska Retursystem also includes two washing facilities – one in Skåne and one in the Stockholm area – where the RTIs pallets and crates are washed. The system is complemented by an electronic logistics system connecting producers, manufacturers, wholesalers and retailers of daily commodities.

Pallets and crates in different sizes accommodate a variety of everyday commodities.

Svenska met their goals and their success continues:

> In the Skåne area, the RTI system has been operational since 2001 and was initially used mainly in the fruit and vegetable sectors. Wholesalers and distributors of canned beer joined in later on.

> The system established in the Stockholm area duplicated the first one in Skåne and added to its clients meat and poultry distributors as well as dairy product distributors.

The system is transferable to national supply chains in Europe, and works efficiently in both densely and sparsely populated areas… and is on its way to a local store near you…

Reference: LIFE 00 ENV/S/000867
Total eligible cost: EUR 6,144,344
LIFE contribution: EUR 1,843,303
Beneficiary: Svenska Retursystem AB (SRS)

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Duration: from 1 January 2001 to 31 December 2002.
EU legislative reference: Packaging and Packaging Waste Directive 94/62/EEC.

LIFE-Environment project in Belgium

Cleaning up European seaports: A Belgian approach

Antwerp, Europe's second largest seaport, decided to take waste matters in hand and not only clean up the local port, but bring its success to other European waters.

Antwerp Port, Belgium.

Welcoming sailors, tourists and exotic commerce from other lands, seaports have long been linked to adventure and mystery. However the continuous activity and influx of ships – particularly that of cargo ships – leads to increasingly high volumes of waste which, if not carefully managed, can cause significant damage to the environment. Moreover, in keeping with EC Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, which identifies what kinds of waste can be disposed of at sea and what must be discharged at harbour facilities, the waste generated in European seaports is expected to rise.

In response to this challenge, the port authority Antwerp Port Engineering and Consulting (APEC), decided that a solution must be found to manage the growing quantities of waste generated by port and port related activities such as warehousing, stevedoring and cargo handling. APEC wanted to find a solution not only for the Antwerp Port, but a practical tool for seaport waste management that could be successfully applied to ports throughout Europe. This goal led to the creation of "Ecoware", an integrated waste monitoring and management system.

The Ecoware project, which began in September 1998 and ran through July 2000, involved the development of an electronic mapping system to monitor the waste flows in Belgian ports throughout each phase of port and port related activities. A web based version of the programme maps all waste related activities and makes it easy for all parties involved – from ships and shipping agents to port authorities, waste treatment plants and regional waste authorities – to be notified of all routing and logistics and, for instance, incoming waste from a ship.

Training was provided for port staff to ensure the most efficient and effective use of the new system, including presentations and a handbook. This was not only a practical exercise, but also helped to build a sense of ownership among the staff in keeping the seaport clean and contributing to a cleaner, safer environment.

This multi-dimensional project brought together a variety of partners in the fields of computer technology and telecommunications, management and training and all contributed towards its success.

Finally, APEC presented the Ecoware system to 10 other European seaports, waste contractors and ship owners.

But the work is not over. Now that they have introduced a successful waste monitoring and management system, APEC has set its sights on developing a strategy to minimise bottlenecks at port disposal facilities and an efficient recycling and recovery programme.

Reference: LIFE 98 ENV/B/000254
Total eligible cost: EUR 1,336,420
LIFE contribution: EUR 646,079
Beneficiary: Antwerp Port Engineering and Consulting (APEC), Italiëlei 2, 2000 – Antwerpen (BE)

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Duration: from 1 September 1998 to 1 July 2000.
EU legislative reference: Port Infrastructure Directive 2000/59/EC – Facilities for ship-generated waste and cargo residues

LIFE-Environment project in Germany

Environmentally-friendly tourism and sea grass recycling

The growing number of tourists on Europe's beaches can boost the local economy. However, coastline communities are finding it increasingly difficult to keep their beaches clean - not only of man-made waste, but also of natural waste such as sea grass and algae. The LIFE beneficiary Kluetzer Winkel, on the Baltic Sea in Germany has found a way to recycle this natural waste and keep European coastlines clean. Bernd Anders, co-ordinator of the project, tells us how.

Clearing the coast of organic waste, Island of Moen, Denmark.

Preparing organic waste for transformation into a range of natural products.

"Each year, more and more tourists head for the beach at the first rays of sunshine. These tourists boost the local economy, however, it's becoming increasingly difficult to manage the waste produced by vacationers. It's also becoming more and more difficult to clear the beaches of flotsam and jetsam, or seaweed and algae, the natural "waste" that washes continually ashore. This natural waste can be very off-putting for beach-goers; no one likes to go for a swim and get tangled up in clinging masses of seaweed.

In the past, we used to deposit jetsam in waste dumps. But the new EC guidelines on environmental protection prohibit this practice because the rotting processes of the flotsam and jetsam cause the emission of carbon dioxides in to the atmosphere.

The Danish island of Moen is one of many coastal areas in Europe facing the problem of how to dispose of this natural waste in an ecologically safe way. The Municipality knew they had to find an answer, so they launched a search for partners to help them come up with an ecologically conscious solution.

Our company had already worked on this problem; in fact, we had developed a system to recycle the surplus sea grass and algae and boost Environmentally-friendly tourism at the same time by keeping the beach clean and inviting for vacationers. Our system had already proved effective in Mecklenburg-Vorpommern.

Zostera-Dämm is a heating insulation product made of seaweed and algae.

What we do is collect the flotsam and jetsam and transform it into natural products such as poured heat insulation, heat insulation mats and erosion protection mats. Seaweed pellets are another useful product made from the waste. These are used in animal hygiene and as an oil-binding agent or as a poured floor equaliser, for example.

We work closely with Metall-und Anlagenbau Ltd, who help to recycle the seaweed and algae into the heating insulation product now known as Zostera-Dämm.

The success on the Danish coast is just the beginning. The Aquitaine in France is using the same system… The challenge now is to get other coastal communities to join the partnership for cleaning up Europe's beaches".

Insulation mats are one example of the many transformations of flotsam and jetsam.

Reference: LIFE 00/ENV/D/000312
Total eligible cost: EUR 3,629,722
LIFE contribution: EUR 1,814, 861.00
Beneficiary: Amt Kluetzer Winkel

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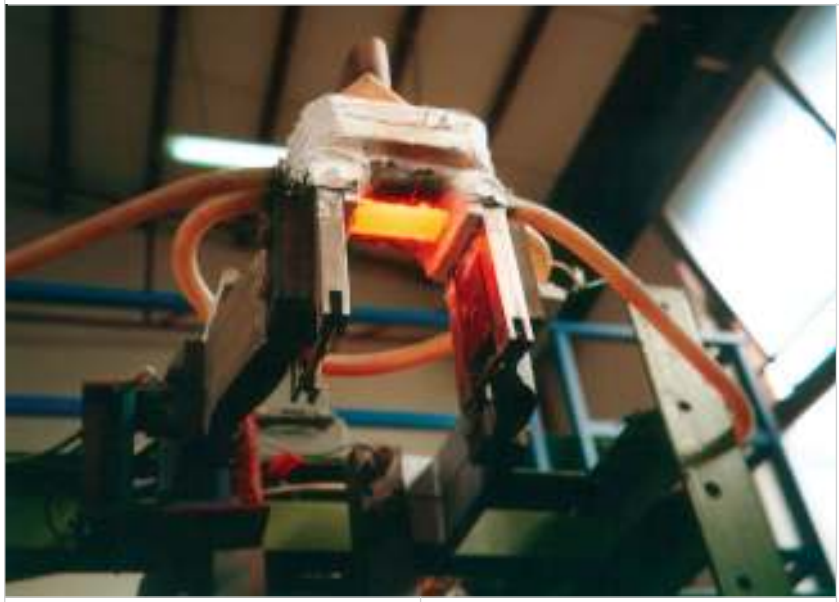
Duration: from 15 November 1999 to 31 December 2003.

EU legislative reference: Waste Framework Directive 75/442/EEC

LIFE-Environment project in Italy

Hidden strength: Waste-based reinforcing materials

Contento Trade, an SME specialising in research and development for innovative environment strategies, devised a process to transform the fine fly ash produced in the waste incineration process into a powerful reinforcing substance for textiles, cement and plastic products.



Fly ash from municipal solid waste incinerators is filtered and transformed into a powerful reinforcing substance.

Fly ash, produced from municipal waste incineration, is one of the finest, lightest residues produced in the waste incineration process, and is collected in many plants using a filtration system. Once collected, it is usually deposited at the nearest neutralisation treatment centre. In Europe, approximately 1 500 000 tonnes of fly ash are produced per annum. The cost of its disposal in Europe varies from EUR 150 to EUR 500 per tonne.

A highly soluble and reactive coal combustion by-product, fly ash contains significant quantities of heavy metals (including zinc, lead, cadmium, chromium). These heavy metals are often present in the form of anionic salts (chlorides and sulphates) and the alkaline anionic salts are one of the main components of this waste (up to 25% of chlorine in some samples).

Within this inorganic fraction of the substance, which is very variable in composition, there is an organic fraction, which is relatively rich in unburned elements, in aromatic compounds and often also rich in dioxins and furans.

It is very difficult to stabilise this waste efficiently: the presence of a relevant water soluble fraction requires a preliminary washing treatment to remove the anionic salts, followed by mixing with hydraulic binders and complexing agents to fix the heavy metals. The fly ash washing water is heavily polluted and requires a complicated water purification treatment. Usually, the organic fraction of incinerator ashes does not undergo a specific stabilisation treatment; it is simply blocked physically by the hydraulic binders, therefore creating potential risks with successive sublimation.

Fly ash is transformed into glass fibers to reinforce textiles, cement and plastic products.

Waste-based reinforcement materials: A viable solution

Contento Trade, an Italian SME specialising in research and development for innovative environment strategies, devised a process, known as waste-based reinforcement materials (WBRM), to transform the fine fly ash produced in the waste incineration process into a powerful reinforcing substance for textiles, cement and plastic products.

WBRM uses alkaline metals and heavy metals present in the ashes to accelerate the melting process of the glass mass and reduce the silicate softening points that comprise the main constituents of the substance. Using this process it is possible to obtain up to 2,5 kg of glass – depending on the chemical characteristics of the used ashes – from 1 kg of fly ash.

The glass produced using the WBRM process is elastic, viscous and plastic. These characteristics can be optimised by adding small quantities of melting elements traditionally used in the glass industry (such as carbonates), which render the compound easily spinnable at the plants used for the production of conventional glass fibers (such as E glass fibers, C glass fibers, or basaltic fibers) used all over the world in different industrial products and processes. The physical chemical characteristics of the derived WBRM fibers are similar in appearance to conventional E glass produced from traditional raw materials.

The chemical characteristics of WBRM fibers boast a higher resistance to alkaline aggressions than E glass fibers, even if they do not reach the stability of the glass fibers made with zirconium oxide.

Economic advantages

Over 88% of the materials used in the WBRM process is comprised of the following kinds of waste:

> fly ashes from municipal solid waste incinerators;

> coal combustion ashes;

> boiler slag (ashes) from municipal solid waste incinerators;

> foundry sands.

This process guarantees consistent savings on the purchasing costs of raw materials, which are high for the E glass fibers. In addition, the initial phase of melting waste glass requires much lower temperatures and refining time than for traditional E glass.

This results in a constant economical and energy savings. Estimates show that a standard unit with the capacity to treat 15 000 tonnes per year of material costs about EUR 3.5 million.

The WBRM process has a limited impact on the environment.

Environmental advantages

The process re-uses wastes almost entirely, rather than raw materials, and has a limited impact on the environment because it involves:

> a minimal production of process solid waste (less than 1% of the quantity of treated wastes);

> an absence of solid and liquid wastes;

> a minimal production of fumes, which can be absorbed completely by the fumes abatement systems of the guest incinerator (compared to the incinerator fumes, they represent a minimum quantity - less than 1%).

WBRM fibers are valuable because the heavy metals contained in them are stabilised. Moreover high temperature treatments, combined with suitable planting solutions, assure the WBRM process a complete elimination of the organic polluting agents from the fumes that are transported to high efficiency fume abatement plants.

Fly ash being spun into glass fibers.

Aside from the glass and the fibers produced, WBRM also produces a mixture of purified salts (calcium, sodium and potassium chlorides) which can be used as de-icing salts for use on roads. These salts, which represent 20-40% of the mass of the treated ashes that lack heavy metals, are an excellent alternative to calcium and sodium chlorides normally used on roads to avoid accidents caused by ice. The WBRM process makes the best use of all the ash constituents and presents a viable alternative to disposal.

Conceptually, WBRM provides an extremely efficient neutralisation system for the ashes because both the glass and the fibers derived contain relevant quantities of heavy metals (lead, zinc, chromium, copper, cadmium, nickel, cobalt, etc.) strictly linked in a glassy silicates reticule. In a single passage, over 80% of the heavy metals of the basic wastes mixtures is fixed in the glassy structure of the fiber, while the remaining part is removed with the fumes and the collection from the fumes abatement systems and becomes again part of the fly ashes and so is re-circulating inside the treatment plant.

The evaluation on the complete life cycle of the WBRM products showed interesting environmental advantages in terms of reduction of raw materials use and energy consumption, and qualifies this process as cleaner technology.

How can WBRM be used?

WBRM has many uses. In the European glass fibers market in 2000, about 700 000 tonnes of reinforcing glassy materials were produced, equal to 28% of the whole world production (96-98% of the whole world market of the reinforcing fibers is represented by E glass fibers).

The main user of glass fibers is the textiles and non woven fabrics industry, followed by the composite material sector, the thermal insulation sector, industrial mufflers, filters, etc. Analysis shows that the thermal properties of WBRM fibers are exactly like those of the E glass fibers.

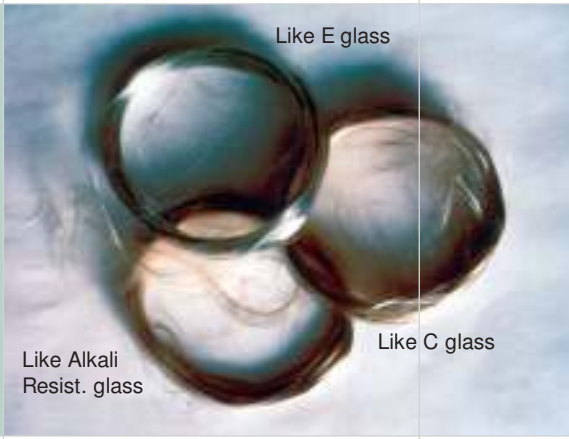
Another area where WBRM makes a significant contribution is in the cement industry. The ordinary cement conglomerate usually has a limited resistance to tensile stress. Adding WBRM to concrete makes it stronger, more durable and less permeable. It is also an important ingredient to reduce cracks; the fibers, particularly metallic ones, are used to intercept the cracks that occur in the post-breaking phase.

Also significant in the European glass fibers market are fibroreinforced bituminous materials, used primarily to improve the resistance to tensile stress (for example in waterproof sheaths). The fibrous support (non woven fabric) is fundamental for the sheaths industrial production because this is the basic layer on which the sheaths are "built" (thanks to many impregnation passages and deposition with bitumen and other components). In this sector the most used fiber is polyester, covering 80-85% of the market, while the E glass fiber covers 15-20%. The main limiting factor with E fibers is their cost, which is approximately double that of polyester fibers. The availability of low cost glass fibers (as WBRM fibers) could augment significantly their market in this sector, which amount to 2 500 tonnes per year in Italy alone.

Conserving natural resources

Production and use of waste based reinforcement materials helps conserve the earth's primary mineral resources, provides valuable raw materials and reduces the disposal costs of fly ash. Moreover, the process can be adapted to different countries and settings.

The glass fibers produced from fly ash are similar to conventional glass produced from traditional raw materials.



Reference: LIFE 98 ENV/IT/000132
Total eligible cost: EUR 1,248,808.39
LIFE contribution: EUR 374,642.52
Beneficiary: Contento Trade S.r.l.

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Duration: from 1 October 1998 to 31 December 2001.
EU legislative reference: Waste Incineration Directive 2000/76/EC; Waste Framework Directive 75/442/EEC; Integrated Pollution Prevention and Control Directive 1996/61/EC

LIFE-Environment project in Finland

Hospital plastic waste recycling

Finland's Tampere University Hospital developed a methodological model for sorting and recycling plastic waste in the health services sector.

Plastic waste generated in hospitals accounts for approximately 5.4-8 kg waste per bed daily throughout Europe. Unfortunately, while many of these materials can be recycled, misperceptions and prejudices associated with plastic used in hospitals mean that these valuable resources are most often dumped at the nearest landfill, compounding the already high volumes of waste in our environment.

In fact, the amount of plastic used in the health sector is on the rise, as is the demand for high quality plastics. The staff at Tampere University hospital in Finland identified a lack of recycling models to provide guidance in this area, and decided to create a set of guidelines for recycling hospital plastic in cooperation with specialists in the field of plastics and logistics. These guidelines would centre on the features particular to hospital plastic waste (such as its highly variable composition). The recycled plastic would feed back into the materials production chain, thus reducing the amount of waste produced and the burden on landfills and on the environment.

The team enlisted the collaboration of Helsinki University Central Hospital, Kanta-Häme Central Hospital, Kuopio University Hospital, Tampere Regional Solid Waste Management Ltd., plus a team of experts in the plastics industry.

As a first step, the quality and quantity of plastic waste produced within the participating hospitals was analysed, breaking it down by type of plastic and type of product. After that the collection and processing was carried out with the help of guidelines on separation and collection of the plastic waste.

One of the innovative features of the project involved identifying which products are suitable for recycling. Potential re-users are small-and medium-sized plastics companies.

On completion of the project, the results revealed that approximately 71% of all hospital plastic waste is suitable for recycling, despite the fact that the hospitals use hundreds of different plastic products made of widely varying chemical compounds. Another important finding was that the impurities leading to possible risks, infections, etc. upon waste collection are rather small.

The project classified plastic waste in four categories:

> "Clean" plastics (no contact with patients or patient secretions): no treatment is necessary, the material can be recycled as is.

> Plastics with impurities (either from food colouring or from use in patient care such as protective gloves and intravenous sets and other disposable medical care equipment): must be rinsed before recycling to remove impurities.

> Plastics that have become contaminated with patients' microbes carrying a possible risk of infection (such as petri dishes): must be disinfected or put through the autoclave.

> Plastics that have become infected with microbes that carry a high rate of infection: all implements and equipment used to treat patients with infectious diseases must be disinfected and treated separately before being removed from the hospital premises.

Reference: LIFE 98 ENV/FIN/000577
Total eligible cost: EUR 300,532.92
LIFE contribution: EUR 150,261.96
Beneficiary: Tampere University Hospital

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Duration: from 1 September 1998 to 1 September 2001.
EU legislative reference: Packaging and Packaging Waste Directive 94/62/EEC; Waste Framework Directive 75/442/EEC - Waste Incineration Directive 2000/76/EC. Landfill of Waste Directive 1999/31/EC

LIFE-Environment project in the Netherlands

Re-use of second hand car components in company car fleets

To comply with the EC Directive on end-of-life vehicles, Achmea SchadeService – the largest insurance company in the Netherlands – created an award-winning scheme for Environmentally-friendly car dismantling and recycling.

Damaged cars and end-of-life vehicles (ELVs) generate between 8 to 9 million tonnes of waste in Europe every year, made up of ferro and non-ferro metals, plastic, rubber and glass. Approximately 25% of this waste is hazardous, and is currently festering in landfills throughout the continent. To manage this problem, the European Parliament and Council adopted Directive 2000/53/EC which calls on Member States to recover, recycle and re-use car components.

In the Netherlands, there was no professional company in existence that repaired cars using second-hand components. Sectors in which automobiles either play the principal role – such as car leasing companies – and businesses where cars are provided for their staff systematically had their vehicles repaired using new parts.

With no mechanism in the country to use second-hand components, Achmea SchadeService, the largest insurance company in the Netherlands, decided to create one: Green Repair.

The main goal of Green Repair was to carry out successfully the large-scale re-use of car components in partnership with insurance companies and claim managers, auto repair and car dismantling companies. This would help the environment by reducing the amounts of ELV waste and reduce the cost on insurance premiums up to as much as 15% since second-hand car parts are less expensive than new.

Achmea set up a logistics system, co-ordinated by Achmea Parts Service, to manage the handling and availability of the used car parts and quality insurance systems and ensure clear communication lines between all stakeholders.

Skilled automotive technicians replace damaged car parts with high quality second-hand car parts.

Achmea Parts Service stocks top quality used car parts.

Achmea works in partnership with skilled auto mechanics and repair shops.

A strong logistics system makes it possible to track replacement parts within one hour.

Used car parts are given a new life.

So how does this work in practice? Achmea developed a “Green Policy” for auto insurance. When a Green Policy holder is in a car accident, he/she calls an approved Green Repair auto repair company. This company analyses the damages and makes an estimate of the repair costs, then contacts the Achmea Parts Service, which tracks good quality salvaged car components, with a request for the required parts.

The Achmea Parts Service logs the request to affiliated Green Repair car dismantling companies and receives an answer on availability of the parts within an hour. Only high quality second-hand parts are used; if none are available, then a new part is purchased. While the car is being repaired, the Green Policy holder is given a car to use until his own is ready.

All the participants in the Green Repair scheme must comply with a battery of requirements, must adhere to strict environmental standards and must ensure excellent customer service.

Green Repair is an all around success: Achmea SchadeService has proved that re-use of car parts on a large scale is economically, ecologically and technically feasible and has shown that 80% of all car damage can be repaired with used car parts without compromising quality standards.

Thus, used car parts are given a new life rather than being tossed into a landfill and motor insurance purchasers pay lower insurance premiums and receive top quality car repair when needed.

With Green Repair, motor insurance purchasers pay lower premiums and receive top quality car repair.

Reference: LIFE99 ENV/NL/000233
Total eligible cost: EUR 587,645,38
LIFE contribution: EUR 176,293,61
Beneficiary: Achmea SchadeService.

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Duration: from 15 November 1999 to 15 November 2001.
EU legislative reference: End-of-Life Vehicles Directive 2000/53/EC

LIFE-Environment project in Belgium

Rcycl: Domestic waste reduction, vocational training and job creation

The Ministry of the German-speaking Community of Belgium, in partnership with Rcycl, a non-profit association, set out to recycle bulky domestic waste while at the same time providing vocational training and creating jobs for the disadvantaged population in the community.

Diaservice Yaka sells second hand cloths, toys and small household items and is set up like a regular department store.

Nestled against the gently rolling hills of the eastern part of Belgium, bordering Germany and the Netherlands, presides Eupen, a prosperous town and home to the Ministry of the German–speaking Community of Belgium. But the city's tranquil, elegant streets belie a bustling endeavor to keep Eupen's streets clean, help the environment and provide vocational training and jobs for the disadvantaged members of the community.

Indeed, Eupen is at the heart of Rcycl, which began as a LIFE pilot project (from October 1999 – December 2002). The project was conceived as a network to improve the bulky waste disposal system in place at the time, reduce the expense of waste removal for the community, provide a social service for youth, the handicapped, the long-term unemployed, and provide an opportunity for the disadvantaged members of the community to purchase good quality second-hand items at a minimal cost.

The way it was

Before Rcycl was created, there were 1-2 official bulky waste pick-up days in Eupen and surrounding communities. On these days, the local citizens in the community would put their bulky waste in front of their homes, and the lorries would drive by and pick up the refuse. Since the possibility of getting rid of this household refuse occurred so infrequently, these goods would sit for months gathering dust in garages and attics. On the designated pick-up days, the streets were then overflowing with bulky household items… There was an additional unwelcome phenomenon, "bulky refuse tourism": neighbouring communities in the Netherlands and in Germany, where the pick-up costs for bulky waste are high, would bring their waste over the border and add it to the heaps outside of their Belgian neighbour's homes.

Additional downsides to the classic door-to-door system were the relatively high costs for collecting and disposing of household refuse – approximately EUR 130 per tonne (about 20 kg/resident) – and an extremely low recycling rate, meaning that most of the waste was tossed onto the growing heap in the nearest landfill or disposed of illegally in the neighbouring countryside.

Bulky refuse is picked up and delivered to the sorting centre in Eupen.

An efficient, service-oriented approach

Rcycl offers a round the clock pick-up service for all bulky household waste, including furniture, old electrical appliances, household items, clothes, wood and metal for Eupen and the seven other communities it services: Plombières, Kelmis, Raeren, Aubel, Limbourg, Lontzen and Baelen. The pick-up service is free of charge in 5 of the 8 communities, and the total population served is 65,000 and 26,000 households on 400 km^2.

The system is based on a three-pillar strategy:

> 75% recovery of waste: 10% of which is re-used, 65% is recycled;

> job creation: 20 new jobs have been created (8 at the sorting centre), with 15 "Article 60" employees (sponsored by the federal reintegration programme);

> training: Rcycl works in collaboration with the Robert Schuman (Eupen) and Don Bosco (Verviers) institutes and has trained 30 interns (providing 3000 hours of on-the-job training per month).

Here is how Rcycl works: when a citizen in one of the participating communities has an item or items to be removed, he/she calls the sorting centre in Eupen. In Eupen itself, the items are removed within 48 hours; in the other communities, a pick-up is made weekly. The waste items are taken to the sorting centre where they are weighed, sorted immediately upon arrival into large wooden crates for clothing, toys, electrical and electronic equipment, styrofoam, etc. and are stored temporarily until the appropriate partner organisations in turn pick up the items (i.e. furniture, is picked-up by 3R, toys and household items by Yaka, etc.).

The Eupen sorting centre works with a network of 10-15 non-profit partner agencies, notably:

> CFER - Centre de Formation en Entreprise et Récupération;

> 3R - repairs and sells second-hand furniture, bricolage, electrical appliances, stoves and dishwashers;

> Fra-Dolcine – repairs and resells higher quality upholstered furniture;

> Day Centre for the Handicapped, Kelmis and surrounding communities-mainly repairs and restores better quality furniture;

> Diaservice Yaka – sells second-hand clothing, toys, small houseware items such as dishes, cutlery and glassware.

The sorting centre contacts the partner agencies who then collect the items that their agency handles. From time to time, some electrical appliances are repaired on the spot, however this is relatively rare as the lack of space makes regular repair work unmanageable. Another problem as a result of the limited space is that items that are not picked up by partner agencies within a few days must be dismantled, or thrown away.

The second-hand partner agencies take great pains to present the items in the best condition possible: at Yaka, toys are washed thoroughly, then vacuum-wrapped in cellophane so that they appear new. Clothing is immaculate, pressed and presented on racks for women, men and children just as one would see in retail stores. The furniture at 3R is cleaned, repaired and displayed neatly in the appropriate area of the store (living rooms, dining sets, bedroom sets, kitchens, etc.), again, just as one would see in a regular retail store.

Sorting centre, Eupen: waste is weighed and sorted immediately on arrival.

The project is not only environmentally and socially sound but is also economically advantageous for the communities it serves. "The overall quantities of waste are reduced because the majority – 75% – is recycled or resold. That's 75% less waste deposited in community waste sites and landfills. As a result, the Communes spend less money on handling waste," said Michael Mockel of the Ministry of the German-speaking Community of Belgium and co-ordinator of the Rcycl network. "Rcycl also creates jobs for the long-term unemployed, provides training for youths, and the disadvantaged members of the community are able to purchase at minimal cost basic necessary items such as clothing, housewares, furniture… it's a win-win proposition".

In fact, the results could be even better if the sorting centre had a bigger space in which to work. "We would like to do more repair here on site. We have the tools, we have the interns, but we don't have enough space to use these tools under sufficiently safe conditions", said Mr Mockel. Negotiations are currently underway with the Walloon Region for new premises for the sorting centre of 4000 m². "If we get the new space, we will also be able to develop other projects, for example collect packaging waste, set up a repair shop, open a "brocante" which would be open to the public every day… We could be restoring and recycling 85% of the waste in the communes!".

Indeed, paying the rent for the current premises accounts for the highest running cost of the operation. Costs for personnel are minimal (50%): staff at 3R, the Day Centre Kelmis and at the sorting centre are subsidised by the Community of the German-speaking part of Belgium. Those at, Fra-Dolcine and Yaka are financed by the Walloon Region. All partners work also with "Article 60" (long-term unemployed) employees who are financed up to 75-100 % with federal subsidies.

The long-term internship programme (minimum 1 year, maximum 3 years) provides a paid apprenticeship for troubled youths (Community of the German-speaking part of Belgium) helping them to become responsible members of the community and be more easily employable afterwards. However, even more could be done. "Ideally, we would like to provide closer mentoring with each of the interns. But we just don't have enough staff for now to be able to do it", said Miguel Pelegrin, Head of the sorting centre at Eupen.

3R repairs second hand items ranging from electrical equipment to wooden and upholstered furniture.

3R living room department.

A model of success

Rcycl works. In 2002 alone, 850 tonnes of bulky waste were collected (10% of which comprised electrical and electronic equipment) from households and an additional 157 tonnes of electrical and electronic waste were recuperated from stores and other businesses.

The system is easy to put in place, the running costs are low and it can be easily reproduced in many other countries. A Rcycl brochure is now available in 6 languages describing how to set up this simple yet highly effective system.

As a LIFE-sponsored project, Rcycl ended in December 2002. But the solid network of committed partners and continued support from the Ministry of the German-speaking Community and the Walloon Region of Belgium mean that Rcycl is here to stay.

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