

ELVES IN ASSOCIATIONWITH SIMI

RECYCLING AND RECOVERY OF END OF LIFE VEHICLES IN IRELAND











NOTE ON THE FIGURES IN THIS REPORT

This report is based on an analysis of the components contained in a sample of 201 ELVs. The trial was undertaken to provide data for the development of protocols (in particular a metal content assumption) for reporting on Ireland's reuse, recycling, and recovery targets to the European Commission. Although this report uses data from this trial, due to differences in the definitions used, the final figures shown here may not be the same as those used in European reporting.



What this Study is About

The End of Life Vehicles Directive 2000/53/EC (ELV Directive) requires Ireland and other EU countries to recycle and recover End of Life Vehicles (ELVs), or scrap cars as they are usually known. Targets for reuse (of parts), recycling, and recovery are specified.

These annual targets are 95% for overall reuse, recycling, and recovery of ELVs that are domestic cars and light commercials. However, there must be a minimum 85% reuse and recycling. The reason for the distinction is to favour reuse of component parts and the recycling of materials from ELVs to other materials, over purely recovery activities, such as in a waste-to-energy facility. Achievement of these

targets is reported annually to the European Commission. The process of treating an ELV starts at an Authorised Treatment Facility (ATF), known to us as a scrapyard or dismantler. ELVs are first depolluted, meaning the oil, fuel, and other fluids are drained from the ELV into tanks and recycled. Other components are removed for resale and reuse, or for further recycling. The remains of the ELV is then sent to a

shredding company that mechanically fragments the ELV. The fragments are further separated depending on their composition (iron, steel, aluminium, heavy plastic, light plastic, etc).

This report follows this process and records the procedure and weights of the ELV, components, and materials at each stage of the treatment process.





DID YOU KNOW?





The targets are a mixture of reuse, recycling, and recovery of car (M1) and van (N1) ELVs. From 2015, the waste management of ELVs must achieve a two-fold target: 85% reuse and recycling, and 95% reuse, recycling and recovery. In essence, the difference between the two targets is the amount that may go to an incineration facility for energy recovery. This means that reuse and recycling is given priority.

The EU



Many European countries adopt protocols (for example, the metal content of an ELV) to assist in the reporting process. A protocol is a weight or percentage derived from the treatment of a sample of ELVs that has been accepted for use in European reporting. It allows a country to use the figure to help report reuse, recycling, or recovery rates for particular readily recycled components such as metal. This frees up time to focus on the elements of the ELV that are not always recycled.



How was this study carried out?



The purpose and objective of this study was to detail an average ELV composition, based upon the ELV sample collected. The way this was done was by following the typical daily practice within the ELV recycling sector, thus:

- An ELV sample was collected and its details recorded and weighed.
- The ELV sample was depolluted prior to its fragmentation and segregation via shredding.
- The components and materials that were removed, recycled, recovered or disposed of during the depollution, shredding, and segregation processes were all recorded and weighed.

We collected a sample of 201 ELVs and put it through this waste treatment process. We documented and weighed the ELVs at the start, the weight of the components during the depollution process, and the weight of the material compositions after shredding and segregation. We also know how these components and materials are typically reused, recycled, and recovered.



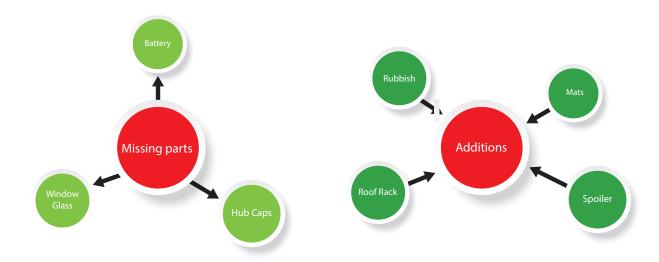
CONSIDERATIONS BEFORE STARTING



The ELVs were collected and stored undercover in a warehouse to protect the sample from the weather. An ELV outdoors with a broken window would absorb, sponge-like, a significant quantity of water and would affect the weight of the vehicle at the start of the trial. During the shredding process, this water would evaporate, as the shredding generates a lot of heat. Hence the start weight and finish weight would be different.

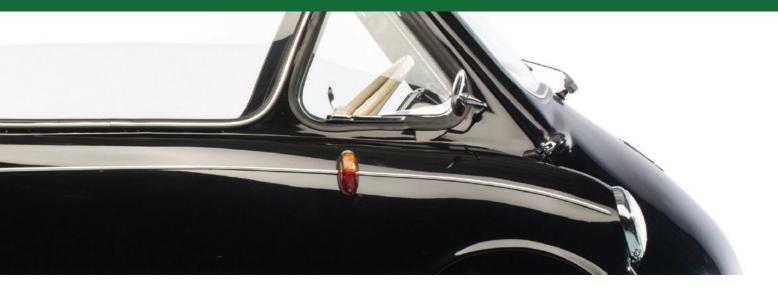
Another consideration that can seriously affect the weight of a vehicle is if things are added to it or taken away from it during its lifespan. Vehicles may have modifications made to them, such as the addition of a tow bar or a rear spoiler. They may also have removable things added like roof racks or seat covers. When scrapped, a vehicle may also contain non-car related items like rubbish. On top of this, by the time a vehicle is scrapped, parts may have been removed for reuse on another vehicle. Just take a look at some of the items that had to be considered as missing or had to be recorded as added.

MISSING PARTS AND ADDITIONS





THE RECYCLING PROCESS



DEPOLLUTION

The depollution process included the removal of the following:

- Fluids from reservoirs (radiator, screenwash)
- Oil filter
- Air con fluid/ gas
- Gear box, differential and engine block oils
- Fuel

Finally, the Airbags were deployed by plugging in a computer and activating them remotely.

SHREDDING

After shredding and initial processing, three basic outputs were generated: Ferrous metals, Light Shredder Fraction, (also called Auto Shredder Residue or ASR) and Shredder Heavy Fraction (SHF). The ASR and SHF underwent some additional segregation, including trommelling to sort shredded particle size, and Eddy Current Separation (ECS) to remove non-ferrous metals.

METALLIC FRACTION

The metallic fraction of ELVs is readily available for recycling through the well-established metals recycling industry. However, there are further recovery and recycling processes focusing on those additional non-metallic materials that are required to meet the 95% overall target.

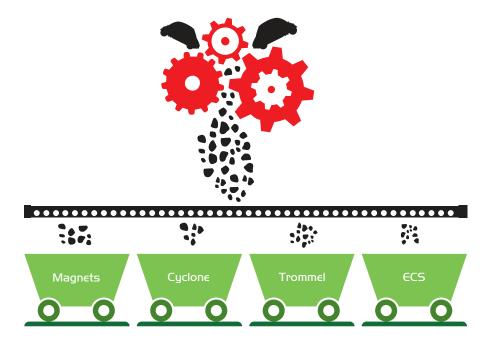


SHREDDING ELVs



The shredded ELV will go through a number of processes, sometimes more than once, to separate it into its components.

- Magnets separate ferrous metals (metals containing iron) from the rest of the ELV.
- Cyclones are used to remove light elements of ASR for example light plastics, pieces of carpet.
- Trommels are used to separate the material by size.
- Eddy Current Separators (ECS) use a magnetic field to separate non-ferrous metals (e.g. aluminium, brass, copper) from the shredded materials.





OUR ELV SAMPLE

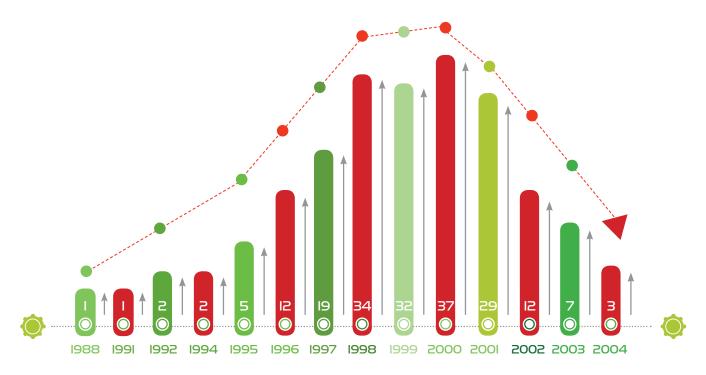
Not all cars are the same so not all ELVs are the same. However, a large enough sample can represent an average ELV currently being scrapped by the final owners. Our ELV sample consisted of 201 ELVs. The sample was selected based on the vehicles that arrived at the ATF over a 12 month period. This was considered representative of what would regularly arrive at an ATF.





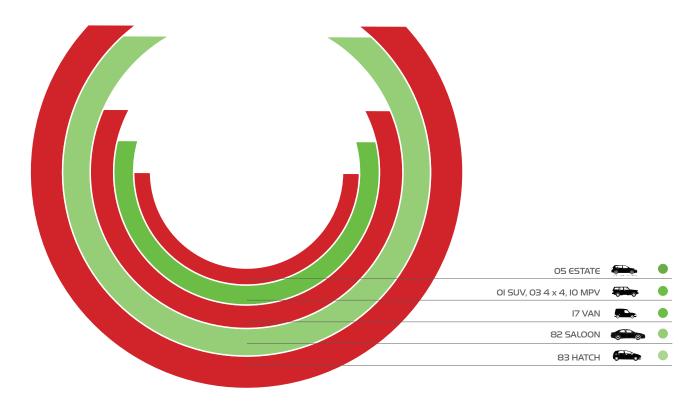
CURVE SHOWING (WEIGHTED) AVERAGE AGE OF ELV BY NUMBER

The (weighted) average age of an ELV in this sample is 15 years old.



TYPE OF ELV IN SAMPLE BY NUMBER

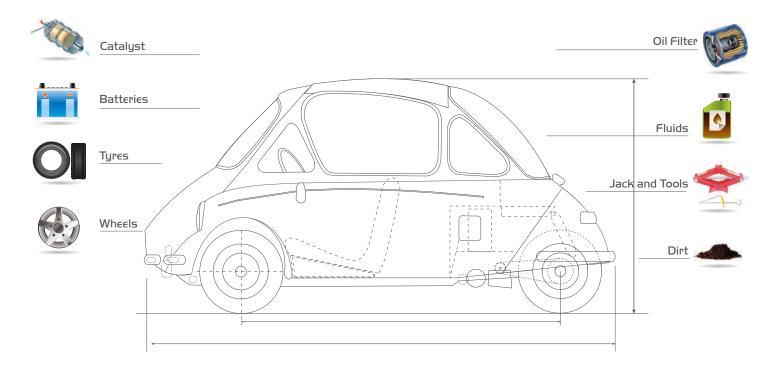
Most vehicles are either hatchbacks or saloons, and this is again shown in the ELV sample. Five had no registration in Ireland.



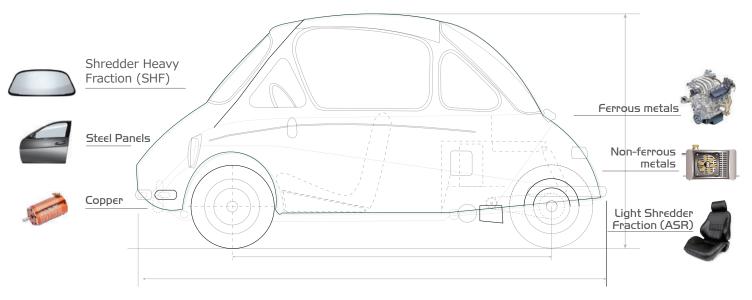


WHAT IS THE RESULT?

DEPOLLUTION



SHREDDING





Components of an Average End of Life Vehicle

Item	Weight (kg)	Percent (%)
TOTAL ELV at Start	217,905	100.00
Average ELV Start Weight ¹	1,084	

I. Depollution

DEPOLLUTION SUMMARY	Weight (kg)	Percent (%)
Catalyst	716	0.33
Jack and Tools	175	0.08
Oil filter	85	0.04
Wheels	6,729	3.09
Batteries	1,267	0.58
Tyres	6,104	2.80
Dirt	81	0.04
Fluids	2,149	0.99
DEPOLLUTION OUTPUT TOTAL	17,307	7.94

2. Shredding

SHREDDER SUMMARY	Weight (kg)	Percent (%)
Ferrous metals (engine, gearbox, chassis)	142,800	65.53
Non-ferrous metals (radiator, electronic ECUs)	9,479	4.35
Armatures/ Copper (starter motor)	400	0.18
Stainless Steel (panels)	574	0.26
Wiring Loom (plastic/ metal mix)	162	0.07
Shredder Heavy Fraction – SHF (glass, some wiring, bumper, trim)	5,106	2.34
Light Shredder Fraction – ASR (seats/ foam, carpet, fabric roof, rubber)	41,889	19.22
SHREDDER OUTPUT TOTAL	200,410	91.97

TOTAL ELV at Finish	217,717	99.91
Missing fraction/difference ²	187	0.09

- The Start Weight is the weight of the vehicle as received at the start of the trial. Items that had been added to the vehicle during its lifespan (e.g. rubbish, spare car parts) were removed where possible and the weight of these items were not included in the Start Weight.
- 2 Likely to have resulted from differing precision provided by the scales used. Scales were calibrated, serviced and tested before use, but precision limitations still exist, particularly with the larger scales used to initially weigh the ELVs.

The result of the study showed that nearly 8% of an ELV is reused/ recycled at an ATF, with the remaining material processed at a Shredder. The proportion reused/ recycled at an ATF would increase at ATFs that undertake further dismantling for parts for reuse. An average ELV is composed of 75% metals (69% ferrous and 6% non-ferrous), which is all recycled. The rest is a mixture of materials including rubber, plastics, glass and fabrics.

Taking into account parts and materials removed at an ATF, around 78% of an ELV is currently readily available for reuse or recycling. Of the remaining 22%, further post shredder treatment can remove recyclable materials such a glass and plastic. A significant proportion is also used in recovery activities, for example as a fuel source in a waste-to-energy plant.



GLOSSARY

Armatures: The copper wound electric motor spindle. These items are typically magnetically separated as a result of the steel spindle, but are also recovered by handpicking from the conveyor belt.

ASR – Automotive Shredder Residue: Non-metallic fraction produced by the shredder. These materials are typically separated from the heavier plastic and metals by air suction. Also called Light Shedder Fraction.

ATF - Authorised Treatment Facility: A facility authorised to undertake ELV depollution and treatment.

Baler: Equipment used to compress materials into a denser cube of materials for transport.

ECS – Eddy Current Separator: A powerful magnetic field used to separate non-ferrous metals from waste after all ferrous metals have been removed.

ELV: End-of-life Vehicle

ELV Hulk: Fully depolluted **ELV**

Ferrous Metals: Those iron based metals, including steel and iron, often defined by those items that can be magnetically separated.

Ferrous Fraction: The materials magnetically separated from the shredded materials.

M1 Vehicles: Designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat.

N1 Vehicles: Designed and constructed for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes.

Non-Ferrous Metals: Metals not containing iron, often defined by those separated by ECS. It includes for example aluminium, magnesium, copper and brass.

PSST: Post Shredder Separation Technology: Further off-line separation of shredder outputs.

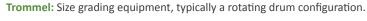
Reuse: In relation to end-of-life vehicles means any operation by which components of end-of-life vehicles are used for the same purpose for which they were conceived.

Recycling: In relation to end-of-life vehicles means the reprocessing in a production process of the waste materials for their original purpose or for other purposes but excluding energy recovery.

Recovery: Means any of the applicable operations provided for in Annex II to Directive 2008/98/EC. Energy recovery means the use of combustible waste as a means to generate energy through direct incineration with or without other waste, but with the recovery of heat.

Shredder: Fragmenting hammer mill and associated downstream separation equipment used for the processing of mixed metal materials.

SHF – Shredder Heavy Fraction: Mixed metals and plastics remaining once the ferrous metals and ASR (see above) have been removed from the shredded materials

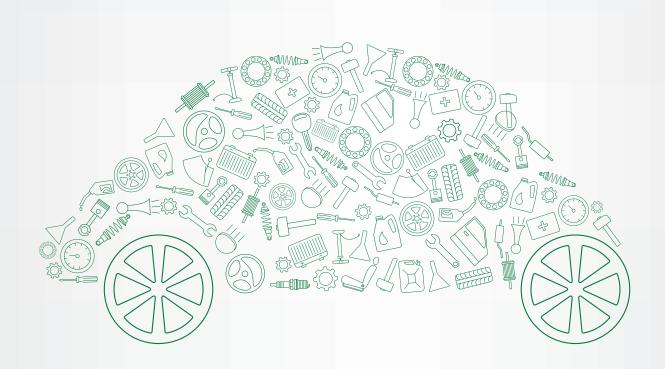












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