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EVALUATION

of

Directive (EC) 2000/53 of 18 September 2000 on end-of-life vehicles

{SWD(2021) 61 final}

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GLOSSARY

Term or acronym	*Meaning or definition*
ACEA	European Association of Automobile Manufacturers
ASR	Automotive Shredder Residues
ATF	Authorised Treatment Facilities
BAT	Best available techniques
BEV	Battery Electric Vehicle
Batteries Directive	Batteries Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators
CLP	Classification, Labelling and Packaging (CLP) Regulation ((EC) No 1272/2008)
CMI	Car Manufacturing Industry
CoD	Certificate of Destruction
EC	European Commission
ECHA	The European Chemicals Agency
EEA	European Economic Area
EEA	European Environment Agency
EEE	Electrical and electronic equipment
ELV	End-of-life vehicle
ELV Directive	Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles - Commission Statement (OJ L 269, 21.10.2000, p. 34–43). Directive as last amended by Directive (EU) 2018/849 of the European Parliament and of the Council of 30 May 2018 (OJ L 150, 14.6.2018, p. 141).
EoL	End-of-life
EPR	Extended Producer Responsibility
ELoW	European List of Waste
EV	Electric Vehicle
EU	European Union
EuRIC	European Recycling Industries' Confederation
FTB	Free take-back
GHG	Green House Gas
ICE	Internal Combustion Engine
IMDS	International Material Data System
ISG	Inter-service Steering Group
HDV	Heavy Duty Vehicle (e.g. Trucks)
Li-ion batteries	Lithium-ion batteries
LSR	Light Shredder Residues

MS	Member States as addressed by the WFD and the ELV Directive ('Text with EEA relevance'): 27 Member States of the European Union plus 3 States of the European Economic Area (Norway, Iceland, Liechtenstein)
OEM	Original Equipment Manufacturer
PHEV	Plug-in Hybrid Electric Vehicle
PPWD	Packaging and Packaging Waste Directive
PST	Post-Shredder Technologies
SVHC	Substance of Very High Concern
REACH	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC
RoHS	Restriction of Hazardous Substances Directive 2011/65/EC, Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment
SME	Small Medium Enterprise
SUV	Sport Utility Vehicle
TAC	Technical Advisory Committee
ToR	Terms of Reference
VAs	Voluntary Agreements
WEEE Directive	Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)
WFD	Waste Framework Directive, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3) as last amended by Directive (EU) 2018/852 of the European Parliament and of the Council of 30 May 2018 (OJ L 150, 14.6.2018, p. 141).
WSR / WShipR	Waste Shipment Regulation, Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste
WStatR	Waste Statistics Regulation, Regulation (EC) No 2150/2002 on EU waste statistics

1. INTRODUCTION

1.1. Purpose

The purpose of this document is to present an evaluation of the effectiveness, efficiency, coherence relevance and EU added value of Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles[1] (hereinafter - ELV Directive).

Since its adoption in 2000, the ELV Directive has not undergone any substantial revision. With the adoption of the Waste Package in 2018[2], a review clause (Article 10a) was introduced into the Directive establishing a legal obligation for the Commission, as follows: *'By 31 December 2020, the Commission shall review this Directive, and to that end, shall submit a report to the European Parliament and to the Council, accompanied, if appropriate, by a legislative proposal.'*

The production of vehicles has undergone significant changes since the adoption of the Directive 20 years ago. These transformations have been influenced by the increasing use of new technologies and components in cars, such as plastics, carbon fibre or electronics, causing specific challenges for their recovery and recycling from ELVs. The growing number of electric vehicles on the EU market is expected to bring additional new challenges to the ELV sector, as the modern electric vehicles contain parts and components (e.g. batteries), requiring specific treatment at the end of their life, and other (some electric motors, containing rare materials) which are currently hard to recycle, and parts (batteries, strong magnets) which pose significant handling safety issues.

The recovery measures adopted to mitigate the economic consequences of the COVID-19 pandemic, and in particular financial incentives to purchase electric/hybrid cars, will accelerate the shift to electric cars in the EU. They might also potentially lead to an increased volume of relatively recent vehicles sent for scrapping.

This evaluation assesses to which extent the EU legislation on end-of-life vehicles is fit for purposes to deal and measure with these new developments.

The document also evaluates the ELV Directive in light of (i) the political priorities and actions set out in the European Green Deal[3] and the Circular Economy Action Plan[4], which define an ambitious agenda to transform the European economy, based on a modern, competitive, low carbon and circular industry, and (ii) the EU framework legislation on waste management, as amended in 2018.

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[1] *OJ L 269, 21.10.2000,* p. 34–43, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1599215579091&uri=CELEX:32000L0053

[2] Directive (EU) 2018/849 of the European Parliament and the Council of 30 May 2018 amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and 2012/19EU on waste electrical and electronic equipment *(OJ L 150, 14.6.2018, p. 93–99).*

[3] COM(2019) 640 final

[4] COM(2020) 98 final

The European Green Deal and the Circular Economy Action Plan emphasise that the EU policy on waste should place the reduction of waste generation at its core, notably through changes in the design of products, promote high quality recycling and facilitate the uptake of recycled materials in new products. The Chemicals Strategy for Sustainability[5] also strives for a safe and sustainable-by-design approach and for non-toxic material cycles: "*it is necessary to ensure that substances of concern in products and recycled materials are minimised. As a principle, the same limit value for hazardous substances should apply for virgin and recycled material.*"

Where waste cannot be avoided, its economic value must be recovered and its impact on the environment and on climate change should be avoided or minimised. In this regard, the European Green Deal identifies vehicles as one of the products where "*the Commission will consider legal requirements to boost the market of secondary raw materials with mandatory recycled content*". Additionally, vehicles are among seven sectors selected as the key product value chains in the new Circular Economy Action Plan, which directly refers to the new legislative initiative by stating "*the Commission will also propose to revise the rules on end-of-life vehicles with a view to promoting more circular business models by linking design issues to end-of-life treatment, considering rules on mandatory recycled content for certain materials of components, and improving recycling efficiency*". The evaluation report is based on the evaluation criteria set out in the Better Regulation Guidelines[6], as presented in the Commission's evaluation roadmap[7], namely:

- ✓ **Effectiveness:** looking into the extent to which the actions defined under the Directive have been implemented and whether this has resulted in achieving the ELV objectives;
- ✓ **Efficiency:** assessing whether the obligations arising from the implementation of the ELV Directive have been implemented in a cost-effective way and if there is a potential for further synergies to strengthen delivery while minimising costs and administrative burden, including impact on SMEs;
- ✓ **Relevance:** assessing whether the issues addressed by the ELV Directive still match current needs (e.g. developments in terms of e-mobility or new hazardous substances) and contribute to solutions to issues addressed by wider EU policies on circular economy, climate change, plastics, resource efficiency, raw materials, etc.;
- ✓ **Coherence:** assessing coherence of the ELV Directive with the EU wide policy objectives on circular economy, as well as possible inconsistencies and overlaps of the ELV Directive with the waste legislation, in particular the Waste Framework Directive and the Batteries Directive, and EU legislation on car registration and on car type-approval;

[5] COM(2020) 667 final

[6] https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox_en

[7] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1912-Legislation-on-end-of-life-vehicles-evaluation

- ✓ **EU added value:** of the Directive compared to what Member States could have reached acting alone at national, regional and international level.

These criteria are operationalised via questions specific to this evaluation (*see* Section 5 and Annex 3).

1.2. Scope

This evaluation covers the whole Directive 2000/53/EC on end-of-life vehicles, from its adoption in 2000 until present, including the amendments and the implementation in all EU-28 Member States. As a consequence, this report analyses both the issues deriving from the nature of the legislation itself as well as those deriving from its transposition and implementation in Member States, including monitoring and enforcement.

1.3. The ELV sector and the COVID-19 pandemic

The evaluation of the ELV Directive also needs to factor in, as much as possible, the impact of the COVID-19 pandemic on the various economic sectors affected by the Directive. The structural implications of the COVID-19 pandemic for the ELV Directive are difficult to foresee, in view of the numerous uncertainties linked to the pandemic itself and to its long term consequences for the interested sectors. It will require later estimations as the second wave of the pandemic started in Europe in October 2020, when this evaluation was being finalised.

This section therefore attempts to describe the short term, immediate impact that the pandemic had on the automotive chain, as well as indications as to what could be its more medium term implications, based on the views of the sectors concerned and relevant experts.

All the automotive chain, from manufacturers to suppliers to aftersales market and recyclers, has been hard-hit by the first wave of the COVID-19 pandemic.

In June 2020, the European Automobile Manufacturers' Association (ACEA) indicated that car registrations were expected to drop by 25% in 2020, meaning that car sales would decrease by more than 3 million from 12.8 million units in 2019 to some 9.6 million units this year. This would represent the lowest number of new cars sold since 2013[8] and is mainly due to factory shutdowns during the lockdowns put in place in different EU Member States, as well as the disruption of supply chains.

The aftermarket automotive sector (vehicle parts production, their distribution, diagnostics and repair & maintenance) was also largely impacted in the EU by the pandemic: the confinement measures and the temporary closing of business-consumer interfaces has resulted in a drop in demand, with a clear effect on the access to liquidities for the overwhelming majority of SMEs and family businesses of the sector[9].

[8] https://www.acea.be/press-releases/article/eu-car-sales-forecast-2020-record-drop-of-25-expected-this-year-says-acea
[9] Data from the automotive aftermarket sector

Many ELV recycling facilities have been subject to temporary closures, while aluminium and steel prices decreased, supply chains and production lines were disrupted and the trade in goods and services interrupted. This has resulted in serious operational and financial difficulties for many businesses active in the sector, many of them small and medium-size enterprises (SMEs) that have been facing serious liquidity issues. The impact on the ELV sector was a reduction in the number of ELVs, reduction of auto parts sales, lack of storage as many facilities were closed or could not proceed with treatment and lack of available shipping logistics to ship Automotive Shredder Residue (ASR) to available installations. Recent studies show that auto parts sales will slow significantly and will fall by 15% in 2020 and remain 4% to 8% lower than forecasts through 2025[10]. Experts in the sector predict that a more complete and accurate estimate of the impact of crisis on dismantlers and shredders will only be possible in 2021.

The dismantling sector also pointed to the surge of ELV treatment by illegal operators as sales of the spare parts for reuse via Internet platforms were on the rise and the sellers are not always certified dismantlers and recyclers.

In response to the economic crisis caused by COVID-19, the EU adopted the NextGenerationEU recovery instrument[11]. Under this instrument, grants, notably from the new Recovery and Resilience Facility, ERDF and Cohesion Fund, should be prioritised for projects with the highest social, environment, economic and EU added-value, offering an opportunity to accelerate the green transition. Furthermore, to mitigate the economic impact of the COVID-19 pandemic, most Member States have put in place considerable incentives (e.g. grants, tax reduction, free parking) for acquiring cars with low tailpipe greenhouse gas emissions (EVs and hybrids), or e-scooters and e-bikes. In the short term, these incentives to purchase new cars might result in the replacement of old cars with newly purchased cars, leading to a higher number of used vehicles becoming end-of-life vehicles, and additional activities for the ELV dismantling sector. This would be the case especially if the incentive schemes also comprise premiums for the scrapping of used cars, which however does not seem to be the case in most EU Member States. Past experiences have shown that such scrapping premiums can actually destabilise the car dismantling sector if it leads to a sudden afflux of ELVs to their facilities, bringing with it a decrease in prices and additional storage costs.

In the medium term, it is expected a further acceleration towards the electrification and higher automation of the automotive sector. This will have important consequences for the vehicle dismantling and recycling sectors, as much fewer parts are needed in electric vehicles (no gearbox, no exhaust system, much fewer moving parts in the engine, etc.), and increased digitalization will increase the share of on-board electronics. On the other hand, batteries and motors of EVs contain many valuable materials (cobalt, lithium copper, rare earths, etc.) for which recycling will represent both technical challenges and an economic interest, and shall have strong impact on innovation within the sector, but also pose safety issues which require

[10] https://www.bain.com/insights/covid-19-will-hurt-the-auto-parts-market-in-2020-and-beyond-infographic/

[11] Communication from the Commission, Europe's moment: Repair and Prepare for the Next Generation, (COM(2020) 456 final, 27.5.2020)

training of the personnel coming in contact with such material. This issue is further discussed in this evaluation report.

At the same time, the automotive aftermarket stakeholders pointed out that the demand for new cars might go down if the economic crisis persists, and with it a reduced purchasing power for consumers. This could mean that households keep their cars longer, with more activities on the repairing side to keep them in good conditions, as well as increased demand for second-hand vehicles, which are cheaper.

2. BACKGROUND TO THE INITIATIVE

2.1. Description of the initiative

2.1.1. Historic background and response to the ELV problematics

The EU policy on waste management, and its associated legislation, dates back from 1975 with Directive 75/442 on waste and Directive 75/439 on waste oil.

Discussions on waste from ELVs date back to the 1970s. They were focusing particularly on the concerns caused by the illegal disposal of hazardous waste and the difficulties to treat plastic waste derived from ELVs. Increasing quantities of plastic waste were found in the Light Shredder Residues (LSR) and, due to their limited compacting characteristics, used a large amount of volume within landfills. Their incineration was also challenging as it required pre-treatment operations. The treatment of exhaust gas of waste incinerators was less developed at that time. In addition, other environmental and health risks, such as contamination of the metal scrap with heavy metals, raised public concerns.

A number of reports and studies exposed the environmental, economic and social challenges linked to the growing number of ELVs in Europe[12][13]. The number of ELVs generated in the EU-15 Member States was estimated to amount to between 7.6 and 10.3 million units per year, representing between 8 and 9 million tonnes of waste.

As a response, under the Article 175(1) of TEC (current Article 192 of TFEU), the Directive 2000/53/EC on end-of-life vehicles (ELV Directive) was adopted in 2000 in order to minimise the impact of end-of-life vehicles (ELVs) on the environment and to improve the environmental performance of all the economic operators involved in the life-cycle of vehicles.

2.1.2. General purpose and objectives of the ELV Directive

The first EU-wide legal framework on the ELV sets three key objectives with the aim of:

[12] Tuddenham, Mark; Hempen, Susanne; Bongaerts, Jan C. (1996): END OF LIFE VEHICLES (ELV): Current basic data reflecting the overall ecological and economic context of the ELV issue. Final report. Institute for European Environmental Policy (IEEP).

[13] Zoboli, Roberto; Barbiroli, Giancarlo; Leoncini, Riccardo; Mazzanti, Massimiliano; Montresor, Sandro (2000): Regulation and innovation in the area of end-of-life vehicles. Hg. v. European Commission JRC-IPTS und Enterprise DG. Instituto Di Ricerca Sulla Dinamica Dei Sistemi Economici, IDSE; Consiglio Nazionale delle Ricerche, CNR. Milan, Italy.

- **preventing** waste from vehicles;
- **promoting** reuse, recycling and other forms of recovery of ELVs and their components so as to reduce the disposal of waste;
- **improving** the environmental performance of all economic operators involved in the life cycle of vehicles, especially those involved in the treatment of end-of life vehicles.

While harmonising environmental requirements, the Directive also seeks to ensure the smooth operation of the internal market and to avoid distortions of competition in the EU through an EU-wide framework in order to ensure coherence between national approaches.

In order to pursue these objectives, the Directive contains measures regarding:

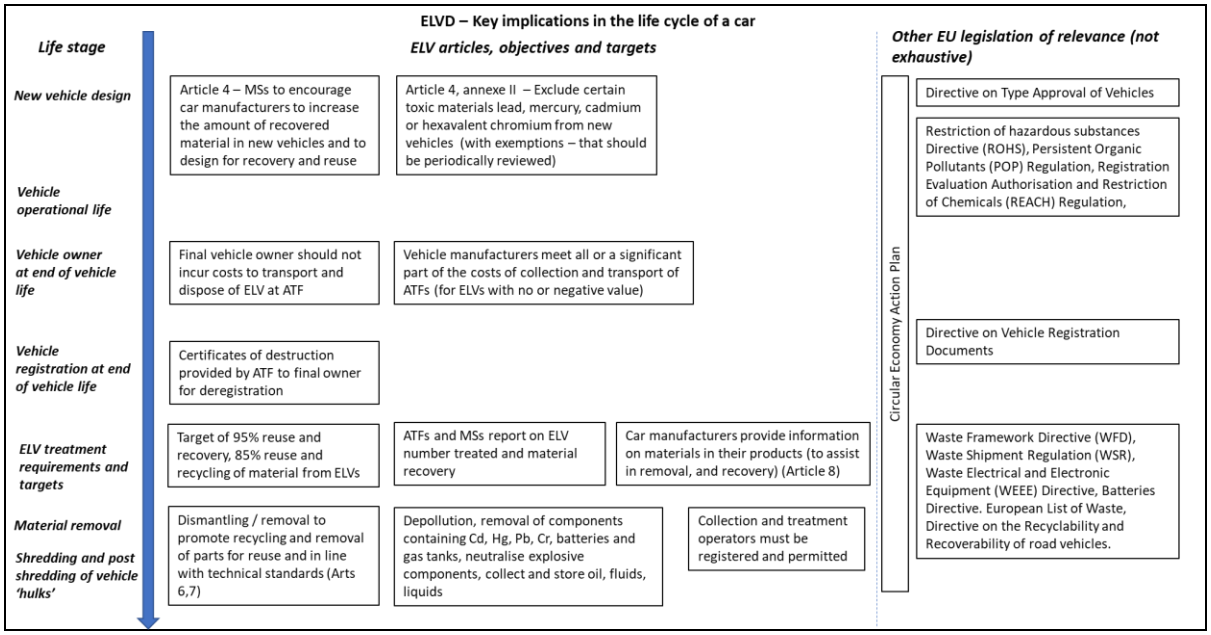
- the **prevention** of waste, especially measures to limit the presence of hazardous substances (lead, mercury, cadmium and hexavalent chromium) in vehicles and encouragement for Member States to take account and facilitate the recycling and reuse of vehicles and their parts, in the design and production stage of new vehicles;
- the **collection** of ELVs, notably through the obligations for Member States to ensure that authorised treatment facilities (ATFs) are available within their territory, that ELVs are transferred to such ATFs, and that the delivery of an ELV to ATFs occurs without any costs for the last holder. ATFs must be registered, comply with minimum technical requirements and permitted by Member States' competent authorities;
- the **environmentally sound treatment** of ELVs;
- the **targets (by weight) for the re-use and recycling (85%) of ELVs** as well **as re-use and recovery (95%) of components** from ELVs;
- the **provision of information by producers** on components and materials used in vehicles, to facilitate their identification for reuse and recovery.

Specific requirements apply to remove certain vehicle components and liquids that are high pollution risks and/or contain materials of high value.

2.1.3. Main provisions of the ELV Directive

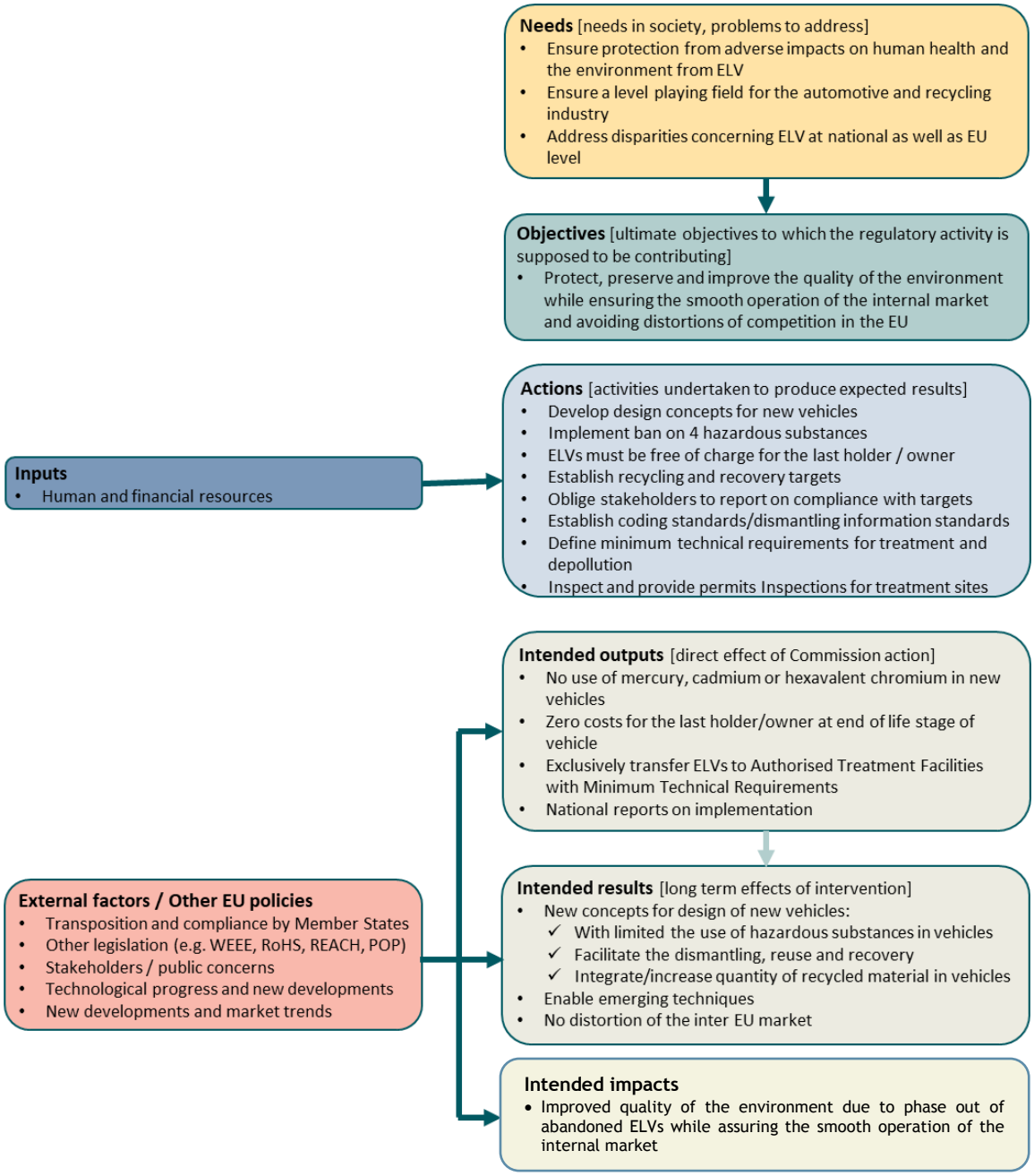
Figure 2-1 provides an overview of the provisions of the ELV Directive.

Figure 2-1: Summary of the ELV Directive



2.2. Intervention Logic

The ***intervention logic*** below shows the intended functioning, desired results and overall rationale of the Directive.



It identifies:

- The **needs** to be addressed;
- The **objectives** to put in place aiming to address the needs;
- The **inputs** to implement the Directive;
- The **actions and measures** undertaken to meet the objectives;
- The **consequences** (expected outputs and results) evolving from the actions; and
- The **expected impacts,** which should fully resolve the needs.
- The **external influences** – other factors that influence the expected outputs, results and impacts outside the scope of the ELV Directive.

2.3. Interactions with other EU policies and legislations

The ELV Directive needs to be considered in the broad context set out by the EU policies on climate change, circular economy, combating pollution and industrial strategies, as reflected especially in the European Green Deal[14], the Circular Economy Action Plan[15], Chemicals Strategy for Sustainability[16] and the New Industrial Strategy for Europe[17]. The Directive touches upon issues which are relevant as well for the EU legislation relating to the design[18] and registration[19] of vehicles. It also interacts with many pieces of EU legislation on waste, especially the Waste Framework Directive, and also the Batteries Directive, the WEEE Directive and the Waste Shipment Regulation.

The interaction and coherence with these EU policies and legislation are assessed in detail in Section 5 of this document.

2.4. Baseline

The baseline and starting point of the evaluation is defined by the date of entry into force of the Directive (2000). At the time the ELV Directive was drafted, there was no requirement to proceed with a formal impact assessment including a baseline/counter factual of no intervention. Therefore, the lack of data limits possibility to present a comprehensive overview of the original baseline. The evaluation takes into account the situation prior to the adoption of Directive, where national frameworks of ELV Directive type legislation had been established only in some Member States.

The earliest information on the legislative situation before the ELV Directive entered into force in the EU is described in the JRC-IPTS report, providing the general overview of the ELV Directive related issues[20]. The report contains the following summary:

"*At end of 1999, 10 EU member countries (AT, BE, FR, DE, IT, NL, PT, ES, SE and the UK) had specific regulations and/or industrial voluntary agreements (VAs) for ELV. Another three countries were discussing industrial agreements (FI and IE) or introducing legislation (DK). Six countries (AT, BE, DE, IT, NL and SE) combine VAs with legislation directly addressing ELV. AT, FR, IT and NL introduced VAs or countrywide initiatives before the drafting of the EU Directive proposal. The VAs and legislation in other countries (BE, DE, PT, ES and SE) were developed in 1997–99 during the debate on the EU Directive proposal. A process of integration between industrial agreements and legislation occurred in DE and SE after a long confrontation between industry and environmental policy-makers. In other large countries*

[14] COM(2019) 640 final
[15] COM(2020) 98 final
[16] COM(2020) 667 final
[17] COM(2020) 102 final
[18] Directive 2005/64/EC of the European Parliament and of the Council of 26 October 2005 on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability and amending Council Directive 70/156/EEC *(OJ L 310, 25.11.2005, p. 10–27).*
[19] Council Directive 1999/37/EC of 29 April 1999 on the registration documents for vehicles *(OJ L 138, 1.6.1999, p. 57–65).*
[20] Zoboli, Roberto; Barbiroli, Giancarlo; Leoncini, Riccardo; Mazzanti, Massimiliano; Montresor, Sandro (2000): Regulation and innovation in the area of end-of-life vehicles. Hg. v. European Commission JRCIPTS und Enterprise DG. Instituto Di Ricerca Sulla Dinamica Dei Sistemi Economici, IDSE; Consiglio Nazionale delle Ricerche, CNR. Milan, Italy.

(FR, IT and the UK), ELV policy is mainly based only on VAs promoted by the car industry and involving a number of other industries. One major feature of these VAs is the absence of specific economic instruments of the free take-back (FTB) type and the prominence of free-market relationships. The agreement implemented in NL represents a specific approach for both its organisational framework and its economic incentives. A recycling fee is levied on new car prices and redistributed to dismantlers and recyclers to pay incremental recycling costs. Specific mechanical recycling targets are established. Most national voluntary agreements and/or legislation established a recovery target rate of 85 % of car weight by 2002 and a total recovery target rate of 95 % by 2015. Most countries specify the targets only in terms of recovery rates (not recycling rates, as in the EU Directive) thus allowing unconstrained energy recovery of ASR."

3. IMPLEMENTATION AND STATE OF PLAY

3.1. Implementation of ELV Directive

A number of reports and studies have been published since 2000 on the implementation of the ELV Directive.

This includes in particular Commission implementation reports based on information provided by Member States pursuant to Commission Decision 2001/753/EC[21] concerning a questionnaire for Member States reports on the implementation of Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles and the Compliance Promotion Initiative to assess the implementation of Directive 2000/53/EC on end-of life vehicles (the ELV Directive) with emphasis on the end-of life vehicles of unknown whereabouts. They can be found on the Commission's website[22].

A number of specific reports and studies were also carried out on legal, economic and practical aspects linked to the ELV Directive, in particular the following:

- End of life vehicles: Legal aspects, national practices and recommendations for future successful approach (study for the European Parliament's Committee on Environment, Public Health and Food Safety, 2010)[23];
- Requirements for the management of waste containing persistent organic pollutants – Rules concerning waste in the POP Regulation and their application to Waste Electrical and Electronic Equipment and end-of-life vehicles (2016)
- Development of proposals, including legal instruments, to improve the data situation on the whereabouts of end-of-life vehicles (2017)[24];
- Report the End-of-Life Vehicle sector by ADEME (2017)[25];
- Enhancing the Separation of Components and Materials from End-of-Life Vehicles Aiming at the Recovery of Critical Metals by ORKAM (2017)[26];

[21] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001D0753
[22] https://ec.europa.eu/environment/waste/elv/implementation_en.htm
[23] https://ec.europa.eu/environment/waste/pdf/study/elv.pdf
[24] https://www.umweltbundesamt.de/publikationen/development-of-proposals-including-legal;
[25] https://www.ademe.fr/sites/default/files/assets/documents/automotive-end-life-vehicles-data-2017-report.pdf;
[26] The final report is in German with a short English abstract (page 4) and an English summary of 13 pages (pages 36 to 48). https://www.umweltbundesamt.de/publikationen/optimierung-der-separation-von-bauteilen

- Effectively tackling the issue of millions of vehicles with unknown whereabouts - European priority measure: establishing leakage-proof vehicle registration systems by UBA (2020)[27];
- Used vehicles and the environment. UNEP report (2020)[28];
- Used vehicles exported to Africa – a study on the quality of used export vehicles. Human Environment and Transport Inspectorate the Dutch Ministry of Infrastructure and Water Management (2020)[29].

The implementation of the ELV Directive required that multiple changes be made to its Annex II, relating to hazardous substances. Under the ELV Directive, vehicle and equipment manufacturers are required to limit the use of lead, mercury, cadmium and hexavalent chromium for materials and components put on the market after 1 July 2003, subject to the exemptions listed in Annex II to the Directive. Until 2019, where their use is unavoidable. Annex II has been amended 10 times in order to reduce these exemptions while taking into account the technical and scientific progress. More information on these changes is provided in the webpage of the European Commission[30].

3.2. Key facts and figures relating to the ELV sector in the EU

- In 2016, 258 million passenger cars were registered in the EU, and these all fall within the scope of the ELV Directive. Around 90% of the 34 million trucks registered weigh less than 3.5 tonnes and are also within the scope of the ELV Directive. Trucks weighing more than 3.5 tonnes are not covered by the ELV Directive. The remaining 45 million vehicles, including motorcycles, trailers and semi-trailers, road tractors, special purpose vehicles, motor coaches, buses and trolley buses, are not within the scope of the ELV Directive.
- The average age of an ELV in the EU is between 15 and 22 years.
- In 2018, approximately 15 million new passenger cars were registered in the EU27[31].
- In 2017, 11.21 million light commercial vehicles below 3.5 tonnes total mass (category M1) and passenger cars (category N1) left the stock of registered vehicles. Of these, 6.57 million were reported as ELVs and 0.87 million were reported as exports of used cars to non-EU countries. Therefore, the whereabouts of 3.77 million vehicles which left the stock of registered vehicles are unknown (see further development on this in section 5.1.2).
- The ELV Directive establishes minimum technical requirements for the treatments used in ATFs and shredders. Europe has approximately 14 000 ATFs and 350 automotive shredding facilities.
- The average weight of an ELV in 2017 was 1088 kg[32]. This means that the 11.21 million vehicles leaving the stock in 2017 represent 12.2 million tonnes of waste.

[27] Effectively tackling the issue of millions of vehicles with unknown whereabouts - European priority measure: establishing leakage-proof vehicle registration systems;
[28] A link to the UNEP report: https://www.unep.org/resources/report/global-trade-used-vehicles-report
[29] A link to the study: https://www.ilent.nl/binaries/ilt/documenten/rapporten/2020/10/26/rapport--used-vehicles-exported-to-africa/RAPPORT-+Used+vehicles+exported+to+Africa.pdf
[30] See, https://ec.europa.eu/environment/waste/elv/events_en.htm
[31] Eurostat data is available here:https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Passenger_cars_in_the_EU

- Based on the average material composition of ELVs, 12.2 million tonnes of represent a material flow of 70% (8.5 million tonnes) of ferrous metals, 4% (490 000 tonnes) of non-ferrous metals (excluding wiring harnesses), 3% (365 000 tonnes (glass)) and 14.8% (1.48 million tonnes) of mixed plastics. These figures exclude tyres, battery casings and the plastic sheathing of wiring harnesses.

[32] Source: Eurostat: unpublished data for 2018 for 16 out of 31 EU and EEA countries

4. METHOD

4.1. Evaluation questions

In line with the Commission's better regulation policy, this report assesses the Directive according to five **evaluation criteria**: effectiveness, efficiency, relevance, coherence and EU added value. To this end, this report answers the following evaluation questions:

Effectiveness:

- To what extent have the objectives of the ELV Directive been achieved?
- To what extent have the results been effectively monitored?
- Which factors contributed to or hampered the observed achievements of the ELV Directive?
- Did the ELV Directive lead to other significant changes or results?
- What and to which extent did Member States implement measures to address the problems of "missing ELV" (e.g. cooperation mechanisms between MSs)?

Efficiency:

- To what extent are the costs proportionate to the benefits which have been achieved as a result of the ELV Directive?
- How are the overall costs and benefits linked to the implementation of the ELV Directive distributed across the relevant economic actors?
- What factors influenced the efficiency?

Relevance:

- To what extent is the ELV Directive appropriately covering the new challenges, changing environment and developments affecting the automotive and ELV sectors?
- How well do the objectives and provisions of the ELV Directive correspond to the current EU policy objectives?

Coherence:

- To what extent is the ELV Directive coherent with other EU policies and legislation?

EU added value:

- What is the added-value resulting from the ELV Directive?

4.2. Process

The Commission first published a roadmap for the evaluation of the ELV Directive in 2018[33]. The Commission also worked with a consortium of consultants which produced in August 2020 a study designed to support this evaluation[34].

The main steps undertaken and sources of information used for this evaluation are the following:

- A review of existing literature and data (the legal acts and documents related to the implementation of the Directive; exemption evaluation reports related to the hazardous substance prohibitions[35]; end-of-life vehicle statistics from Eurostat[36]; relevant studies[37]; data from the reports by Member States);
- An open public consultation was conducted by the Commission for 12 weeks, 6 August 2019 – 29 October 2019[38]. In total, 141 stakeholders responded to the consultation, approximately half of them have been received from the business community;
- Targeted consultation activities were also performed, consisting of a survey and interviews which key stakeholders for the ELV Directive. A total of 72 stakeholders responded to the targeted questionnaire coming from a range of stakeholder groups, including Member State Competent Authorities, Trade Associations, Non-Government Organisations and other stakeholders;
- On 5 February 2020, a Stakeholder workshop was organised to verify and to support the findings of the evaluation. It involved 71 representatives of Member States authorities, economic operators and their representatives at EU and national level, NGOs and academics.

More information on the methodology and process followed for this evaluation (including on the consultation of stakeholders) can be found in the Annexes to the present document and on the European Commission's webpage specially dedicated for the evaluation of the ELV Directive: https://ec.europa.eu/environment/waste/elv/review_en.htm.

4.3. Limitations – robustness of findings

Stakeholder consultation

The evaluation aimed to involve all affected stakeholders via the most appropriate methods. A variety of tools were used to collect the evidence required for the evaluation, including the

[33] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1912-Legislation-on-end-of-life-vehicles-evaluation

[34] More information on the process of the evaluation is available in the consultants' webpage: https://www.elv-evaluation.eu/

[35] See consultant final reports published: https://elv.exemptions.oeko.info/index.php?id=20

[36] Clarification on statistics is provided here: https://ec.europa.eu/eurostat/statistics-explained/index.php/End-of-life_vehicle_statistics

[37] https://ec.europa.eu/environment/waste/elv/events_en.htm

[38] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1912-Legislation-on-end-of-life-vehicles-evaluation

targeted survey and interviews, the Open Public Consultation (OPC) and the stakeholder workshop. Several limitations were identified in the capacity to obtain the relevant information:

- Input from targeted interviews was relatively limited. Despite multiple contacts, a number of stakeholders declined invitations for various reasons, e.g., preference to provide responses in written through the survey, no availability. As such, the number of individual responses was less than initially planned. However, in view of the participation of most of those contacted to the targeted survey and the stakeholder workshop, the impact to the validity of the conclusions is considered to be limited;
- Despite the surveys and the interviews, no input was received from certain stakeholder groups, including insurers (except for one company), consumer representatives and vehicle registration experts. This information gap was partially mitigated by applying a tailored desk research with the aim reflect the viewpoints of these groups in the overall assessment;
- There was a "Consultation fatigue" by the stakeholders in the consultation process. For the time efficiency purposes, the tailored approach was applied to manage the stakeholder communication, in particular, through the targeted surveys ensuring the questions addressed are appropriate and clearly stated.

Costs and other data collection

The collection of data on costs associated with the ELV was rather challenging. Stakeholders were asked to provide information on the costs resulting from the implementation of the Directive, such as administrative, technical compliance, monitoring, collecting and reporting data and estimates, labour costs, including their distribution among the sectors/operators[39]. Contribution from stakeholders was relatively limited. There were conflicting views and data available regarding the costs associated with ELVs.

In some cases, respondents were unable to identify the costs associated with the Directive from other costs. This posed limitations to the capacity to provide a comprehensive estimation of the costs. Where available, data from relevant studies/reports was used to fill relevant gaps and verify the input from stakeholders. Where necessary, the combination of expert and qualitative judgments was applied. Due to the strong interrelation of the ELV Directive with other EU legislation (such as the Batteries Directive and Chemical legislation), evaluation and focus exclusively on the ELVs regulatory aspects required critical analysis. It was particularly important in identifying the costs solely imposed by the Directive. As there was no impact assessment required for the primary proposal of the Directive before 2000, it was impossible to retrieve the original estimate of costs.

Validity of analysis and conclusions

The input provided by stakeholders during the consultation process on some important data remained limited. In order to address possible information and data gaps, after the completion

[39] See Annex 5 on the costs and benefits.

of the open public consultation, a stakeholder workshop was organised to present the initial findings and test them against a broad range of stakeholders. As a result, and on the basis of the additional input received, the evaluation was accordingly refined and, where necessary, revised. It ensured validity and confidence of the findings and conclusions of the report.

5. ANALYSIS AND ANSWERS TO THE EVALUATION QUESTIONS

This section provides an evaluation of the ELV Directive according to the five evaluation criteria (effectiveness, efficiency, relevance, coherence and added-value of the Directive). The evaluation work was initiated based on a series of questions – the questions and corresponding answers are compiled in this section, so as to provide an analysis of the most relevant aspects linked to the ELV Directive. More information on the initial questions and their rationale can be found in the evaluation matrix presented in Annex 3.

5.1. Effectiveness

The overall effectiveness of the ELV Directive is analysed in the following sections, through examining the progress towards achievement the objectives and targets, factors hindering such progress and issues relating to reporting. It contains an important focus on the issue of "missing ELV", which represents the major problem affecting the effectiveness of the ELV Directive.

5.1.1. Have the objectives and targets of the ELV Directive been met and monitored?

This section provides an overview of the implementation of the objectives established by the ELV Directive. It encompasses the implementation of the provisions relating to waste prevention, to the collection and treatment of ELV, to the reuse, recovery and recycling targets, as well as the provisions on reporting.

5.1.1.1. Waste prevention: elimination of hazardous substances

Article 4(1)(a) of the Directive stipulates that, in order to promote the prevention of waste Member States shall encourage vehicle manufacturers and their supply chain "*to limit the use of hazardous substances in vehicles and to reduce them as far as possible from the conception of the vehicle onwards, so as in particular to prevent their release into the environment, make recycling easier, and avoid the need to dispose of hazardous waste*". To this end, Article 4(2)(a) prohibits the use of lead, mercury, cadmium or hexavalent chromium in materials and components of vehicles put on the market after 1 July 2003, other than in cases listed in Annex II. This annex specifies a number of materials and components in which the use of these substances is tolerated, if the use of these substances is unavoidable. The Commission amends this annex on a regular basis adapting it to technical and scientific progress. The items listed in this annex are referred to as "exemptions" throughout this document.

When the ELV Directive was adopted in 2000, Annex II specified 13 exemptions: 5 exemptions for the use of lead (Pb) in various alloys; six exemptions for the use of Pb in various components, an exemption for hexavalent chromium (Cr VI) in coatings and one for mercury (Hg) in bulbs and displays. The annex also required the Commission to review two of the specified exemptions as well as a number of additional ones according to the procedure specified in Art. 4(2) (via a Commission delegated act). To date, the annex has been reviewed ten times and all exemptions for cadmium and mercury have expired as well as all but one exemption for hexavalent chromium and most of the exemptions for lead. The exemption for

lead-acid batteries in terms of the volume of hazardous substance applied is the most significant remaining one, and is currently being reviewed[40].

The most frequent issues raised by stakeholders do not question the overall logic and effectiveness of the ELV Directive in addressing hazardous substances, but relate to the frequency of the review of the exemptions, as well as to the justification for keeping or removing these exemptions.

There is no reference in the Directive on the frequency of the review of the exemptions. Since 2002, Annex II has been reviewed every 2-3 years. In relation to the frequency of the amendments of Annex II, most stakeholders did not have an opinion (40%) as to whether amendments were frequent enough, another large group, mostly representing national or regional administrations, responded they were sufficient (35%) and a number of stakeholders, notably from companies or business associations, considered the reviews were too frequent (24%). It was noted that in cases where substitute candidates are not yet known, more time could be given between exemption evaluations to allow sufficient time for the design of vehicles to progress and to be adapted to scientific and technical progress. It would address long design cycles of vehicles that include re-design, a number of testing phases (on component, vehicle and field level), type-approval and ramp-up of production scale. The RoHS Directive allows exemptions of a maximum duration of up to 7 years for categories with longer design cycles, e.g. medical devices, monitoring and control devices.

A longer maximum duration of exemptions might also be explored for the ELV Directive. The maximum duration should only be applied where candidate substitutes are not identified, assuming that the time for development of substitutes, their testing and the ramp-up of full scale manufacture will need a longer period to ensure implementation. Where substitutes are identified and in development, the exemption duration should be considered in relation to the stage of development and the plan for development and implementation of substitutes. Indications that substitutes are expected to reach maturity within less than the maximum duration would justify a shorter exemption, with the aim of the evaluation allowing the specification of an end-date for the exemption.

Recital 11 of the Directive states that "*in particular the use of lead, mercury, cadmium and hexavalent chromium should be prohibited*", explaining that these "*heavy metals should only be used in certain applications according to a list which will be regularly reviewed*". The main criterion for deciding on the continuation of an exemption is whether the use of the substances concerned is unavoidable. Stakeholders have noticed that the justification criteria are not harmonised with those used notably in the RoHS Directive. It was also pointed out that the situation in which a substitute may also have negative environmental impacts is not specifically addressed under the ELV Directive and could lead to undesirable substitutions. Some stakeholders pleaded for the introduction of socio-economic aspects, as in the RoHS Directive, which may also be relevant with the aim to weigh impacts on the environment and on health against economic impacts.

[40] See for more information on the process: https://ec.europa.eu/environment/waste/elv/events_en.htm

The European Chemicals Agency currently does not play any role in the assessment of the exemptions relating to hazardous substances laid down in the ELV Directive. It should be noted that, in its recent proposal for a Regulation on batteries, the Commission has proposed that the European Chemicals Agency is tasked to perform a similar assessment for batteries.

Overall, it can be concluded that the ELV Directive has been largely effective in achieving its aim to limit the presence of hazardous substances in vehicles. The main problematic issues relate to the inconsistency of the ELV Directive with other EU legislation on the criteria used to justify/remove exemptions and the duration of these exemptions. However, this does not invalidate the conclusion that these provisions have generally been effective.

5.1.1.2. Waste prevention: design and production of new vehicles and integration of recycled materials in vehicles

Article 4 of the ELV Directive contains provisions regarding the design and production of new vehicles. It notably requests Member States to "*encourage*" the facilitation of dismantling, reuse and recovery, in particular the recycling, of end-of life vehicles, their components and materials, at the design and production stage. Member States shall also *"encourage"* the automotive sector to "*integrate an increasing quantity of recycled material in vehicles and other products, in order to develop the markets for recycled materials".*

These provisions are very general and not sufficiently specific and measurable. No information is available which shows that Member States have taken measures in these fields, in order to implement that provisions of the ELV Directive, which "*encouraged*" them to do so. These provisions have therefore had little to no impact on the design and manufacturing of new vehicles. It is doubtful that vehicles currently put on the market are easier to dismantle and recycle than in 2000, notably in view of the changes in the composition of cars which includes a growing volume of plastics and electronics. Some interesting initiatives have been adopted by some car manufacturers, notably to promote the re-use of spare parts, the re-manufacturing of components or recycling of materials, as well as the use of recycled materials. These initiatives were taken on a voluntary basis and cannot be traced back to the implementation of the ELV Directive.

It can therefore be concluded, that in view of their general nature, the provisions of the ELV Directive on the design and production of new vehicles and on the integration of recycled materials have not brought about real improvements at the EU level on these issues.

These issues are further discussed in the parts of the present report assessing the relevance of the ELV Directive and its coherence with the Circular Economy Action Plan and the Directive 2005/64/EC on the type-approval of motor vehicles regarding their reusability, recyclability and recoverability.

5.1.1.3. Collection and treatment of ELV in Authorised Treatment Facilities (ATFs) and shredders

Article 5 of the ELV Directive requires that "*systems for the collection of all end-of life vehicles*" are set up in all Member States, which should have "*adequate availability*" within their territory.

The number of Authorised Treatment Facilities (ATFs) is therefore an important indicator to assess how the ELV Directive has been implemented on this point. The concept of "authorised treatment facility" did not exist in EU law before the adoption of the ELV Directive. The first reporting on the number of ATF dates back from the period 2011-2014,

for which the Member States informed the Commission of the existence of approximately 13 000 ATFs, each of which treat an average of around 500 ELVs per year (minimum 69 in LT and maximum 2295 in HU). The total number of ATFs increased during the period 2014 – 2017 to about 14 000, although the development of ATF capacity varies between Member States.[41] The evaluation did not point to any major problems in the implementation of the provisions regarding the availability of ATFs across the EU.

To ensure effectiveness, Member States encourage ATFs and other establishments operating treatment operations to introduce "*certified environmental management systems"*[42], for which there is however no definition. The EU Eco-Management and Audit Scheme (EMAS) and ISO 14001 are among the most commonly used certification systems. ATF registration under these systems has been used as measure of compliance with this requirement. The reporting on the implementation of EMAS for ATFs varies across the Member States. Relatively few Member States report a large number of EMAS certified ATFs. Certification to the less demanding ISO 14001, an alternative environmental management system, is more often applied than EMAS certification.

All Member States are also implementing correctly the provisions of the ELV Directive according to which the delivery of the vehicle to an authorised treatment facility shall occur without any cost for the last holder and/or owner.

Article 5(2) of the ELV Directive specifies that "*Member States shall also take the necessary measures to ensure that all end-of life vehicles are transferred to authorised treatment facilities"*. The number of ELVs transferred to ATFs across the EU amount **to around 6 million per year.** However, a large number of ELVs are not transferred to ATFs and are considered as "missing vehicles" (see section 5.1.2. on this issue in the present report).

After collection, the typical treatment of end-of-life vehicles usually consists of two different steps[43]:

i. The first step is the treatment in an ATF, where ELVs are de-polluted and dismantled, as required by the ELV Directive. Minimum requirements for installations for storage and treatment of ELVs in such ATFs are described in Annex I to the ELV Directive. Additional national requirements might also be established. No particular problems were reported on the implementation of these standards during the evaluation process;

ii. The second step is the shredding of depolluted ELVs. Shredders for ELVs are regulated by the best available techniques (BAT) reference document for waste treatment. A total of 352 "automotive shredders" were operating in the EU and Norway in 2014. Most of these were in Italy (62), France (50), UK (47), Germany

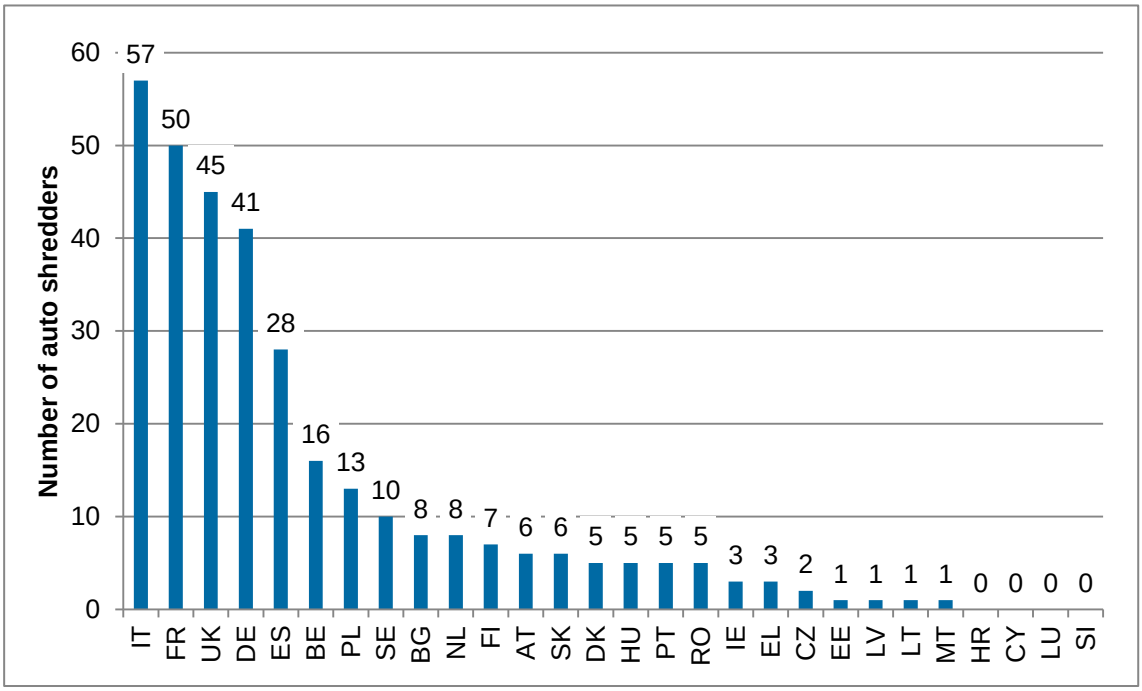
[41] Elliott, T.; Hudson, J.; Gillie, H.; Watson, S.; Lugal L.; Almasi, A. (2019): Final Report on the Implementation of Directive 2000/53/EC on End-of-Life Vehicles. For the period 2014–2017 and Report from the Commission on the implementation of Directive 2000/53/EC on end-of-life vehicles for the period 2014-2017, COM/2020/33 final

[42] Article 6(5) of ELV Directive

[43] The overview of the processes involved in depollution of end-of-life vehicles, dismantling components, shredding and post-shredding, although the latter element is not explicitly covered by the ELV Directive, are further detailed in Annex 5 of this report.

(43) and Spain (31). The remaining 33% of this type of shredders are distributed across 20 countries. There is minimum one shredder identified per Member State[44].

Figure 5-1: Number of auto shredders per country



Source: Mc Kenna 2014

After shredding, the residues are either disposed of or treated in post-shredder technology (PST) facilities. Some shredders have integrated PST or separate PST on site; other shredders send residues of the shredding process to offsite PST plants while some operators send shredder residues without PST for disposal e.g. at landfills. PST facilities allow to recover or recycle residues and improve recycling rates. The current reporting rules do not require Member States to present information on the existence and capacity of PST facilities, so that there is not comprehensive overview of the situation across the EU, or comparison between Member States on this point.

5.1.1.4. Factors increasing material recovery

Removal of materials from ELVs prior to shredding allows to maximise their recovery from ELVs. It prevents mixing of materials at the shredding stage and preserves their value, and recyclability and reusability properties. The ELV Directive sets out provisions on the removal of parts to promote reuse and recycling (see Article 6(3) and Annex I(4)) which are not sufficiently precise, and whose effect is limited. For example, these provisions mention the removal of glass without specifying at which stage of the treatment this removal should take place. This means that, in practice, the removal of glass is rarely performed before the shredding stage, which seriously undermines the possibility to recycle glass.

[44] Only Malta and Luxembourg report to Eurostat not having a national shredder (source: Statement of Eurostat, 18 April 2020).

The targeted survey confirmed that ATFs tend to remove parts and materials pre-shredding, if a profitable market exists for these. According to eight stakeholders, including experts and business organisations not all parts/materials are economically profitable to dismantle. According to three stakeholders, including administrative organisations, the reason why materials are currently not removed is the lack of an obligation to do so in the Directive.

Removal of catalysts, tyres, metal components are considered as the operations which are the most commonly performed at the pre-shredding phase. Potential reasons of non-existence of pre-shredding treatment operations in the EU were indicated at the workshop:

- **Glass**: A glass association noted that every Member State has the facilities/capacity to recycle, so that the lack of recycling could be due to the higher price of recycled material (vs. virgin material);
- **Plastic components**: an EPR organisation noted that they are not removed due to the costs and low value of recycled materials;
- **Copper**: such as that found in wiring (removal requiring precise recycling practices) has a high extraction cost and it is therefore not economically viable for an ATF to extract it.

Although an extensive material separation and recovery is carried out post-shredder, a majority of the targeted stakeholders, including branch organisations, recyclers, national and regional administration, a trade union and environmental organisations, highlighted removal of other parts before shredding is important to promote a higher rate of recycling (53% of stakeholders), only 23% responded this was not important. It particularly concerns batteries, oils and fluids, and electrical and electronic equipment[45]. This is because these materials are of high value and a market exists that supports their recycling. It also has to be taken into account that ATFs compete with non-registered dismantlers and it would impose an extra burden on the registered dismantlers if they were obliged to meet the additional costs of dismantling.

Overall, the insufficient recovery of materials pre-shredding is an example where maximising the objectives of the Circular Economy is being constrained by economic barriers and a lack of clear language in the ELV Directive.

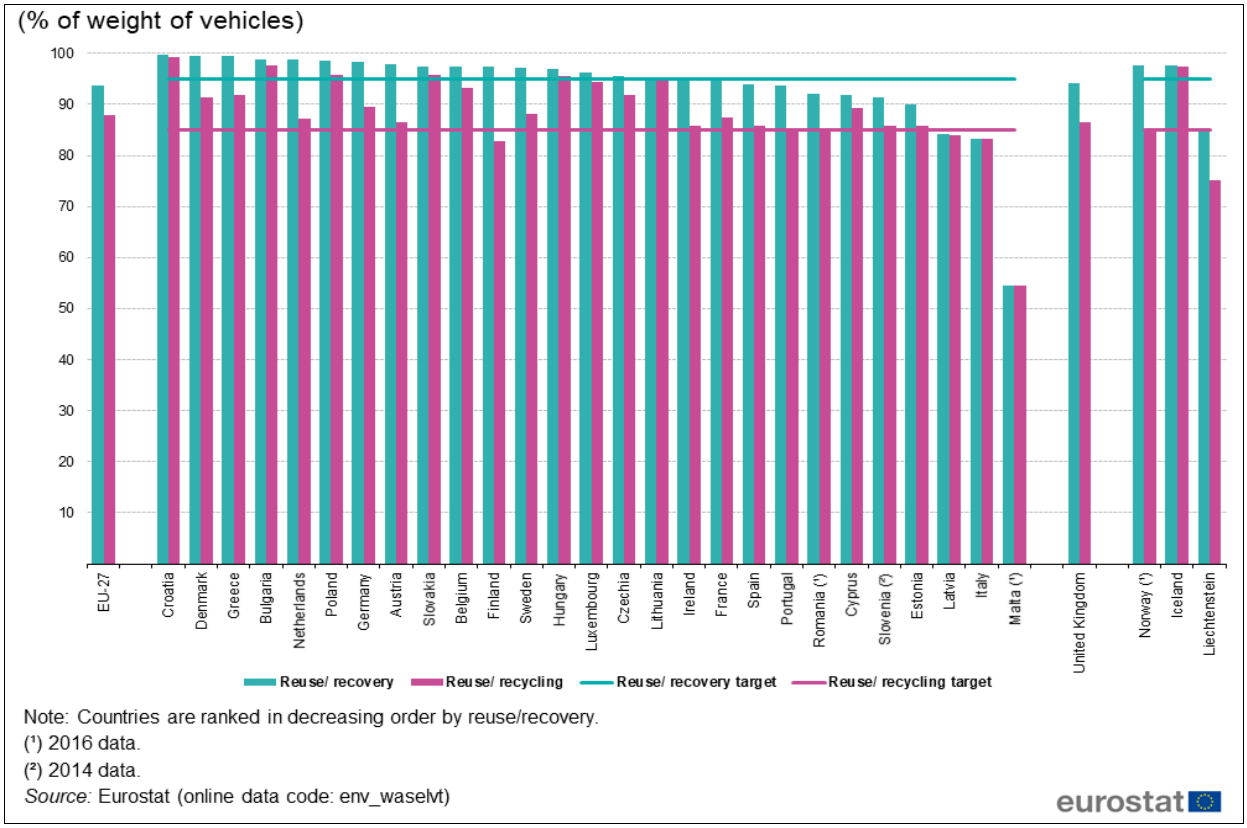
5.1.1.5. Reuse and recycling targets

Article 7 of the ELV Directive sets out targets for the re-use and recycling of ELVs (85% by an average weight per vehicle and year) as well as re-use and recovery of ELVs (95% by an average weight per vehicle and year). These targets were due to be met by the Member States by 1 January 2015.

As presented in **Figure 5-2** a large majority of the Member States reported compliance with meeting these targets for 2017 which is the latest year where this information is available.

[45] Two stakeholders (a Belgian NGO and a Belgian business association) also mentioned catalysts, non-ferrous metals, tyres, wiring, control units, electronics, foam and textiles.

Figure 5-2: Reuse/recovery and reuse/recycling rate for end-of life vehicles, 2017



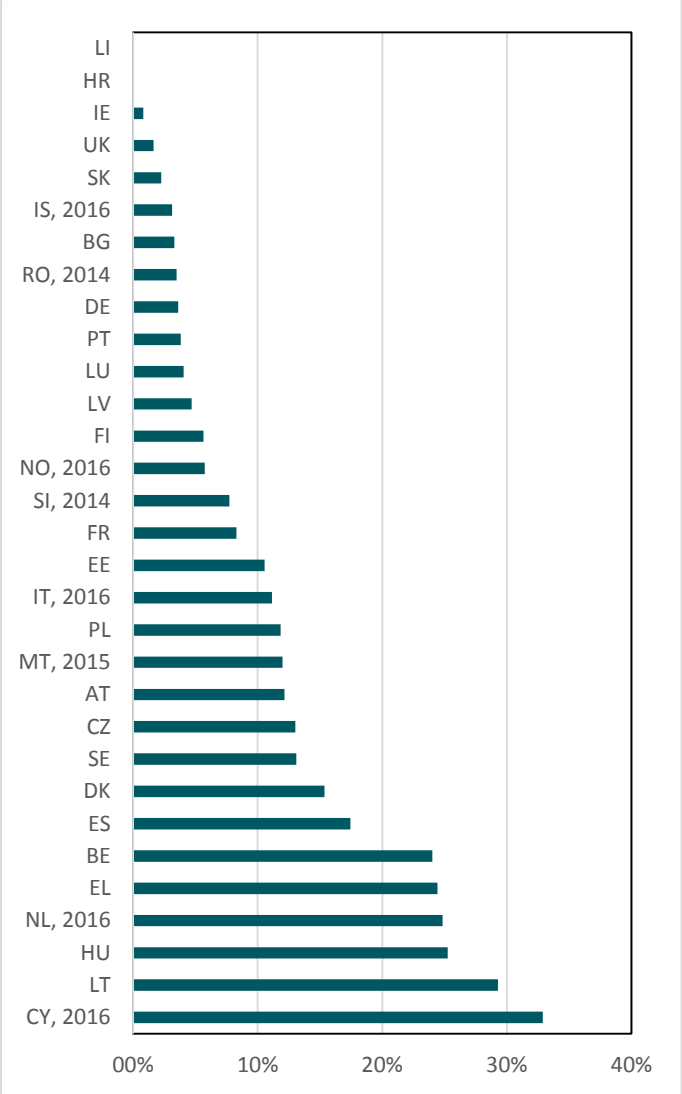
15 Member States had met the minimum reuse and recovery target of 95% by an average weight per vehicle and year. The average reuse and recovery rate for the EU28 as a whole was 94%, just below the target[46].The data reported by the Member States indicate that the recovery/reuse and recycling/reuse targets set out in the ELV Directive have largely been met, as it is shown in Figure above.

The different options available to the Member States for reporting on the attainment of the targets means however that the data are not necessarily comparable and that their quality varies across Member States.

There is no separate target established for reuse, and the level of reuse reported by the EU Member States varies considerably. **Figure 5-3** displays the share of reuse, compared to the total volume of reported reuse, recovery and disposal operations, as reported by the Member States for the year 2017 (or for the year otherwise indicated in the table).

Figure 5-3: Share of reuse, compared to the total volume of reuse, recovery and disposal, 2017

[46] More detailed information is available in the Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of Directive 2000/53/EC on end-of-life vehicles for the period 2014-2017 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0033)



Source: Data: Eurostat; compilation: Oeko-Institut e.V.

The date set out for achieving these targets is 2015 and these targets have not be revised since the adoption of the ELV Directive in 2000. Article 7(3) foresees that targets should have been set for the post 2015 period, but this was not done. The Commission published a report[47] on these targets in 2007, after conducting an Impact Assessment[48], assessing available information from a study on the costs and benefits of the ELV Directive. The assessment showed that the targets set by the ELV Directive for 2015 generated both substantial environmental and economic benefits and that repealing or reducing the targets would reduce these benefits. The report concluded that these targets should remain stable in order to guarantee investment security into more cost efficient waste treatment technologies. Therefore, the report concluded that Commission should not propose a revision of the targets.

[47] COM(2007)5 final
[48] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=SEC%3A2007%3A0015%3AFIN

Other important aspects relating to these targets are addressed in other parts of the present report (notably the lack of coherence with the Waste Framework Directive on the definition of "recycling", as well as the added-value of setting targets per weight vs per materials).

5.1.1.6. Material specific recovery targets

There is a limited quantitative data available on the recycling of specific materials from ELVs. Table 1 in the Annex of Commission Decision 2005/293/EC laying down detailed rules on the monitoring of the reuse/recovery and reuse/recycling targets set out in the ELV Directive contains some materials from the depollution and dismantling for which reporting on reuse/recycling/energy recovery/total recovery is requested. However this table is not mandatory and Member States do not provide this detailed information.

A report by the French Environment Agency[49] provides details on the reuse, recycling, energy recovery and disposal by material, based on data for ELVs treated in France in 2018 (see table below). The figure shows that metal and metallic components (such as catalytic converters and batteries) are almost 100% reused and/or recycled. For non-metallic components, the share of re-use is 12,5%, recycling 39%, sent to energy recovery facilities for 27% and landfilled for 22%. A higher share of such materials (e.g. glass, tyres and most plastics) are directed to energy recovery or disposal. Regarding tyres, in 2018, 62% of end-of-life tyres were recycled into other applications and 33% of tyres is directed to energy recovery[50]. Retreading tyres is also a way to increase resource efficiency of tyres[51]. The lowest reuse and recycling rates are reported for textiles and polyurethane foams.

The targeted survey included a specific question on whether specific waste management targets per material, such as a specific rate for aluminium, plastic, glass, would improve the implementation of the ELV Directive. Different reactions were received, although a majority of respondents agreed specific material targets would improve the implementation of the Directive. Eight stakeholders, representing recyclers, experts and public authorities, noted it would lead to incentives for higher recycling and better eco-design of cars.

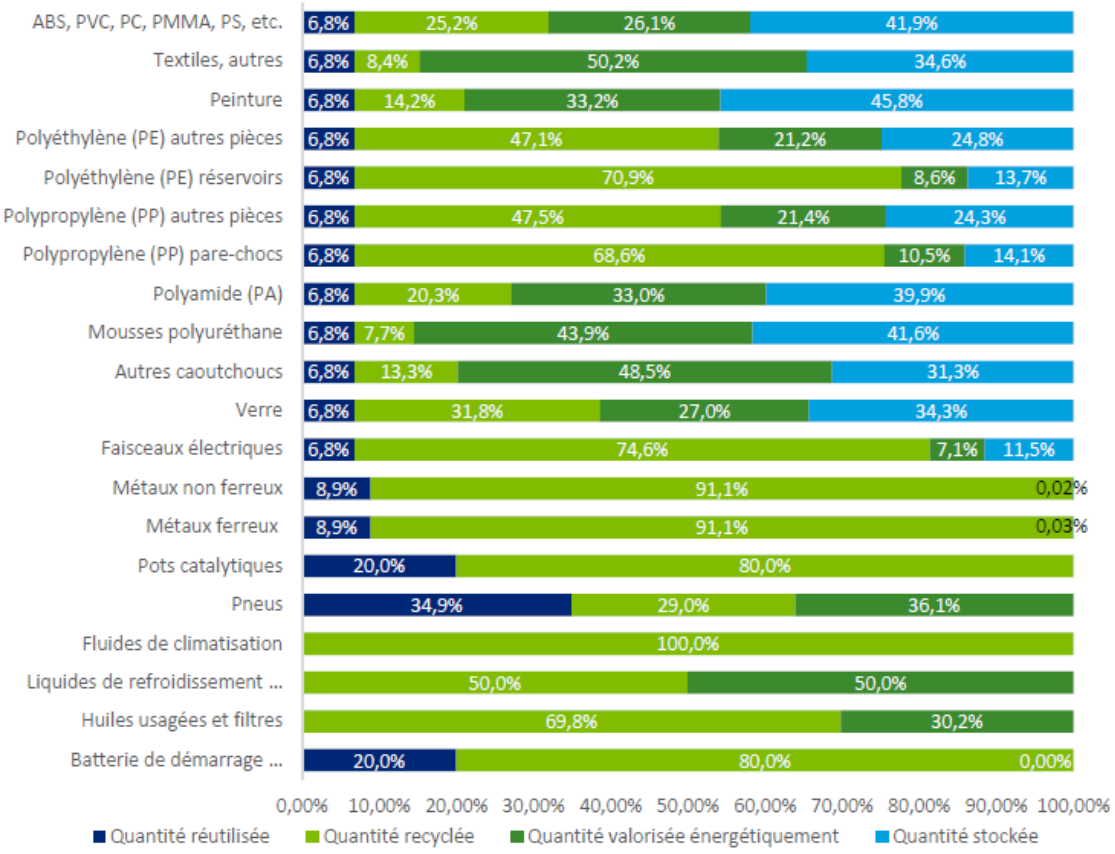
Specific targets were suggested for certain materials such as aluminium, glass and plastic. However, it was opposed by one stakeholder that a specific rate for aluminium would highly increase costs for ELV dismantling, while another business association indicated that aluminium recycling from automotive applications is already in the average of 95%.

[49] ADEME (2020): Rapport Annuel de l'Observatoire des Véhicules Hors d'Usage – Données 2018

[50] https://www.etrma.org/library/europe-91-of-all-end-of-life-tyres-collected-and-treated-in-2018/ [accessed on 25/11/2020]

[51] Ernst & Young et Associés. 2016 The socio-economic impact of truck tyre retreading in Europe The circular economy of tyres in danger

Figure 5-4: Breakdown by type of treatment of each material constituting an ELV



Source: Ademe (2020)

On the other hand, some stakeholders did not see material specific targets as the best solution and argued that the material market values should remain as the driving force. This view was supported by the EPR organisation and an ATF company stating that material targets would not be effective without pre-existing markets for secondary materials. The glass-related association, however, strongly supported the idea of introducing specific targets per materials, especially for glass, noting that such target is already established in other EU legislation. The current targets render material recovery highly dependent on the profitability factor, which level varies from material to material. Such situation implies that the current model is left for self-regulatory, and constraints the effectiveness of the Directive and its contribution to the circular economy.

5.1.1.7. Information on cars components and materials designed to improve dismantling

Article 8 of the ELV Directive contains provisions designed to facilitate the identification of components and materials in vehicles which are suitable for reuse and recovery, as well as to make this information accessible to dismantlers. To comply with these requirements, the car industry established the International Dismantling Information System (IDIS) which provides

the dismantling information to the ATFs. 26 manufacturers representing 77 brands and 3 161 models and variants use IDIS to provide dismantling information to 6 476 registered users.[52]

Repair and maintenance information (RMI) might also be required for reuse. The Directive does not oblige the producers to provide such information for free. In fact, the producers provide the dismantling information in IDIS free of charge, while access to RMI may incur a fee. Stakeholders from the repair and dismantling sectors, as well as those involved in the sale of spare parts, have been complaining of a lack of transparency from the car manufacturing side with regard to the characteristics of components in cars. The car manufacturers often invoke commercial or confidentiality reasons to limit in practice the sharing of this information.

While the ELV Directive has contributed to improve transparency with regard to information needed for dismantling and reuse purposes, it seems that there are still obstacles which prevent the dismantling, reuse and repair sectors from benefiting of a range of information and data which could contribute to their activities and to the objectives of the Directive.

5.1.1.8. Effectiveness in monitoring the results: reporting provisions

Every three years Member States report on the implementation of the ELV Directive, based on Commission Decision 2001/753/EC[53], and a questionnaire annexed to this Decision, and every year they report on the ELV targets on reuse/recovery and reuse/recycling targets as required in the Commission Decision 2005/293/EC[54], derived and completed by the information reported in the tables 1 to 4 of the questionnaire according to the same legislation. All this information is published in Eurobase[55]. According to Article 9, paragraph 1b *"The data reported by Member States in accordance with paragraph 1a shall be accompanied by a quality check report".* The quality check reports[56] are accompanying the Eurostat standard questionnaire[57] for Member States on the quality and validity of the data for the annual reporting and are not agreed for publishing. These reports are not formalised in the Commission Decision and therefore these are containing complementary information regarding the peculiar ELVs processing in each country. As a result, the content of the quality reports varies across the Member States. There is often no information available on the existence of capacity in specific stages in ELV treatment capacities (like Post Shredding Technology) or information on how Member States provide evidence that exported ELVs or parts of ELVs are effectively recycled. Reporting on reuse of components of ELVs is

[52] https://idis2.com: Accessed: 13.01.2020

[53] 2001/753/EC: Commission Decision of 17 October 2001 concerning a questionnaire for Member States reports on the implementation of Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles *(OJ L 282, 26.10.2001, p. 77–80)*

[54] 2005/293/EC: Commission Decision of 1 April 2005 laying down detailed rules on the monitoring of the reuse/recovery and reuse/recycling targets set out in Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles *(OJ L 94, 13.4.2005, p. 30–33).*

[55] All data transmitted by Member States in the questionnaires are regularly published in these datasets, including voluntary data: https://ec.europa.eu/eurostat/databrowser/bookmark/a1a45e99-9b12-4f21-ad93-fbd63ceb892b?lang=en and https://ec.europa.eu/eurostat/databrowser/bookmark/68a973c1-b122-4b2d-b54c-a411c328cb26?lang=en

[56] Article 1 (1) of the Commission Decision 2005/293/EC stipulates that "…Member States shall complete tables 1 to 4 set out in the Annex to this Decision together with an appropriate description of the data used."

[57] See the link on the template of the questionnaire: https://ec.europa.eu/eurostat/documents/342366/351811/Template+questionnaire+for+ELV

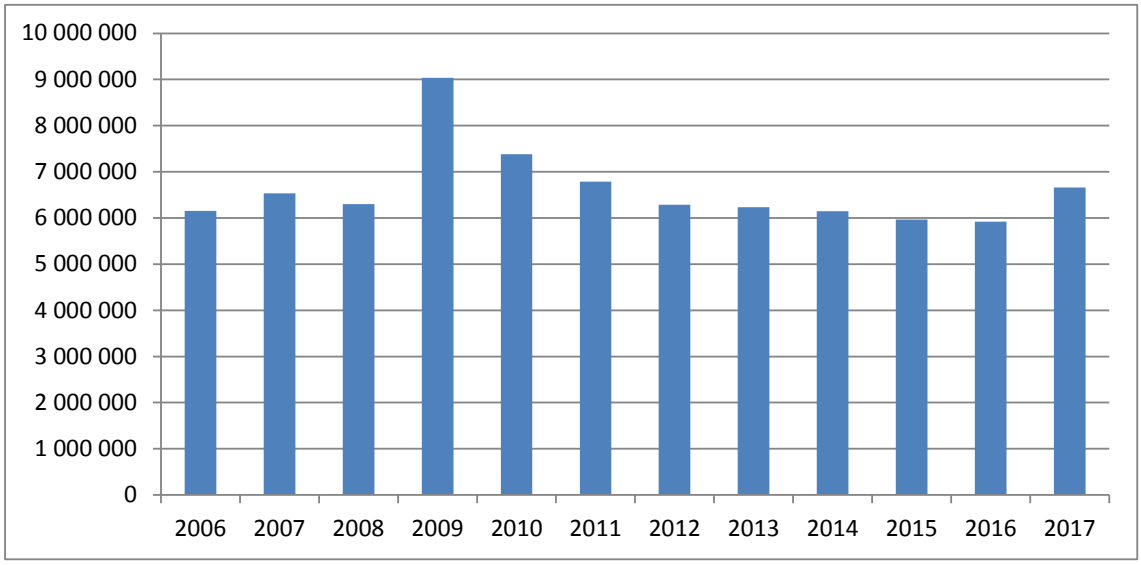
hampered by non-existence of an explicit target on reuse and the different reporting options available to the Member States.

5.1.2. A significant problem affecting the effectiveness of the ELV Directive: the "missing ELV"

5.1.2.1. Overview of the problem of "missing vehicles"

Commission Decision 2005/293/EC lays down that Member States shall report on the total number of ELVs on their territory each year[58]. The reported numbers of ELVs generated in EU-28 until 2017 are displayed in **Figure 5-5.**

Figure 5-5: Number of ELVs generated in EU-28



Source: Eurostat

The rise in 2009 was caused by scrappage schemes, including pay out to the last owner, in the context of the financial crisis 2008/2009. The slight peak in 2017 is considered to be a result by incentives to scrap old diesel vehicles as a consequence of diesel exhaust gas treatment fraud.

While around 6.5 million ELVs are reported to be treated according to the ELV Directive every year, it is estimated that around 35% of de-registered vehicles, i.e. approximately 4 million units per year, are of unknown whereabouts. These vehicles are not properly accounted for and these de-registered vehicles are not tracked properly. There is a possibility that many of these vehicles become ELVs and are not dismantled and finally treated according to the standards set out in the ELV Directive. This is the most serious problem affecting the effectiveness of the ELV Directive.

[58] See Article 1(3)(b) of Commission Decision 2005/295/EC

The table below displays number of unknown whereabouts of vehicles each year in the EU. As observed, there were no significant changes in trends from 2008 to 2017.

Table 5-1: Results of the calculations for unknown whereabouts of vehicles for EU-28

	2008	2009	2010	2011	2012	2013	2014	2015*	2016*	2017*
Unknown whereabouts (million vehicles)	4.1	3.4	3.4	3.8	3.5	3.7	4.7	3.8	3.9	3.8

** EU-28, excluding Bulgaria*
Source 2008 – 2014: (Mehlhart et al. 2017); 2015 – 2017: Oeko-Institut, update for this evaluation report

A number of studies have assessed the issue of ELVs of unknown whereabouts:

- Effectively tackling the issue of millions of vehicles with unknown whereabouts - European priority measure: establishing leakage-proof vehicle registration systems (UBA 2020)[59]
- Velten, Eike Karola; Clemens Brauer, Jan-Erik Thie (2020): Used vehicle trade and fleet composition in Europe. Final report of the project "Used vehicle trade and fleet composition in Europe" on behalf of the EEA. Ecologic Institute and Fraunhofer Institute for Systems and Innovation Research ISI: Berlin, Karlsruhe;
- 'End of life vehicles: Legal aspects, national practices and commissioned recommendations for future successful approach' (Schneider et al. 2010), commissioned by the European Parliament;
- 'European second-hand car market analysis', (Mehlhart et al. 2011[60]), commissioned by the European Commission (DG CLIMA);
- 'Compliance promotion initiative to assess the implementation of Directive 2000/53/EU on end-of-life vehicles with emphasis on the end of life vehicles of unknown whereabouts' (Mehlhart et al. 2017[61]), commissioned by the European Commission (DG ENV).

All these studies identified shortcomings in the vehicle registration and de-registration procedures, impeding the possibility to identify the correct number of ELVs generated in each Member State. As shown in **Figure 5-6**, 11.21 million vehicles exited the stock of registered vehicles in EU-28 in 2017 (sum of the red, green and yellow arrows to the right of the

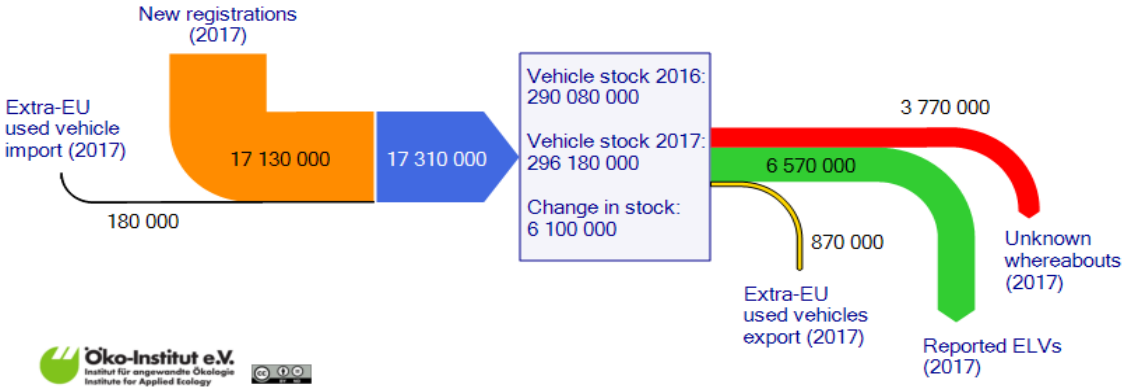
59 https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/sciopap_uba_elv_measures_to_combat_illegal_dismantling_2020_06_29.pdf

60 Mehlhart, Georg; Merz, Cornelia; Akkermans, Lars; Jordal-Jorgensen, Jorgen; (Keine Angabe) (2011): European second-hand car market analysis. Final Report. Hg. v. Öko-Institut e. V. Darmstadt, Germany.

61 Mehlhart, Georg; Kosinska, Izabela; Baron, Yifaat; Hermann, Andreas (2017): Assessment of the implementation of Directive 2000/53/EU on end-of-life vehicles (the ELV Directive) with emphasis on the end of life vehicles of unknown whereabouts. Hg. v. European Commission. Öko-Institut e. V., Germany. Freiburg, Germany. https://www.oeko.de/fileadmin/oekodoc/ELV_Report_European-Commission_Oeko-Institut.pdf

figure)[62]. 6.57 million were treated as ELVs within the EU-28, 0.87 million were exported to non-EU-28 countries.

Figure 5-6: Unknown whereabouts of vehicles (M1 + N1) in the EU-28 excluding Bulgaria in 2017



Source: Oeko-Institut

The final destination of the difference of 3.77 million vehicles is not easy to be derived from official sources. These vehicles may be either shipped and sold as second hand vehicles in other EU Member States, and not properly reported to the country of registration (there is an important volume of second-hand cars shipped between EU Member States[63]). These vehicles can also be kept for exclusive use in private properties. Another reason might that these vehicles are illegally treated as ELVs and thereby not reported officially, or illegally exported outside the EU. The lack of incentives for the last vehicle owners to deliver their ELV to an ATF was mentioned as one factor which contributes to the low number of vehicles reported as ELV compared to the number of "missing vehicles".

This problem shows that the current framework does not ensure a sufficient traceability of de-reregistered/used vehicles. It does not ensure that all ELVs are reported according to the minimum requirements established by the Directive.

It has not been possible to date to estimate the proportion of ELVs missing due to "administrative problems" (linked to the loss of information on the fate of vehicles shipped from one Member State to another, and going through de-registration and re-registration procedures in different Member States) compared to the proportion of missing ELVs due to illegal activities (especially illegal exports and illegal disposals).

Table 5-2 compiles the most important causes for the high number of "missing ELVs", as well as the corresponding legal situation and environmental impacts.

[62] According to the methodology applied in the study 'Compliance promotion initiative to assess the implementation of Directive 2000/53/EU on end-of-life vehicles with emphasis on the end of life vehicles of unknown whereabouts' (Mehlhart et al. 2017), commissioned by the European Commission (DG ENV) .

[63] See more information p. 31 "EU trade of used vehicle", https://www.ecologic.eu/sites/files/publication/2020/2632-01_ecologicisi_usedvehiclesstocktrade_march2020.pdf.

Table 5-2: Reasons for ELVs of unknown whereabouts

Reason for unknown whereabouts ELV	Legal situation	Environmental concern
Non-reported export of used vehicle to non-EU-countries	The export of second-hand vehicles is permitted under European law, but failure to declare is a breach of the obligation to report to the customs authorities. In some importing countries, import bans apply to used vehicles with different characteristics. Thus, undeclared exports could also violate the regulations of the destination country.	If the used vehicle is near to end of life, hazardous components might be harming the environment in the near future if not treated according to the minimum requirements applicable in the EU.
Non-reported transfer of used vehicles to other EU Member States	Currently there is no obligation in force to report to the vehicle register of origin the re-registration in the country of destination. In the context of the car registration procedure there is a request to the register of origin if the car is stolen or other police information is registered. However, this communication is not necessarily introduced in the register of the country of origin.	No direct environmental concern, even though the shipment of old vehicles can generate air pollution in the country of destination
Export of ELVs to non-EU non-OECD countries	Infringement of European law (Waste Shipment Regulation), which bans the export of hazardous waste outside the OECD.	Not appropriate treatment of hazardous waste might cause environmental harm. Illegal transfer might cause clean-up cost and compensation to the receiving country by the country of origin
Non-reported shipment of ELVs to other EU Member States. Treatment in the receiving MS in ATF or non-ATF. (Even if a CoD is issued, it is not forwarded to the country of origin.)	The shipment of ELVs from one EU MS to another one should require the application of the prior informed consent procedure (PIC) as ELVs would usually be considered as hazardous waste	No concern, if the ATF operates according its permits. The risk of environmental pollution is higher in non-ATFs compared to ATFs
Non-reported treatment in ATFs (While it would be possible no CoD is issued)	Currently not illegal	No concern, if the ATF operates according its permits
Treatment in non-authorised treatment facilities, within or outside the Union.	Illegal according to ELV Directive	The risk of environmental pollution is higher compared to ATFs
Increase of ELVs / de-registered vehicles on stock	Unlikely option as the number of vehicles of unknown whereabouts is simply too high, vehicles would be visible.	

The problems linked to deregistration of vehicles and the differences between ELVs and used vehicles, as well as initiatives to address them, are described further below.

5.1.2.2. Certificates of Destruction (CoD) and conditions for deregistration of vehicles

The ELV Directive (Article 5(3)) states that "*Member States shall set up a system according to which the presentation of a certificate of destruction is* ***a*** *condition for deregistration of the*

end-of life vehicle. This certificate shall be issued to the holder and/or owner when the end-of life vehicle is transferred to a treatment facility". This provision attempts to make a link between the legal requirement of issuing a certificate of destruction under the ELV Directive and deregistration of vehicles, which is otherwise regulated through the Directive 1999/37/EC on the registration documents for vehicles. There is also a general provision in this Directive linking the cancellation of the registration of vehicles and the ELV Directive[64]. There are many situations where vehicles get deregistered, which are not linked to the fact that they are becoming ELV. Declaration that the vehicle will not be used for a certain period of time and is used exclusively on private grounds can in some countries be a condition for (sometimes temporary) deregistration. For example, Germany maintains procedures of automatic deregistration, if a vehicle is temporarily deregistered for a particular length of time and not re-registered. Other conditions may include export to another country (which may include vehicles that are then becoming ELVs in the importing country), migration of the vehicle together with the owner to another EU country or theft. Therefore the total number of ELVs reported by the Member States cannot be assumed to correspond to the number of deregistered vehicles.

In addition, the exchange of information between the different national administrations in charge of the ELV Directive and those in charge of the registration of vehicles is often not organised in a way which allows to keep track of vehicles, particularly for those which are shipped to another Member States and become afterwards ELV.

For all these reasons, the vehicle registration systems and the reporting of ELVs in the Member States are not functioning well together.

To address this problem, some Member States have adopted specific incentives or rules to ensure that ELVs are delivered to ATFs and reported as ELV to all relevant administrations. Financial incentives have been established in Denmark in a form of "pay out scheme" to encourage the vehicle's last owner to bring a vehicle to an authorised treatment facility (ATF) in exchange for a payment. One of the most comprehensive approaches is applied in Portugal where the vehicle tax is levied until an ATF provides the CoD. Although functional, this approach would be difficult to implement in Member States where vehicles can be registered as no longer "on the road" and exempted from vehicle tax. The Netherlands have a different registration system where the whereabouts of vehicles is very strictly followed[65].

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[64] *See* Article 3a(3) of Directive 1999/37: "*In the event that the competent authority of a Member State receives notification that a vehicle has been treated as an end-of-life vehicle in accordance with Directive 2000/53/EC of the European Parliament and of the Council, the registration of that vehicle shall be cancelled permanently and information to that effect shall be added to the electronic register*".

[65] *In principle, the Dutch licensing system is based on ownership. Around 660 000 vehicles are removed from the vehicle register every year. Vehicle owners must actively deregister their vehicles. If they fail to do so, they remain liable for the vehicle obligations. In this way the register is kept up to date. Deregistration can take place through an official export or destruction procedure. In case of export, the owner must report the vehicle as exported to the Netherlands Vehicle Authority (RDW) and have the documents stamped accordingly. In case of destruction, the owner must deliver the vehicle to an RDW-accredited destruction firm. The destruction firm reports the vehicle as destroyed to the RDW vehicle register; this is done electronically. The owner then receives a warranty against liability. Temporary suspension (for use on private ground) is possible for up to 3 years. The average cost of such a transaction is € 121. The Tax Department of the Ministry of Finance checks compliance with the regulations concerning the non-use of suspended vehicles. (source: https://www.vehicle-chain.eu/report.aspx)*

Stakeholders agreed that stronger regulation on registration/deregistration procedures and exchange on deregistration information between Member States are key steps to reinforce the application of the CoD. It was also observed that insurance companies are in position to better contribute to the implementation of the Directive, in particular through strengthening control in organising the auctions of ELVs. Selling large quantities of ELVs to the highest bidder is currently unregulated and could serve as a channel for the illegal operations, including export. There are some attempts in this area. For instance, France introduced in 2020 a new legal approach which strengthens the conditions to terminate a car insurance in cases when a car owner refuses compensation after a car accident which led to damages which cannot be technically or economically repaired. For such cars, the new legislation only allows the termination of the insurance upon production of a CoD, or of a new insurance contract, or proof that the car has been repaired[66].

Stakeholders advocated for closer cooperation between authorities at national and regional level to address the issue of registration/deregistration of vehicles and its connections to the ELVs of unknown whereabouts.

5.1.2.3. Shipments of ELVs vs. used cars

The problem of "missing ELVs" is also linked to the shipment of used cars from one Member States to another or to 3rd countries outside the EU. The transboundary shipment of ELVs is not covered by the ELV Directive but is subject to the provisions of of the Waste Shipment Regulation (WSR). ELV are considered as hazardous waste[67], which cannot be exported outside the OECD under the Waste Shipment Regulation.

Shipments of ELVs within the EU and from and to OECD countries, are subject to the procedure of prior written notification and consent referred to in the WSR, unless they are depolluted (and hence considered as non-hazardous waste).

While the export of ELVs outside the OECD is prohibited, this is not the case for the export of "used cars". In practice, it is often difficult to distinguish used vehicles (non-waste) from ELVs (which are waste) for the purposes of shipments. This is mainly related to the interpretation of whether the vehicle in question meets the waste definition.

Specific guidelines[68] were developed by the Waste Shipment Correspondents to assist enforcement and customs officials in implementing the rules on the export of ELVs, and especially to distinguish between ELVs and used cars. According to these guidelines, the distinction between waste vehicles and used vehicles, first of all, depends on the answer to the question whether the holder of the vehicle intended to discard it or not. To make this

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[66] Cf. Article 102 of the 2020 law on circular economy (https://circulaire.legifrance.gouv.fr/jorf/article_jo/JORFARTI000041553867). More information is available in the Ademe report (2019) on the Global overview of incentive schemes aiming to bring ELVS (End-of-Life Vehicles) through authorised processing channels: https://partage.ademe.fr/public/4741b6

[67] Unless for ELVs which have been, before export, depolluted (a stripped vehicle) and do not contain neither liquids nor other hazardous components e.g. batteries or brake fluids; in this case, the ELVs could typically be classified as non-hazardous wastes. Their export outside the EU is allowed, except to those 3rd countries which have notified the Commission under Commission Regulation 1418/2007 that they do not accept the import of such waste.

[68] Correspondents' Guidelines No 9 on shipment of waste vehicles: https://ec.europa.eu/environment/waste/shipments/pdf/correspondents_guidelines9_en.pdf

judgment it is necessary to examine the situation of the vehicle on a case-by-case basis. The guidelines further indicate the characteristics of a used vehicle vs characteristics of waste. For instance, a vehicle would qualify as waste if it is not suitable for minor repair or has badly damaged essential parts (e.g. as a result of an accident) or is cut into pieces (e.g. two halves); if the repair costs exceed the present value of the vehicle (exception: vintage cars or vehicles) and the possibility for repair cannot be assumed, it would classify as a waste.

In practice, as the guidelines are not legally binding and contain advice rather than straightforward criteria to distinguish between waste and non-waste, they are not applied consistently across the Union. Furthermore, the guidelines refers to a case-by-case approach according to a number of characteristics. Customs and other enforcement authorities at large shipment hubs like Rotterdam port claim that it is not possible for them to assess each single used vehicle for export to decide if it is waste or not. In the event of targeted controls, the guidelines can still be used, but apparently, they are not applied largely in practice. The effect is that many used vehicles, considered within the EU as ELVs, are illegally exported to third countries.

A recent study on the quality of used vehicles[69] carried by the Dutch Ministry of Infrastructure and Water Management shows that a significant part of the used vehicles exported to African countries, where Libya, Nigeria, and Ghana are the top three destinations, is of similar age as end-of-life vehicles recycled in the Netherlands. Most of them do not meet Euro 4/IV emissions standard, i.e. they are older than 15 years. The findings from this study, based on their sample, show that most used vehicles exported today outside the EU do not have a valid roadworthiness certificate. These exports to African countries are likely to cause environmental harm with hazardous liquids or other hazardous substances leaking into the environment and causing public health problems, in particular to those people involved in their treatment. The study also shows that the exchange of information on the export of used vehicles is hampered by the fact that the information on vehicle registrations is not made available from one Member State to other Member States, in the absence of obligation to do so under EU law. The absence of the Vehicle Identification Number (VIN) in the customs declaration is also singled out as hampering a proper traceability on the export of used vehicles. A UNEP report on the environmental impacts of export of used vehicles to the developing world[70] states that the lack of effective standards and regulations is resulting in the dumping of old, polluting and unsafe vehicles. It urges developed countries to stop exporting vehicles that fail environment and safety inspections and are no longer considered roadworthy. It further invites the importing countries to introduce stronger quality standards. The environmental implications of such exports and their links with the climate change policy are discussed in the Section 5.4.2.

The export of used vehicles or ELV furthermore causes valuable resources to be lost for the EU circular economy. It also puts into questions the application of producer responsibility. While the manufacturers and importers are obliged to set up systems for the collection, treatment, and reuse/recovery of parts and materials from vehicles that have reached the end-

[69] For more information see the Dutch report on the used vehicles exported to Africa: https://www.ilent.nl/documenten/rapporten/2020/10/26/rapport--used-vehicles-exported-to-africa

[70] See the full UNEP report here: https://www.unep.org/news-and-stories/press-release/new-un-report-details-environmental-impacts-export-used-vehicles

of-life phase, these obligations are not implemented when they are exported to countries which do not have appropriate and environmentally sound disposal and treatment infrastructure for ELVs. This situation raises concerns as only about 55% of the EU trade in used light duty vehicles was traded within the EU in 2018, while the remaining part mainly went to developing countries. It is estimated that in 2018 alone, the EU exported over 1 million used light duty vehicles to African countries out of a total of 1.5 million used light duty vehicles imported in these countries that year[71].

To facilitate the distinction between used cars and ELVs, a number of Member States have put in place specific measures, so as to better monitor and track their shipment. For example, in the Netherlands, a vehicle is considered as an ELV when it cannot be repaired for market value realistic costs in the country of export. A similar approach is applied in Ireland.

Despite available at the national level, the provisions of the ELV Directive have not been effective to ensure that all ELVs get properly reported and it is likely that an important number of these unreported ELVs are not treated according to the rules in the ELV Directive, notably as they are exported outside the EU without sufficient controls. The fact that individual Member States have adopted several specific measures on this point is a sign that, in its current form, the ELV Directive does not provide a sufficient solution to address this problem.

5.1.2.4. Inspections and enforcement of ELV Directive

There are no provisions in the ELV Directive requesting Member States to take enforcement actions to ensure a proper implementation of its provisions. There are in particular no provisions on inspection of ATFs and other treatment facilities, or relating to the export of ELVs. Several Member States reported that they carry out occasional inspections of ATFs through standard procedures of the competent environmental authorities.

During the consultation, stakeholders indicated that inspections in non-ATFs are not undertaken. It means that the scope of inspections are usually limited to the ATFs, leaving repair car workshops, spare parts shops, export companies and online market places unassessed in terms of illegal trafficking of cars and spare parts. In terms of vehicle exporters, inspections are effective to some extent, but the enforcement of exporting regulation requires more knowledge and expertise. As it was observed by the Netherlands experience, inspections based on the EU Waste Shipment Regulation currently only stop the worst quality vehicles (wrecks), which constitute one or two cases from every hundred vehicles lining up for West Africa[72]. Moreover, 80% of exported vehicles to Africa do not have a valid roadworthiness certificate, which means that such vehicles are not fit to be used on public roads in the EU as they do not conform to vehicle safety and emissions standards[73]. These findings reconfirm the need to strengthen the control of the vehicles, since the EU was the

[71] See press release: https://www.unep.org/news-and-stories/press-release/new-un-report-details-environmental-impacts-export-used-vehicles

[72] See full report here: https://www.ilent.nl/documenten/rapporten/2020/10/26/rapport--used-vehicles-exported-to-africa

[73] Directive 2014/45/EU of the European Parliament and of the Council of 3 April 2014 on periodic roadworthiness tests for motor vehicles and their trailers and repealing Directive 2009/40/EC *(OJ L 127, 29.4.2014, p. 51–128)*

largest exporter with 54 % of the totally exported used vehicles worldwide between 2015 and 2018[74].

Problems with the enforcement of the ELV Directive have also been sporadically observed with regard to the obligations under Article 4(2)(a) to ensure that materials and components in vehicles do not contain lead, mercury, cadmium and hexavalent chromium, with the exceptions of the cases listed in Annex II of the Directive. The finding in 2019 that a number of car manufacturers were using components in circuit boards containing lead above the authorised limits illustrated the insufficient efforts put in enforcing these rules. The revised rules on market surveillance in the type-approval Regulation[75] should help addressing better such problems at EU level in the future. Nevertheless, insufficient human and financial resources were the most decisive factors mentioned as preventing Member States from carrying out enforcement/inspection activities.

5.2. Efficiency

The evaluation on the efficiency of the ELV Directive focuses on the actual costs and benefits associated with the implementation of the ELV Directive, as well as on the administrative burden linked to it. A special emphasis is placed upon the distribution of costs and benefits across economic actors, aiming to answer whether the total benefits overweight the costs faced by operators at the different ELV treatment phases.

5.2.1. Benefits and costs

This section attempts to present an overview of environmental, social and economic costs and benefits related to the implementation to the ELV Directive, as they accrue to different stakeholders, identifying what factors are driving these costs/benefits and how these factors relate to the Directive.

Although it is difficult to identify precisely, extrapolate at EU level and compare **costs and benefits** associated with the ELV Directive, the consultation carried out as part of this evaluation showed that the vast majority of the stakeholders recognised that the total benefits of the Directive outweigh its costs.

A detailed analysis on the costs and benefits, including figures and tables, is provided in the Annex 4 of this report and Chapter 6.7 of the study supporting this evaluation[76].

5.2.1.1. Benefits

There **environmental, social and economic benefits** attributable to the Directive are presented below.

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[74] https://wedocs.unep.org/bitstream/handle/20.500.11822/34175/UVE.pdf?sequence=1&isAllowed=y

[75] Regulation (EU) 2018/858 of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0858&from=EN)

[76] https://ec.europa.eu/environment/waste/elv/pdf/ELV DIRECTIVE%20Evaluation-Final%20report%20Aug2020%20(002).pdf

The environmental benefits include the avoided damages to the environment due to inappropriate handling of ELVs, leading to uncontrolled disposal of hazardous substances, fluids and other components, as well as the reduction of hazardous substances in vehicles. Indirect environmental benefit may include the lower environmental damage associated with resource extraction avoided due to recycling and reuse of materials and components from ELVs.

Social benefits involve the avoided damage in human health due to exposure to hazardous substances and unregulated dismantling operations. Other social benefits include the employment and income generation for employees across the EU in the dismantling sector and other economic operators, the majority of which are small-medium enterprises (SMEs). According to the statistical classification of economic activities in the European Community (NACE), the nearest definition to the ATFs is E38.3.1 – 'Dismantling of wrecks'. In the 2017 Eurostat report[77] there were 2 675 enterprises with 14 137 employees and a total production value of EUR 2 787 million across the EU 28. Comparing these numbers with the known number of ATFs indicated above suggests that this NACE code covers only the number of active ATFs (e.g. 14 000 ATFs will have more than 14 137 employees).

Economic benefits comprise business revenues for the dismantling and shredding sectors and for a number of other sectors that use secondary materials derived from ELV treatment. The creation of a level playing field for all market participants across the EU is also considered an economic benefit derived from the Directive. Approximately 6 to 7 million ELVs are reportedly treated each year in approximately 14 000 ATFs[78] and in 352 "automotive shredders" across the EU[79]. The analysis of the ELV economic activity of ATFs alone is complex, as the majority of companies do not conduct cost accounting based on the ELV activity, which often coexists with other activities, such as purchase/sale of damaged vehicles and second-hand vehicles, sale of new spare parts, trade in scrap metal. ATFs derive income from selling both parts for reuse and materials for recycling from ELVs. Based on the information provided by the stakeholders, the most profitable components for removal included lead-acid batteries, catalysts, metal components (with Cu, Al, Mg), engines and gear boxes. Other materials reported as profitable for removal were electronics, especially electronic control units, wiring, foam and textiles.

It is difficult to retrieve data on benefits which provide a comprehensive picture for the whole dismantling sector at the EU level. Data presented below are approximate that will vary over time, depend on market prices, and are likely to be different per Member States.

In a 2015 report relating to the economic situation of the vehicle dismantling sector in France, it was estimated that the operating income derived from the sale of recovered/removed parts by ATFs was estimated to amounted to an average of €130/ELV and of 134€/ELV for the

[77] Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E), Code:sbs_na_ind_r2. Accessed 7/5/2020

[78] Elliott, T.; Hudson, J.; Gillie, H.; Watson, S.; Lugal L.; Almasi, A. (2019): Final Report on the Implementation of Directive 2000/53/EC on End-of-Life Vehicles. For the period 2014–2017.

[79] Mc Kenna (2014): European Auto Shredder List and Map. An interactive map of auto shredding plants in the 28 member states of the European Union plus Norway.

materials sent for recycling or recovery[80]. For shredders, the sale of materials (mostly ferrous and non-ferrous metals) represented an average amount of 258€ per tonne. This report found that the average operational income of ATFs was slightly negative, while the operational income for shredders was close to zero.

As a large share of the revenues derived from the dismantling and shredding of ELV is represented by the sale of ferrous metal, the overall value of these sales at EU level can also be used as an indicator to assess the turnover of the sector: based on an average price of 235€/tonne for shredder steel scrap, and the fact that non-ferrous metal accounts for 70% approximately of the weight of vehicle and that 6 million ELV are dismantled every year, this overall amount of the sales is around 1 billion €/year.

For the car manufacturing sector, the overall direct economic benefits of the ELV Directive are more difficult to quantify. Such benefits could include the promotion by the car industry of their practices to improve the sustainability of their products through ensuring that most of their parts and components are re-used, recovered or recycled.

The most important economic benefits of the ELV Directive have been to help consolidating the vehicle dismantling and recycling sector in the EU Member States, while ensuring to consumers that they can dispose of their ELV free of charge.

5.2.1.2. Costs

Costs associated with the ELV Directive are incurred by various economic operators for technical compliance, data collection, reporting and monitoring.

The costs for the automotive industry relates to the design of vehicles taking account of dismantling/recyclability requirements, to the replacement of hazardous materials which get prohibited through changes to Annex II of the Directive, to the free take-back of ELV and to the information provided to dismantlers. Based on the input received from the European Automobile Manufacturers' Association (ACEA) on the compliance costs of the automotive industry with the ELV Directive, overall costs of the sector are estimated to amount to around 160 million Euros per year, as shown in the **Table 5-3** bellow. Despite the costs attributable to the sector, there is no evidence nor claims that the ELV Directive has a negative impact on the competitiveness of the automotive industry within the EU.

Table 5-3: ELV Directive compliance costs for the automotive industry in the EU

	Costs since implementation 2000 – 2020 cumulative (million €)	Running costs per year (million €/a)
IMDS (ELV Directive only)	1,632	107
Take-back networks	980	49
Dismantling Info	58	3

[80] Ademe 2015. Terra SA – Deloitte – BIOIS – Évaluation économique de la filière de traitement des véhicules hors d'usage – 2015 – Synthèse. 40 p.

Consumer-Info	26	1
Overall Cost	**2,696**	**160**

**Source: Estimate by the European Automobile Manufacturers' Association (ACEA)*

The costs for the vehicle dismantling sector relate to the purchase of the ELV to their last owners, staff cost, compliance with the technical requirements in Annex I of the ELV Directive and their reporting obligations. According to a compilation of data from different sources, the overall costs, including those covering reporting, monitoring, operating and payments to the last owner of an ELV, is estimated to amount to around 1.2 billion Euros per year[81]. This figure must be treated with caution as it is based on an extrapolation of different data and does not stem from a comprehensive economic assessment of the situation across the EU.

The evaluation did not reveal **any data on significant differences between Member States** in relation to costs incurred by different economic operators, except from the ATF reporting costs.

There is significant variation across Member States on their experienced **costs in collecting and reporting data**. It is considered to be caused by differences in the level of reporting detail requested by national authorities and difference in vehicle registration and de-registration procedures.

Enforcement costs were not reported by national governments. The large number of ELVs with unknown whereabouts, which are partially attributed to illegal activities (i.e. illegal exports and illegal dismantling) implies that the ELV Directive is not being fully enforced in some Member States. Therefore, although the cost of the Directive enforcement cannot be estimated, it is observed as lower than required, meaning that proper enforcement would have to mobilise additional resources from Member States.

The **costs for consumers** for disposing of their ELVs has been identified as either zero or even positive. It has been reported that ATFs often pay to acquire an ELV from the last owner or an insurance companies, if considered that the ELV has a high value due to spare parts or materials. In rare cases, where justified by the Directive, it was mentioned that the final owners might have to pay for the transportation of the ELV from the last owner's storage place to the ATF. Distribution of costs and benefits across economic actors

The distribution of the costs and benefits associated with the ELV Directive across the different economic operators is an issue where diverging views were expressed by the interested players.

There is first disagreement and inconsistent data on the profitability of ATFs. The car manufacturing industry tends to consider that on average ATFs already operate at a profit.

[81] For more explanation see Table C- **Error! Main Document Only.** on the overall costs as a result of the implementation of the ELV Directive (estimates)in the Annex 5 of this document and page 67 of the study supporting the evaluation of the ELV Directive https://ec.europa.eu/environment/waste/elv/pdf/ELVD%20Evaluation-Final%20report%20Aug2020%20(002).pdf

ATFs claim they lose money, but still process the ELVs in compliance with regulations, although economically they have no incentive to treat some ELVs. For example, the economic analysis of the ATF activity in France in 2015 showed that around 40% of ATFs were operating at a loss. It suggests that the treatment (and removal of parts for resale) of some (typically newer) vehicles may subsidise the treatment of older ELVs which have a negative-value to the ATFs. ATFs argue that they are exposed to illegal competitors who do not have to cover *inter alia* all depollution and disposal efforts. Producers argue that the costs for depollution and dismantling are covered by revenues from the reuse of components and recycling of materials. It shows that the Directive has increased costs for the economic operators (e.g. dismantlers, shredders, etc.) at the end of the vehicle life cycle.

The second point relates to whether the car manufacturing sector contributes sufficiently to the costs incurred by the management of end-of-life vehicles. This issue is discussed more in details in the part of the present document dealing with the coherence of the ELV Directive with other EU legislation on the question of "Extended Producer Responsibility" (EPR).

Additional, detailed data on the costs and benefits linked to the ELV Directive for the different stakeholders can be found in the study conducted to support this evaluation report[82].

5.2.2. Administrative burden and simplification opportunities

Regarding the question if the ELV Directive caused any unnecessary regulatory burdens or complexities, the majority of stakeholders did not know (52%), with a relatively even split between yes (35%) and no (33%). In the written comments the most common response on this point concerned the overlaps between the ELV Directive and Batteries Directive, as collection and recycling of batteries is already regulated by the latter. Burdensome reporting was another issue highlighted by some ATFs due to the existing duplicated reporting obligations at the national level.

Respondents were also specifically asked for suggestions to reduce the administrative burden. First, it was suggested to simplify the reporting obligations deriving from the ELV Directive by using online tools. Secondly, changes were proposed in the vehicle (de-) registration and notification systems, with the suggestion that vehicle registrations could be cancelled directly by authorised dismantlers, which would reduce the workload for authorities and represent an effective measure to reduce the amount of untracked exports and unregulated ELVs.

Findings of the survey on the administrative specific costs contribute to the overall assessment of the administrative burden. Stakeholders were asked to provide information on their hours and costs necessary to administer ELV Directive issues, including data collection, reporting, monitoring and technical compliance issues. Although the responses received are variable between Member States and should be treated with caution, the data collected show the tendency that companies, e.g. recyclers and ATFs, on average spend more resources on technical compliance than other stakeholder types. It also appears that public authorities seem to have higher costs across most categories, but particularly for data collection, and technical compliance. The most robust data were presented by the French Environment and Energy

[82] *See* especially pages 62 to 72 of this study https://ec.europa.eu/environment/waste/elv/pdf/ELV DIRECTIVE%20Evaluation-Final%20report%20Aug2020%20(002).pdf

Management Agency (ADEME) where dismantlers (1 700 companies) and shredders (60 companies) declare their activities to ADEME via a specialised website, roughly accounting for 1.2 million ELVs per year. This costs ADEME €170 000 a year (about 0.15 Euros per ELV) and they use roughly 20 days a year to validate their ELV annual report.

Due to the different approaches applied between Member States, estimation of the total administrative cost of compliance would require a detailed review of procedures and interviews in each Member State. Taking into consideration that Member State raised no particular concerns about their administrative costs, such detailed investigation was not carried out.

Taking into consideration abovementioned aspects, the digitalisation of procedures linked to the implementation of the ELV Directive can potentially contribute to reducing administrative burden. However, regarding the other aspects, there is no clear evidence that the ELV Directive leads to unnecessary administrative burden or complex procedures for stakeholders, including private sector and public authorities.

5.3. Relevance

Different aspects are presented in the section, evaluating how the ELV Directive is adequate to address the evolution of the automotive sector and other current challenges linked to the treatment of end-of-life vehicles.

The section evaluates the relevance of the scope of the ELV Directive and how it correlates with the objectives of the ELV Directive itself. Furthermore, it assesses the ability of the ELV Directive to adapt to subsequent technological advancement, such as the increased use of lightweight materials, electric, electronic and other components in vehicles and the sales of electric or hybrid vehicles, as well as the development of online sales for spare parts.

5.3.1. Scope of the ELV Directive

The ELV Directive covers passenger cars classified as M1[83], light commercial vehicles classified as N1[84] and three-wheel motor vehicles[85] as defined in Directive 92/61/EEC but excludes motor tricycles[86]. Other vehicles, such as buses with more than 9 seats, specialty vehicles such as ambulances, motorcycles, commercial vehicles for the transport of goods

[83]Category M1: Motor vehicles designed and constructed primarily for the carriage of persons and their luggage and comprising not more than eight seating positions in addition to the driver's seating position. Vehicles belonging to category M 1 shall have no space for standing passengers. The number of seating positions may be restricted to one (i.e. the driver's seating position). More details on the terms used in this definition e.g. 'seating position' are provided in Annex II of Directive 2007/46/EC of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, last amended by 4.4.2019.

[84] Category N1: Motor vehicles designed and constructed primarily for the carriage of goods and having a maximum mass not exceeding 3,5 tonnes. More details on the terms used in this definition e.g. 'mass' are provided in Annex II of Directive 2007/46/EC of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, last amended by 4.4.2019.

[85] The terms used in the ELV Directive are not as specific as the Regulation (EU) No 168/2013 of 15 January 2013, last amended by 4.4.2019 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles repealing the mentioned Directive 92/61/EEC. For details on the vehicle classification, please refer to Annex II, General definitions, criteria for vehicle categorisation, vehicle types and types of bodywork of Regulation (EU) No 168/2013.

[86] *See* footnote before.

with a maximum mass of more than 3.5 tonnes, trailers and other vehicles (e.g. trains, boats and airplanes) are not covered by the ELV Directive, meaning that totally 25 % of all vehicles are not subject to compulsory treatment in ATFs under minimum requirements at the end of their lifecycle.

The Eurostat statistics show that after the passenger cars, trucks (including to a large extent N1 vehicles) and motorcycles represent respectively the second and third largest groups of the vehicles of all vehicles registered in the EU in 2016. In the context of the ELV Directive, it means that 258 million passenger cars, representing over 75 % of all vehicles, and around 90% of the 34 million trucks with the weight less than 3.5 tonnes registered in the EU fall within the scope of the Directive[87]. The remaining 45 million vehicles, including motorcycles, trailers and semi-trailers, road tractors, special vehicles, motor coaches, buses and trolley buses, are not within the scope of the ELV Directive.

Table 5-4: Share of vehicle type (by numbers) in EU 28 for 2016

Vehicle type	Number	Percentage
Passenger cars	258 003 552	76.3%
Trucks	34 413 937	10.2%
Motorcycles	22 018 223	6.5%
Trailers and semi-trailers	15 898 235	4.7%
Road tractors	3 809 333	1.1%
Special vehicles	3 256 933	1.0%
Motor coaches, buses and trolley buses	902 522	0.3%

Source: Eurostat, stock of vehicles by category, [tran_r_vehst]; download 2020/01/05

Their inclusion should be assessed in light of the environmental concerns that the disposal and treatment of waste derived from these vehicles might be posing a potential risk to the environment. Although the general provisions from the Waste Framework Directive apply to end-of-life vehicles which are not covered by the ELV Directive, their effect is limited, as they do not contain requirements which are specifically tailored to these vehicles, notably on waste prevention, collection, recovery and recycling.

Many stakeholders supported the extension of the scope of the ELV Directive to motorcycles, buses and trucks, but a number of them stressed that they should not be subject to the same rules as the vehicles currently covered by the Directive.

Stakeholders from the vehicle manufacturing sector highlighted that the situation of heavy duty vehicles, mainly vehicles designed for the carriage of passenger and their luggage with more than 8 seats plus the driver and commercial vehicles for the transport of goods with a maximum mass exceeding 3.5 tonnes, cannot be comparable to that of passenger cars. First of all, the lifetime of trucks and buses is longer than passenger cars. The exploitation of these

[87] Note: Eurostat definition of trucks does not distinguish trucks below the maximum weight of 3.5 tonnes and above.

vehicles is based on different technical features, since trucks and buses must perform under more challenging conditions. The durability and reparability of these vehicles are often prerequisites for their customers. To that end, many manufacturers offer maintenance and repair contracts to ensure the proper performance and a long lifespan of these vehicles. The European Automobile Manufacturers Association (ACEA) also noted that manufacturers of heavy-duty vehicles already phase out heavy metals on a voluntary basis whenever that is technically and economically possible and provide dismantling information. All vehicle manufacturers operating in the EU must fulfil the requirements of the REACH which sets restriction, or even prohibition, of potentially dangerous materials and substances applies to all products placed on the European market, including trucks and buses. In addition, ACEA pointed out notably that the reuse and recycling of trucks and buses is a highly profitable business driven by market forces, since average heavy duty vehicle consists 80% of steel and iron, resulting in high recycling rates[88]. The processes for depollution and dismantling are also different from those for passenger cars, as they require different types of treatment, additional storage and physical resources[89]. Therefore, it might be difficult to develop common requirements for the dismantling, decontamination and further treatment of industrial vehicles and passenger cars.

Stakeholders from the motorcycle manufacturing industry also highlighted the differences between their sector and passenger cars. They emphasised that the manufacturing of motorcycles is composed of a higher number of SMEs than for cars, that motorcycles have a relatively longer life, and that there was no strong evidence that the current situation created negative environmental impacts in respect of the treatment of end-of-life motorcycles.

These stakeholders indicated that the arguments presented above represent the reasons why trucks, buses and motorcycles have not been originally covered within the scope of ELV Directive.

A survey on the types of non-car vehicles received by ATFs in France showed that most ATFs do not frequently receive end-of-life vehicles other than passenger cars. For instance, 70-90% of ATFs in France "never" or "rarely" receive motorcycles, light two-wheel powered vehicles, quads and cars without licence[90]. This seems to support the claims that these vehicles require specific dismantling and treatment processes.

The relevance of leaving 45 millions of vehicles outside the scope the ELV Directive seems questionable, as these vehicles are currently not subject to any specific EU-wide rules regarding the treatment of the waste they generate, which also causes loss in circular economy terms.The specific features of these vehicles need however to be fully taken in consideration in future reflexion on the extension of the scope of the ELV Directive.

5.3.2. Increased use of electric, electronic and other components in vehicles

[88] https://www.acea.be/uploads/publications/ACEA_Position_Paper-End-of-Life_Vehicles_Directive_Trucks_Buses.pdf

[89] The Spanish national association for recycling of industrial vehicles (Anervi, 2011).

[90] ADEME (2018). Presentation of results of the ADEME's survey about the treatment by ATF of other end-of-life vehicles than cars and light industrial vehicles.

Vehicles are increasingly equipped with electronic components, which contain valuable materials, such as gold, silver, palladium, tantalum and other rare earth materials. The unsound management of these materials during the dismantling process creates negative environmental consequences and represent a loss of valuable resources. There is no specific requirement in the ELV Directive to separate and recover these materials. There are also no specific recovery/recycling targets for these materials. The conventional treatment methods (shredding after depollution) for ELV are not appropriate to ensure the separation and recovery of such materials[91]. Ensuring a proper recovery of these materials brings with it additional costs for dismantlers, but their sale should also generate additional revenues. Many electric and electronic components have a long life-span and can be sold as spare parts if separated. On the other hand, their durability is expected to be longer compared to the mechanical components. A business association noted that the increased use of electric and electronic components will make the 95% recovery target impossible to achieve, as these materials cannot be technically or economically recycled under current conditions.

There is no legal basis either in the ELV Directive requiring the provision of information by the producers on the localisation of such electric or electronic components and on how to separate and recover them during the dismantling process. As a solution, this may be addressed through the SCIP database[92] mandated to European Chemicals Agency under the Waste Framework Directive. However, it is unclear if this will be sufficient for dismantlers to dispose of all the required information to perform their dismantling.

The provisions of the ELV Directive are not suited to ensure a high level of recovery and recycling of valuable materials contained in the electric and electronic components increasingly used in recent vehicles.

5.3.3. Increased use of lightweight materials in vehicles like plastics, carbon-fibres, fibre-reinforced (plastics) materials and others

It is estimated that the automotive sector generates around 5% of all plastic waste in the EU. The use of plastics in cars has been increasing in the last decades, together with other lightweight materials, primarily at the expense of metals, helping curb the increase in the mass of vehicles and their associated emissions of greenhouse gases. The share of plastics is estimated to reach 15-20% of the weight of cars built today, so in the range of 100 to 200kg per car (depending on the models). This is not only the amount of plastics used in cars that is on the rise but also the plastics composition that is different due to a broader range of applications (e.g. the increase of electronics in cars requires plastic housing for these electronics, the use of plastic in coachwork parts).

Table 5-5: Average composition of an ELV in 2015 in France according to ADEME[93]

Polypropylene (PP) - other parts	4.4%

[91] Groke, M.; Kaerger, W.; Sander, K.; Bergamos, M. (2017): Optimierung der Separation von Bauteilen und Materialien aus Altfahrzeugen zur Rückgewinnung kritischer Metalle (ORKAM). In: Umweltbundesamt, UBA Texte (02/2017).

[92] SCIP is the database for information on **S**ubstances of **C**oncern **I**n articles as such or in complex objects (**P**roducts), see https://echa.europa.eu/scip

[93] Monier, V.; Salès, K.; Lucet, L.; Benhallam, R. (2017): Annual Report End-of life vehicles 2015. Annual Report of the End-of-life vehicle sector observatory – 2015. France.

ABS, PVC, PC, PMMA, PS, etc.	2.2%
Polyurethane foam	2.0%
Textiles, other	1.7%
Other rubber compounds	1.1%
Polypropylene (PP) - bumpers	1.1%
Polyamides (PA)	1.0%
Polyethylene (PE) - fuel tanks	0.8%
Polyethylene (PE) - other parts	0.5%
Total	**14.8%**
Tyres	3.4%
Lead starter battery	1.4%
Wiring harnesses	1.0%
Paint	0.8%
Total	**6.6%**

Ferrous metals	70.0%
Non-ferrous metals (excluding wiring harnesses)	4.0%
Glass	3.0%
Spent oil and filters	0.7%
Catalytic converters	0.5%
Cooling or brake fluids	0.4%
Air-conditioning fluids	0.1%
Total	**78.7%**

In practice, when compared with other materials present in ELVs, plastic components are those which have the lowest recycling rates and the highest rates when it comes to materials sent for disposal (cf. Section 5.1 on material recovery in the effectiveness part). There are therefore considerable quantities of plastic waste from ELVs sent for incineration or landfilling each year. If nothing changes, these quantities will increase further, along with the trends to use more plastic materials in cars observed over the last decade.

The perspective that the automotive sector starts to use other new types of components, like fiber reinforced plastics, also poses a challenge in terms of waste management, as they are currently particularly difficult to recycle.

Many stakeholders indicate that the increased use of these lightweight materials like plastics will affect waste management costs. It was also recognized by the ATF that some new materials require more complex technologies and higher energy demand to recycle which would consequently result in higher waste management costs and GHG emissions. Some stakeholders indicated that the situation is not the same for other lightweight materials (aluminium for example).

There are no specific requirements in the ELV Directive or in the “type approval” Directive 2005/64/EC designed to facilitate the proper treatment of plastics and other lightweight materials such as carbon fibre and fibre reinforced plastics derived from ELVs. There are for example no provisions requiring that information is made available on these materials, no

obligation for ATF to separate them before shredding and no specific recovery or recycling targets.

Overall, it seems clear that the ELV Directive does not contain sufficient provisions to deal adequately with the challenges posed by the increased use of lightweight materials in cars.

5.3.4. Changes in the types of vehicles put on the EU market: increase of electric or hybrid vehicles and of SUV

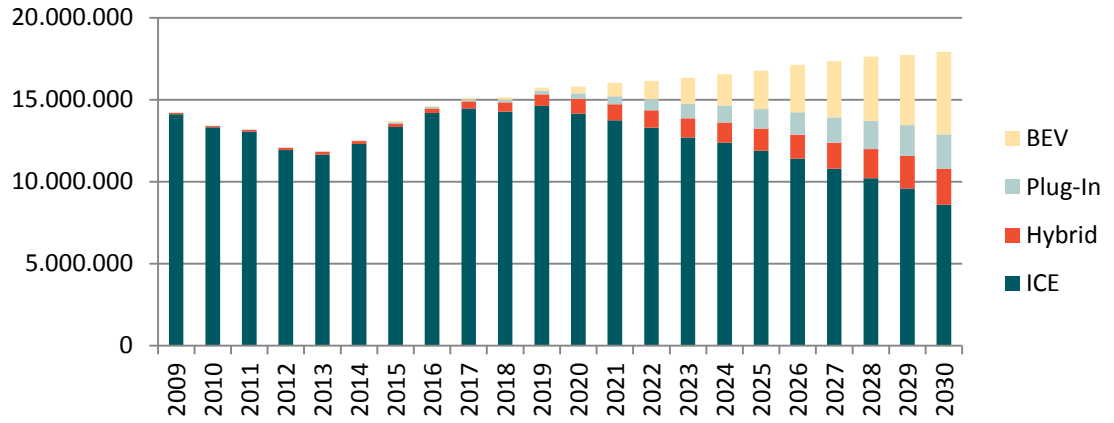
The volume of electric and hybrid vehicles reaching the end of their life and sent for dismantling is currently still low compared to the vehicles with internal combustion engines in the EU. Therefore, there is limited to no experience in the dismantling sector on how to deal with such vehicles, as well as on its overall impact on their business model. In view of an average life time of 15 years, this is likely to continue to be the case in the near future.

Nevertheless, this situation is expected to change considerably in the next decade, with the foreseeable boom in the sale of electric and hybrid vehicles on the EU market. A strong increase in the electrification of vehicles is expected to take place between 2020 and 2030. In 2030, approximately a quarter of all passenger cars sold in the EU are predicted to be battery powered. Plug-In Hybrids and Hybrids together are expected to account for another quarter of sales while the rest of the vehicles are expected to be based on the Internal Combustion Engines.

The expected increase in uptake of all electric vehicle (EV) types is illustrated in the **Figure 5-7** below. It illustrates the projected development of passenger car sales in the EU until 2030, which also correlates with the EU long-term climate neutrality targets, but it should be noted that it does not take into account the possible impact of the COVID-19 pandemic, which is not yet possible to factor in.

Figure 5-7: Development of passenger car sales in the EU (BEV=Battery Electric Vehicles, ICE=Internal Combustion Engine[94])

[94] The data in the figure up to 2017 are statistics (Eurostat, ACEA) and the projections of the future sales are based on the International Energy Agency's (IEA) 2DS scenario (IEA 2017: https://www.iea.org/reports/energy-technology-perspectives-2017) and statistical trends in the EU's share of total global sales (Boston Consulting Group 2017: https://www.bcg.com/en-be/press/2november2017-electrified-vehicles-take-half-of-global-auto-market).



BEV: Battery Electric Vehicle (pure EV);
Plug-In: Plug-In electric vehicle (combination of ICE and electric motor, which is the main source of power);
Hybrid: hybrid electric vehicle (combination of electric motor ICE, which is the main source of power)
ICE: internal combustion engines powered by gasoline, diesel, biofuels or natural gas
Source: Model for passenger cars sales, Oeko-Institut e.V

The massive arrival from electric and hybrid vehicles will lead to considerable changes in the management of ELVs at the 2030-2035 horizon. The ELV Directive was not designed to deal with this evolution. More than 50% of the consulted stakeholders noted that the increased use of EV will increase waste management costs for ELVs. Dismantling may temporarily become less profitable as costs for storage, training, equipment, safety (e.g. against fires from Li-ion batteries) and transportation may increase. Several of the consulted stakeholders, including companies, business associations and academics suggested it would require new technology and processes for ATFs. Dismantling of high voltage traction batteries requires specific staff training and equipment, and is time consuming. This effort might be compensated if the traction battery is sold for 'second use' but it might also be possible that additional costs occur for long distance transport to qualified repurposing or recycling facilities, which should be addressed in the separate future EU legislation on batteries. As to other parts and materials contained in electric and hybrid vehicles, it is unclear if the ELV Directive in its current form is sufficient to ensure that they are properly recovered and recycled. The dismantling and recycling sectors are also expected to derive higher revenues from the recovery and recycling of valuable raw materials[95] (copper, nickel, cobalt, palladium, platinum, ruthenium, lanthanum etc.) used in EVs batteries, electronic devices and other components contained in low-emissions vehicles. In addition, increased flow of secondary (critical) raw materials could "improve supply security for the EU"[96]. Also, increased resource efficiency and business opportunities can derive from remanufacturing of new components in vehicles[97], e.g.

[95] EC, 2020. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Critical Raw materials Resilience: Charting a path towards greater security and sustainability. COM(2020) 474 final.
[96] EC, 2020. Critical Raw Materials for strategic technologies and sectors in the EU - A foresight study. Joint Research Centre (JRC) of the European Commission. https://doi.org/10.2873/865242
[97] Matsumoto, M., 2020. Product remanufacturing in Japan: trends and challenges, in: 27th CIRP Life Cycle Engineering Conference (LCE2020). Grenoble (held online)

electric motors. In a life-cycle perspective, the transition towards low-emissions vehicles entails a shift of environmental impacts from the use phase to the manufacturing phase[98].

The proposal by the Commission for a new Regulation on Batteries is expected to improve circularity in the design of batteries of EVs. The articulation with the ELV Directive will be important.

In addition to the batteries, ELVs from EVs contain very costly components like electric motors, which may generate income for the dismantlers. However, dismantlers are not currently experienced with such components and the markets for them is not yet developed.

In addition to the shift to electric vehicles, another major development in the automotive sector has been the rise in sales of Sport Utility Vehicles (SUVs). Around 40% of annual car sales today are SUVs, compared with less than 20% a decade ago[99]. In addition to the fact that SUVs produce CO_2 emissions which are higher than conventional cars, they are also heavier and larger than conventional cars. These trends mean that the weight of ELVs and related waste generated by the automotive sector are expected to increase correspondingly.

Overall, the emergence of new generation of vehicles will require adaptations among different economic operators, e.g. ATFs, dismantlers, shredders to recyclers, insurance companies. These factors once again confirm the important role of the ELV Directive to provide a solid legal framework which would be able to accommodate the dynamics related to the automotive sector.

5.3.5. Online sales of spare parts from ELVs

During the consultation, a number of stakeholders pointed to the challenges posed by the online sales of spare parts. They stressed this happens in the absence of traceability on the origin of the parts. Notably, the vehicle identification number (VIN) is not always provided at the point of online sale. This is also the case for the registration number of the dismantler showing that the parts were dismantled in an authorised facility. This makes it easier for non-ATFs to benefit from selling used parts without complying with the minimum standards required for ATFs.

Some stakeholders stated that in the USA one cannot sell spare parts (online or offline) for a vehicle without being registered as a commercial company. In some countries, the authorities have also set up partnership with online sales websites to ensure that used spare parts are only put on the market if they come from a licensed ATF[100].

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[98] Ellingsen, L.A.-W., Hung, C.R., 2018. Research for TRAN Committee - Battery-powered electric vehicles: market development and lifecycle emissions. Study requested by the European Parliament's Committee on Transport and Tourism.

[99] More observations on the changes in the car market related to SUVs can be found in the website of the International Energy Agency: https://www.iea.org/commentaries/growing-preference-for-suvs-challenges-emissions-reductions-in-passenger-car-market

[100] See for example the partnership between the UK authorities and eBay in this regard: https://www.gov.uk/government/news/environment-agency-joins-forces-with-ebay-to-stop-illegal-vehicle-breakers

5.3.6. Role of insurance companies in the end-of-life stage of vehicles

Insurance companies own very large volumes of cars which have become ELVs (as vehicles damaged beyond repair in accidents typically become ELVs owned by insurance companies). They are also a major actor when it comes to car repairing. These companies are defined in the ELV Directive as one the relevant "economic operators", which should notably be involved in setting up systems for the collection, treatment and recovery of end-of life vehicles. In practice, it seems that these provisions have not been leading to any obligations for insurance companies to contribute actively to the objectives of the ELV Directive.

There are a few examples of insurance companies which voluntarily opted for a proactive policy for a sustainable management of ELVs. This includes for example the establishment of partnerships between an insurance company in France and a network of qualified ATF and repair companies, so as to ensure that damaged cars or ELVs sold by insurance companies get dismantled with a view to maximising the reuse of their spare parts[101]. These seem to remain marginal examples, while the most common practice is for insurance companies to sell damaged cars or ELVs in auction to the best prices, without paying attention to their final destination. This can be problematic for the traceability of such cars and does not encourage a high quality treatment of the ELVs. As a result, a number of stakeholders pleaded for insurance companies to be more involved in the implementation of the Directive. Some stakeholders also suggested to link insurance payments to CoD so that only the presentation of a CoD will allow the insurance payment to cease, as a way to better ensure that CoD are issued when a vehicle is not used any longer.

5.4. Coherence

This section looks at the overall coherence of the ELV Directive, assessing how provisions interact internally across the Directive and also in relation to the other EU legislation and policies.

5.4.1. To what extent is the ELV Directive internally coherent?

The ELV Directive is considered as internally coherent (i.e. it does not contradict itself). During the consultation process, it was pointed out that Article 4(1)(a)[102]on prevention encourages Member States to limit hazardous substances, in addition to those prohibited by the Directive. However, it was indicated that individual prohibition measures taken at national level might hamper the functioning of the internal market but there is no evidence that such measures were taken. In any event, this does not affect the internal coherence of the ELV Directive.

[101] See https://www.maif.fr/particuliers/auto-moto/recycler-auto/recycler-voiture.html

[102] *Article 4 (1) - Prevention*
"1. In order to promote the prevention of waste Member States shall encourage, in particular:
(a) vehicle manufacturers, in liaison with material and equipment manufacturers, to limit the use of hazardous substances in vehicles and to reduce them as far as possible from the conception of the vehicle onwards, so as in particular to prevent their release into the environment, make recycling easier, and avoid the need to dispose of hazardous waste; (...)".

5.4.2. To what extent is the ELV Directive coherent with other EU policy instruments and the overall EU and international policy goals?

The coherence of the ELV Directive is evaluated first with regard to EU overarching policies on circular economy and climate change, and then with regard to the EU waste legislation, and the Basel Convention.

5.4.2.1.Coherence with the EU approach to Circular Economy

The circular economy model aims to maximise the reduction of waste and reuse of materials. The European Commission has recently adopted a new Circular Economy Action Plan[103] - one of the main blocks of the European Green Deal[104]. The new Action Plan announces initiatives along the entire life cycle of products, targeting for example their design and manufacturing, promoting circular economy processes, fostering sustainable consumption, promoting repair, re-use and remanufacturing and aiming to reduce waste and ensure that the resources used are kept in the EU economy for as long as possible.

The ELV Directive contains general provisions which contributes to the development of a more circular economy, especially the measures on the:

- Use of recycled materials in new vehicles;
- Recovery, recycling and re-use targets;
- Regulation of recovery and sale of parts removed from ELVs.

However, the evaluation results show that the ELV Directive needs better consistency with the objectives of the European Green Deal and the Circular Economy Action Plan. The ELV Directive does not sufficiently address key areas, notably waste prevention, including eco-design of cars to facilitate re-use, repair, remanufacturing and recycling. The potential to increase recycling and re-use and ensure a level playing field for high quality recycling is not used. The same is true for the promotion of concrete measures to facilitate re-use/remanufacturing of parts and high quality recycling of ELV across the EU. These issues are addressed in previous sections of this evaluation, which reflect the fact that the ELV Directive often contains provisions which are too general to have any real impact (for example on the design and production of new vehicles) or which are not adapted to deal with the challenges posed by the evolution of the market of current vehicles (for example general targets for re-use/recycling and re-use/recovery by weight, which does not lead to the optimal treatment of many components and materials, such as glass or plastics).

– *Use of recycled materials (e.g. plastics) in new vehicles*

The uptake of recycled materials is identified in the Circular Economy Action Plan as a priority for the building of circular economy models across the EU. This is also a key pillar of the Plastics Strategy adopted by the European Commission in 2018. While doing so, the

[103] To access the document: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN
[104] To access the document: https://ec.europa.eu/info/node/123797

Chemicals Strategy for Sustainability[105] is emphasising non-toxic material cycles "*it is necessary to ensure that substances of concern in products and recycled materials are minimised. As a principle, the same limit value for hazardous substances should apply for virgin and recycled material.*" The automotive sector is identified as particularly important in that respect, notably for plastics. As indicated in section 5.3.3, the use of plastics in new vehicles has increased and will further increase and, therefore, the automotive industry represents a considerable potential for the use of recycled plastics.

According to Article 4(1)(c) of the ELV Directive, "*Member States **shall encourage** […] vehicle manufacturers, in liaison with material and equipment manufacturers, to integrate an increasing quantity of recycled material in vehicles and other products, in order to develop the markets for recycled materials".*

Hence, the ELV Directive sets only a general obligation for the Member States to encourage integrating of increasing quantity of recycled material. These provisions have not been made more specific or operational and there are no specific legal provisions for a mandatory minimum content of recycled materials in new vehicles. Several manufacturers have taken voluntary actions to increase the use of secondary materials in the production of new vehicles (*see* **Table 5-6** below). For example, Volkswagen reported in 2009 that 40% of vehicle weight of its Golf model was from recycled material. Other manufacturers also reported that they achieved, or aim to achieve, an increase in the share of recycled content in their vehicles (total or plastic).

Table 5-6: Manufacturer data on recycled content in vehicles

Manufacturer and model	Type of recycled content	Year	Share of recycled material
Volkswagen, Golf	total recyclate	2009	Secondary raw materials ca. 40% of vehicle weight (501 kg metal recyclates, 15 kg plastics recyclates, 9 kg glass and 2 kg operating fluids)[106]
Daimler, general	total recyclate	2015	The specifications for Daimler vehicles stipulate that the proportion of so-called secondary raw materials, including recycled materials, is to be increased continuously. The planning therefore provides for an annual review until 2020. As an interim target, 25 percent more renewable raw materials and recyclates should be used by 2015 compared with the base year 2010. The target was even exceeded with a 39% increase in use of recyclates and 28% in renewable raw materials in comparison to 2010 by 2015 (exceeded target of 25% increase).[107]

[105] COM(2020) 667 final

[106] https://www.recyclingmagazin.de/2009/02/20/ueber-500-kg-rezyklate-im-neuen-golf/; accessed: 23 March 2020

[107] https://www.globalcompact.de/de/themen/Good-Practices/Umweltschutz/Best-Practice-Kreislaufwirtschaft-bei-Daimler.php; accessed: 23 March 2020

Manufacturer and model	Type of recycled content	Year	Share of recycled material
Daimler Mercedes S Class,	plastic recyclate	?	Total weight of components made of recycled plastics: 49.7 kgs All black plastic parts of the Mercedes S-Class's outer skin are made of recycled materials.[108]
Daimler Mercedes B Class	plastic recyclate	?	13% increase in recycled material compared with the predecessor model. Typical areas of application are wheel arch linings, cable ducts and underbody panelling.[109]
Daimler Mercedes A Class	plastic recyclate	?	118 components plus small parts with a total weight of 58.3 kilograms from resource-saving materials.[110]
Opel Adam	?	2015	170 components with recyclates;
BMW 7er	plastic recyclate	?	15-20% by weight of a vehicle's total plastic volume[111]
BMW i3	plastic recyclate	?	ca. 25% of the thermoplastics used in the production of the car consist of recycled materials.
Volvo	plastic recyclate	?	at least 25% recycled plastics in every new car from 2025 onwards[112]
Renault Espace	plastic recyclate	?	50 kg recycled plastic content.[113]

As it is shown in the table, the use of recycled materials, in particular plastic, is steadily increasing. This shows that the uptake of such recycled materials is a reality already for many car manufacturers. There is however no clear overview on the overall uptake of recycled plastics by the car manufacturing industry and the practice in that respect depends largely on the individual strategies of each company.

Car manufacturers have indicated that the incorporation of larger volumes of recycled plastics in new vehicles depends on the necessity to guarantee a stable supply for suitable quality and

[108] https://www.tagesspiegel.de/mobil/recycling-bei-der-automobilproduktion-wiederverwendung-spart-nicht-nur-geld/12044148.html; accessed: 23 March 2020
[109] https://www.daimler.com/nachhaltigkeit/umweltzertifikate/b-klasse.html; accessed: 23 March 2020
[110] *Ibid.*
[111] https://www.bmw.de/de/topics/service-zubehoer/bmw-service/recycling.html; accessed: 23 March 2020
[112] https://group.volvocars.com/news/sustainability/2018/volvo-aims-for-25-per-cent-recycled-plastics-in-cars-from-2025
[113] https://group.renault.com/en/news-on-air/news/renault-actively-developing-circular-economy-throughout-vehicles-life-cycle/; accessed: 23 March 2020

volume of such plastic. Another determining factor is the difference in costs between the cost of production of virgin plastics and the production of recycled plastics.

The Circular Plastics Alliance[114] was launched in December 2018 to "take action to boost the EU market for recycled plastics up to 10 million tonnes by 2025". A working group has been created to work on this objective for the automotive industry and the outcome of their work will be relevant to assess the potential for a higher uptake in recycled plastics in new cars.

While many different technological and economic factors determine the use of recycled plastics in new cars, it can be concluded that the current provisions of the ELV Directive in this regard have not been sufficient specific to prompt a general higher uptake of recycled plastics, and thereby consistency with the objectives of the EU policy on circular economy.

5.4.2.2.Coherence with the EU Climate change policy

The ELV Directive also needs to be assessed with regard to the EU climate change policy. The European Green Deal[115] has reconfirmed the EU commitment to fight climate change and to become the world's first climate-neutral continent by 2050. For this purpose, the Commission has adopted the Communication on stepping up Europe's 2030 climate ambition[116] and proposed to address the climate crisis by raising the EU's ambition on reducing greenhouse gas emissions to at least 55% below 1990 levels by 2030.

The climate neutrality objective is of key importance for the transport sector which is one of the largest contributors to greenhouse gas emissions. Globally, the transport sector is responsible for nearly a quarter of total energy-related carbon dioxide (CO2) emissions[117]. In 2017, 27 % of total EU-28 greenhouse gas emissions in 2017 came from the transport sector, including aviation and maritime emissions. Road transport was responsible for almost 72 % of total greenhouse gas emissions from the transport sector, where 44% of these emissions were from passenger cars, 9% from light commercial vehicles and 19 % from heavy-duty vehicles.[118] Passenger cars are responsible for around 12.0% of total EU emissions of carbon dioxide (CO_2), i.e. the main greenhouse gas[119].

To address the problem and to reduce emissions, since 2009, the EU legislation has set mandatory tailpipe emission targets for new cars and, since 2011, for new vans. On 17 April 2019, the European Parliament and the Council adopted Regulation (EU) 2019/631 setting CO_2 emission performance standards for new passenger cars and for new vans in the EU. This Regulation started applying on 1 January 2020, setting reduction targets of 15% for cars and vans to be achieved from 2025, and of 37.5% for cars and 31% for vans to be achieved from 2030, compared to 2021. For road transport, CO_2 and vehicle standards have proven to be an effective policy tool, while stringent CO_2 emissions performance standards ensure the

[114] https://ec.europa.eu/growth/industry/policy/circular-plastics-alliance_en
[115] COM (2019)640 final.
[116] COM(2020)562 final
[117] https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter8.pdf
[118] https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-12
[119] https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en

supply of modern and innovative clean vehicles. However, as highlighted in the European Green Deal, to contribute to the overall climate neutrality objective for 2050, emissions of the transport sector need to be reduced by 90% by 2050. The CO_2 standards are currently under revision, the Commission's new proposal is expected to be delivered in June 2021, with the aim to align standards with the new 2030 and 2050 ambitions.

In this process, electrification is seen as a key avenue for decarbonisation during the use phase, meaning that conventional cars will gradually be displaced by zero tailpipe emissions vehicles. This trend is further exacerbated by the EU policy designed to reduce air pollutant emissions from vehicles. Successive "Euro" standards were adopted in that respect for light-duty vehicles (cars and vans) and for heavy-duty vehicles (trucks, buses and coaches). The latest standards are Euro 6 for light-duty, and Euro VI for heavy-duty. In addition, the need to reduce the emissions of GHG during the use phase might also encourage the use of lightweight materials in new cars, particularly combustion-based ones, thus complicating recycling.

It is clear that the fleet renewal prompted by the EU policies on climate change and air pollution will eventually bring changes and challenges for the ELV sector, as exposed in sections 5.3.2, 5.3.3 and 5.3.4.

As highlighted in 5.3.4, the transition towards low-tailpipe emissions vehicles entails a shift of environmental impacts between life cycle stages. Although it is currently difficult to appropriately quantify impacts/benefits of end-of-life phase due to lack of robust data, improvements in end-of-life management of vehicles and especially of low-tailpipe emissions vehicles has the potential to reduce greenhouse emissions beyond the transport sector and including from industry, where vehicles are produced, or from waste, where vehicles are recycled, and other impacts[120], hence making "circularity […] a prerequisite for climate neutrality"[121]. For instance, further investigating emissions linked to battery recycling will be instrumental in ensuring that end-of-life emissions, and therefore overall lifecycle emissions, of vehicles with an electric powertrain are aligned with climate objectives.

Another possible impact of the EU policies on climate change and air pollution, which is also relevant for the ELV Directive, relates to the export of second-hand vehicles. Based on ACEA information, the EU motor vehicle fleet is getting older year-on-year. Passenger cars are now on average 10.8 years old, vans 10.9 years and heavy commercial vehicles 12.3 years[122]. Besides higher operational costs and safety concerns, the used vehicles pose greater environmental challenges as vehicle emissions are a significant source of the fine particulate matter (PM2.5) and nitrogen oxides (NOx) being major causes of urban air pollution.

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[120] Hill, N., Amaral, S., Morgan-Price, S., Nokes, T., Bates, J., Helms, H., Fehrenbach, H., Biemann, K., Abdalla, N., Jöhrens, J., Cotton, E., German, L., Harris, A., Haye, S., Sim, C., Bauen, A., 2020. Determining the environmental impacts of conventional and alternatively fuelled vehicles through LCA. Ricardo Energy & Environment for the European Commission.

[121] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A new Circular Economy Action Plan For a cleaner and more competitive Europe, COM(2020) 98 final

[122] https://www.acea.be/statistics/tag/category/average-vehicle-age

It is expected that the global fleet of light duty vehicles is set to at least double by 2050. Around 90% of this growth will take place in non-OECD countries, which import a large number of used vehicles[123]. It is likely that the combination of stricter emission limits in the EU and increased demand for second-hand vehicles in non-OECD countries leads to a growth of export of such vehicles from the EU. The negative impacts of such export for the environment and road safety are laid out in a recent report by the Dutch Ministry of Infrastructure and Water Management on the quality of the used vehicles exported to Africa[124]. The vehicles exported to African countries often do not meet the Euro 4/IV emission standard and do not have a valid periodic roadworthiness certificate. Around 20% of tested petrol vehicles fail tests for emission requirements. Many of these export vehicles, therefore, are a cause for polluting emissions and present risks for road safety and an increased flow of ELVs in the recipient countries. As a response, fifteen ECOWAS countries in West Africa adopted a coordinated approach on the import policy which would allow to only accept vehicles with a minimum Euro 4/IV emission standard from January 1, 2021. This underlines the seriousness of the problems linked to the export of used vehicles, presented in section 5.1.2 of this document.

The treatment process of ELVs also affects climate change by releasing GHG emissions, in particular for operations which release powerful GHGs like air conditioning fluids. They require specific technologies and are energy-intensive, which is likely to be the case for components and materials which are difficult to recover or recycle, such as plastics and electronics. On the other hand, the dismantling of spare parts before shredding requires less technology and energy, and the re-use/remanufacturing of these parts would reduce the need for new resources for the production of new parts and also offer skilled employment opportunities[125].Moreover, requirement to incorporate recycled plastics into new vehicles would boost recycling of plastics, reduce dependence on virgin raw materials and lower GHG emissions[126].

5.4.2.3.Waste Framework Directive[127]

- *Definitions of recycling and re-use*

These definitions of the terms “reuse” and “recycling” are different in the ELV Directive and in the Waste Framework Directive (WFD).

The definition for recycling is broader under the ELV Directive, since it allows backfilling[128] to be accounted as recycling, while backfilling is not considered as recycling under the

[123] https://wedocs.unep.org/bitstream/handle/20.500.11822/34175/UVE.pdf?sequence=1&isAllowed=y

[124] Used Vehicles Exported to Africa, Netherlands Human Environment and Transport Inspectorate, Ministry of Infrastructure and Water Management, 2020 https://www.ilent.nl/documenten/rapporten/2020/10/26/rapport--used-vehicles-exported-to-africa

[125] Parker, D., Riley, K., Robinson, S., Symington, H., Hollins, O., 2015. Remanufacturing Market Study. European Remanufacturing Network (ERN). Available at https://www.remanufacturing.eu/assets/pdfs/remanufacturing-market-study.pdf”

[126] More than 90% of plastics today are produced from fossil feedstock and plastics production gives rise to approximately 400 million tonnes of GHG emissions per year globally (2012). If current trends continue, by 2050 it could rise to 20% of global oil consumption and 15% of the global annual carbon emissions. *Ibid.*

[127] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives *(OJ L 312, 22.11.2008, p. 3–30).*

WFD[129]. Waste from ELVs which are typically sent to backfilling operations are reported as recycling. If such waste were not accounted for recycling, it is likely that some Member States would not be able to meet the recycling targets under the ELV Directive.

While the WFD distinguishes between "reuse" and "preparing for reuse", the ELV Directive establishes its own definition of "reuse". Under Article 2 (6) of the ELV Directive reuse means any operation by which components of end-of-life vehicles are used for the same purpose for which they were conceived. Reuse of ELV components is thus an operation that takes place when the vehicle reaches the waste stage. In practice, such components are removed from an ELV, tested and sold cease being waste and are sold as used parts, usually with a warranty. The WFD adopts a different approach by defining reuse as the operation by which that products or components that are not waste are used again for the same purpose for which they were conceived have never been waste.[130] In addition, it is important to mention that the notion of "preparing for re-use"[131], which applies to products or components of products that have become waste, and is included in the waste hierarchy defined in Article 4 of the WFD, does not appear in the ELV Directive. It can be concluded that reuse in the ELV Directive is understood more as a practical concept that the used part (and still functional) part is actually functional and can be placed in a car as used part, therefore effectively reused, while preparation for reuse does not necessarily mean that the same part from an ELV would be actually reused for the same purpose it was initially conceived.

- *Extended Producer Responsibility*

The ELV Directive sets out provisions on the role of producers (e.g. car manufacturers) in respect to the collection of ELVs, as well as on making dismantling information available for each new car, as reflected in the table below:

Main requirements for vehicle producers under the ELV Directive: Article 2(13):

'Dismantling information' means all information required for the correct and environmentally sound treatment of end-of life vehicles. It shall be made available to authorised treatment facilities by vehicle manufacturers and component producers in the form of manuals or by means of electronic media (e.g. CD-ROM, on-line services).

Article 5(4):

Member States shall take the necessary measures to ensure that the delivery of the vehicle to an authorised treatment facility in accordance with paragraph 3 occurs without any cost for the last holder and/or owner as a result of the vehicle's having no or a negative market value.

[128] Under the WFD, backfilling is defined as "any recovery operation where suitable non- hazardous waste is used for purposes of reclamation in excavated areas or for engineering purposes in landscaping. Waste used for backfilling must substitute non-waste materials, be suitable for the aforementioned purposes, and be limited to the amount strictly necessary to achieve those purposes"

[129] More clarification is provided in the Guidance on the interpretation of the term backfilling prepared by EUROSTAT: https://ec.europa.eu/eurostat/documents/342366/4953052/Guidance-on-Backfilling.pdf/c18d330c-97f2-4f8c-badd-ba446491b47e

[130] Article 3 (13) of the WFD 'reuse' means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived;

[131] Article 3(16) of the WFD 'preparing for re-use' means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing;

Member States shall take the necessary measures to ensure that producers meet all, or a significant part of, the costs of the implementation of this measure and/or take back end-of life vehicles under the same conditions as referred to in the first subparagraph.

Article 8(3):

Member States shall take the necessary measures to ensure that producers provide dismantling information for each type of new vehicle put on the market within six months after the vehicle is put on the market. This information shall identify, as far as it is needed by treatment facilities in order to comply with the provisions of this Directive, the different vehicle components and materials, and the location of all hazardous substances in the vehicles, in particular with a view to the achievement of the objectives laid down in Article 7.

Article 8(4):

Without prejudice to commercial and industrial confidentiality, Member States shall take the necessary measures to ensure that manufacturers of components used in vehicles make available to authorised treatment facilities, as far as it is requested by these facilities, appropriate information concerning dismantling, storage and testing of components which can be reused.

All Member States have transposed the provision that the delivery of the vehicle for the last holder/owner to an ATF must occur without any costs.

The question of the availability and quality of dismantling information made available by producers is analysed in Section 5.1.1.7.

While these elements are relevant to facilitate the collection and treatment of ELVs, it should be noted that they are pretty limited, when compared to other areas where Extended Producer Responsibility (EPR) schemes have been established. Under such schemes, producers bear a higher financial or organisational responsibility for the end-of-life stage of goods placed on the EU market.

In that respect, the ELV Directive does not take into account the "general minimum requirements for extended producer responsibility schemes" as defined in Article 8a the Waste Framework Directive. Notably, there is no clear provision in the ELV Directive on the need for producer to cover the costs of the treatment of ELVs necessary to meet the targets set out in the Directive. The Packaging and Packaging Waste Directive foresees that EPR schemes should be put in place for packaging, based on the criteria set out in the WFD, by 2024. Other EU waste legislation, such as the WEEE Directive, also contains obligations relating to the establishment of EPR scheme covering a wide range of actions designed to ensure the proper treatment of waste from electrical and electronic equipment.

The absence of sufficient responsibility from the side of producers was presented by some stakeholders as an important impediment to achieve the recovery and recycling of some materials in ELV. For example, the dismantling of glass before shredding is rarely performed by ATF, in view of the costs of the operation, which are not compensated by the revenues from their sale. As a result, glass is instead directed to the shredder heavy fraction (SHF) which is used for construction purposes or for backfilling or disposed of in landfills. This is a

loss of resources, as glass removed before shredding could be rather recycled and used by glass producers[132].

Similar shortcomings exist for other materials (plastics, electronic components) where the current cost for dismantling and subsequent separation and recycling are not compensated by the revenues generated for the dismantlers or recyclers[133].

The targeted survey carried as a part of evaluation included a question on the extent of the ELV Directive related costs attributable to the vehicle producers. The results demonstrated that public authorities (national, regional and local) were generally more likely to agree that vehicle producers bear the costs linked to the implementation of the Directive. Companies, mainly representing the recyclers or ATFs, were the most likely to disagree. Most of them indicated that dismantlers and shredders cover the main costs of the implementation of the Directive. A number of stakeholders from a broader range of representatives presumed the current additional costs are normally shared by dismantlers and shredders. Five stakeholders responded that the treatment of ELVs is sustainable/self-supporting, which implies that the costs of the entire ELV treatment process are covered by the value of the recovered material and/or the sale of recovered parts.

The reduced financial viability of shredding and dismantling companies was noted (see section on efficiency above). Five responses pointed out that legal ATFs will become less profitable in comparison to informal/fraudulent companies that purchase and dismantle ELVs, with a presumption that the current economic model encourages down-cycling rather than recycling.

The provisions in the ELV Directive on the producers' responsibility for the management of ELVs are rather limited when compared to the general minimum requirements set out in the Waste Framework Directive and those in place in other EU waste legislation. This results in limited support to high quality recycling of materials which are costly to recover from ELVs.

5.4.2.4.Basel Convention[134] and the Waste Shipment Regulation[135]

There is a close link between the ELV Directive and the Waste Shipment Regulation, which is under revision process at the time of preparing this evaluation document[136]. The Waste Shipment Regulation establishes the rules governing the transboundary movement of waste vehicles, which are classified as "hazardous waste" for shipments inside and outside the EU. There is however a difficulty in distinguishing between a "used vehicle" and an "ELV" for

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[132] Bartels, Pieter (2016): ELV glass: Re-cycling or Re-covery? 16th International Automobile Recycling Congress IARC 2016. FERVER. Berlin, Germany, 15.03.2016.
[133] Sander, Knut; Kohlmeyer, Regina; Rödig, Lisa; Wagner, Lukas (2017): ELV: Recovery Rates and High Grade Recycling. 17th international Automobile Recycling Congress IARC 2017. Ökopol, Germany; Umweltbundesamt, Germany. IARC 2017 Berlin. Berlin, Germany, 22.03.2017.
[134] More information on the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal: https://www.basel.int/portals/4/basel%20convention/docs/text/baselconventiontext-e.pdf
[135] Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste *(OJ L 190 12.7.2006, p. 1).*
[136] For more information on the revision of the WSR, see here: https://ec.europa.eu/environment/waste/shipments/review_of_the_wsr.htm

export purposes. This is not specifically defined by the legal instruments, but guidance documents, such as the Waste Correspondents' Guidelines No 9 on waste vehicles[137], have been developed. These guidelines have however proven difficult to use in practice. This might cause the undefined situation when "used vehicles" are exported but the EU authorities are not able to track their final *de facto* status whether they are re-registered or illegally scrapped. More aspects regarding the shipment of ELVs are discussed in the section 5.1.2. on "missing vehicles".

5.4.2.5. *Stockholm Convention*[138] *on Persistent Organic Pollutants (POPs) and the EU POPs Regulation*[139]

The Stockholm Convention is implemented in the EU through the POPs Regulation, which bans or restricts the production of persistent organic pollutants and their use in both chemical products and articles. These provisions apply to vehicles. There is no incoherence or overlap between the ELV Directive on one hand and the Stockholm Convention and the POPs Regulation on the other hand. The POPs Regulation has an impact on the ELV sector: it affects firstly the substances/materials used for the production of new vehicles and, secondly, the treatment of materials separated from ELVs, which subsequently may impact the ability of ELV operators to fulfil the targets specified in the ELV Directive. In practice, the most important POP-related issue for the treatment of ELVs relates to the presence and disposal of the flame retardant decabromodiphenyl ether (DecaBDE) and other POP-BDE in shredder residue, which needs to be taken into account in recycling. The disposal and recovery of waste containing such POPs is regulated through the POPs Regulation (Article 7).

5.4.2.6. *Directive on Waste Electrical and Electronic Equipment (WEEE)*[140] *and RoHS Directive*[141]

Questions have arisen on the EU legal waste regime applying to certain EEE that are istalled into vehicles or used exclusively in vehicles.

The Guidance document[142] of European Commision "*Directive 2000/53/EC on the end-of-life vehicles*" provides the general rule on clarifying the links of the ELV Directive with the WEEE and RoHS Directive: "*if the ELV Directives applies, the WEEE and RoHS Directives are not applicable*".

The Guidance document further states that if a device is designed specifically for use in a vehicle, the ELV Directive applies. If a device is not specifically designed for use in a

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[137] See the text of guidance document: https://ec.europa.eu/environment/waste/shipments/guidance.htm

[138] More information on the Stockholm Convention on Persistent Organic Pollutants http://www.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

[139] Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (*OJ L 169, 25.6.2019, p. 45–77).*

[140] Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) *(OJ L 197, 24.7.2012, p. 38–71).*

[141] Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment *(OJ L 174, 1.7.2011, p. 88–110).*

[142] See,Guidance Document on the ELV Directive (http://ec.europa.eu/environment/waste/elv/legislation_en.htm) (page 8) and the WEEE Frequently Asked Questions (http://ec.europa.eu/environment/waste/weee/legis_en.htm)

vehicle, that device is covered by the RoHS and WEEE legislation[143]. It can be concluded that EEEs that are specifically designed for the use in/with vehicles and cannot be used alone, are excluded from the scope of the WEEE Directive[144], e.g. GPS installed in vehicles or car keys.

Questions of coherence arise over certain EEEs that fall into the scope of RoHS Directive and WEEE Directive and are also used in vehicles[145]. This EEE shall be compliant with RoHS Directive and when it comes to the end-of-life shall be handled as WEEE[146]. This means that ELV operators shall attribute the waste of this equipment to WEEE operators.

Clearer distinction on defining which components are under the scope of the ELV Directive and which are under the scope of the RoHS/WEEE Directives would facilitate an ELV operator in attributing devices or parts of them to the correct waste stream.

5.4.2.7.Batteries Directive[147]

The Batteries Directive establishes general requirements for the treatment and recycling of batteries at the end of their life, but does not lay down detailed obligations. It establishes also some provisions in relation to their design (substance prohibitions, battery removability from appliances, etc.). As batteries used in vehicles are within the scope of the Batteries Directive but also regulated through ELV Directive, there are certain overlaps between the two Directives.

In relation to prohibition of hazardous substances, the Batteries Directive specifically refers to cadmium, lead and mercury as "dangerous" substances, however prohibitions are only made in this Directive for mercury (in all battery applications) and for cadmium (in most portable batteries). Automotive batteries are defined as batteries used for automotive starter, lighting or ignition power functions. Other batteries used in vehicles fall under the Batteries Directive definition for "industrial batteries". In both cases, Recital 30 of the Batteries Directive specifies that "*Automotive and industrial batteries and accumulators used in vehicles should meet the requirements of Directive 2000/53/EC, in particular Article 4 thereof*". The substance prohibitions of the ELV Directive therefore apply to these components. Exemption 5b of Annex II of ELV refers to lead in batteries and is still valid for lead acid batteries in most vehicles and currently under evaluation[148].

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[143] For instance, car radios cannot fulfil their purpose in equipment other than the vehicle, the Commission does not consider them to be in scope of the WEEE Directive.

[144] on the basis of the article 2, par. 4, d),

[145] See, Guidance Document on the ELV Directive (http://ec.europa.eu/environment/waste/elv/legislation_en.htm) and the WEEE Frequently Asked Questions (http://ec.europa.eu/environment/waste/weee/legis_en.htm) .

[146] For more information see FAQ on WEEE and RoHS Directive https://ec.europa.eu/environment/waste/pdf/faq_weee.pdf 'Some electrical and electronic devices such as radios, CD players and navigation systems can be bought separately in repair shops, supermarkets or specialized shops and installed and used in vehicles. Where devices are not specifically designed to be used in vehicles, those devices would be covered by the RoHS Directive. Where electrical and electronic devisces, such as radios, CD players and navigation systems, are designed primarily for use in vehicles (such as car radios) the ELV Directive'

[147] Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC *(OJ L 266, 26.9.2006, p. 1–14).*

[148] More information about the evaluations is available here: https://ec.europa.eu/environment/waste/elv/events_en.htm

Regarding waste management, the ELV Directive stipulates that batteries shall be removed as part of the depollution treatment of ELV. The treatment and recycling of the batteries and the recycling rates and efficiencies are governed by the Batteries Directive. The amount resulting from recycling of the dismantled batteries contributes to the recycling rate of the ELVs.

The treatment of large and heavy traction batteries of EVs is set to become more relevant in the future. As the traction batteries are considered industrial batteries and according to the Batteries Directive the 'producer shall not refuse to take back', it is not clear under the current framework if the dismantler must bear the cost for storage and transport of such batteries (today mostly Li-ion and for some hybrid EV also NiMH batteries) or the batteries producer. The targeted 'recycling efficiency rate' for 'other batteries' is 50% according to the Batteries Directive. Traction batteries for EV (both Li-ion and NiMH) fall under this category. Depending on the growing share of the battery in the total weight of the vehicle, achieving the target of the Batteries Directive might not be sufficient to achieve the recycling target of the ELV Directive.

The legislative proposal of a Regulation on batteries and waste batteries[149], which is expected to repeal and replace the Batteries Directive, intends to address many issues of direct relevance for the ELV sector and the ELV Directive. First of all, the proposal introduces a clear classification of batteries, including a separate definition on "electric vehicle battery" which intends to cover batteries specifically designed to provide traction to electric vehicles. It also sets out comprehensive rules cocerning the design, collection, treatment and recycling of batteries. In addition, it reinforces the principle of extended producer responsibility, for the collection, transportation and treatment/recycling of all batteries. Detailed reporting obligations are proposed for all actors involved in the collection of waste automotive, industrial and electric vehicles batteries as for portable batteries. The revised Batteries legislation is expected to ensure stronger coherence between the ELV and batteries policy frameworks. One example is the use of lead in batteries, which is currently regulated through the ELV Directive. As currently proposed, the new Batteries Regulation would deal with hazardous substances in batteries and their evaluation in a coherent and comprehensive way, in conjunction with Regulation (EC) N° 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

[149]Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) No 2019/1020 (COM(2020) 798/3) (2020/353 (COD) (Proposal and Annexes)

5.4.2.8.Directive on Vehicle Registration Documents[150]

As indicated in section 5.1.2 on the problem of "missing vehicles", the existing procedures for registration and deregistration of vehicles in the EU Member States do not allow to keep track of all ELVs generated in the EU. The Directive on the registration documents for vehicles (1999/37/EC) and the ELV Directive have different objectives and their interplay does not ensure that one vehicle de-registered in one Member State be reported to the Member State where it was initially registered. There are a number of reasons for such shortcomings, including the absence of a harmonised set of terms linked to definitive or temporary de-registration, the absence of a 'conclusive list of conditions defining when a permanent cancellation shall apply' as well as the absence of an obligation for Member States to share information on de-registered vehicles imported from another Member State.

5.4.2.9. Directive 2005/64/EC on the type-approval of motor vehicles regarding their reusability, recyclability and recoverability[151]

Directive 2005/64/EC is the main piece of EU legislation linking the design of new vehicles and their reusability, recyclability and recoverability. One of its purpose is to ensure coherence between the type approval procedures for new vehicles on one hand, and the obligations contained in the ELV Directive with respect to the prohibition of hazardous substances, treatment of ELVs and the re-use, recycling and recovery targets.

According to Article 6(1) of Directive 2005/64/EC "*Member States shall not grant any type approval without first ensuring that the manufacturer has put in place satisfactory arrangements and procedures, in accordance with point 3 of Annex IV, to manage properly the reusability, recyclability and recoverability aspects covered by this Directive. When this preliminary assessment has been carried out, a certificate named 'Certificate of Compliance with Annex IV' (hereinafter the certificate of compliance) shall be granted to the manufacturer*".

The Directive 2005/64/EC provides a number of obligations that need to be complied with by the Member States and car manufacturers on how to demonstrate that new models comply with the relevant obligations under EU law on reusability, recyclability and recoverability.

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[150] Council Directive 1999/37/EC of 29 April 1999 on the registration documents for vehicles, *OJ L 138, 1.6.1999, p. 57–65* Regulation (EU) 2019/2144 of the European Parliament and of the Council of 27 November 2019 on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users, amending Regulation (EU) 2018/858 of the European Parliament and of the Council and repealing Regulations (EC) No 78/2009, (EC) No 79/2009 and (EC) No 661/2009 of the European Parliament and of the Council and Commission Regulations (EC) No 631/2009, (EU) No 406/2010, (EU) No 672/2010, (EU) No 1003/2010, (EU) No 1005/2010, (EU) No 1008/2010, (EU) No 1009/2010, (EU) No 19/2011, (EU) No 109/2011, (EU) No 458/2011, (EU) No 65/2012, (EU) No 130/2012, (EU) No 347/2012, (EU) No 351/2012, (EU) No 1230/2012 and (EU) 2015/166: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1602848873781&uri=CELEX:32019R2144

[151] Directive 2005/64/EC of the European Parliament and of the Council of 26 October 2005 on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability and amending Council Directive 70/156/EEC *(OJ L 310, 25.11.2005, p. 10–27)*

In some instances, the wording used in the Directive 2005/64/EC lacks precision and leaves room for interpretation, which could jeopardise the attainment of the objectives of the ELV Directive, particularly when it comes to the reuse, recycling and recovery targets. The definitions of "reusability", "recyclability" and "recoverability" in Directive 2005/64/EC refers to the "potential" for "reusability", "recyclability" and "recoverability"[152]. It is not clear how this potential is calculated. Potential recycling seems quite different from actual recycling for example and there is a risk that the provision could be interpreted quite broadly.

Directive 2005/64/EC (Article 6) also states that, in order to obtain the type approval, car manufacturers "*shall recommend a strategy to ensure dismantling, reuse of component parts, recycling and recovery of materials"* and that this strategy "*shall take into account the proven technologies available or in development at the time of the application for a vehicle type-approval"*. The reference to proven technologies "*in development"* also creates some uncertainty as to the fact that these technologies will be available when the cars in question will become ELVs.

Another example on the possible insufficient link between the aims of the ELV Directive and Directive 2005/64/EC is the fact that the latter considers that "*tyres should be considered as recyclable*" for the purpose of calculating the recyclability of cars. There is no justification for this consideration, while available data show that, despite the potential, a large part of end-of-life tyres are actually not recycled.[153]

During the consultation process for this evaluation, some stakeholders have expressed doubts that some recent car models actually comply with the obligations of Directive 2005/64/EC relating to the recyclability of new vehicles, notably in view of the important quantities of materials contained in these models which are difficult to recycle (especially plastics and carbon fibre-reinforced plastics).

There is no reporting requirement for Member States on the implementation of Directive 2005/64/EC[154]. It is therefore not possible to evaluate to which extent this Directive is being implemented and if its provisions are still fit for purpose in view of the evolution of the car manufacturing sector since 2005 and of the EU policy objectives on circular economy. However, the new type-approval Regulation[155] reinforces the type-approval testing of new cars on the EU market and where tests and investigations show non-compliance, the market surveillance authority of the Member State can decide to demand a recall or, in severe cases,

[152] See, article 4 of the Directive.

[153] According to ETRMA 62% is recycled into other applications than tyres. https://www.etrma.org/key-topics/circular-economy/

[154] Directive 2005/64/EC of the European Parliament and of the Council of 26 October 2005 on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability and amending Council Directive 70/156/EEC (1) and Commission Directive 2009/1/EC of 7 January 2009 amending, for the purposes of its adaptation to technical progress, Directive 2005/64/EC of the European Parliament and of the Council on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability *(OJ L 310, 25.11.2005, p. 10–27).*

[155] Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC *(OJ L 151, 14.6.2018, p. 1–218).*

full withdrawal from the market. The Commission will also have the right to order recalls or market withdrawals. This will allow the remedial measure to have an EU wide effect, which did not exist.

Even so, the elements presented above show that there are a number of areas where coherence with the ELV Directive seems insufficient.

5.4.2.10. European List of Waste[156]

The European List of Waste (ELoW) includes several notes on the classification of the outputs of the ELVs, i.e. any waste marked with an asterisk (*) in the list of wastes shall be considered as hazardous waste pursuant to Directive 2008/98/EC, unless Article 20 of that Directive applies (see table below). The ELV Directive though does not refer to the ELoW, while this could be useful to ensure coherence and data comparability in the area of reporting.

Table 5-7: Waste from ELVs as indicated in the European List of Waste

European List of Waste Number	Label
16 01	**end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)**
16 01 03	end-of-life tyres
16 01 04*	end-of-life vehicles
16 01 06	end-of-life vehicles, containing neither liquids nor other hazardous components
16 01 07*	oil filters
16 01 08*	components containing mercury
16 01 09*	components containing PCBs
16 01 10*	explosive components (for example air bags)
16 01 11*	brake pads containing asbestos
16 01 12	brake pads other than those mentioned in 16 01 11

[156] Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (notified under document number C(2000) 1147) (*OJ L 226, 6.9.2000, p. 3)* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02000D0532-20150601

European List of Waste Number	Label
16 01 13*	brake fluids
16 01 14*	antifreeze fluids containing hazardous substances
16 01 15	antifreeze fluids other than those mentioned in 16 01 14
16 01 16	tanks for liquefied gas
16 01 17	ferrous metal
16 01 18	non-ferrous metal
16 01 19	Plastic
16 01 20	Glass
16 01 21*	hazardous components other than those mentioned in 16 01 07 to 16 01 11 and 16 01 13 and 16 01 14
16 01 22	components not otherwise specified
16 01 99	wastes not otherwise specified
16 06	**batteries and accumulators**
16 06 01*	lead batteries
16 06 02*	Ni-Cd batteries
16 06 03*	mercury-containing batteries
16 06 04	alkaline batteries (except 16 06 03)
16 06 05	other batteries and accumulators
16 06 06*	separately collected electrolyte from batteries and accumulators
16 08	**spent catalysts**
16 08 01	spent catalysts containing gold, silver, rhenium, rhodium, palladium, iridium or platinum (except 16 08 07)
16 08 02*	spent catalysts containing hazardous transition metals or hazardous transition metal compounds
16 08 03	spent catalysts containing transition metals or transition metal compounds not otherwise specified

European List of Waste Number	Label
16 08 07*	spent catalysts contaminated with hazardous substances
13 01	**waste hydraulic oils**
13 04	**bilge oils**
13 05	**oil/water separator contents**
13 08	**oil wastes not otherwise specified**
14 06	**waste organic solvents, refrigerants and foam/aerosolpropellant**

5.5. EU Added Value

Since its entry into force in 2000, the ELV Directive has improved the consistency of national conditions and harmonized the fragmented regulation of ELV among Member States. Based on the Article 192 of TFEU, it established **the first EU wide legal framework on ELVs** by imposing requirements on the manufacturing of new cars, setting recovery and recycling targets, minimum requirements for the ELV treatment, prevention of waste generation from cars.

The implementation of the ELV Directive increased the collection of ELVs, which subsequently led to increased rates of reuse and recycling of ELV parts and materials. As a result of minimum technical requirements, currently there are approximately 14 000 ATFs and 350 automotive shredding facilities in Europe.

The prohibition of certain hazardous substances is considered to have **a long-term positive impact** on the possibilities to reuse or recycle materials retrieved from the ELVs.

The ELV Directive has also positively **influenced the composition of components in other vehicle sectors,** which are not covered by the scope of the Directive[157]. In relation to the global effect, although Article 4(2)(a)[158]only requires that vehicles placed on the EU market are compliant with the substance prohibitions, the progress achieved here is also often implemented in vehicles marketed outside the EU. It suggests that the benefits from the substance prohibitions is expected to exceed the EU market. Nonetheless, it was also noted by some stakeholders that, compared to the legislation outside the EU, the ELV Directive sets stricter standards which might impact the competitiveness of the EU car industry (but this is

[157] Based on the information provided by the motorcycle trade association, prohibitions have affected the composition of components used in the motorcycle sector because the two industries use common parts.

[158] Article 4(2)(a) also requires Member States to "*ensure that materials and components of vehicles put on the market after 1 July 2003 do not contain lead, mercury, cadmium or hexavalent chromium other than in cases listed in Annex II under the conditions specified therein"*.

counterbalanced by the fact that the ELV Directive applies to all vehicles put on the EU market and not just to cars produced in the EU).

Taking into consideration all aspects, the ELV Directive has been having a clear added-value and a withdrawal of the Directive would present a serious risk in increasing the uncontrolled disposal of ELVs, uncontrolled use of hazardous substances and lowering the rates of reuse, recycling and recovery from ELVs.

On the other hand, the evaluation has identified several aspects which limit the added value of the Directive:

- The reporting according to Commission Decision 2005/293/EC[159] laying down detailed rules for the monitoring of the reuse/recovery and reuse/recycling targets does **not provide sufficient evidence on the recycling rates achieved**. This is notably due to the fact that Member States do not all have the same interpretation of some terms in the Directive, as well, for example, that the current reporting provisions do not require the information on the PST capacity available in each Member State.
- The ELV Directive does not ensure that information is made available on the overall number of ELVs in the EU. Member States have to report the number of ELVs treated in their country[160]. However, not all Member States are providing information on the destiny of deregistered cars and there is no way to know which of these vehicles are becoming ELVs.
- The procedure to demonstrate the effective recycling of vehicles exported to a 3rd country is not clearly defined;
- While the transposition into national legislation has been completed by the Member States, there is evidence of implementation and **enforcement deficits across the EU.** Considering the large number of missing vehicles, de-registration procedures are not properly established and monitored ensuring that that all ELVs are sent to ATFs.
- **The ELV Directive does not establish requirements for mandatory inspections of the sector**, including ATFs, workshops, garages performing dismantling/depollution activities;
- **Ineffective tracking information.** Parts for reuse are offered, *inter alia* via internet sales, to consumers from unidentified providers and often without a certificate or other documentation demonstrating that the parts are dismantled by ATFs.

6.5. Conclusions

[159] 2005/293/EC: Commission Decision of 1 April 2005 laying down detailed rules on the monitoring of the reuse/recovery and reuse/recycling targets set out in Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles (notified under document number C(2004) 2849)

[160] Article 1(1), par.2 of Commission Decision 2005/293/EC, *(OJ L 94, 13.4.2005, p. 30)* and the guidance document: https://ec.europa.eu/eurostat/documents/342366/0/ELV+Guidance-2019

This section presents the main conclusions relating to the effectiveness, efficiency, relevance, coherence and EU added value of the ELV Directive, based on the findings presented above.

6.1. Effectiveness

The Directive has established a robust legal framework which has been effective to harmonise minimum ELV treatment across the EU by restricting hazardous substances on manufacturing of new cars, setting minimum requirements for the ELV treatment and recovery and recycling targets,.

It has contributed to numerous achievements, in particular in the following areas:

- Setting high recycling, recovery and reuse targets: Member States reported compliance with meeting the 85% reuse and recycling target as well as the recovery targets for 2017;
- Increase of collection rates of ELVs;
- Reduction of uncontrolled disposal and illegal activities with a consequent increase in proper collection and proper recovery of environmentally damaging materials;
- 14 000 ATFs have been established across the EU based under the harmonised minimum requirement set in the ELV Directive;
- Establishment of the International Dismantling Information System (IDIS).

The ELV Directive contains general provisions on the design of cars to facilitate their dismantling and the uptake of recycled materials. These provisions are directly relevant to building a circular model for the car industry but are not sufficiently detailed, specific and/or measurable. As a result, they have not brought about real improvements at the EU level to match the expectations that the car industry is truly a circular industry.

In addition, the problem of "**missing vehicles"** remain of considerable importance:

- Around 10 million ELVs are expected to become available for treatment each year. However, the number of ELVs officially treated in the EU is well below the number of vehicles leaving the stock of registered vehicles. The numbers reported and treated in ATFs are around 6 million, leaving about 35% of the total vehicles which exited the stock as "unknown whereabouts" each year. Although no conclusive data is available to quantify the most significant reasons, the most important factors explaining the problem are linked to:
    - the lack of a coherent vehicle deregistration approach among Member States, which creates the conditions for vehicles to effectively 'disappear' from the statistics of Member States. While Article 5(3) of the ELV Directive obliges to present a CoD to deregister an ELV, there are other situations where vehicles can get de-registered and there is no exhaustive list established at the EU legislation for the deregistration conditions;
    - the lack of systematic reporting by Member States to the country of origin if an imported used vehicle is re-registered in the importing country or if an imported used vehicle is scrapped;
    - the challenges with the distinction between "used vehicles" and ELVs, which is of particular acuity in relation to the export of second-hand vehicles outside the EU (1 million/year according to official data).

Inspections and controls are currently insufficient to ensure that such distinction is properly respected.

Another problem undermining the effectiveness of the ELV Directive is **lack of provisions on inspections** of ATFs or the wider dismantling/recycling sector. Due to insufficient human and financial resources, only occasional inspections are carried by Member States with a limited focus on the ATFs. Thus it is considered that setting a legal obligation to perform inspections and minimum standards followed by reporting requirement would improve the effectiveness of the EVL Directive and, moreover, would strengthen the competitiveness of ATFs vs. unregistered facilities.

The effectiveness of the ELV Directive is also undermined by the lack of sufficiently clear reporting obligations. This is especially the case to properly monitor how the re-use, recycling and recovery targets are implemented by the relevant economic actors across the Member States.

6.2. Efficiency

- ***Costs and Benefits***

Although it is difficult to **compare the costs and benefits** associated with the Directive, the vast majority of the stakeholders considered that the total benefits of the Directive outweigh its costs.

The main benefits of the Directive can be summarised as follows:

- Environmental benefits include avoided damages to ecosystems due to hazardous substances and inappropriate handling of ELV fluids and other components.
- Social benefits involve the avoided damage to human health due to exposure to hazardous substances and unregulated dismantling operations. Other social benefits include the employment and income generation for employees across the EU in the dismantling sector and other economic operators, the majority of which are SMEs.
- Economic benefits comprise business revenues for the dismantling and shredding sectors and for a number of other sectors that use secondary materials derived by ELV treatment. The creation of a level playing field across the EU for all economic actors involved in the collection, treatment and reuse, recycling and recovery of ELVs is also an important economic benefit derived from the ELV Directive.

Costs associated with the ELV Directive are incurred by various economic operators for data collection, reporting, monitoring, and technical compliance. The distribution of these costs among economic operators in the automotive sector is an issue where diverging views were expressed by the interested players. There is notably no definitive data on the profitability of the ATFs, even though available information seems to show that their economic situation is generally fragile. For the consumers, the ELV Directive did not incur any cost, especially as it foresees that the disposal of ELVs by its last owner should occur for free.

There is also no evidence nor claims that the ELV Directive has a negative impact on the competitiveness of the automotive industry within the EU.

- ***Administrative Burden and Simplification Opportunities***

Based on the results of the stakeholders' consultation, there is **no clear evidence that the ELV Directive leads to unnecessary administrative burden or complex procedures for stakeholders and public authorities.** Public authorities experience costs to administer the ELV Directive, including data collection, reporting, monitoring and technical compliance issues. Companies, e.g. recyclers and ATFs, on average spend more resources on technical compliance than other stakeholder types. Move to online tools (i.e. online reporting for issuing a CoD) and shift to digitalisation would help to reduce avoidable administrative burden, notably related to the reporting obligations or other procedures, e.g. vehicle (de-) registration and notification systems.

6.3. Relevance

- ***Scope***

The vast majority of the vehicle market is covered by the ELV Directive, where passenger vehicles comprise the major share of vehicles currently operating in the market (76.3%). However, 25% of vehicles do not fall within the scope of the Directive, e.g. trucks of more than 3, 5 tonnes, big buses, specialty vehicles and motorcycles. The relevance of leaving 45 millions of vehicles outside the scope the ELV Directive seems questionable, as these vehicles are currently not subject to any specific EU-wide rules regarding the treatment of the waste they generate. Most stakeholders supported the extension of scope across other vehicle types, motorcycles, buses and trucks, justified by environmental reasons. Also it was noted that there is a fragmented regulation of small e-vehicles (e.g. e-scooters, e-bikes, wheelchairs), which certain aspects are covered by different EU legislations. Expanding the scope of the ELV Directive to other vehicle types is seen relevant and hence requires a further analysis of the economic, social and environmental impacts. The specific features of these vehicles need however to be fully taken in consideration in future reflexion on the extension of the scope of the ELV Directive.

- ***Increased use of electric, electronic components and lightweight materials in vehicles***

The evaluation revealed that the **provisions of the ELV Directive are not suited to ensure a high level of recovery and recycling of increasingly used valuable materials,** such as gold, silver, palladium, tantalum and other rare earth metals, contained in the electric and electronic components. One of the major reasons causing this vacuum in this area is related to the lack of specific requirements in the ELV Directive to separate and recover these materials and this is impossible to be achieved without a higher level of dismantling processing. In addition, the Directive does not foresee specific recovery/recycling targets for these materials. The increased use of lightweight materials in vehicles, e.g. carbon-fibre reinforced plastics, also creates challenges for the ELV treatment, as they are currently particularly difficult to recycle. This is likely to increase the cost and complexity of dismantling. On the other hand, costly components are expected to generate dismantling income, as electric/hybrid vehicles will eventually increase the revenues of the recycling sector due to the higher recovery of valuable metals.

As a result, the ELV Directive does not contain sufficient provisions to deal adequately with the challenges posed by the increased use of lightweight materials, electronic and electric components in cars.

- ***Increase in sales of electric or hybrid vehicles***

By 2030 approximately a half of all passenger cars sold in the EU are predicted to be electric vehicles or hybrid. This represents a considerable change compared to the situation when the ELV Directive was adopted in 2000. More than 50% of the consulted stakeholders noted that the increased use of EVs will increase waste management costs for ELVs. An important challenge is the management of batteries from electric vehicles, which should be addressed in the separate future EU legislation on batteries. The ELV Directive should be well articulated with this new legislation. As to other parts and materials contained in electric and hybrid vehicles, it is unclear if the ELV Directive in its current form is sufficient to ensure that they are properly recovered and recycled.

6.4. Coherence

The ELV Directive is considered as internally coherent.

The ELV Directive relies on a general approach which is coherent with the EU policy objectives on **circular economy**. However, its provisions are in many respect not sufficient to ensure that the general orientations expressed in the ELV Directive are turned into concrete deliverables. As indicated in the effectiveness part, this is the case especially for the provisions on the design and manufacturing of vehicles and on the use of recycled materials. In addition, the provisions on the treatment of ELVs (notably the fact that they do not specify which materials/parts should be removed prior to shredding) and the targets for re-use and recycling, and for re-use and recovery (which are based on the overall weight of vehicles) are also too general to ensure that some valuable materials are recovered and recycled. The absence of provisions setting out a full-fledged EPR scheme to support the treatment of end-of-life vehicles is another obstacle to high quality recycling and recovery of such materials: these operations are costly for ATFs and recyclers to perform, and the revenues generated from these activities might not offset these costs. As a result, important quantities of waste from ELVs, which could be avoided or recycled, are destined for energy recovery or disposed in landfills.

The evaluation showed that synergy is also important with the EU ambitious **climate change agenda.** The EU legislation on the reduction of GHG and air pollutants from vehicles will accelerate the shift of the automotive sector to electric cars and will also encourage the use of lightweight materials like plastics in vehicles. As indicated above, this will represent considerable challenges for the recycling of ELVs. In addition, the adoption of strict norms in the EU might further increase the export of used vehicles outside the EU, rendering the inspection and control of the export of ELVs even more challenging than is currently the case. A more circular design for the production of cars, a higher rate of re-use of spare parts from ELVs, a higher uptake of recycled materials in new cars and higher levels of recycling would bring with them reduction of GHG both in the production phase and the dismantling phases of vehicles.

While the ELV Directive is generally coherent with other pieces of EU legislation, there are a number of instances where incoherencies are problematic:

- The definition of “recycling” of the ELV Directive is too broad and not aligned with the WFD. The ELV Directive does not refer to the term extended producer responsibility and does not establish minimum requirements in line with the provisions of the WFD on EPR, or other EU legislation on waste (such as packaging waste or WEEE). As a result, there is no full EPR system established

by the ELV Directive, clearly defining distribution of costs for the collection and treatment of waste between producers and other economic operators. The current provisions of the ELV Directive do not appear sufficient to address the challenges related to the growing market of electric vehicles, increased use of lightweight materials, in particular plastic carbon fibre, and digital components in the vehicles.

- Questions have arisen over ceratin EEE that is installed into vehicles or used exclusively with vehicles and what legislation, ELV or RoHS/WEEE, is applicable. Clearer distinction on defining which components are under the scope of the ELV Directive and which are under the scope of the RoHS/WEEE would facilitate an ELV operator in attributing devices or parts of them to the correct waste stream.
- Better coherence is needed with Directive 2005/64/EC on the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability, notably to ensure that the design of new cars properly allows for the attainment of targets set by the ELV Directive.
- The ELV Directive and Directive 1999/37/EC on the registration documents for vehicles are not based on the harmonised set of terms, which has effects on deregistration and the issuing of CoDs.
- There is a reference to the European List of Waste (ELoW) in the implementation of ELV Directive[161]. Although this coding was a mere indication, there is evidence that Member States are currently reporting in line with the the LoW, whenever the Member States have a reporting system permitting to collect such information, supported also by the indications provided by Eurostat in past years and in the Eurobase codes definitions. The current problem is that not all the Member States have implemented a reporting system permitting to gather the most part of the voluntary information set up in Table 1 of the Commission Decision 2005/293/EC.

6.5. EU added value

There are no doubts that the ELV Directive has improved the consistency of national conditions and harmonized the fragmented regulation on ELVs among Member States. Implementation of the provisions increased collection of ELVs, which subsequently led to increased rates of reuse and recycling of ELV parts and materials. Prohibition of certain hazardous substances in ELVs and their parts is considered to have a long-term impact on the possibilities to reuse or recycle materials retrieved from the ELVs. Benefits from the substance prohibitions is expected to exceed the EU market.

6.6. Lessons learnt

The evaluation of the ELV Directive confirmed that it remains an useful piece of legislation, which aptly contributed to the EU environmental acquis by harmonising the approach among the EU Member States on the ELVs collection and treatment, and improved the environmental performance of the economic operators involved in the life cycle of vehicles.

[161] See, note 3 in Commission Decision 2005/293/EC

Although the ELV Directive has largely served its purpose, its implementation showed certain weaknesses, mainly related to the general nature of its provisions, its lack of relevance to address the challenges linked to the evolution of the automotive industry and its incoherence with other pieces of EU legislation. These elements are a clear indication that the Directive should be reviewed.

The review could usefully look into the way to improve the ELV Directive with the following objectives:

1) **addressing the current implementation challenges,** notably obstacles hampering the performance of the Directive (i.e. examining the extension of the scope of ELVs, addressing the factors feeding the "missing vehicles", setting up proper Extended Producer Responsibility schemes, reinforcing inspections of treatment facilities and export);

2) **addressing the technological advancement and future challenges** (i.e. electrification of vehicles, increased use of lightweight materials, digitalisation, online sales) **and encouraging the transition of the automotive sector to the circular economy** (i.e. better design of vehicles for re-use, remanufacturing, recycling; higher uptake of recycled materials).

These options and measures will be assessed as part of the review process of the ELV Directive, which started in October 2020 with the publication of an inception impact assessment roadmap[162] and is expected to be concluded in 2022.

[162] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12633-Revision-of-EU-legislation-on-end-of-life-vehicles

ANNEX 1: PROCEDURAL INFORMATION

Lead DGs and internal references

The evaluation has been coordinated by the European Commission's Directorate-General (DG) for Environment supported by an interservice steering group (ISG) involving representatives of *DG Internal Market, Industry, Entrepreneurship and SMEs, DG Energy, DG for Climate Action, DG for Communications Networks, Content and Technology, DG Mobility and Transport, DG for Research and Innovation, the Joint Research Centre, DG Eurostat, the Legal Service and the Secretariat-General.* The group steered and monitored the evaluation's progress and ensured that it met the necessary standards for quality, impartiality and usefulness.

Organisation and timing

The roadmap[163] was published on 4 October 2018 and feedback on this roadmap was received until 1 November 2018.

The stakeholder consultation strategy was prepared and made publicly available in 2018. It set a number or consultation activities comprising a public consultation and targeted consultation in the form of interviews and surveys. While a detailed consultation synopsis is provided in Annex 2, a brief explanation of consultation activities follows here.

In order to maximise the engagement of the stakeholders, the evaluation process was based on the targeted consultation approach. In this respect, the online survey was launched on September 25th 2019 and remained open for 8 weeks, until November 22nd to obtain input on the questions examined in the report. Accordingly, the online questionnaire was developed in consultation with the Commission services and was pilot tested with five stakeholders. A total of 72 stakeholders responded to the targeted questionnaire coming from a range of stakeholder groups.

In addition to the targeted survey, 9 interviews with selected stakeholders were conducted with a view to complement the input from the survey. A total of nine interviews were conducted out of the total of 19 organisations contacted. These included four interviews that were conducted during the initial stages that assisted in the development of the survey questionnaire. Totally, over 50 representative associations and individual companies responded in writing to the targeted consultation.

In addition to the targeted consultation, open public consultation was conducted by the Commission for 12 weeks (6 August 2019 – 29 October 2019). In total, 141 responses were received.

[163] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1912-Legislation-on-end-of-life-vehicles-evaluation

In order to supplement the input of the stakeholder consultation, a stakeholder workshop was organised on 5 February 2020 on the basis of initial analysis of the findings. The workshop was attended by 71 stakeholders from authorities, industry representatives (economic operators and their representatives at EU and national level) and other stakeholders, including NGOs and academic experts.

A Europa webpage was set to provide information on the evaluation process[164].

Exceptions to the Better Regulation Guidelines

No exceptions were made to the Better Regulation Guidelines[165] during this evaluation.

Evidence, sources and quality

The evaluation was supported by a study that *inter alia* provided support on stakeholder consultation. This study was initiated in 2017 and was performed by a consortium led by Trinomics[166]. The study was completed in August 2020[167].

Stakeholder consultation and targeted data collection were an important element of the exercise (see Annex 2). A Stakeholder workshop was held on 5 February 2020 to actively involve Member State competent authorities and stakeholders and to gather views and information necessary to support the evaluation of the ELV Directive[168].

The following key studies and reports have been taken into account:

- the legal acts and documents related to the implementation of the Directive;
- Commission implementation reports based on information provided by Member States pursuant to Commission Decision 2001/753/EC[169] concerning a questionnaire for Member States reports on the implementation of Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles;
- exemption evaluation reports related to the hazardous substance prohibitions[170];
- End-of-life vehicle statistics from Eurostat[171];
- Effectively tackling the issue of millions of vehicles with unknown whereabouts - European priority measure: establishing leakage-proof vehicle registration systems by UBA (2020)[172];
- Used vehicles and the environment. UNEP report (2020)[173];

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[164] https://ec.europa.eu/environment/waste/elv/evaluation_en.htm
[165] https://ec.europa.eu/info/better-regulation-guidelines-and-toolbox_en
[166] Study "Service contract supporting the Evaluation of the Directive 2000/53/EC on end-of-life vehicles", commissioned by the European Commission, DG Environ-ment A.2, under the framework contract ENV.F.1./FRA/2014/0063, and between Trinomics and the contractors Oeko-Institut e.V. and Ricardo.
[167]https://publications.europa.eu/en/publication-detail/-/publication/926420bc-8284-11e9-9f05-01aa75ed71a1/language-en/format-PDF
[168]The minutes of the meeting have been published are available at: https://www.elv-evaluation.eu/fileadmin/user_upload/documents/ELV_Evaluation_Workshop_Minutes.pdf
[169] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001D0753
[170] *See* consultant final reports published under: https://elv.exemptions.oeko.info/index.php?id=20
[171] https://ec.europa.eu/eurostat/statistics-explained/index.php/End-of-life_vehicle_statistics
[172] Effectively tackling the issue of millions of vehicles with unknown whereabouts - European priority measure: establishing leakage-proof vehicle registration systems;

- Used vehicles exported to Africa – a study on the quality of used export vehicles. Human Environment and Transport Inspectorate the Dutch Ministry of Infrastructure and Water Management (2020)[174].
- relevant studies[175] and presentations[176].

[173] A link to the UNEP report: https://www.unep.org/resources/report/global-trade-used-vehicles-report
[174] A link to the study: https://www.ilent.nl/binaries/ilt/documenten/rapporten/2020/10/26/rapport--used-vehicles-exported-to-africa/RAPPORT-+Used+vehicles+exported+to+Africa.pdf
[175] https://ec.europa.eu/environment/waste/elv/events_en.htm
[176] More information on information sources, studies and presentations can be find in the webpage of the study performed by the consortium consultants: https://www.elv-evaluation.eu/

ANNEX 2. SYNOPSIS REPORT OF THE STAKEHOLDER CONSULTATION

Stakeholder Consultation Strategy

A stakeholder consultation strategy was prepared and adopted for this evaluation. It defined the objectives of the consultation, which are the following:

To involve stakeholders in the policy evaluation process by gathering their views on the functioning of the ELV Directive and receiving suggestions for improvement;

To collect additional data and relevant facts on the implementation of the ELV Directive beyond the materials already available;

To identify all those parts of the ELV Directive that stakeholders consider negative, problematic or undesirable, including implementation problems, excessive administrative or regulatory burden, inconsistencies both within the ELV and with other legislation, duplications or overlaps, measures that no longer address present and future challenges, and gaps in the Directive that limit its ability to meet its objectives.

To identify those parts of the ELV Directive that stakeholders consider positive and that worked well. To identify positive elements in the implementation of the ELV Directive in different Member States so that best practices can be highlighted and shared.

To analyse potential divergences between Member States in the implementation of the ELV Directive across the EU, identify the reasons for these, and suggest appropriate measures for better harmonisation of rules.

A combination of survey and targeted interviews has been used to obtain contribution from relevant stakeholders, which included the following target groups:

Industry stakeholders: This group of stakeholders included trade associations and individual entities including vehicle manufacturers, authorised treatment facilities (ATF), recyclers, insurers (as vehicles which are damaged beyond repair in accidents typically become end of life vehicles that are owned by insurance companies), material recycling companies and organisations;

Authorities including national and regional authorities responsible for ELV implementation as well national authorities responsible with vehicles registration;

Representatives of civil society including environmental and motoring NGOs, consumer representatives and academics.

Targeted survey

A targeted online survey has been used to obtain input on the broad range of topics examined in the evaluation. The online questionnaire was developed by the external consultant in consultation with the Commission services and was pilot tested with five stakeholders.

The survey was launched on 25 September 2019 and remained open for 8 weeks, until 22 November 2019.

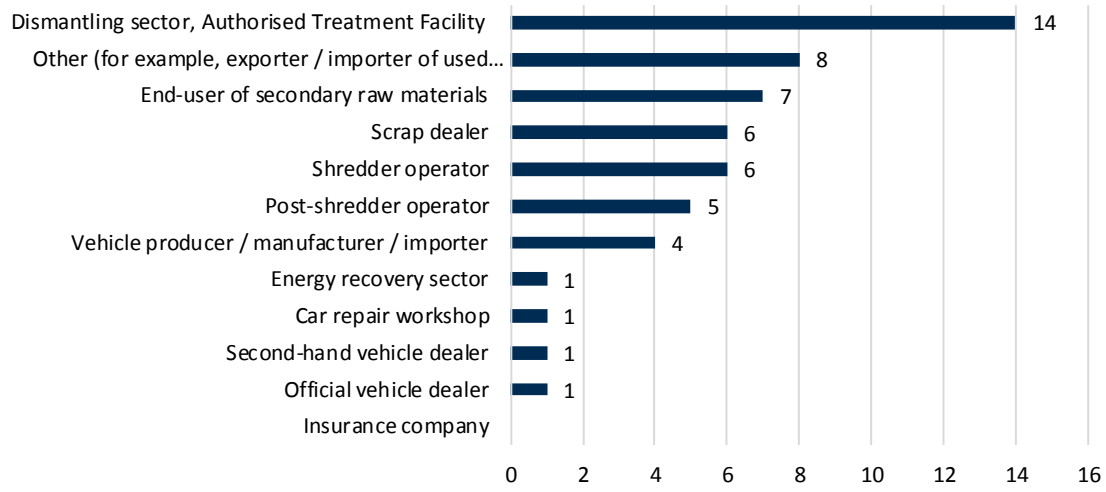
A total of 72 stakeholders responded to the targeted questionnaire coming from a range of stakeholder groups (*see* below, **Table A- 1**). Most responses came from authorities (mainly national and regional) followed by individual businesses and business associations. There were fewer responses from representatives of the civil society, including environmental organisations, NGOs, academic experts and trade unions. There were no responses from consumer representatives.

Table A-1: Respondents to the targeted survey by type

Stakeholder type	Number of responses	Share of total
Authorities	**34**	**47%**
National	20	28%
Regional	10	14%
Local	4	6%
Industry	**21**	**29%**
Individual enterprises	12	17%
Business associations	9	13%
Civic society	**10**	**14%**
Environmental organisations/NGOs	4	6%
Academic/research organisation	2	3%
Trade unions	1	1%
Individual citizens	3	4%
Other/non-identified	**7**	**10%**
Total	**72**	**100%**

In terms of the responses from industry sector, most respondents were from the dismantling sector (ATFs) (*see* **Figure A- 1**). However, input was obtained from all parts of the supply chain directly or indirectly affected, including both vehicle manufacturers, dealers and importers as well as those involved in the processing stages (end-users of secondary raw materials, scrap dealers and shredder operators). The only gap was the absence of responses from the insurance sector.

Figure A- 1: Private sector stakeholders' ELV areas of operation



Stakeholder interviews

In addition to the survey, 9 interviews with a selected stakeholders were conducted. These were intended to supplement the input from the survey.

A total of nine interviews were conducted out of the total of 19 organisations contacted. These included four interviews that were conducted during the initial stages that assisted in the development of the survey questionnaire and provide some initial output. A number of stakeholders did not respond to the invitation for an interview despite the multiple requests. Nonetheless, the interviewees do represent a range of stakeholders including business associations, one European EPR organisation, one European ATF company, and one national authority.

Table A-2: Summary of individual face to face* interviews

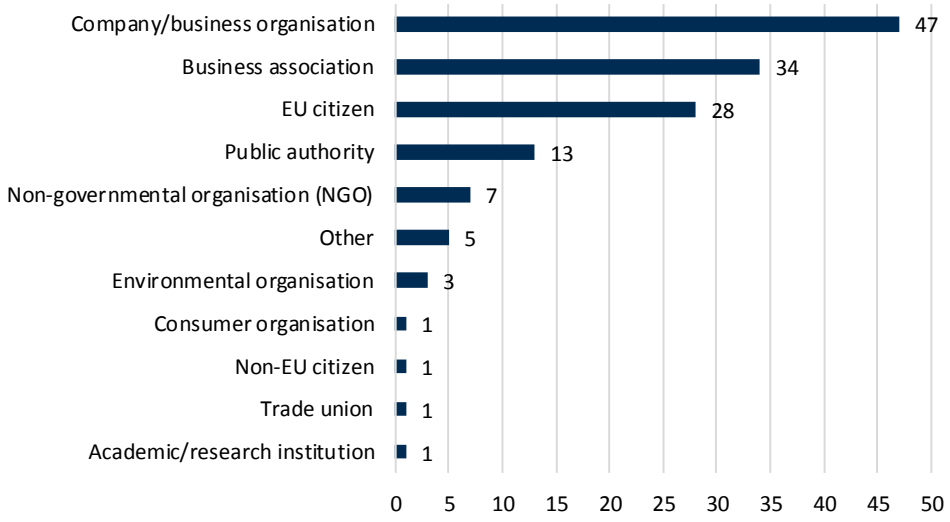
Type of stakeholder	Contacted	Completed (face to face)*
Industry association	14	6 (including 4 initial interviews)
ATF enterprise	1	1
EPR enterprise	2	1
National authority	1	1
Total		**9**

* *over 50 representative associations and individual companies responded in writing to the targeted consultation*

Open Public Consultation (OPC)

In addition to the targeted consultation and open public consultation was conducted by the Commission, running from 6 August 2019 – 29 October 2019 (12 weeks). In total, 141 responses were received. The breakdown by stakeholder type is presented in the **Figure A- 1** below.

Figure A- 2: Responses to the OPC by type (n=141)



More information is provided in the consultation synopsis report (Annex C).

Stakeholder workshop

In order to supplement the input of the stakeholder consultation, a stakeholder workshop on was organised February 5th 2020. The workshop took place after all the consultations (surveys and interviews) had been completed, followed by the initial analysis of the findings. The objective of the workshop was to present the results of the OPC and targeted consultations to stakeholders, present our initial/emerging findings and receive input that could help us fill in information gaps.

A total of 71 stakeholders from authorities, industry representatives (economic operators and their representatives at EU and national level) and other stakeholders, including NGOs and academic experts participated.

Table A-3: Stakeholder workshop participants by type

Stakeholder type	Number of participants	Share of total
National Authorities	**20**	**28.2%**
Industry	**50**	**61.9%**
Individual enterprises	16	22.5%
Industry associations	28 (14 EU and 14 national)	39.4%
Civic society	**4**	**5.6%**
Environmental organisations/NGOs	3	4.2%
Academic/research organisation	1	1.4%
Other/non-identified	**3**	**4.2%**
Total	**71**	**100%**

The following topics were covered during the workshop:

- Introduction to the purpose of the evaluation, as well as an overview of the evaluation roadmap and the expected timeframe (presented by DG ENV);

- Presentation by the study team on the analysis of the implementation of the Directive and the preliminary findings by evaluation question, followed by a Question & Answer session;
- Initial summary of the feedback received from stakeholders during the interactive session, followed by conclusions and closing remarks.

The workshop participants were invited to provide further feedback on the evaluation and were encouraged to reflect on the future developments. The obtained input was used to validate and revise the findings in the preparation of this evaluation. The detailed report of the workshop can be found in Annex E of the study supporting this document[177] and also in the website dedicated to publicise events and share results: https://www.elv-evaluation.eu/.

Overview of the stakeholder inputs

This section summarises the responses from the targeted survey, OPC and interviews, what principally build the synopsis report for the evaluation of the ELV Directive in accordance with the criteria set out in the Better Regulation Guidelines[178], as presented in the Commission's evaluation roadmap[179].

I. Effectiveness

Has the ELV Directive done what it was intended to do?

Question: From your experience, to what extent do you agree that the ELV DIRECTIVE has led to the following changes or results?

Stakeholders perceived that the Directive has led to a decrease in uncontrolled disposal and an increase in the reuse, recycling and recovery of material from ELV and their components.

Stakeholders were less clear on whether the ELV Directive has contributed to the smooth operation of the internal market. Most were neutral to this statement (n=23), with the next largest groups either agreeing or having no opinion (n=16 for both).

Question: Whether the Directive led to any significant changes or results?

It was seen as leading to an increase in proper collection systems for ELV, particularly influencing the increase of the number of quality ATFs .It has also contributed to a slight reduction of illegal operations in the ELV sector.

Question: Factors hampering the achievement of the ELV

[177] 165-176 p.
[178] https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox_en
[179] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1912-Legislation-on-end-of-life-vehicles-evaluation

Illegal operations were noted by most respondents as hampering the implementation of the Directive, mostly in relation to the improper export and treatment of vehicles. This was seen as being combatable with better MS enforcement of the Directive (n=12).

Interviews

- Majority of stakeholders expressed the opinion that the Directive achieved the reduction of uncontrolled disposal of ELVs an increased recycling reuse and recovery of ELV components achieved by the Directive. One battery association noted that disposal of EV batteries is the only issue to address still.
- Several stakeholders less clear that the Directive achieved a smooth operation of the internal market. Illegal operations and enforcement vary across Member States and therefore effect market competitiveness (as noted by an EU EPR organisation and an ATF). This factor further was seen as the main issues hampering the achievements of the Directive.
- It was noted ELVs with missing essential components can still be processed at an ATF for a small fee. This can incentivise removal of essential parts without justification (car accident etc.). This therefore fosters illegal and profitable disposal of such parts. Legal justification for missing parts was recommended as being necessary to stop such practices.

Extended Producer Responsibility (EPR)

Question: To what extent do you agree that vehicle producers currently bear the cost of the ELV DIRECTIVE implementation according to EPR provisions?

Lithuanian stakeholders and public authorities (particularly regional administrations) believed vehicle producers bear the costs of the Directive.

Companies were the most likely to disagree with this statement, the key explanation for this is likely to be that many of them are recyclers and ATFs. {*raises the question - if they are bearing the costs how do they continue to operate?*}

Question: If vehicle producers don't bear most costs of the Directive then who does?

Dismantlers (n=29) and shredders (n=21) were perceived by most stakeholders as bearing the main costs of the Directive. With another large group believing vehicle producers do (n=25).

There were a large number of open responses that noted that there are shared costs across different stakeholder types, however most focused on shredders and dismantlers (n=8).

Question: If shredders and dismantlers are meeting implementation costs – what effect is this having?

A variety of stakeholders noted that such costs lead to more informal/fraudulent activities related to the purchase and dismantling of ELVs. This was because their financial viability is reduced by increased costs. They therefore have to make ends meet in other ways.

Question: How likely do you think illegal operations (such as the illegal disposal of refrigerants from air conditioning) are to be found in the following ELV destinations / treatment routes?

DIY and small car repair workshops were perceived as being more likely to be involved in illegal operations. ATFs were not deemed as likely.

Question: To what extent are the following obligatory treatment operations for depollution of end-of-life vehicles established in your country?

The removal of batteries, fluids and potentially explosive materials were noted as being almost 100-75% established as obligatory treatment operations across EU MS.

High response rates came from Belgium and Czechia (two of the three highest response MS types). Lithuania (the MS with most responses - typically wrote 'I do not know' for all three).

Interviews

- Stakeholders split into two main camps on the topic of EPR systems in various MS. Those who believe that:
- Manufacturers **do not bear the cost** for the delivery of all the ELVs to an ATF without any costs to the last holder/owner (often citing it falls onto ATFs to finance, or some stating it's the responsibility of dismantlers and shredders); and
- Manufacturers **do pay** for cost of delivery of ELVs to the ATFs gate.
- Stakeholders noted that illegal operations are less likely to occur in ATFs, whereas such operations are more of a problem in small car repair workshops and the DIY sector. These sectors have lower enforcement as they pose a smaller environmental risk (according to a Dutch stakeholder).

Circular Economy Links

Question: To what extent are the following treatment operations before shredding intended to promote the recycling of end-of-life vehicles, established in your country?

Treatment operations noted as promoting recycling pre-shredding processes included: the removal of catalysts (65% of stakeholders), tyres (60%) and metal components (34%).

On several other operations there was a relatively high "I do not know" response, including removal of secondary metals (56%), glass (36%) and metal components (34%).

Question: Do you think it is important to remove other parts before shredding in order to promote a higher rate of recycling?

A majority of stakeholders thought it was important (53%) including recyclers, a branch organisation, national and regional administrations.

Batteries, fluids/oils and electronics were seen as the most important parts that should be removed.

Stakeholders also elaborate why some materials (listed in the bullet above) are not removed. This included low economic viability (n=8 including companies and experts), and a lack of obligations in the Directive (n=3 mostly national governments).

Interviews

When asked why some treatment operations before shredding were not equally established in Europe, stakeholders discussed the following materials:

- **Glass**: glass removal is completely absent from Greece (according to a Greek stakeholder), however a glass association noted every MS has the facilities/capacity to recycle, a lack of recycling could therefore be due to the higher price of recycled material.
- **Plastic components**: Again they are not removed due to the costs and low value of recycled materials.
- **Copper**: such as that found in wiring (therefore constituting precise recycling practices) has high extraction costs.

Motor cycle industry stakeholders noted they are practicing with aiding the Circular Economy, even though they are not forced to by the Directive. The inclusion of motorbikes would create a level playing for the market – however it could endanger bike users to bikes with lower-grade parts.

Inspections of ELV treatment facilities and implementation

Question: How useful and effective are the inspections carried out by the national authorities of the facilities mentioned in the box below in your country?

ATFs was the only option were stakeholders believed inspections were useful and effective [fully (n=17), to a large extent (n=14), or to some extent (n=13)], with few stakeholders stating "not at all". Non-ATFs and exporters of used vehicles had a more mixed response.

Some stakeholders (two public authorities and an NGO) are of the opinion that authorities do not have enough staff/resources to fully execute inspections across ATFs, non-ATFs and exports.

Question: Would specific waste management targets per material, such as a specific rate for aluminium, plastic, glass, improve the implementation of the ELV Directive?

There were mixed reactions, however more (43%) stated it would improve the implementation of the Directive. Eight stakeholders (including recyclers, experts and public authorities) noted it would lead to incentives for higher recycling, create a level playing field across EU and would lead to better ecodesign in car design.

Interviews

An EPR organisation and an association noted inspections of ATFs were thorough and useful. A Greek stakeholder noted that in Greece inspections are less thorough.

On the need for specific material waste management targets stakeholders were generally against this as it would require existing secondary material markets for this – which is not the case for many materials. However a glass association was in favour of this for glass components.

Innovation

Question: From your experience, to what extent do you agree that the ELV Directive has caused a change in the design of vehicles in the following aspects?

Stakeholders perceive that the Directive has had a positive influence, by limiting restricted hazardous substances in vehicles (Ca, Hg, Pb, Cr(VI)) (22% strongly agree, 41% agree).

Open responses noted that legislative harmonisation (particularly with the Batteries Directive) was sought after.

Question: Do you think the ELV Directive fosters or hampers innovation? (both in car design and ELV treatment)?

Few stakeholders perceive that the Directive hampers innovation for either car design or ELV treatment.

40% believed that is fosters ELV treatment innovation. Examples included the 2015 recycling targets which (in combination with complex plastic car designs) foster the development of post-shredder technologies and complex plastic recycling of ELVs.

Less conclusive on car design with a mixed response (either no impact or fosters innovation).

Interviews

Although, the dismantling of ELVs and their components has become more difficult, stakeholders the Directive did foster innovation in ELV treatment.

II. Efficiency

Costs and benefits

Question: With regard to the relationship between the cost of dismantling and the value of the parts recovered from end of life vehicles, are any of the components mentioned in the non-exhaustive list below profitable to remove from ELVs?

Profitable components to remove included: Pb-acid batteries (70% of stakeholders agree), catalysts (66%), metal components (Cu, Al, Mg) (55%), engines (48%), and gear boxes (48%). Electronics were mentioned as a component missing from the list.

Question: Please estimate your staff and other costs related to the ELV Directive

It was hard to draw broad conclusions about resource use by stakeholder types, due to the lack of quantifiable and comparable data. It was clear that on average recyclers and ATFs, do spend more resources on technical compliance than other stakeholder types.

Public authorities seemed to have higher costs across most categories, but particularly for Data collection, and Technical compliance.

Question: For those with experience in more than one Member State (MS), do these costs vary between MSs?

Most stakeholders "did not know" whether costs varied between MS (73%).

Only stakeholders that know are EU associations.

Nine stakeholders pointed out that the main issue of varying costs is labour costs.

Question: Has the ELV Directive caused any unnecessary regulatory burdens or complexities?

Most stakeholders do not know and an even split said both yes and no (35% and 33% respectively).

Three companies noted the overlap of ELV Directive and Batteries Directive caused a concern about burdens in this respect.

Question: Do you have any suggestions for reducing the administrative burden?

Most pressing concern (although only noted by 5 stakeholders) was to digitalise the (de)registration system to make it less of a burden.

Question: Regarding the intended objectives of the ELV Directive, to what extent do you agree with the following statements: a) The ELV Directive has helped to protect the environment; b) The ELV Directive has helped to protect human health; c) The ELV Directive contributed to a level playing field for companies involved in vehicles and their end of life

Most stakeholders noted it had performed positively on all the above statements (with very few disagree or strongly disagree responses – Agree being the largest responses for all).

The highest consensus was for the ELV Directive helping to protect the environment which received 25% of stakeholders strongly agreeing and 48% agreeing.

The least positive category was c) on the Directive creating a level playing field for companies involved with ELV (the highest response was split between agree and I do not know n=17 for both).

Question: To what extent do you agree with the following statements on the costs and benefits of the ELV Directive? It has increased the income for the different operators of the sector

Most stakeholders 'do not know' across all categories. Unclear to analyse.

Based on a smaller amount of data, it seems some stakeholders perceive ATF stakeholders to be gaining an increased income and vehicle producers as receiving a decreased income as a result of the Directive (however based on less than 25% of respondents – as most wrote "I do not know".

Those that (strongly) disagreed that the ELV Directive led to increased income of car manufacturers were unsurprisingly in the automotive production industry. Similarly, on income of ELV treatment sector, it was mostly recycling companies and associations that (strongly) disagreed and the automotive sector that agreed.

Question: To what extent do you agree with the following statements on the costs and benefits of the ELV Directive? It has reduced costs (e.g. through harmonisation of rules) for the different operators of the sector

Similar response to the previous question – most do not know.

Very small amount of stakeholders that do not perceive ATFs and vehicle manufacturers as having increased costs. In both cases it was stakeholders from the relevant sector that stated their costs had not been reduced.

Question: To what extent do you agree with the following statement on the costs and benefits of the ELV Directive? The benefits (economic and environmental) outweigh the costs of its implementation

Many stakeholders (32 responses or 56% of total responses) noted that the Directives' benefits outweighed the costs. Very few (4%) disagreed with this.

National governments and business associations were more like to agree and companies were most likely to be neutral on the topic.

Interviews

- One stakeholder noted on the relationship of cost of dismantling and the value of the parts recovered of an ELV that Li-ion batteries should be regulated better under the Batteries Directive. This was because although the market functions properly (and informally) now, there are risks if the market grows in the future, which it is predicted to do. Some costs created for stakeholders who have to monitor coherent and overlaps of ELV, Batteries and Chemicals Directives for the use of automotive batteries.
- General mixed opinions on the costs and benefits of the Directive. Different stakeholders with different interests and market operations perceive the Directive to negatively effect their sector and positively effect (or be neutral) to other sectors.

Simplification opportunities

Question: Can you identify any opportunities to simplify the legislation or reduce unnecessary regulatory costs without undermining the intended objectives of the ELV Directive?

There was no large consensus on one/two issues. However several varying opinions were presented, the largest of which are presented here.

Simplified reporting (n=2), monitoring and controlling systems (n=5), better harmonisation and enforcements of CoDs (n=5), harmonised legislation (make the Directive a Regulation) (n=6), harmonise vehicle (de-)registration (n=6).

Interviews

Stakeholders

I. Effectiveness/Efficiency: Communication and data transfer

Question: How well does the cooperation and data exchange work within and between Member States services on de-registration of vehicles, provision of Certificates of Destruction, data on vehicle recycling (including PST) and ELV monitoring, export of used vehicles, and re-registration of exported / imported vehicles

The area perceived as having the most/best cooperation and data exchange **within MSs** was the **data on vehicle recycling and ELV monitoring**, while the areas with the least cooperation and data exchange were the **re-registration of exported / imported vehicles** and the **export of used vehicles.**

The areas with the most cooperation and data exchange **between MSs** were sharing of **data on vehicle recycling and ELV monitoring,** whereas the areas with the least cooperation and data exchange between MS were the **export of used vehicles** and the **de-registration of vehicles**.

Question: What measures and criteria were applied by your Member State for shipments to distinguish ELVs from used vehicles when vehicles are shipped out of the territory of the MS to another MS or outside the EU? (If you are able to answer for more than one MS please do so) (This question should include any views you have on the implementation/ actual situation, effectiveness of correspondents' guideline No 9.)

The Netherlands was suggested as the best practice example. In the Netherlands a vehicle becomes an ELV when it cannot be repaired for realistic costs in the country of export. In Italy, a provision will enter into force and will oblige exported cars to pass a roadworthiness test in the previous 6 months before an export to another country is possible. Dublin City Council (the designated national competent authority for Ireland) has developed guidance, which incorporates the provisions of Guidelines No. 9 and enforces the requirement to have mechanical certification for all used vehicles and used vehicle parts.

The enforcement of the guidelines was highlighted as the main problem. The fact that the guidelines are legally non-binding and the lack of shipment inspections contribute to the lower enforcement.

Question: What measures (for example use of CoD to deregister vehicles, or financial incentives etc.) are applied by your MS (and/or any other MS you are aware of) to ensure that if a Certificate of Destruction (CoD) is issued the related ELV is dismantled at an authorised treatment facilities (ATFs)?

In Portugal, a road tax (IUC - Imposto Único de Circulação) is levied, each year, to the owners of all registered vehicles until a valid CoD is presented. In the Netherlands the ownership concept ensures that owners of vehicles pay taxes on use until official deregistration. In Germany, penalties are used to ensure that CoDs are required to send ELVs to official ATFs. Stakeholders mentioned that in Belgium and Czechia, there are no financial incentives to ensure the use of CoDs.

It was mentioned that financial incentives are only effective when they are linked to CoDs.

Question: What are your views on the incentives offered by some MSs to ensure that ELVs are treated in legal ATFs and get a CoD?

a) *Pay-out scheme kind of deposit refund scheme, where the last owner benefits by receiving an extra pay out*

This measure was mostly seen as effective (effective n=22, ineffective n=6, don't know n=22);

The level of the initial deposit is important, as if it is too low it provides no steering effect towards legal ATFs and if its' too high it incentivises early scrapping of vehicles.

b) Termination of ongoing taxes levies if the vehicle is finally deregistered or exported

This measure had even higher percentage of acceptance than the above (effective n=29, ineffective n=3, don't know n=18);

This measure is used in the Czech and Dutch systems. Stakeholders mentioned that they are effective systems as they were easy to implement and comprehensive.

Question: Are you aware of other types of MS measures to address the problems of vehicles going missing from the system?

Most stakeholders that provided a concrete answer referred to the termination of ongoing taxation when presenting an ELV with an official CoD at a legal ATF.

Question: It has been observed that the whereabouts of a significant number of end of life vehicles is unknown. Please rank the following potential reasons for these 'missing' vehicles.

- This question was not analysed because some respondents did not really rank the options but chose only some preferred options. Some options had 45 responses and others 27, so it was not possible to make a ranking.
- However, with these statistical inconsistencies in mind, we can infer that the three reasons for the missing vehicles that were ranked high are that 1) the ELVs are scraped in the country of origin but not deregistered, 2) ELVs exported to other Member States as used vehicles. Never registered in the receiving Member State instead scraped in the receiving Member States but without data exchange with the Member State of origin, 3) Used vehicles exported outside the EU and not deregistered in the Member State of origin.

Question: Annex II of the ELV Directive lists materials and components that are exempt from Article 4(2)(a) regarding the restriction for the use of lead, mercury, cadmium or hexavalent chromium.

a) Are the criteria "according to technical and scientific progress" for amending Annex II to the ELV Directive adequate?

Most of the stakeholders (48%) stated that they did not know. Otherwise, more stakeholders believed the criteria were to a large extent adequate (26%), with only 6% of stakeholders saying they were not at all relevant.

Stakeholders mentioned that socio-economic aspects should be further considered together with the "technical and scientific" aspects (i.e. whether a scientific alternative is economically and practically viable)

b) Annex II to the ELV Directive has been updated frequently with an average of 2 years. Is the frequency of the review of exemptions listed in Annex II to the ELV Directive by the Commission adequate?

Most stakeholders did not know (40%), another large group believed they were sufficient (35%) and a number of stakeholders noted the reviews were too frequent (24%);

From those who said is sufficient, 58% are national or regional administrations, and from those who said too frequent, 60% were either companies or business associations.

Interviews

- Within the Netherlands, data exchange seems to work very well, while within Greece very badly. Between MS, both stakeholders agreed that data exchange is problematic, except maybe for the data on vehicle recycling and ELV monitoring.
- The issuance of a CoD as a measure that ensures that ELVs are dismantled in legal ATFs works well in the Netherlands as it is inspected by the Dutch inspection authority. In Greece, due to the lack of inspections to identify illegal operations, the CoD does not necessarily mean that ELVs have been treated legally.
- In terms of the incentives that could be used to ensuring that ELVs are treated legally, the interviewees indicated that a pay-out scheme would not work in the Netherlands, but it could work in Greece. The termination of ongoing taxes / levies once the vehicle is deregistered was considered as the most effective. Insurance premiums as incentives were suggested by one association. According to that the last owner would be obliged to annually pay insurance until he/she can provide a CoD or a proof of sale.

II. Relevance

Future relevance

Question: What do you think will be the impact on ELV procedures (i.e. waste management costs and the regulatory needs) of the following changes that are expected to occur (and/or continue) during the next five to twenty years (multiple answers were allowed)?

a) Increase in sales of electric or hybrid vehicles

More than 50% of the respondents said that this will increase waste management costs for ELVs and 30% mentioned that this will require changes in regulation;

The most significant impact will come from the rising interest in electric/hybrid vehicles. Stakeholders mentioned that this among others will require new technology and processes for vehicle disposal and increased requirements on the ATFs, meaning that producer's responsibility will have to be strengthened;

Other stakeholders mentioned that electric/hybrid vehicles will increase the revenues of the recycling sector due to the higher recovery of valuable metals.

b) Increased use of lightweight materials in vehicles (i.e. plastics)

42% of stakeholders believe this will increase waste management costs for ELVs and 25% mentioned that this will require changes in regulation;

Recycling of lightweight materials, such as carbon fibres and plastics, will be an issue, and thus it was suggested that their separation before shredding should be enforced. The increased use of such materials may render the 95% recovery target impossible to be achieved. The ELV Dire can function as an instrument to balance the trade-off between lightweight material use and recyclability.

c) Increased use of electronic components in vehicles

Almost half of the respondents believe that this will increase waste management costs for ELVs and 22% mentioned that this will require changes in regulation;

Some stakeholders mentioned that increased use of electronic components in vehicles will increase dismantler's revenue through trade of used parts.

d) Other changes to vehicle design and/or use

Economies of scale will be a determining factor whether the cost of ELV treatment will increase;

Technological development should increase the life of vehicles and car-sharing will reduce the need for cars, which may reduce the ELV management cost.

Question: Are there any other issues or changes in context that you think the current ELV Directive should be adjusted in order to address?

There is a need for a clear definition of what an ELV is, mainly a distinction of ELVs from used vehicles. Harmonisation of definitions with the Waste Framework Directive were also raised. Harmonisation of the Directive among the MS was mentioned.

The involvement of different stakeholder types in the Directive was raised. In particular, it was mentioned that the role of insurance companies has to be enhanced. Greater responsibility of vehicle manufacturers in the implementation of the Directive was also mentioned.

Interviews

- Increase in sales of electric/hybrid vehicles will increase future waste management costs, according to an ATF company, while an association and an EPR organisation mentioned that it will require changes in regulation.
- Lightweight materials may also lead to increased costs of ELV treatment, according to the ATF. The EPR organisation mentioned that treating such materials is highly energy intensive, and as such change in regulation to allow GHG monitoring might be necessary.
- Both the ATF and the EPR organisation mentioned that the increased use of electronic components in vehicles will increase the waste management costs.
- Regarding the future adjustments of the ELV Directive, the EPR organisation and the ATF mentioned that insurance companies need to be involved more in the implementation of the Directive. The ATF also brought up the need for a system to address the unregulated trafficking of spare parts.

Scope

Question: What are your views on extending the scope of the ELV Directive to include motorcycles, buses, and trucks?

More than 60% support of including all three vehicle types in the scope of the Directive.

Those in favour mentioned that all these vehicles have comparable vehicle documents and produce comparable waste streams, therefore they could be included in the Directive's scope.

Those against argued that trucks and buses usually do not end their life in Europe, but exported and used in non-EU countries.

Interviews

- There was no strong opposition to adding motorcycles, buses, and trucks in the scope of the Directive.
- The association related to motorcycle manufacturers mentioned that the Directive was prepared without having motorcycles in mind and thus it would require significant adjustment. According to them, the lead time and phase-in are the most important factors if the Commission decides to add motorcycles in the scope of the Directive.

III. EU Added Value

Question: Is the value resulting from the ELV Directive additional, the same, or lower than the value that would otherwise have been created by Member State action only through national legislation?

44% of respondents thinks the Directive has added value, while 25% thinks is the same. From those who responded that there is added value (n=26), 40% believe that if the Directive was not in place, there would be more uncontrolled disposal of ELVs and 35% believe that there would be lower reuse, recycling, and other forms of recovery of ELVs and their components.

Question: Does the ELV Directive affect the competitiveness of the EU car sector compared to the global car sector?

Most respondents did not know (62%) and 23% answered that it does affect its competitiveness. Those who said it does affect competitiveness mentioned that the ATF requirements are more strict than in any other non-EU country and that the Directive causes business uncertainty for battery and car manufacturers.

Interviews

- A Greek stakeholder mentioned that the value of the Directive is additional to what would be the case without the Directive and that the consequence of not having the Directive would be more uncontrolled disposal of ELVs and lower reuse, recycling, and other forms of recovery of ELVs and their components.
- A batteries-related association mentioned that ELV Directive increases uncertainty for European manufacturers of batteries and they presume also for the car industry.

IV. Coherence

Question: Is the ELV Directive coherent with the Basel Convention?

The majority of the respondents perceived the ELV Directive to be coherent with the Basel Convention (57%) and only 3% of the respondents (n=2) think that it is not coherent.

Question: Is the ELV Directive coherent with international obligations as referred to in the Stockholm Convention?

A large group of the respondents also found the Directive coherent with the Stockholm Convention (40%), while 9% of the respondents (n=6) thought it is not.

Question: Is the ELV Directive coherent with the WEEE Directive, Batteries Directive, RoHS Directive, POP Regulation, REACH Regulation, Circular Economy policy, Waste Shipment Regulation, Directive 1999/37/EC, and ISO 22628?

The most perceived coherent policies were the Batteries Directive and the WEEE Directive. The least perceived coherent policy was EU Circular Economy Policy.

Interviews

A batteries-related association expressed the desire for automotive batteries to be removed from the ELV Directive and to be solely addressed by the Batteries Directive, highlighting that the ELV Directive duplicates the Batteries Directive and REACH and it is not coherent with the principles used in RoHS Directive.

The EPR organisation had the same opinion about the Batteries Directive. They also mentioned that there are some issues with the WEEE recast from 2018, which causes a high burden for car importers to work out the electronics in these vehicles, as it is not clear if these are regulated by the WEEE or the ELV Directive. In addition, they claimed that although the circular economy is a good goal, it should be recognised that it is not easy to be achieved for complex products like vehicles.

OPC Responses

Questions: On the deregistration of vehicles (n=141 per question)

- Stakeholders perceive that there are adequate facilities in their region for collection of ELVs (strongly agree: n=64 and agree: n=49).
- Stakeholders perceive that deregistering their vehicle would not incur costs (strongly agree: n=59, agree n=24).
- Stakeholders perceive that certificates of destruction are provided to the last owner of a vehicle before EoL (strongly agree: n=46, agree: 30).
- They were positive that payments received reflect the components recovered from ELV (strongly agree: n=41, agree: n=37)
- The deregistration system is perceived as simple (strongly agree: n=37; agree n=39).
- Stakeholders only strongly disagreed with the fact that financial incentives are provided to encourage proper disposal at ATFs (strongly disagree n=37, disagree n=18).
- Finally stakeholders were unsure about issues of deregistering a car in country A and registering the same car in a second country but not receiving deregistration proof from country A (unsure: n=88).

Question: On the facilities that accept defective parts or used liquids removed from vehicles

The 65% of respondents said that if repairing their vehicle independently, there would be facilities to give their defective vehicle parts without a fee, as opposed to the 24% of the respondents that would only find such facilities that would accept parts only with a fee.

The 46% of respondents mentioned that there would be facilities in their country of residence to accept used liquids from the vehicle for free and 45% said that they would have to pay a fee.

Question: An increasing number of spare parts are sold via the internet. Please indicate if spare parts purchased via the internet in your country are accompanied with the following information

Most stakeholders (34%) noted that spare parts are not sold with any information on their origin or that they were unaware of the issue (31%).

Some stakeholders (16%) mentioned that they can see the name of the dismantler who dismantled the spare part from an ELV, while 10% of the respondents said that the vehicle Identification number (VIN) of the vehicle from which the spare part was removed is known and 10% said that the registration number of the dismantler, which indicates that the dismantler is an authorised treatment facility and registered in the national registry, is known.

Question: Are you aware of any problems related to the disposal and treatment of ELVs in your country or region?

Most stakeholders perceive there are some issues with disposal of ELVs in their country/region (61%). Only a mere 20% noted they thought there were no issues.

Germany, Spain, France and Denmark represented countries that had proportionally higher numbers of stakeholders that noted problems with disposal

Issues included illegal and black market operations, lack of enforcement, problems with recycling systems and issues identifying the last registered owner.

OPC Open responses

- The issues of **illegal and black market ELV operations** and a **lack of enforcement** was a key issue brought up by the following stakeholders: companies/business organisations, public and business associations. They believe that these issues should be more explicitly covered by the Directive.
- Concerns were raised over **recycling** of specific materials not being well addressed in the legislation. Current practices miss crucial and efficient technologies and often lead to lower quality secondary materials. This issue was mainly discussed by EU citizens and company and business organisations.
- **Reuse and repair** were also deemed vital to be strongly integrated into the Directive. Stakeholders noted that there needs to be a larger EU market for the renovation (upgrade) of vehicles, spare parts and general repair of ELVs.
- **Other topics included** the broadening of the scope of the Directive, tackling missing vehicles, end producer responsibility, digitalisation, registration and deregistration and EU policy synergy.

Use of Stakeholder inputs

The draft and final report include the key points taken from the consultations for each evaluation question. The report shows where these inputs have been used to triangulate and/or supplement the information from literature and data in order to carry out the analysis.

ANNEX 3. METHODS USED IN PREPARING THE EVALUATION

This Annex provides the overall evaluation framework as presented in Appendix A of the study performed by the consortium led by Trinomics in support of this evaluation. It links with the various methodological tools used (i.e. interviews, workshops, survey, open public consultation, literature analysis) and supplements Section 4 to this evaluation document.

#	Evaluation (sub) question	ToR	Judgment criteria	Indicators	Method/Source
Effectiveness					
1	**To what extent have the objectives of the ELV Directive been achieved?**				
1.1	*To what extent have the targets on ELVs, on reuse/recycling/recovery and on the elimination of the use of hazardous substances been met?*	1	• *Performance in terms of increase in recycling, reduction in the use of hazardous substances etc.*	• *Reuse/recovery/recycling rates* • *Amounts of hazardous substances still used or removed.*	• ***Data analysis*** *on judgment criteria* • ***Review of literature*** *on implementation reports, fitness check*
1.2	*To what extent have the provisions on prevention, collection, treatment, reuse, recovery, coding standards/dismantling information been implemented?*	3	• *Performance of MSs with regard to transposing ELV Directive into national policies* • *Performance of MSs with regard to implementing these national policies*	• *Implementation rates per MS* • *Stakeholder views on implementation*	• ***Review of literature*** *on national legislation, coding standards, implementation review* • ***Stakeholder input*** *from recyclers, MS officials etc. (at MS level)*
1.3	*To what extent can the achieved results/effects be credited to the ELV Directive?*	N	• *Assessment of (e.g.) stakeholder views and literature consensus on the extent to which results can be credited to the ELV Directive* • *Comparison to the baseline (when defined)*	• *List of drivers (e.g. political support, active research community) and barriers*	• ***Literature review*** *on contribution of other policies to targets* • ***Stakeholder input*** *from MS and EU officials, (re)manufacturers, recyclers, NGOs, academia*
1.4	*To what extent were the results expected?*	1	• *Difference between results and expectations* • *Any unexpected results?*	• *List of effects / expectations* • *Group expected and unexpected effects*	• ***Literature review*** *on intentions/ implementation of ELV Directive* • ***Stakeholder input*** *from EU officials, MS officials, academia*
2	**To what extent have the results been effectively monitored?**				
2.1	*Have the reporting data from Eurostat and the information provided in data accompanying national quality reports been effective for monitoring of the targets?*	17	• *Assessment of stakeholder views and literature on monitoring techniques* • *Monitoring performance (based on Eurostat data)*	• *List of monitoring techniques* • *Eurostat data* • *Views on monitoring of ELV data (Eurostat specifically)*	• ***Literature review*** *on implementation reports, fitness check* • ***Stakeholder input*** *from MS and EU officials (monitoring agencies) and (re)manufacturers, recyclers, NGOs, academia*
2.2	*To what extent does the current cooperation and data exchange between the national services and links with other relevant legislation serve the*	8	• *Assessment of stakeholder views* • *Involvement / performance of ministries in (de-) registration of vehicles*	• *Views on the current cooperation and data exchange* • Degree of involvement of ministries in *(de-) registration of*	• ***Stakeholder input*** *(targeted consultation and interviews) from MS and EU officials*

	purpose of the ELV Directive?			*vehicles*	
2.3	*To what extent are the current challenges for the communication of data on ELV for the compilation of statistics and the monitoring of target achievements addressed?*	2	• *Assessment of stakeholder views and literature*	• *Views on challenges on communication/data/ monitoring (specifically addressing PST and exported ELVs*	• ***Literature review** on implementation reports, fitness check* • ***Stakeholder input** questionnaire and interviews with MS and EU officials*
2.4	*To what extent have the current mechanisms to measure the performance in the implementation of the ELV Directive and to monitor the results (e.g. challenges with communication of data) been effective?*	16	• *Assessment of stakeholder views, literature and ATF data*	• *List of monitoring techniques* • *Views on monitoring of ELV data* • *The number of ATFs certified by EMAS*	• ***Literature review** on implementation reports (comparison between the Eunomia and ARGUS reports), fitness check* • ***Stakeholder input** (questionnaire and interviews) e.g. from monitoring officials, (re)manufacturers, recyclers, NGOs, academia*
3	**Which factors contributed to or hampered the observed achievements of the ELV Directive?**				
3.1	*To what extent are the provisions on Extended Producers Responsibility (EPR) sufficient in the ELV Directive to contribute to a good implementation of its objectives?*	19	• *Assessment of stakeholder views* • *How EPR is applied in other Directives, in comparison to how it is applied in the ELV.*	• *Views on the effectiveness of EPR provisions in the ELV Directive and in other Directives (to what extent do they leave room for interpretation?)*	• ***Literature review** on implementation reports and EPR elsewhere.* • ***Stakeholder input** from MS officials, manufacturers and ATFs*
3.2	*To what extent did the dismantling of parts before shredding affect the ELV targets and the quality of recyclates, in view of the objectives of the Waste Framework Directive (WFD) and the Circular Economy Action Plan?*	20	• *Performance in terms of the dismantling of parts and components for reuse/recycling* • *Assessment of stakeholder views and literature on relation between results and ELV targets*	• *Data on number and quality of dismantling of parts and recyclates* • *Views and data on market conditions (costs to dismantle) Evidence on relevance of the WFD and Circular Economy Action Plan*	• ***Literature review** on WFD and Circular Economy Action Plan* • ***Stakeholder input** from MS officials, remanufacturers, recyclers and dismantlers*
3.3	*What other factors contributed to or hampered the achievement of the objectives of the ELV Directive?*	4	• *Assess the differences between the ELV Directive's effects and expectations and assess the effect of a set of factors*	• *List of factors that contributed/hampered the ELV Directive* • *List of effects/expectations from ELV Directive*	• ***Literature review** on implementation reports* • ***Stakeholder input** from MS and EU officials, NGOs and motor industry.*
4	**Did the ELV Directive lead to other significant changes or results?**				
4.1	*Did the ELV Directive foster or hamper innovation?*	7	• *Assessment of views and literature on the relation between ELV Directive and innovation (both in car design and ELV treatment)*	• *List of ELV treatment techniques* • *List of vehicle design changes* • *Views on potential negative effect on innovation (e.g. chemicals policy)*	• ***Literature review** on implementation reports, material evolution* • ***Stakeholder input** (e.g. producers and processors) Case studies on pre vs. post shredder recovery. (Pre shredder may be more innovative)*

4.2	*Did the ELV Directive undermine the achievement of the objectives of the raw materials and innovation policies?*	8	• *Performance on raw material use* • *Assessment of views and literature on interplay between the ELV Directive with raw materials and innovation*	• *List of ELV Directive achievements* • *List of raw materials and innovation results* • *Data on material use*	• ***Literature review** on raw material and innovation policies* • ***Stakeholder input** (targeted consultation) from EU officials and others involved in raw materials and innovation policies*
4.3	*Did the ELV Directive lead to other significant changes or results (aside of sub question 4.1 and 4.2)?*	5, 6	• *Assessment between causality of changes and ELV Directive (based on stakeholder views)*	• *List of potential changes caused by ELV Directive*	• ***Stakeholder input** (questionnaire, interviews)*
5	**What and to which extent did MSs implement measures to address the problems of "missing ELV" (e.g. cooperation mechanisms between MSs)?**				
5.1	*What measures and criteria were applied by MSs for shipments to distinguish ELVs from used vehicles?*	10	• *Assessment of stakeholder views* • *Performance of measures*	• *List of all measures and criteria, per MS* • *Views on implementation/ actual situation, correspondents' guideline No 9 (which distinguishes ELVs from used vehicles)*	• ***Literature review** on implementation reports/fitness check* • ***Stakeholder input** from MS customs services, NGOs*
5.2	*To what extent were implemented national Certificates of Destruction (CoD) systems designed to make sure that ELVs were dismantled at authorised treatment facilities (ATFs)?*	12	• *Performance of CoD systems* • *Assessment of stakeholder views*	• *List and quality of CoD systems*	• ***Literature review** on implementation report and the 2017 study*[180] • ***Stakeholder input** (e.g. questionnaire, registration and environmental authorities)*
5.3	*To what extent do the incentives adopted by some MSs contribute to ensure that ELVs are treated in legal ATFs and get a CoD?*	13	• *Performance of incentives* • *Assessment of stakeholder views and literature on actual situation/practical issues*	• *List of incentives (and best practices)*	• ***Literature review** on MS implementation* • ***Stakeholder input** (targeted consultation) from processors, ATFs, MS officials*
5.4	*How effective were inspections in the MSs in the ATFs to identity their legality?*	15	• *Assessment of views*	• *Views on inspections and success rate (best practices from specific MSs)*	• ***Stakeholder input** (e.g. public authorities from different MS)*
5.5	*What and to which extent did MSs implement other measures to address the problems of "missing feedback"?*	9	• *Existence and performance of other measures*	• *List of other measures*	• ***Literature review** on MS implementation* • ***Stakeholder input** (e.g. public*

[180] Mehlhart, G.; Kosińska, I.; Baron, Y. Hermann, A. (2017): Assessment of the implementation of Directive 2000/53/EU on end-of-life vehicles (the ELV Directive) with emphasis on the end of life vehicles of unknown whereabouts, Study commissioned by the European Commission and carried out by Öko-Institut

					authorities from different MS)
Efficiency					
6	**To what extent are the costs involved proportionate, given the benefits which have been achieved?**				
6.1	*What are the costs and benefits (monetary and non-monetary) associated with the implementation of the ELV Directive for different players (e.g. public authorities, consumers?*	21, 22, 23	• *Identification and assessment of these costs and benefits*	• *Direct and indirect technical and administrative costs for the various actors and processes arising from the ELV Directive requirements (including competition with illegal operators)* • *Direct and indirect benefits for the various actors (including society as a whole) arising from the ELV Directive implementation*	• ***Data analysis*** • ***Review of literature*** *(e.g. studies from DE and FR)* • **Stakeholder input** *(targeted survey, interviews) from e.g. operators, processors, manufacturers, regulators etc. – to collect data for standard cost model assessment*
6.2	*To what extent are there distributional impacts of the costs and benefits resulting from the ELV Directive (e.g. on SMEs, different sectors, across MSs)?*	21	• *Quantitative assessment of costs and benefits* • *Assessment of stakeholder views and literature*	• *List of (in) direct technical and administrative costs (and benefits) per MS arising from the implementation of ELV Directive (indicate who incurs the costs/benefits - e.g. type/size of business/sector).* • *Qualitative / quantitative indicators building on impacts and benefits per MS.*	• ***Data analysis*** • ***Review of literature*** • ***Stakeholder input*** *(targeted surveys and interviews) from e.g. operators, processors, manufacturers, regulators etc. from different MS*
6.3	*How does the polluter-pays principle, applied as Extended producers Responsibility (EPR), affect the different operators involved and are the costs resulting from the EPR fairly allocated?*	29, 30	• *Assessment of distribution of costs amongst operators*	• *Description of the EPR effects on operators* • *(In)direct technical and administrative costs*	• ***Data analysis*** • ***Review of literature*** • ***Stakeholder input*** *from e.g. operators, processors, manufacturers etc. – to collect data, among other*
6.4	*To what extent were there (and what caused) differences in costs and benefits between MSs?*	25	• *Assessment of differences and graphic display of quantitative results where appropriate (e.g. labour costs, age of vehicle fleet)*	• *Description of specific examples of cost differences, reasons and consequences* • *Data on labour costs, age of vehicle fleet etc.*	• ***Data analysis*** • ***Review of literature*** • ***Stakeholder input*** *(public and targeted survey) from e.g. operators, processors, manufacturers etc.*
6.5	*To what extent did the ELV Directive support the EU internal market and the creation of a level playing field for economic operators?*	32	• *Assessment of the size of the effect on the internal market, per element*	• *List of elements in the ELV Directive that contribute to supporting the internal market (e.g. minimum requirements)*	• ***Review of literature*** • ***Stakeholder input*** *from e.g. operators and particularly SMEs*
6.6	*What is the impact of the provisions in*	33	• *Assessment of stakeholder views and literature*	• *Competitiveness of EU*	• ***Data analysis*** *competitiveness*

	the ELV Directive and its harmonisation of requirements on the competitiveness of the automotive industry within the EU?		• *Assessment of differences between ELV Directive and legislation outside EU*	*automotive sector and other regions* • *List of similar regulations*	• ***Stakeholder input*** **(***interviews and targeted survey) from e.g. operators and particularly manufacturers and producers*
7	**What factors influenced the efficiency?**				
7.1	Is there any evidence that the implementation of the ELV Directive has caused unnecessary regulatory burden or complexity?	24	• *Assessment of difference in costs compared to other comparable regimes* • *Assessment of stakeholder views on the regulatory burden*	• *Costs resulting from ELV Directive and (e.g.) costs prior to the ELV Directive implementation in the EU or costs in non-EU countries*	• ***Review of literature*** *on implementation* • ***Stakeholder input*** *(targeted survey and interviews) from e.g. operators, manufacturers, producers, insurance companies across MS*
7.2	*Are there any good or bad practices that can be identified in terms of efficiency in the achievement of results?*	31	• *Assessment of stakeholder views*	• *List of practices highlighted as good / bad*	• ***Stakeholder input*** *from e.g. operators, processors, manufacturers, MS and EU officials etc. (data analysis based on input)*
7.3	*How efficient is the exchange of information between the car registration and the environmental departments in the MSs?*	1	• *Assessment of type of information exchanged and processes (based on stakeholder views and literature)*	• *Description of the types of information exchanged between the relevant departments* • *Description of processes involved in the exchange of information*	• ***Review of literature*** *particularly the compliance promotion initiative and the study on missing whereabouts*[181] • ***Stakeholder input*** *(interviews, targeted survey) from e.g. public authorities from different MSs*
7.4	*How efficient has been the exchange of information/notification between the national authorities on re-registration of exported cars?*	14	• *Assessment of stakeholder views*	• *Description of processes involved in the exchange of information*	• ***Stakeholder input*** *(interviews, targeted survey) from e.g. public authorities from different MSs*
	Relevance				
8	**How well do the objectives of the ELV Directive correspond to the current needs within the EU?**				
8.1	*Is there still a need for the ELV DIRECTIVE?*	34	• *Assessment of stakeholder views and data on the potential impact of not having the ELV Directive*	• *Data on relation between ELV and environmental degradation (e.g. scrap pollution data)* • *Views of stakeholders on the (future) needs*	• ***Intervention logic*** • ***Literature review*** *on indicators* • ***Stakeholder input*** *(public consultation, targeted survey) from all stakeholders*
8.2	*Are there any needs relevant to the management of end-of-life vehicles that*	37	• *Assessment of views on unaddressed needs of stakeholders and literature*	• *List ELV Directive results and other needs*	• ***Literature review*** • ***Stakeholder consultation*** *(public*

[181] Mehlhart, G.; Kosińska, I.; Baron, Y. Hermann, A. (2017): Assessment of the implementation of Directive 2000/53/EU on end-of-life vehicles (the ELV Directive) with emphasis on the end of life vehicles of unknown whereabouts, Study commissioned by the European Commission and carried out by Öko-Institut

	were not adequately covered by the ELV Directive or by any other instrument?				*consultation, targeted survey) from all stakeholders*
8.3	*Are there opportunities to simplify the legislation or reduce unnecessary regulatory costs without undermining the intended objectives of the ELV Directive?*	36	• *Assessment on the impact of potential amendments to the ELV Directive*	• *List of potential amendments to simply ELV Directive*	• ***Literature review*** • ***Stakeholder input*** ***(****targeted survey, interviews) from e.g. from operators, processors, manufacturers, MS and EU officials*
8.4	*To what extent are the definitions in the ELV Directive still up to date?*	41	• *Assessment of definition and potential future changes*	• *Views of stakeholders on definition (and future developments)*	• ***Literature review*** *on (reports on) relevant Directives* • ***Stakeholder input*** *from e.g. from operators, processors, manufacturers, MS and EU officials*
9	**To what extent can the ELV Directive appropriately cover the new challenges, changing environment and developments related to ELV?**				
9.1	*To what extent can the ELV Directive cover technological developments? (e.g. the growing share of electric vehicles)?*	38, 39, 40	• *Assessment of stakeholder views and literature on the relation between the ELV Directive and technological change in sector*	• *Data on take up of new approaches, and model projections of future take up* • *Views of stakeholders (focus on EVs)*	• ***Literature review*** *on technical developments in sector* • ***Stakeholder input*** *e.g. from operators, processors, manufacturers, MS and EU officials*
9.2	*To what extent can the ELV Directive cover new challenges for recycling that will contribute to better implementation of the aims of the ELV Directive?*	38	• *Assessment of uptake of new approaches and stakeholder views*	• *Data on take up of new approaches (e.g. PST), and model projections of future take up* •	• ***Literature review*** *on recycling developments* • ***Stakeholder input*** *(interviews) from e.g. material recyclers, (re)manufacturers*
9.3	*To what extent is the ELV Directive addressing factors influencing EoL (strategies to reuse/recycling of materials, improved replaceability and repairability, remanufacturing and second use possibilities)?*	39	• *Assessment of stakeholder views and literature*	• *Innovative examples – possibly case studies*	• ***Literature review*** • ***Stakeholder input*** *(interviews) from e.g. material recyclers, (re)manufacturers*
9.4	*To what extent is the ELV Directive addressing the co-operation between producers and recyclers in order to achieve better recycling and resource use?*	40	• *Assessment of stakeholder views and literature*	• *Examples of cooperation (if data available)* • *Overview of stakeholder network*	• ***Literature review*** • ***Network analysis (if possible)*** • ***Stakeholder input*** *(interviews) from e.g. material recyclers, (re)manufacturers*
9.5	*Are the frequency and motivations for amending Annex II to the ELV Directive adequate?*	42	• *Assessment of the number of requests to change and the reasons to change*	• *No. changes requested and made to date*	• ***Literature review*** • ***Stakeholder input*** *(open public consultation, targeted survey) from e.g. material recyclers, (re)manufacturers, shredders ATFs*
9.6	*To what extent is the scope of the ELV*	35	• *Assessment of stakeholder views and literature*	• *Views of stakeholders*	• ***Intervention logic***

	Directive still appropriate?				• ***Literature review*** *on developments* • ***Stakeholder input*** *(interviews) from e.g. material recyclers, (re)manufacturers*
Coherence					
10	**To what extent is the ELV Directive internally coherent?**				
10.1	Does the ELV Directive contain any internal incoherencies?	N	• *Assessment of potential incoherencies*	• *List potential areas of incoherence*	• ***Stakeholder input*** *(interviews) from e.g. material recyclers, manufacturers*
11	**To what extent is the ELV Directive coherent with other EU policy instruments and the overall EU and international policy goals?**				
11.1	*To what extent are there synergies and overlaps between the ELV Directive and other EU policy instruments?*	44, 45, 46	• *Assessment of stakeholder views and literature*	• *Description of any potential conflicts (e e.g. WSR; Directive 1999/37/EC on vehicle registration documents; ISO 22628 Road vehicles — Recyclability and recoverability; chemicals legislation)*	• ***Evaluations of other Directives*** *– e.g. WSR, ROHS, REACH* • ***Stakeholder input (open public consultation and targeted survey)*** *from e.g. EU officials, material recyclers, (re)manufacturers*
11.2	*To what extent does the ELV Directive support the overall EU policy goals?*	43, 46	• *Assess the potential effect of the ELV Directive on different policy goals*	• *List of EU overall policy goals and ELV Directive effects*	• ***Intervention logic*** • ***Literature review (****other evaluations)* • ***Stakeholder input*** *from EU officials (view on policy overlap synergies and conflicts)*
11.3	*To what extent are the Definitions in the ELV Directive coherent with other EU policies?*	43, 46	• *Identification of definitions in conflict*	• *List of ELV Directive definitions and related definitions*	• ***Literature review*** *on alignment of policies* • ***Stakeholder input*** *from e.g. EU officials, (re)manufacturers and recyclers*
11.4	*To what extent is the ELV Directive coherent with international obligations (i.e. from the Basel Convention and Stockholm Convention?*	**N**	• *Assessment of stakeholder views and literature (alignment with WSR and POP-regulation)*	• *List of international obligations and ELV Directive objectives and results*	• ***Literature review*** *(WSR and POP-regulation evaluation)* • ***Stakeholder input*** *from e.g. EU officials, (re)manufacturers and recyclers*
EU Added value					
12	**What is the Added value resulting from the ELV Directive?**				
12.1	*What is the Added value of the ELV Directive compared to what MSs could have been reached without the ELV Directive?*	47	• *Assessment of views of stakeholders on benefits compared to the situation without the ELV Directive*	• *Views of stakeholders on benefits compared to the situation without the ELV Directive*	• ***Literature review*** *past evaluations of the ELV Directive – including the baseline assessments* • ***Stakeholder input*** *from e.g. MS and EU officials, (re)manufacturers, recyclers, NGOs, academics*

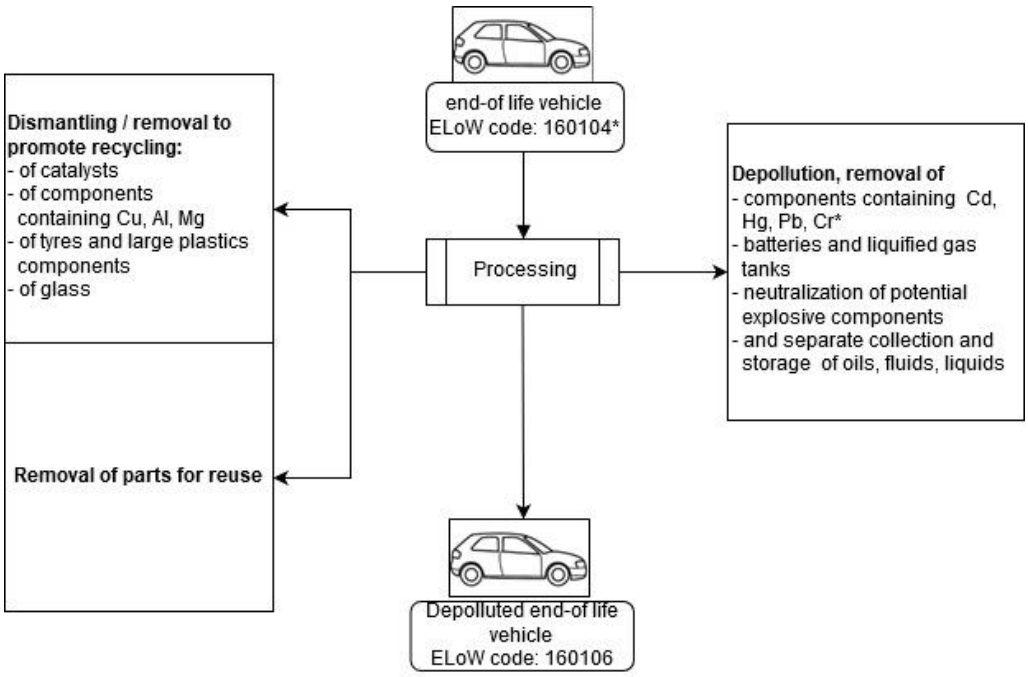
12.2	*What would be the most likely consequences of stopping or withdrawing the existing EU intervention?*	N	• *Assessment of the potential withdrawal - what would occur with just MS action?*	• *List of such potential consequences*	• ***Stakeholder input** from e.g. MS and EU officials, (re)manufacturers, recyclers, NGOs, academics*
12.3	*What is the Added value of the ELV Directive at EU and a global level (e.g. on the global automotive industry)?*	48	• *Assessment of views of stakeholders on benefits compared to the situation without the ELV Directive, but with international obligations*	• *List of global actions (comparable to ELV Directive)*	• ***Literature review** on past evaluations of the ELV Directive* • ***Stakeholder input** from e.g. MS and EU officials, NGOs, academics, esp global auto industry)*

ANNEX 4. TECHNICAL INFORMATION

Technical solutions and treatment of the ELVs are indispensable in the overall process of the implementation of the ELV Directive. This Annex describes the processes involved in depollution of end-of-life vehicles, dismantling components, shredding and post-shredding, although the latter element is not explicitly mentioned in the ELV Directive.

The typical treatment of end-of-life vehicles is separated into different steps. The first step is the treatment in an Authorised Treatment Facility (ATF) as required by the ELV Directive and displayed in **Figure B-1** below. Minimum requirements for installations for storage and treatment of ELVs in such ATFs are described in Annex I to the ELV Directive. Additional national requirements might also be established.

Figure B-1: Operations in an authorised treatment facility (ATF)



Source: Oeko-Institut

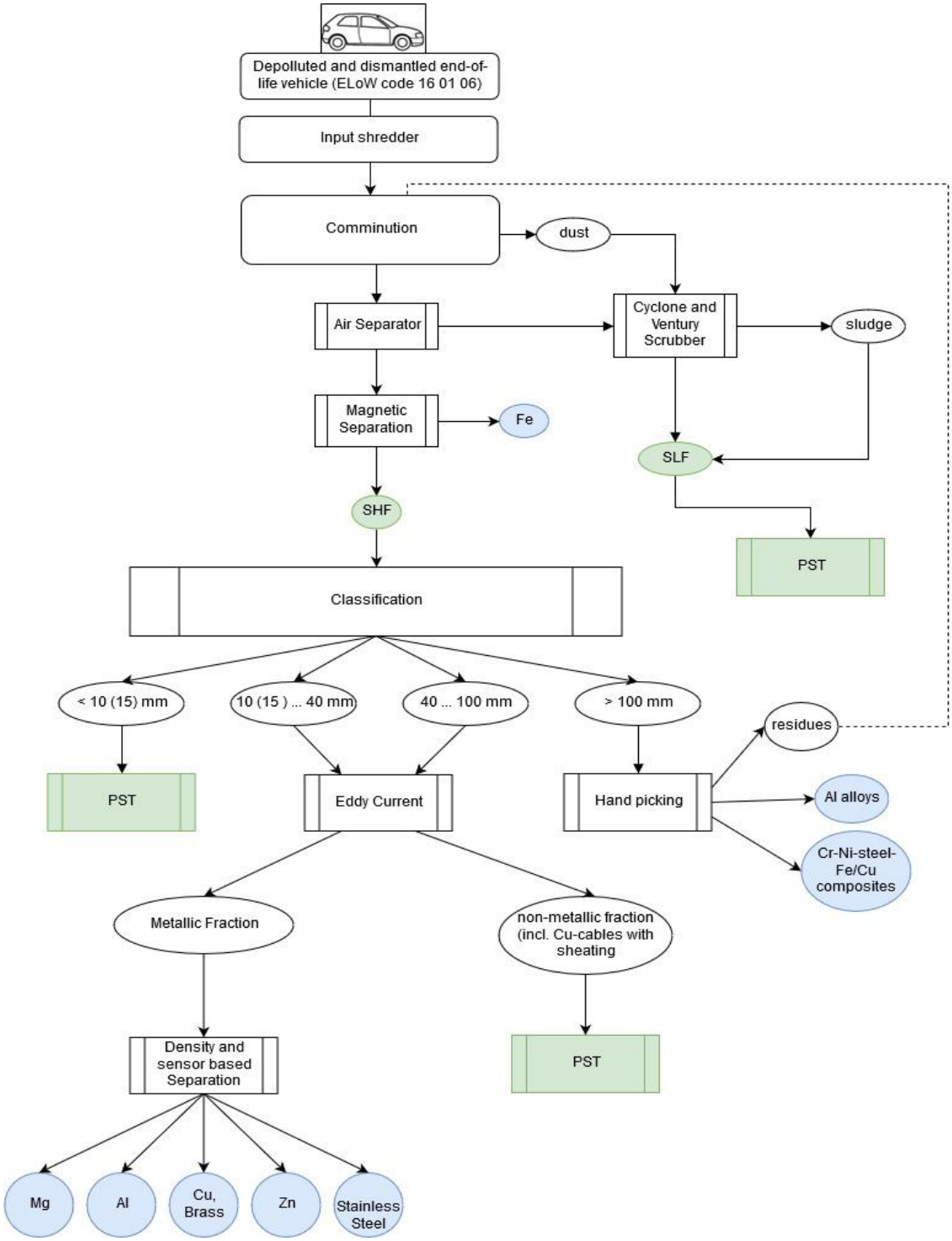
The second step is shredding the depolluted ELV as displayed in **Figure B-2**. Shredders for ELVs are regulated by the best available techniques (BAT) reference document for waste treatment[182].

It is important to note that shredding is a sorting operation and shall not be considered as recycling for the objectives of the Directive. The main outputs of the shredding process are

[182] https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/best-available-techniques-bat-reference-document-waste-treatment-industrial-emissions

ferrous metals, aluminium and other metallic fractions. The shredder light fraction (SLF) and some parts of the shredder heavy fraction (SHF) are either disposed of or treated in so-called post-shredder technology (PST) facilities.

Figure B- 2: Shredding process for ELVs

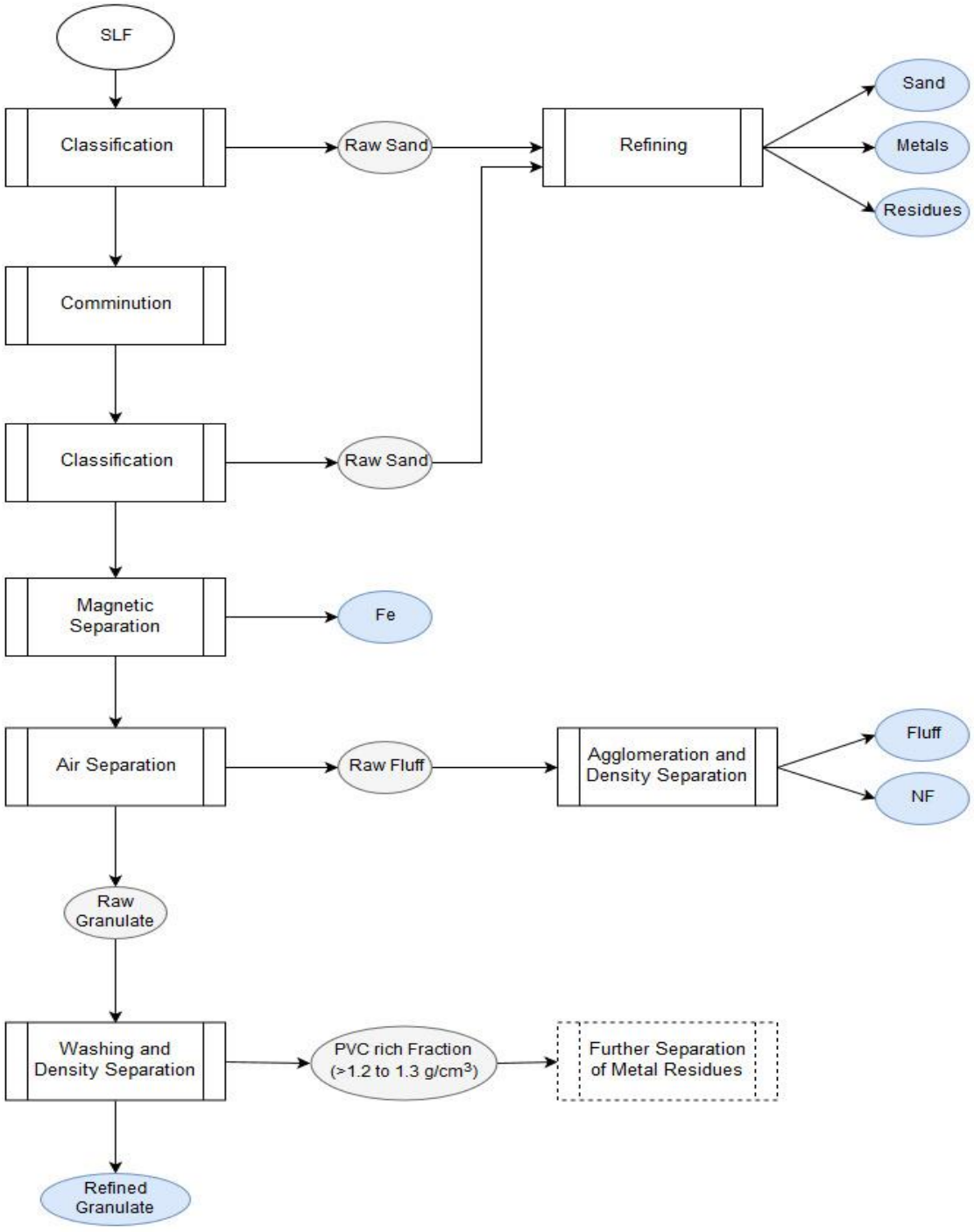


Source: Oeko-Institut

Post-shredder technology is the further reprocessing of shredder residues. It is considered as a necessary operation to fulfil the recycling targets set by the ELV Directive. Different technical adaptations are applied across Europe. Some PST are integrated into the shredder facility or they are installed separately on site. Residues after the shredding process can also be sent to offsite PST plants, while other operators direct shredder residues for disposal to the landfills.

Typical operations of PST are displayed in **Figure B- 3** below.

Figure B- 3: Operations in the post-shredder technology (PST) facilities



ANNEX 5. ANALYSIS ON THE COSTS AND BENEFITS

ELV Directive specific costs

Table C- 1: Summary of cost data collected via targeted consultations

Stakeholder Type	No. responses	Hours per year	Cost per hour (€)	Other costs (€ per year) (e.g. software or training)
Data collection				
EU Recycling Association (EuRIC)		100-200 depending on the country	12-60 depending on the country	100,000
Recycler/ATF	*3*	100 – 4,000	6-120	0 – 500,000
National government/administration	*4*	16-5,000	10 - 35	10 – 7,700
Regional government/administration	*3*	145 – 10,600	33 – 40	123 – 1,100
Reporting				
EU Recycling Association (EuRIC)		10-40 depending on the country	12-60 depending on the country	-
Recyclers (ATFs)	5	50 – 4,800	5 – 120	50 – 500,000
National government/administration	5	8 – 5,000	10 - 35	10 – 6,700
Regional government/administration	4 (from 3 MSs)	5 – 10,600	30 – 2,300	123 - 1100
Monitoring				
EU Recycling Association (EuRIC)		20-40 depending on the country	11-60 depending on the country	-
Recyclers (ATFs)	5 (from 3 MSs)	200 – 4,800	5 - 120	150 – 500,000
National government/administration	4	300 – 2,500	10 - 35	0
Regional government/administration	5 (4 MSs)	5 – 10,600	30 - 123	3 – 10.200
Technical compliance				
EU Recycling Association (EuRIC)		10,000 variable depending on the country	14-35 depending on the country	-
Recyclers (ATFs)	5 (from 3 MSs)	100 – 20,000	5 - 100	100 – 500,000
National government/administration	3	300 – 4,000	10 - 35	0 - 20
Regional government/administration	5 (4 MSs)	145 – 10,600	33 - 134	21 – 1,100

Table C- 2: Overall costs as a result of the implementation of the ELV Directive (estimates)

Element	Total cost	ELV specific (vs, counter factual)
ATFs and shredders (source = EURIC unless otherwise stated)		
Reporting and monitoring	205 hours per year @ €35/hr for 14,000 ATFs = €100.5m/year	Hard to say how much would occur without ELV Directive. Some sites would be monitored by MS specific legislation
Operating	€40 / ELV (Ademe average) for 6 million ELVs =	Depends on the MS requirements. Likely that in some MSs costs are higher to comply with ELV Directive requirements.

	€240m/year	
Payments to ELV last owners	Highly variable (from €0 to €300 per ELV) average of €150 = €900m/year	Will vary by car, MS and ATF, could be high if the MS in question set low standards. ELV only requires no charge (not payment), Payments vary, and ATFs can vary according to vehicle and its value to them (in parts and scrap)
Car industry (ACEA –estimated annual costs)		
IMDS	€107m/year	Set up as a result of the ELV Directive, but may have occurred anyway.
Take-back networks	€49m/year	May have developed as a result of other legislative and consumer pressure, but hard to know.
Dismantling Information	€3m / year	Set up as a result of the ELV Directive, but may have occurred anyway.
Consumer-Information	€1m/year	Set up as a result of the ELV Directive, but may have occurred anyway.
Member States (Average from data collected in this study)		
Reporting and Inspecting	6,400 hours per year @ €30/hour x 28 MSs= €5.4m/year	Some inspection and data collection would presumably occur without the ELV Directive, in virtually all MSs. Additional burden because of ELV Directive is hard to estimate. Low confidence in quality of reported data.

Table C- 3: Overall benefits as a result of the implementation of the ELV Directive (estimates)

Element	Total (€m/ year)	ELV Directive (vs, counter factual)
ATFs and shredders (EURIC)		
Sale of recovered / removed parts	6 million ELVs treated per year, Ademe estimate of €130/ELV = €780m.	ELV Directive does nothing specific to make this easier (despite it being an ELV Directive objective), but it could be argued that the ELV Directive helps attract ELVs to ATFS, where the parts can be removed.
Sale of recovered materials (e.g. recycled steel)	6-million ELVs treated, 1088kg/ ELV, 70% Ferrous metal = 4.56 million tonnes million tonnes @ €235/tonne = € 1.073 billion,	ELVs would still be scrapped and the profitable material would be recovered without the ELV Directive, but the ELV Directive arguably increases the number of ELVs that are collected. Handling of hazardous and non profitable materials would not be regulated at the EU level, creating the risk of diverse national approaches.
Car industry		
Consumer good will from role / contribution of OEMs to ELV collection costs and use of reclaimed material	Very hard to value, but some manufacturers do promote their green credentials (though nothing specific on the ELV Directive specific costs has been seen), so it is of interest and value to some consumers	Car manufacturers may well have done this anyway, via this or some other route.
Savings from use of recovered material	Maybe low (or even negative), as virgin material is often lower cost than recovered material	
Member States / citizens		
Removal of hazardous	Lead removal (for example) has been shown to offer clear benefits in other	Some (even most) MSs would have developed similar prohibitions, but EU wide action has

Element	Total (€m/ year)	ELV Directive (vs, counter factual)
substances	environmental policies. The same would be true for removal of the prohibited substances from ELVs.	standardised this and probably made the process quicker (and more thorough) in several MSs. EU wide prohibitions obliged OEMS to act on a market wide basis.
Avoidance of impact from recovered resources	GHG savings and other benefits from avoided extraction of virgin materials	Resource recovery likely to have speeded up and occurred in more MSs with the ELV Directive than without it.
Level playing field within and between MSs	Benefits to citizens and legitimate businesses through competing on a fair basis within MSs and between MSs	Most MSs would have aimed to achieve this within their own borders, but the likelihood of consistency between MSs would have been lower
Savings on second hand vs. new parts	Consumers arguably benefit from access to recovered part, also avoids energy use in the manufacture of new parts. Though there are also risks in purchasing used parts of unknown history.	Would have happened without ELV Directive. Role of ELV Directive in increasing this is unclear (not part of its original intention, but increased collection of ELVs arguably makes this easier)