

# LIFE DE-BAY

Equipped island for the management of materials and components for end-of-life vehicles

## LAYMAN'S REPORT



# PROJECT DETAILS

## PROJECT TITLE

ELV DEPOLLUTION BAY – equipped island for the management of materials and components for end of life vehicles

## PROJECT ACRONYM

LIFE De-Bay

## PROJECT REFERENCE

LIFE16 ENV/IT/000220

## DURATION

01 July 2017 – 30 June 2019

## EU CONTRIBUTION

883,183.00 euro

## PROJECT LOCATION

Emilia Romagna (Italy)

## PROJECT WEBSITE

[www.lifedebay.eu](http://www.lifedebay.eu)

## CONTACTS

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## PARTNERS



The LIFE DE-BAY project has received funding from the  
LIFE Programme of the European Union.  
LIFE16 ENV/IT/000220

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# 1. CONTEXT AND BACKGROUND

End-of-life vehicles (ELV) have become a global concern. Countries with a legislative ELV system commonly set a target for recovery rates, with many aiming for more than 95% recover, and, in Europe it is required that at least 85% of the vehicle weight is recycled. Besides, the primary goals of the automotive recycling industry are to harvest automobile components for reuse and to recycle the remaining valuable materials that can be used in the manufacture of new basic materials.

Nevertheless, with the available tools, depolluting and recovering of ELV components is still a time-consuming activity especially for a small and medium-sized dismantler. As a consequence, many ELV go through a very superficial depolluting and recovering process, and are sent to dismantling and shredding even when considerable amounts of fluids and materials could still be recovered.

In order to lower the environmental impact of ELV, the development of more efficient recovery systems and techniques is needed.

## Regulatory Aspects

Every year the end-of-life vehicles (ELV) generate in Europe about 8 million tons of waste. The ELVs represent a particular type of waste: on the one hand they contain potentially hazardous materials and pollutants, such as heavy metals, batteries, waste oil, sulphuric acid and lead from batteries; on the other hand they represent an economic opportunity due to the presence of valuable materials, in homogeneous form and in concentrated amounts.

## The European Directives 2000/53/EC and 2005/64/EC

The need to use specialized equipment for the dismantling and depollution of ELV comes from the European Directive 2000/53/EC and the European Directive 2005/64/EC. It regulates that all vehicle manufacturers and importers of new vehicles are obliged, together with all other affected economical operators of this sector, to take back the ELV from the market and to make sure that their components are dismantled and depolluted in a way that guarantees a respectful treatment of the environment and that until the end of 2006 the recycling and recovery rate of 85% of the material weight and until 2015 a rate of 95% must be achieved.

For the vehicle owners the take-back must be free of charge and it concerns all vehicles for the transport of max. 9 passengers and a weight of max. 3.5 t.

The directive defines the free-of-charge take-back of the vehicles:

- the vehicle must be delivered to a permitted treatment facility indicated by the vehicle manufacturer that takes it back free of charge;
- the vehicle must be complete or at least must include all essential components such as motor, gearbox, vehicle body, electronic components and catalyzer;
- the vehicle must not include contain any type of garbage.

## Depollution process

When an ELV has been delivered to a suitable facility, it will be dismantled and depolluted in a proper way, including the following operations:

- Drainage of all fluids;
- Dismantling of the battery and of the tyres;
- Neutralization of the airbag system.

Each marketable part that is dismantled can be sold, except of the safety components which content pyrotechnic material (f. ex. airbags, seat belt pretensioner).

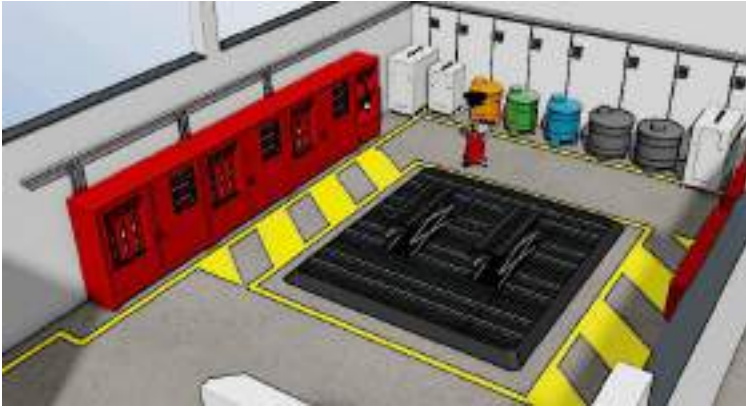
The background of the page is a faded, light-colored image. It shows the front of a car, possibly a classic model, with a license plate that partially reads 'BR'. In the background, there is a stone building with a doorway and a window. The overall tone is light and airy.

## 2. LIFE DE-BAY PROJECT

The aim of LIFE De-Bay depollution island is to allow the recovery of higher amounts of vehicle materials and components (glass, filters) and more efficiently all ELV fluids in a much faster manner than actual tools. Thanks to LIFE De-Bay, dismantlers will be able to depollute ELV in much lower time which is now required, and in much safer conditions for operators.

The final objective is to lower the environmental impact of ELV, through the increased depollution of ELVs and recovery of liquids and materials at the dismantling sites.

# The depollution island



- LOWER ENVIRONMENTAL IMPACT OF ELV
- RECOVERY OF HIGHER AMOUNT OF VEHICLE MATERIALS AND COMPONENTS
- RECOVERY OF 99% OF ALL ELV FLUIDS IN WEIGHT
- DEPOLLUTE ELV IN ONE QUARTER OF THE TIME NOW REQUIRED
- MUCH SAFER CONDITIONS FOR OPERATORS
- MONITORING OF RECOVERED MATERIAL WITH A CERTIFIED SOFTWARE

## Project objectives



### INCREASING:

- RECOVERY OF FLUIDS AND COMPONENTS
- QUALITY OF THE RECOVERED MATERIALS AND SAFETY FOR OPERATOR
- REUSE OF ELV LIQUID AND SOLID MATERIAL
- IMPLEMENT OF THE WASTE LEGISLATION (DIRECTIVE 2000/53/EC)
- PARTNERS BUSINESS AND EMPLOYMENT RATE



### DECREASING:

- POLLUTANT FLUIDS IN THE ENVIRONMENT
- NUMBER OF ACCIDENTS FOR OPERATORS
- LEVEL OF IMPURITIES OF THE RECOVERED MATERIALS (SUCH AS THE METAL CARCASS) WITH AN INCREASE OF THE VALUE OF THE MATERIAL
- INCINERATION OF NON-METAL AUTOMOTIVE SHREDDER RESIDUE (ASR)

## LIFE De-Bay decreases ELV depollution time:

While, at the moment, the time needed to dismantle a medium-sized ELV, by a single operator employed in a small or medium-sized dismantler, is about 67 minutes, with the LIFE De-Bay depollution island is possible to treat the same type of vehicle completely in 17 minutes. A saving of 74% of time will be possible.





### 3. THE DEMONSTRATORS

During the project, two demonstrators have been installed at the dismantlers sites in two EU Countries: F.lli Montalto in Palermo (Italy) and Font Grau in Terrassa, near Barcelona (Spain). These dismantlers gave their consent to participate to the project as demonstrators sites.

These demonstrators dismantler sites have been chosen because they represent the “average case” in terms of business size and operating procedures, they have the required authorizations and the adequate space for the proper installation of the LIFE De-Bay depollution island on their premises.

Demonstration sites operated on more than 1,000 ELV, and collected enough data to define its exact operating characteristics in real life conditions.



## Font Grau, Terrassa (Spain)

For the installation of LIFE De-Bay the owner has dedicated a neighboring area with its own headquarters, on which is acquiring specific machinery for the disposal of certain parts of the recovered vehicles.

The project of the operational layout was agreed in the assembly phase directly with Mr. Font Grau and with its closest collaborators and it was necessary to change the arrangement of the equipment some times.

To improve the layout operational and in order to realize in a more efficient way the activities related to the reclamation of the vehicles it was decided to create a fixed structure on which the vehicle is positioned thanks to a forklift. Here all the activities will be carried out and fluids recovered will be sent on tanks placed on a loft.

The level of the collection tanks is managed by specific digital level indicators and when the maximum level is reached a luminous audible warning device will inform the operator and simultaneously block the suction flow through the pump, to be able to discharge the tank in safety conditions.



*New area dedicated to LIFE De-BAY*



*LIFE De-Bay Equipped Island in Fort Grau (Spain)*

## F.lli Montalto, Palermo (Italy)

The CRM Pilot Centre is a dismantling company run by Family Montalto with the help of some collaborators and specific operators. It is located in an industrial area, close to Villabbate, suburb of Palermo (Italy).

Montalto's brothers has a long time experience in generic demolition site and in past years they open a dismantling site, very close to the actual area.



*Area of F.lli Montalto before the start of the installation activities of LIFE De-Bay*



*LIFE De-Bay equipped island assembling phase*



*Test on tyre separator machine*



*Catalyser cutting machine*

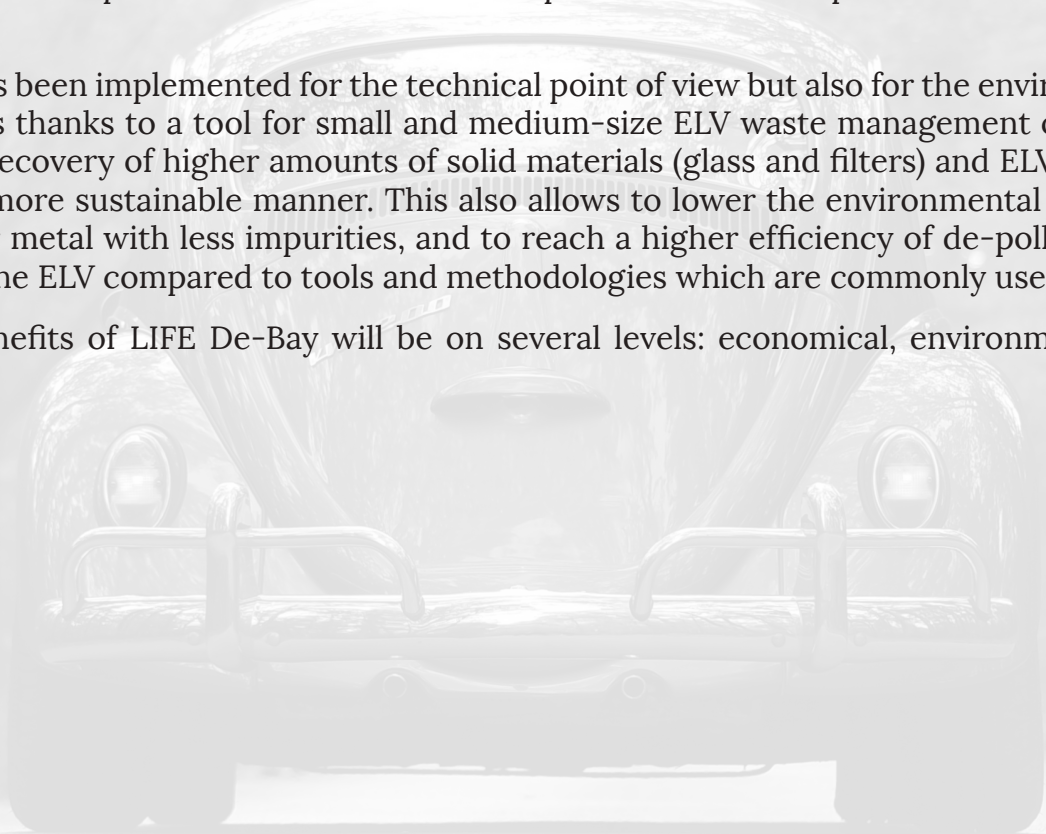
## 4. RESULTS

At the beginning of the project, LIFE De-Bay island was at TRL7 (assembly of existing components), and the project pushes its development to TRL 8 (market readiness).

To be commercially available, the product has been implemented with lot of modification to every single component and tests have been performed on components that have been modified.

The island has been implemented for the technical point of view but also for the environmental performances thanks to a tool for small and medium-size ELV waste management operators, to allow the recovery of higher amounts of solid materials (glass and filters) and ELV fluids, in a faster and more sustainable manner. This also allows to lower the environmental impact of ELVs, recover metal with less impurities, and to reach a higher efficiency of de-pollution and recycling of the ELV compared to tools and methodologies which are commonly used.

Thus, the benefits of LIFE De-Bay will be on several levels: economical, environmental and social.



# Technical Achievements

Single components modifications had been necessary to let the product commercially-available. These modifications have been the following:

- **Components: Tools and equipment for fluid recovery (hose reels, pumps, reservoir tanks and flowmeter equipment)**

The equipment components that Flexbimec used have been designed to deliver the fluids, but they reversed the flow for the recovery from ELV, thus the efficiency of these components was lower than needed.

Besides, the pumps that before worked with oils, now they work on exhaust oils (which contains impurities and different density, for example also in different conditions of temperature) and for fluids with different viscosities

Furthermore, the meter for exhaust fluids has been be modified for the different density of the exhaust fluids, that are different than clean fluids (problems related to valves, ...). The reservoir tank has been adjusted for insertion of the electronic meter (before it do not have an electronic flowmeter, but a mechanical flow meter).

Pneumatic pumps have been used instead of the electronic pumps which are used today.

- **Components for recovery of air conditioner**

Air conditioner components have been modified in order to recover the gas, through filtration and distillation of the gas, and to separate the different types of fluids.

- **Components for glass recovery**

Glass now will be cut with a special cutter which does not release powdered glass, for increased safety of workers.

- **Components for filters recovery**

A tool has been inserted to reduce the volume of filters, to recover the liquids, to separate the iron cap, the paper, the oil. This component did not existing but it has been developed inside the project. The filters press has been added with tools to drain oil, cut the filter and remove the paper, so to reduce volume.



Equipment view



Fluids storage and air-compressor area



Levels control panel

## Environmental Benefits

LIFE De-Bay contributes to the priority area Environment and Resource Efficiency by focusing on the development and demonstration, up to market readiness developing, of a tool that allow small and medium-size dismantlers to meet the regulatory requirements for recovery of at least 95% of an ELV in weight (Directive 200/53).

The LIFE De-Bay island also offer a tool to local control authorities, to keep track of the recovered liquids in an automated and remote manner in all depolluting and dismantling centers.

The LIFE De-Bay island targets the following **four goals**:

- to reduce waste generated;
- to maximise recycling and re-use;
- to limit incineration to non-recyclable materials;
- to limit landfilling to non-recyclable and non-recoverable waste.

With LIFE De-Bay improved island, it will be possible to have important results on the **reduction of the carbon footprint of ELV waste management**, in fact the improved recycling of ELV components and materials will reduce the amount of Automobile Shredder Residue, which is usually either landfilled or used for energy recovery. The decrease of energy recovery of ARS will allow to reduce CO<sub>2</sub> emissions during this phase of the ELV waste management.

Reduction of the carbon footprint has been an important aspect during the project but also after the project: all production has been performed within Flexbimec, which is a low-carbon and low-emission company, with PV and solar energy as the principal source of energy.

Green procurement policies have also be put in place, thus ensuring maximum attention to environmental impacts.



## Economic Benefits for endusers

LIFE De-Bay buyers are small and medium size dismantlers in Europe but also in Brasil, Autralia and USA. They are now able to process a car in **much lower time** which is required with the traditional dismantlers, and to recover materials which are clean from impurities, and separated liquid that can be purified and sold. Thus, their economical benefit are due to:

- increased business: due to the increased speed of processing, they are able to treat 4 times more automobiles;
- increased amount of recovered material;
- increased quality/purity of the recovered material, with associated higher market value for reuse/recycling.



The Island market price has been defined taking into account production costs mainly related to the purchase of materials. The cost of components during this project for two demonstrators have been lowered at the industrial production phase, as the purchasing of higher number of pieces allowed Flexbimec to have higher discounts.



[www.lifedebay.eu](http://www.lifedebay.eu)

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