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Rules on compliance with Article 7.2 of Directive 2000/53/EC

Final Report

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Executive summary

Article 7 (2) of Directive 2000/53/EC on End-of-life Vehicles (ELV) establishes certain minimum targets with respect to the quantitative re-use, recycling and recovery rates for all end-of-life vehicles, which have to be implemented no later than 1 January 2006. By the same article the Commission is asked to establish the detailed rules necessary to control compliance of Member States with the mentioned targets, taking into account all relevant factors, including the availability of data and the issue of exports and imports of end-of-life vehicles.

This study is intended to provide the Commission with explanations of how the reuse, recycling and recovery rates are calculated at present, and to suggest a common calculation method at European level.

Furthermore the available data on cross-border shipments of end-of-life vehicles between the European Union and third countries were to be examined.

Having analysed the information given by the Member States the following areas will be of high relevance for calculating the recycling and recovery rates:

- a) The determination of the denominator of the recovery targets (number and weight of the ELV),
- b) The determination of mass relevant activities at the dismantling site,
- c) The export of body shells,
- d) The determination of mass relevant activities at the shredding sites,
- e) The determination of system boundaries,
- f) The assignment of processes such as recycling, energy recovery or final disposal.

Following recommendations are given for those points:

The <u>denominator of the recycling and recovery rates</u> as described in Article 7(2) of Directive 2000/53/EC is the average vehicle weight and will be determined by the total number of ELVs and the weight of the individual vehicle.

The highest accuracy of the recycling and recovery rates of the Member States can be achieved if the denominator for the calculation of those rates is based on the number of ELVs entering the treatment system of a Member State. It seems to be appropriate to determine the weight of the individual car based on the empty vehicle

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weight given in the registration documents minus the weight of a driver with luggage (75 kg) and minus the amount of fuel included in the calculation method of Directive 70/156/EEC in the valid version of the first time registration of the vehicle.

Fuel removed during dismantling should not be taken into account for the calculation of the recycling and recovery rates in order to avoid double-counting.

Congruence between the factual weight of an ELV and of the corrected weight given in the registration document should be regularly checked by weighing campaigns.

Given the fact that weighing of <u>dismantled materials</u> for further treatment, recycling, recovery and final disposal will be the basis for cost calculation between the dismantling company and installations for further treatment or disposal, it will be appropriate to determine the weight of those materials based on weighing notes.

In order to determine the weight of <u>spare parts</u> two approaches are conceivable:

- 1. Counting of sold spare parts combined with using key factors for the determination of the weight
- 2. Calculation of spare parts

$$m_{s.p.} = m_{i.w.} - [m_{o.w.} + m_{h.z.} + m_{d.m.} + m_{o.m.}]$$

 $m_{s.p.}$ = mass of spare parts

 $m_{i.w.}$ = input weight of ELV

 $m_{o.w.}$ = output weight of body shell

 $m_{h.s.}$ = mass of hazardous substances from depollution

 $m_{d.m.}$ = mass of dismantled materials for recycling

 $m_{o.m.}$ = mass of other materials for disposal

If the input weight or the output weights can not be determined in a reliable way only the first approach or even individual weighing of all spare parts would lead to sensible results.

In case that the second approach is chosen, effective controls of the activities of the dismantling companies and a stringent monitoring will be necessary.

In order to minimise allocation problems in view of the recycling and recovery rates from <u>exported body shells</u> and to avoid extensive monitoring and calculation efforts, it is recommended to credit the achieved recovery outcome to the recycling and recovery rate of the Member State where the respective ELV <u>first</u> entered the treatment system (exporting Member State).

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The recycling and recovery outcome achieved by the receiving country during the last balance period should be used as a calculation basis.

This approach will include some uncertainties which cannot be clarified in the current state of implementation of the ELV Directive in Europe. Therefore the mass relevance of the export of depolluted body shells and its influence on the recycling and recovery rates should be monitored.

The portion of ELV body shells in the input mixture of a <u>shredder</u> should be proven based on weighing notes.

The most feasible way which will most likely achieve a balance between effort and accuracy is to perform regular shredding campaigns exclusively with cars to determine the relation of output streams of a shredder, and their changes over the time and differences by regions. A reliable information basis for a decision about the intensity of those campaigns necessary to achieve sufficiently precise results or about the appropriateness of the method of projections for all Member States is not yet available. A differentiation between shredder types during the shredding campaigns appears to be appropriate.

With respect to <u>system boundaries</u> in the ELV treatment chain, it is proposed to make a logical distinction between the monitoring interface where outgoing material streams are measured, and process-specific <u>key factors</u> to express recycling and recovery rates for subsequent treatment chain.

In order to minimise the monitoring efforts, the <u>monitoring interface</u> should be set at the earliest possible stage in the treatment chain where meaningful results can be achieved. The characteristics of processes following after the monitoring interface can then be expressed by process-specific <u>key factors</u> which will show the aggregated recycling and recovery outcome of the respective treatment method. By combining the proof of amount issued at the monitoring interface and the key factors a determination of recycling and recovery rates will be possible.

The necessary <u>monitoring intensity</u> should be differentiated by priority of the respective waste stream in terms of mass relevance, environmental priority and malpractice potential. The recovery of shredder light fraction should be monitored with highest priority.



If the recycling and recovery rates in the different Member States are to become comparable in the future, it will be essential to find a harmonised approach towards the <u>assignment of recycling and recovery rates to treatment processes</u> in general and in particular for the disposal of shredder residues.

Data on <u>cross-border shipments of used vehicles and ELVs</u> is scarce and inhomogeneous. From information received from Germany, the Netherlands and Switzerland it is evident that a significant number of used vehicles is exported to Accession Countries.

However, due to the incomplete database, it would be premature to draw generalised conclusions for all Member States about the number of vehicles that are deregistered and exported to third countries before treatment.

A comparison between the statistical age distribution of exported cars versus the average age of an ELV in a Member State can give valuable information on whether the majority of exported cars can be assumed to be 2nd hand cars in still reasonable condition or not.

The information provided by several Accession Countries confirms that the number of imported used vehicles is often significantly higher than the number of imported new vehicles. Often, the majority of imported vehicles is already 10 years old, or even older with the result that the average age of the <u>running car fleet</u> in some Accession Countries is 15 years, whereas the average age of <u>ELVs</u> e. g. in the Netherlands is 14 years.

In summary, it can be stated so far that many cars brought on the market in EU Member States will become ELVs elsewhere. Due to the large number of 2nd hand imports, the ELV problem in receiving countries is already significant and expected to grow further.

The older a 2nd hand car already is at the time of import, the less time will remain until it will become an ELV. In order to avoid a situation where Member States would dispose their ELVs by exports, it is suggested to check the sorting efficiency of the collecting systems *via* age statistics and to improve collection efficiency where appropriate.



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Abbreviations

ASR Automotive Shredder Residue
Annex I Annex I of Directive 2000/53/EC

Annex II Annex II of Directive 2000/53/EC

COD Certificate of Destruction

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

R-Rate Rates for recycling and recovery

SLF Shredder Light Fraction
SHF Shredder Heavy Fraction



1 Background and Objectives of the study

Article 7 (2) of Directive 2000/53/EC on End-of-life Vehicles (ELV) establishes that, no later than 1 January 2006, for all end-of-life vehicles, the re-use and recovery shall be increased to a minimum of 85% by an average weight per vehicle and year. Within the same time limit the re-use and recycling shall be increased to a minimum of 80% by an average weight per vehicle and year. For all end-of-life vehicles no later than 1 January 2015 the re-use and recovery shall be increased to a minimum of 95% by an average weight per vehicle and year. Within the same time limit, the re-use and recycling shall be increased to a minimum of 85% by an average weight per vehicle and year [Art. 7 (2) b)].

The last indent of Article 7(2) of the ELV Directive requests the Commission to establish the detailed rules necessary to control compliance of Member States with the mentioned targets, taking into account all relevant factors, including the availability of data and the issue of exports and imports of end-of-life vehicles.

This study is intended to provide the Commission with

- explanations of how the re-use, recycling and recovery rates are calculated at present in the existing schemes in the Member States, Japan, Switzerland and Norway;
- a presentation and explanations of elements which distinguish different calculation methods, including an assessment of their advantages and disadvantages;
- an assessment of the comparability of the methods of calculation of re-use, recycling and recovery targets at national level;
- suggestion for a common calculation method at European level,
- a collection of data on the number of vehicles that are deregistered in Member
 States but exported to third countries before treatment;
- a collection of data on cross-border shipments of end-of-life vehicles between the European Union and third countries.



2 Methodology

From 14.06.02 to 05.07.02 Ökopol sent out a cover letter and two questionnaires to the Member States and additionally to Norway, Switzerland and Japan to evaluate the status of the implementation of the ELV Directive and the current practice concerning the calculation of recycling and recovery rates (see Annex 1.1, 1.2 and 1.3). Additionally personal interviews were performed and information was exchanged via e-mail. It was possible to include information received before 13.09.02 into the study. An overview about the information flow between Ökopol and the responding countries is given in Annex 1.5.

Chapter 3 presents some basic considerations with respect to mass flows in ELV treatment and identifies the crucial points for the calculation of recovery rates.

Chapter 4 informs about the ongoing legal implementation of the ELV Directive in the Member States.

The information provided by the Member States about the calculation methods queried through the questionnaire and about the crucial points identified in chapter 3 is given in chapter 5.

From the variety of solutions found in individual Member States with respect to the crucial points, proposals for a common calculation method are deducted in chapter 6.

Chapter 7 summarises the practice of deregistration and issuing of a Certificate of Destruction, as well as presents the existing information on cross-border shipments of used vehicles and ELV.



3 Basic considerations

3.1 Mass flows

According to the targets and requirements of the ELV Directive (especially Article 6, Article 7 and Annex I) the recycling system for ELVs will comprise depollution, dismantling and shredding as treatment steps before reuse, recycling or recovery processes take place. Removal of hazardous substances which are marked according to Annex II¹, of liquefied gas tanks, liquids, catalysts and glass (Annex I) is fixed as mandatory. Dismantling of metal components containing copper, aluminium and magnesium is only mandatory according to Annex I if these metals are not segregated in the shredding process. Removal of tyres and large plastic components (bumpers, dashboards, fluid containers, etc.) is mandatory if these materials are not segregated in the shredding process in such a way that they can be "effectively recycled as materials" (Annex I).

Figure 1 shows a rough description of the material flows in an ELV treatment system with minimum depollution and dismantling activities according to the ELV Directive. The most relevant mass streams are metal scrap and shredder light fraction (SLF). The mandatory minimum activities of the dismantlers have a low overall relevance in view of the recovery rates. Within the materials which must be dismantled, the most prominent fraction by mass is glass.

¹ Official Journal of the European Communities L 170, 26.06.2002, p. 81



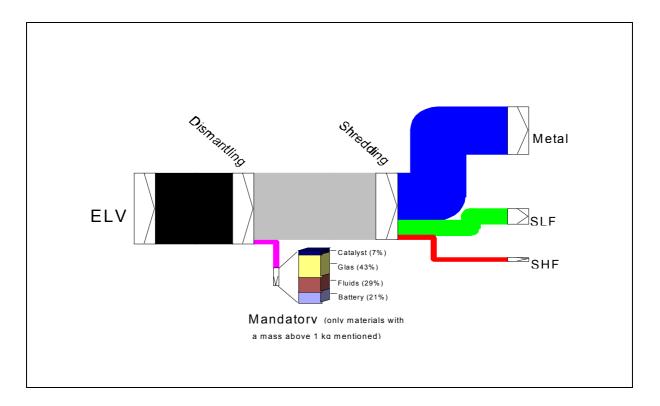


Figure 1: Material flows for minimum depollution and dismantling

Nevertheless, the demand for metal scrap as secondary raw material is high in a functioning market where metal recycling is well established. If plastics and elastomers are not separated during or after the shredding process in the required way, they will have to be separated from the rest of the ELV at the dismantling site before going to the shredder. In that case, metal would have a higher mass relevance in relation to the total shredder output. Figure 2 shows this scenario, where around half of the non-metallic materials are separated at the dismantling company². Dismantling of ferrous scrap is not included in Figure 2 and 3. However, it is reported that in some countries the dismantling of core scrap (e.g. motor and powertrain) is quite common and economically sensible in view of the relation between dismantling efforts and net profits. Figure 3 shows an example of mass flows including the removal of core scrap. It has to be taken into account that with the different dismantling activities before shredding the relation between scrap, SHF and SLF in the shredder output may change (depending on the dismantled materials).

² Figure 2 does not include the dismantling of the metals mentioned in Annex I because it unlikely that they will not be segregated during or after the shredding process.



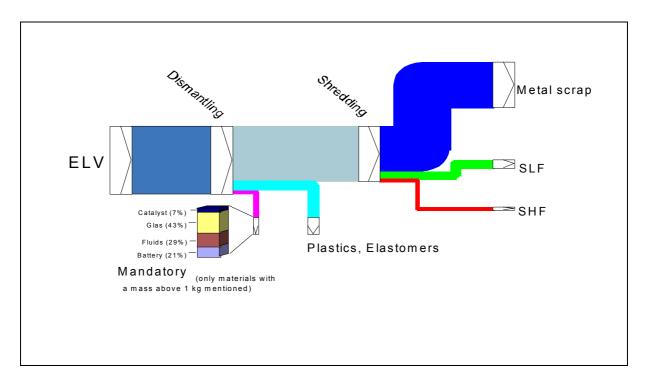


Figure 3: Material flows for increased dismantling of plastics

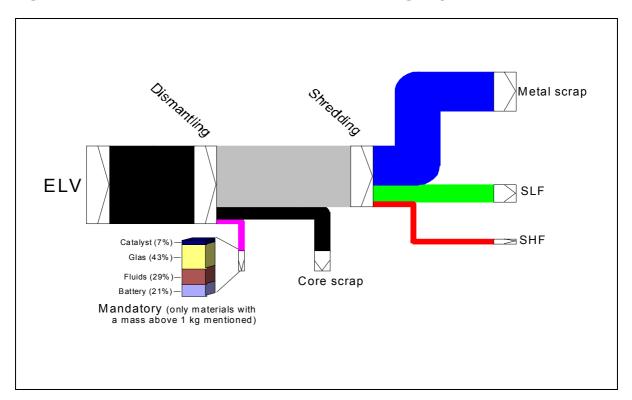


Figure 4: Material flows for increased dismantling of core scrap



3.2 Crucial points for the calculation of recycling and recovery rates

In systems which comprise dismantling and shredding steps as described above the following aspects will be of high relevance for calculating the recovery rates:

- a) determination of the denominator of the recycling and recovery targets (number and weight of the ELV entering the system),
- b) determination of mass relevant activities at the dismantling and shredding sites,
- c) definition of system boundaries,
- d) assignment of processes as recycling, energy recovery or final disposal.

These crucial points will be discussed in detail in chapter 6.

3.3 Norm addressee

According to the ELV Directive there will be different levels for reporting and proving of recycling and recovery rates:

- Article 9.2, paragraph 4 determines that Member States are obliged to report
 the achieved recovery rates to the Commission. The questionnaire for the
 Member States report (Commission Decision 2001/753/EC) includes (as
 relevant points for this study) the number of ELVs submitted to authorised
 treatment facilities [2001/753/EC paragraph 2.3] and the recycling and
 recovery rates per calendar year [2001/753/EC paragraph 2.8].
- Within the Member States the "economic operators" [2000/53/EC Art. 2] are responsible to achieve the recycling and recovery rates. A precise norm addressee on this level is not defined in the ELV Directive. As a result different approaches are or will be realised in the Member States. In the Netherlands for example the car producers and importers are norm addressees. In Germany, the dismantling and shredding companies are obliged to achieve the targets. In some Accession Countries due to the high portions of privately imported second hand cars more state orientated systems may be established.

This study refers to the calculation of recovery rates within the Member States. Economic operators are in the focus for the responsibilities to achieve the recycling targets. A specification of norm addressees will only be done where necessary.

³ Economic operators are defined in Art. 2 of Directive 2000/53/EC as producers, distributors, collectors, motor vehicle insurance companies, dismantlers, shredders, recoverers, recyclers and other treatment operators of end-of life vehicles, including their components and materials.



3.4 Basic requirements

Basic requirements for a common calculation method for all Member States are⁴:

- The calculation method for the recovery rate must be suitable to ensure that the targets of the ELV Directive will be achieved in a best possible way.
- In order to achieve these targets the method must take into account the factual activities, material flows and the treatment and recovery processes as precisely as possible.
- The method must consider the efforts to collect and/or generate the required data and to calculate the recovery rates ("... take into account the availability of data" Art 7.2. of the ELV Directive). It shall provide the necessary information in a reasonable and efficient way.
- The method shall be compatible with different existing systems in the Member States.

⁴ See for example: Lohse, J., Sander, K., Wulf-Schnabel, J.: General requirements for monitoring the recycling of long-lived, technically complex products with an in-depth-analysis of end-of-live vehicles; UBA UFOPLAN Ref. No. 297 929 08; Berlin; 1999



4 Current implementation status

All Member States as well as Norway, Switzerland and Japan have been contacted to provide relevant information and official documents regarding the state of implementation of the ELV Directive. This chapter evaluates the given information and presents the status quo as of September 2002. For a complete list of contacts see Annex 1.5.

4.1 Member States

4.1.1 Austria

The Austrian ELV ordinance⁵ has been ratified and will enter into force on 6 November 2002. The ordinance is accompanied by a comment paper elaborated by the Austrian government⁶ and a background study investigating material flows and developing a data model for the recycling of ELV. A new waste management law⁷ which includes definitions of recycling, recovery and final disposal as well as definitions when waste ceases to be waste will enter into force on 2 November 2002.

4.1.2 Belgium

Being a federal state, Belgium is implementing the ELV Directive at regional level as far as it is a waste issue. Issues dealing with products are regulated on federal level.

In Flandria the implementation has been incorporated into the Flemish waste legislation ("Order of the Flemish Government for the Establishment of the Flemish Regulations Relating to Waste Prevention and Management (Vlarea⁸)"). The waste law is a framework regulation and wrecks are considered as special waste. Flandria has not yet implemented the free-of-cost take-back of ELVs.

Wallonia has transposed the Directive partly into its waste legislation⁹. The free-of-cost take-back of ELVs is implemented. A separate legal document dealing with

⁶ Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft: Vorblatt Altfahrzeugeverordnung, Entwurf, April 2002, p. 12

⁵ Altfahrzeugverordnung

⁷ Abfallwirtschaftsgesetz 2002

⁸ "Vlaamse Reglement inzake Afvalvoorkoming en –Beheer"(Flemish Waste Law): Afdeling (chapter) 3.3.; Voertuigwrakken

⁹ "Arrêté du Gouvernement wallon instaurant une obligation de reprise de certains déchets en vue de leur valorisation ou de leur gestion"



depollution and dismantling requirements as well as the licensing of sites relevant to these activities is about to be adopted¹⁰. The Walloon Government is now waiting for the advice of the State Council which will end the transposition.

As in Flandria the overall legislation is the waste law and matters concerning ELVs are regulated within this framework.

The region of Brussels Capital has issued a separate legal document dealing with regulations on COD, depollution and dismantling requirements as well as the licensing of sites relevant to these activities¹¹. Detailed rules for dismantling may be the subject of a more detailed regulation in the Brussels Capital region, but not details are available at the moment. Brussels has partly transposed the requirements regarding depollution and dismantling as set out in Annex I of the Directive and has adopted a new legal disposition implementing the ELV Directive¹² in July 2002. It is a framework waste legislation where ELVs are listed beside others.

4.1.3 Denmark

The Danish government has implemented the ELV Directive by "Statutory Order No. 480 of June 19, 2002 on Management of Waste in the form of Motor Vehicles and derived Waste Fractions¹³", which entered into force 1 July 2002.

4.1.4 Finland

Finland has not yet implemented the ELV Directive. Due to the former disagreements on how to share the costs of the ELV treatment and how to deal with private car imports, the task to design a new proposal for the transposition of the ELV Directive into Finnish law has been handed over to a clearing person. It is assumed that the momentarily developed model will be able to achieve a compromise between the Finnish authorities, the car manufactures and the recycling companies, so that the implementation will be finalised in the beginning of 2003.

[&]quot;Avant-projet d'arrêté du Gouvernement wallon déterminant les conditions sectorielles des installations de regroupement ou de tri de déchets métalliques recyclables, des installations de regroupement, de tri ou de récupération de pièces de véhicules hors d'usage, des centres de démantèlement et de dépollution des véhicules hors d'usage et des centres de destruction de véhicules hors d'usage et de traitement des métaux ferreux et non ferreux."

¹¹ "Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à l'agrément des exploitants de centres d'élimination de véhicules hors d'usage habilités à délivrer un certificat de destruction, et aux conditions d'exploitation desdits centres"

¹² "Arrêté du Gouvernement de la Région de Bruxelles-Capitale instaurant une obligation de reprise de certains déchets en vue de leur valorisation ou de leur élimination"

¹³ Bekendtgrørelse om håndtering af affald i form af motordrevne køretøjer og affaldsfraktioner herfra



4.1.5 France

France has not yet implemented the ELV Directive. The recent draft proposal for legislation¹⁴ has been presented on 27 May 2002 to all the concerned professionals. It is set as a framework regulation: the details of implementation on the calculation method of the recycling and recovery rates are to be specified in another regulation ("arrêté"). The main authorisation requirements of dismantling and shredding companies appear in the French decree. The final approval of this legal document is set to be latest end 2002. The draft proposal foresees the handing out of a COD to the ELV owner 14 days after take-back and to transmit relevant information to local authorities (deregistration is mentioned)

4.1.6 Germany

Germany implemented the ELV Directive with the "Law on End of Life Vehicles" which entered into force in July 2002. The central part concerning the calculation of recycling rates is the ELV ordinance which adapted the existing ELV ordinance. The self declaration of German industry was cancelled by the industry in July 2002.

4.1.7 Greece

The Greek Government has worked out a draft presidential mandate on ELV to implement the ELV Directive. It is foreseen to be signed by the Minister for Environment in September 2002 and has to be signed by the co-responsible ministries afterwards. Ratification is expected in February 2003.

According to law 2939/2001 from 6 August 2001 all car producers or importers of cars (or car parts) have to install and approve systems for collection, depollution, dismantling, shredding, recovery etc. until 6 February 2003.

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¹⁴ Projet de décret relatif à la mise sur le marché des véhicules, la reprise, la valorisation et l'élimination des véhicules hors d'usage.

¹⁵ Altfahrzeuggesetz



4.1.8 Netherlands

The Netherlands have adopted the "Decree on Management of End-of-Life Vehicles"¹⁶ in July 2002. The recycling rate has to be met earlier than stipulated in the ELV Directive: In 2003 the 85% target has to be met in 2003 and the 95% target in 2007. The Dutch system of accepting ELVs by certified vehicle dismantling companies which have been contracted by Auto Recycling Nederland (ARN), is already working since 1995.

4.1.9 Sweden

Sweden has not yet transposed the ELV Directive completely. So far the vehicle dismantling act (2000/01:47) has been amended and Annex I has been transposed through the National Environmental Protection Agency regulations and General advice on scrap vehicle operations¹⁷. Annex II and other parts of the ELV Directive will probably be implemented in the course of 2003. Through the ordinance for producer responsibility for cars (SFS 1997/788), introduced Jan 1, 1998, the car producers are required to take back cars registered from that date without cost with some exceptions.

¹⁶ Besluit Beheer Autowrakken

¹⁷ NFS 2002:2 Naturvårdsverkets föreskrifter och allmänna råd om skrotbilsverksamhet (National Environmental Protection Agency regulations and General advice on scrap vehicle operations)



4.2 Non-Member States

4.2.1 Japan

The new Japanese "Law on Recycling of End-of-Life Vehicles" has been promulgated on July 12th 2002. It is only a framework law and has to be specified by subordinated legislation. The law stipulates to start ELV recycling operations before end of 2004. One of the main aims of the Japanese law is to reduce the amount of ASR. No information has been submitted on how this target will be met. Producer responsibility has been integrated as well.

Shredders and dismantlers have to be authorised and fulfil detailed reporting procedures concerning the transport of materials. All information will be merged at an information management centre.

4.2.2 Norway

With the "Forskrift om kasserte kjøretøy" the Norwegian Government has implemented the ELV Directive into national law on July 1st 2002.

4.2.3 Switzerland

The Swiss government is still in close collaboration with the industry to decide about details on the Ordinance on Waste¹⁸ and the administrative instruction on ELV¹⁹. It is expected that the ordinance on waste and the administrative instruction will be in force in 2004.

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¹⁸ Verordnung über den Verkehr mit Abfällen

¹⁹ Vollzugshilfe Altautos



5 Current practice in the Member State regarding the crucial points for the calculation of R-Rates²⁰

This chapter summarises the information inquired by Questionnaire B (see Annex 1.3) concerning the in chapter 3.2 identified crucial points for the calculation of recycling and recovery rates. The information gathered has only been discussed in detail when relevant for the crucial factors and presents the status quo as of September 2002. For a complete list of contacts see Annex 1.5.

5.1 Member States

5.1.1 Austria

Determination of the ELV weight

The basis to determine the weight of an ELV is not defined in the ordinance itself, but in the comment paper elaborated by the Austrian government²¹. There the weight is defined as weight indicated in the vehicle registration document minus driver weight (75 kg) and an amount of fuel which will be fixed in some following discussion (e. g. based on a calculation of the average volume of a fuel tank and an average of 5 l remaining fuel in an ELV).

Export of ELVs and body shells

The basis for the denominator of the R-Rates will be the number of ELV given back to producers/importers, the recycling system or dismantlers.

If a depolluted and dismantled body shell is exported to another Member State or to non-EU-countries (as far as allowed), the achieved R-Rates in the receiving countries shall be credited to the national R-Rate. The responsible producer/importer, treatment system or dismantler has to prove that the recycling and recovery is really concluded.

²⁰ The term R-Rate comprises recycling and recovery rates.

²¹ Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft: Vorblatt Altfahrzeugeverordnung, Entwurf, April 2002, p. 12



Activities dismantler

The amount of removed materials at dismantling sites (expected amount: 10%) will be calculated by the difference between the input weight of the ELV and the weight of the body shell which is submitted to the shredder. Additionally, the amount of dismantled materials must be proven by weighing notes.

Activities shredder

Every shredder in the ELV recycling system must perform a shredding campaign with 60 to 100 ELVs every year in order to determine the relation of the output material streams for the specific installation.

The output streams are differentiated in ferrous metal scrap, metal rich shredder light fraction and other shredder light fraction.

The metal rich SLF shall be submitted to further treatment aiming at metal recovery.

Calculation method

Producers and importers have to report to the Ministry of Environment the amount of wastes from dismantling and shredding activities submitted for recycling, energy recovery or final disposal according to a list contained in Annex 5 of the ELV ordinance. Spare parts are mentioned in this list. They are considered as recycled if they are dismantled and stored properly.

System boundaries

The final decision on system boundaries for the calculation of recycling rates depends on the actual recycling or treatment process and depends on the respective waste fraction.

Concerning polymers and similar materials removed at dismantling sites, that the system boundaries will most likely be set at the entrance of the first treatment facility (weighing notes will be mandatory).

The R-Rate for SLF will be calculated based on an assessment of the specific treatment and recycling processes.

Also based on an assessment of the specific treatment and recycling processes, the



R-Rate of the metal rich shredder light fraction which undergoes further treatment will be calculated by one of the following methods:

- Either based on factual material streams: a differentiation will be made between
 metals and non metals. Further steps (e. g. factual recycling rate of the metals in
 a non ferrous metal plant) will not be taken into consideration but a general rate
 will be credited;
- or based on general assumptions about recycling and recovery results based on an average composition of metal rich shredder light fraction.

The system boundaries for the calculation of R-Rates for the shredder light fraction will probably be "behind" possible further treatment steps, but there is no final decision yet.

One possibility discussed in Austria for the disposal of SLF is a fluidised bed combustion. In this process the metals contained in the bottom ash shall be separated and submitted to a metal plant for recycling. This metal portion is intended to be credited as recycling. This would result in the need to set the system boundaries behind the subsequent recycling / recovery steps.

Assignment of processes

Final decisions concerning the question which of the relevant processes in the field of ELV recycling is seen as recycling, which as energy recovery and which as final disposal operation have not yet been taken. Ferrous metal scrap will be credited as 100% recycled.

The definition of 'recycling' in the new waste management law includes activities where waste is used to directly substitute primary raw materials and thus includes feedstock recycling. According to § 5 of the waste management law, waste generally ceases to be waste when immediately used to substitute primary raw materials or products which are made from primary raw materials. Exemptions may be made under certain conditions (§ 5.2 waste management law).

If the SLF is combusted in a municipal waste incinerator (MWI) this may be credited as energy recovery given the fact that the composition and combustion properties of SLF differ from solid municipal waste for which the incineration in a MWI is a final disposal operation.

It is intended to clarify the problem of assignment of processes by 2006.



5.1.2 Belgium

Determination of the ELV weight

In both Flandria and Wallonia, every individual ELV is weighed before and after depollution. Furthermore the federal monitoring institution (Febelauto) compiles the unloaded weight of every individual vehicle.

Dismantling/Depollution

The weight of the dismantled/depolluted materials is calculated from the difference between the vehicle weight from Febelauto (car in new state) and the weight of the unladen ELV at the entrance of the treatment system plus the difference between the weight of the ELV before and after treatment operations (both for Flandria and Wallonia). There is no information available on the mass of exported depolluted ELVs and on the mass of exported materials from treatment.

Calculation method

The R-Rates according to the ELV Directive have been transposed in the legislation of all regions, Flandria setting the first time limit to 01/01/2005 while Wallonia and Brussels Region have set it to 01/01/2006.

Febelauto has issued a calculation method for the rates in its 2001 report. It is not yet fully clarified, how the calculation is done in detail. Clarification is currently being undertaken by the Flemish Public Waste Agency (OVAM).

System boundaries/Assignment of processes

OVAM has given some examples concerning the assignment of certain treatment processes to the categories reuse/recycling/recovery/disposal (Wallonia idem):

Product re-use of tyres, gas tanks, mirrors, lights etc. is considered as re-use.

Recovery and recycling of metals (ferrous and non-ferrous) and plastics out of the shredding mix is considered as Recycling.

Incineration or co-incineration of used oil, non-usable tyres and parts of the high caloric heavy shredder fraction is considered as energy recovery.

Incineration or co-incineration of treated shredder light fraction under the specific condition of use as fuel in combustion plants or disposal on a landfill is considered as disposal.



5.1.3 Denmark

Determination of the ELV weight

It is planned to use the weight of a new car as stated in the car documents as basis for the determination of the ELV weight.

Activities dismantler

From 01.01.2003 at least 10% of the total empty weight of received vehicles shall be removed and provided for recycling.

The weight of the depolluted and dismantled materials is determined at delivery to the collectors/recyclers.

System boundaries

Materials for recycling or recovery are quantified on the basis of outgoing materials from the dismantling companies and shredders, depending on their destination.

5.1.4 Germany

Determination of the ELV weight

The basis to determine the weight of an ELV is the weight indicated in the vehicle registration document. For M1 – vehicles which have been registered until 31 December 1996 only the weight of the tank filling (90% filled tank) is subtracted²². For M1 – vehicles registered after 31 December 1996, the weight of a standard driver (75 kg) will additionally be subtracted. For N1 – vehicles both will be subtracted irrespective of the date of registration.

Export of ELV and body shells

The basis for the determination of the denominator for the recycling rates will be the weight of ELV entering the recycling system.

²² The date was included because after the changing of the type approval directive a transition time of two years was introduced where it was still allowed not to include the driver's weight.



Activities dismantler

Dismantling sites are obliged to dismantle 10 weight percent of an ELV and to submit it to recycling or re-use. Metal, metal parts and fuel must not be credited. It is also possible to achieve this target in cooperation with other dismantlers (horizontal cooperation) or with shredding companies (vertical cooperation) in the recycling chain.

Waste streams and their amounts entering or leaving the dismantling site must be documented.

Activities shredder

Shredding companies are obliged to submit 5 weight percent of the non metallic shredder residues to recovery processes until 2006, and 5 weight percent to recycling and 10 weight percent to recovery processes until 2015.

If metallic components are separated from the shredder light fraction and submitted to a recycling process their amount can be taken into account for the calculation of the recycling rates.

Waste streams and their amount entering or leaving the dismantling site must be documented.

Calculation method

Taking into account the activities at the dismantling and shredding sites the R-Rate will be 15% (respectively 25% until 2015). In order to fulfil the targets of the ELV Directive the amount of recycled metals has to be at least 70% and is credited as recycled. This is not explicitly mentioned within the law but is implied.

System boundaries

Tyres which are removed at a dismantler are credited as recycled in any case if they are submitted to a certified disposal company irrespective of the final destination.

Assignment of processes

The ELV ordinance determines that feedstock recycling is one possible way of recycling.



5.1.5 Finland

Determination of the ELV weight

During a pilot study the ELV average weight has been calculated through weighing of every individual ELV.

Activities dismantler

The weight of dismantled materials and spare parts is not recorded.

System boundaries

Materials for recycling or recovery are quantified on the basis of outgoing materials from the dismantling companies and shredders, depending on their destination.

5.1.6 France

Determination of the ELV weight

The calculation of the ELV weight ("masse à vide") is calculated according to Directive 70/156/EC (see chapter 6.1.2). It consists of a conversion based on manufacturer's data of theoretical weight in car documents ("carte grise").

Dismantling/Depollution

Dismantlers will not be obliged to accept all ELVs. If they consider that the ELV has a negative market value, they can refuse the take-back. In this case the ELV has to be given directly to a shredder. Presently most of the shredders are not equipped for dismantling and depollution (total of approximately 50 in France), but the draft proposal for the implementation of the ELV Directive includes the obligation for the shredder companies to adapt to the requirements on depollution and dismantling of the Directive. The draft proposal contains the obligation for dismantlers to transfer information on the weight of the dismantled/depolluted materials as well as the weight of the accepted ELVs and the weight of the ELVs given to shredders.



5.1.7 Greece

Activities dismantler

Batteries, oils, catalysts and tyres will have to be recycled/recovered up to a certain percentage which is not yet clarified.

Activities shredder

Shredding of the depolluted dismantled ELV will not be mandatory, but it is assumed that all ELVs will be sent to shredder companies.

System boundaries

Materials for recycling or recovery are quantified on the basis of outgoing materials from the dismantling companies and shredders, depending on their destination.

Assignment of processes

Batteries, oils, catalysts and tyres will be recycled partially. Oil and tyres will be recovered energetically.

5.1.8 The Netherlands

Determination of the ELV weight

The average vehicle weight is not defined within the "Decree on Management of End-of-Life Vehicles".

ARN calculates the average ELV weight by regular weighing campaigns of the different car types which will be likely to occur as ELV in the near future.

Activities dismantler

The amount of dismantled materials (11%) is determined by weighing campaigns and is adjusted by the actual amounts submitted by the dismantler.

The difference between the expected amounts and the amounts actually submitted have different reasons: The ELV did not contain the material anymore which should have been dismantled or the material was sold as a spare part. Therefore the



quantities of re-used parts can only be estimated and they have not been part of the recycling rate. Because of the new legislation, ARN will have to monitor re-use as well.

Activities shredder

From 2002 onwards ARN will start to certify shredder companies and establish a shredder intake control system. The ELV will be registered individually with a barcode. Due to this barcode, it is now forbidden to downsize the ELV to such an extent that the identity and content is no longer recognisable (Appendix C, no. 7 Decree on Management of End-of-Life Vehicles).

ELV will be separated into reusable material metal scraps and shredder wastes.

System boundaries

Materials for recycling or recovery are quantified on the basis of outgoing materials from the dismantling companies and shredders, depending on their destination.

Assignment of processes

1.7% of dismantled, depolluted materials account for energy recovery and 9.3 % account for material recycling. The metal content of 75% is based on estimations and studies and considered as recycled.

The Automotive Shredder Residue accounts for 14%. It is not integrated into the recovery rate. The Dutch Ministry for the Environment stated that shredder waste is mostly exported to a heavy fraction separator company in Belgium, where ferrousand non-ferrous metals are separated. The plastic-, rubber-, glass- and textile components are used as fuel for the cement production²³.

²³ E-mail from Mr. Kees den Herder, 11.09.02, The Netherlands Ministry of Housing, Spatial Planning and the Environment



5.1.9 Sweden

Determination of the ELV weight

The ELV weight is based on the kerb weight indicated in the vehicle registration document minus the weight of the driver. The driver's weight is 70 to 75 kg depending on the car type. The kerb weight means the car is in running order including driver and all liquids. The average weight is then calculated as the average of the kerb weight minus driver weight of all the identified scrapped cars divided by the number of CODs (data from the SNRA²⁴).

Activities dismantler

Plastic parts from ELV will be dismantled from 1 January 2006 onwards. Glass windows are dismantled from 21 April 2001 onwards.

The body shell weight, the amount and kind of dismantled materials as well as their destination will be submitted by the dismantler to Bilsweden²⁵.

Activities shredder

The average weight of the depolluted, dismantled ELVs is determined by counting the number of ELV at the delivery to the shredder and weighing the whole load.

The amounts of metals and ASR from the shredder treatment are determined by shredder campaigns. The introduced cars and output of ASR are weighed. So far the fixed amount of ASR in relation to the shredded depolluted and dismantled ELV is 25% and the amount of metal is 75 %.

Any decisions about the future treatment of ASR have not yet been taken. At the moment discussions between the car industry and shredders in Sweden are going on and there will possibly be an overview of a range of methods or already a decision in autumn 2002.

²⁴ The Swedish National Road Administration

²⁵ Association of Swedish Automobile Manufacturers and Wholesalers



Calculation method

75% of the depolluted and dismantled ELVs are considered as recycled based on the results of the shredder campaigns, 25% are considered as disposed (by landfilling). This amount plus the amount of dismantled and depolluted materials result in the overall R-Rate.

System boundaries

Materials for recycling or recovery are quantified on the basis of outgoing materials from the dismantling companies and shredders, depending on their destination.

Assignment of processes

Fuels are considered as reused, oils and brake fluids as energetically recovered. Tyres are either re-used, recycled, recovered or disposed off. All other dismantled materials are considered as recycled²⁶.

5.2 Non-Member States

5.2.1 Norway

Determination of the ELV weight

The average weight of an ELV is calculated by weighing campaigns.

5.2.2 Switzerland

Calculation method

Only calculations for the Reshment-process exist so far, which is a process to treat automotive shredder residue together with fly ash (see chapter 6.5).

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²⁶ Quarterly report 3/98 BPS



System boundaries

The ASR is considered as recycled or recovered when being treated by the Reshment facility.

Assignment of processes

Only for the Reshment-Process:

The energy production is counted as energy recovery and the treatment in metal plants as recycling. Landfilling of the melted granulate is considered as disposal. If in the future the granulate would be used for construction work, this would be considered as recycling.

Summary and conclusions

The national implementation of the ELV Directive has entered into force in five Member States as of September 2002. Proposals or draft versions are available in case of the other responding Member States. The status of legal discussion differs widely from country to country.

Only for Germany, Austria, the Netherlands and Sweden it was possible to explain how the re-use, recycling and recovery rates are calculated either at present or how they are planned to be calculated. The elements which distinguish different calculation methods have been identified for those countries.

Assessment of the comparability of the methods of calculation of re-use, recycling and recovery targets at national level is not possible at this stage, because all countries have not decided on relevant points (e. g. like the integration of the ASR treatment into the overall recovery rate).

However, it can be stated that the present disparate setting of system boundaries and the assignment of processes to the categories of recycling, energy recovery or final disposal has major consequences for the question whether the targets are achieved or not.



6 Deduction of a common calculation method

The information provided by the Member States regarding the crucial points for the calculation in chapter 5 are discussed in the course of this chapter in order to develop a common calculation method.

Having analysed the information given by the Member States the following areas will be of high relevance for calculating the recovery rates:

- b) The determination of the denominator of the recovery targets (number and weight of the ELV)
- b) The determination of mass relevant activities at the dismantling,
- c) The export of body shells,
- d) The determination of mass relevant activities at the shredding sites,
- e) The determination of system boundaries,
- f) The assignment of processes as recycling, energy recovery or final disposal.

Figure 5 summarises the crucial points.

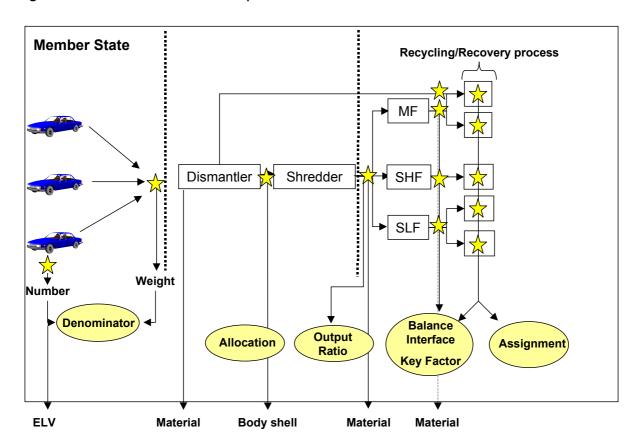


Figure 5: Crucial points for the calculation of recovery rates



6.1 The denominator of the recycling and recovery rates

The denominator of the recycling and recovery rates, as described in Article 7.2 of the ELV Directive, is the average vehicle weight and will be determined by the total number of ELVs and the weight of the individual vehicle.

6.1.1 Total number of vehicles per year

Two possible bases for the total number of ELVs can be differentiated:

- total number of ELVs occurring in a Member State
- total number of ELVs entering the treatment system in a Member State

Scenario

A vehicle in Member State 1 is permanently deregistered and the disposal of the resulting ELV takes place in Member State 2 because the ELV will be exported or because the car (which is registered in Member State 1) crashed in Member State 2.

If the basis for the calculation of the recycling rates is the total number of vehicles deregistered for disposal (not for export!) Member State 1 has to achieve higher recycling and recovery rates per vehicle than Member State 2.

In order to minimise allocation problems at this point and to take the national orientation of the recycling and recovery rates as fair as possible into account we suggest to fix those ELVs as part of the denominator which are factually entering the treatment system of the Member State. The relevant indicator to locate an ELV could be the COD which has to be introduced by all Member States [Art. 5 (3) ELV Directive].

Theoretically, it is possible that a non-depolluted ELV will be exported after issuing a COD but before actually entering the treatment system. However, such a scenario is not very likely to occur due to a number of legal²⁷ and economic²⁸ considerations. Furthermore, their number seems to be negligible according to the findings in chapter 7.

Therefore it can be assumed that all other exports of cars will occur in the form of used cars which cannot be regulated by the ELV Directive.

²⁷ ELVs are red-listed according to Annex IV of Council Regulation (EEC) 259/93 on the supervision and control of shipments of wastes. Following this regulation non-depolluted ELV have to be noticed prior to shipment which means an extra effort. Furthermore according to Dir 2000/53/EC Article 6 all ELV must be handed over to certified treatment facilities.

²⁸ e. g. administrative cost of legal export plus transport costs for low-value goods.



Conclusion

The highest accuracy of the recovery rates of the Member States can be achieved if the denominator for the calculation of recycling and recovery rates is based on the number of ELVs entering the treatment system of a Member State.

6.1.2 Weight of an ELV

The weight of an ELV entering the treatment system can be determined by

- a) Weighing every single car,
- b) Determining the average weight of ELV by weighing campaigns,
- c) Transferring secondary information about the weight of a vehicle.

a) Individual weighing

Weighing of the ELV entering the system will be the most precise way to determine the weight. It requires that scales are available at every entrance point of the system (e. g. every dismantling company). One Member State reported that ELVs have to be weighed before and after depollution and dismantling.

b) Weighing campaigns

Weighing campaigns require that the mix of ELVs actually entering the system is well known and that it is possible to create a representative mix of expected ELVs for the campaign. Regional differences between the Member States (e.g. in view of car type, class or size spreading) and the development of the car weight over time must be taken into account.

c) Secondary Information

Transferring secondary information about the weight of an ELV may be done by using the weight data as stated by the car producer when it was new. How the vehicle weight has to be indicated in the registration form is already harmonised at

Rules on compliance with Article 7.2 of Directive 2000/53/EC





European level by Directive 70/156/EEC²⁹. The annexes of Directive 70/156/EEC have been replaced through the Commission Directive 2001/116/EC³⁰ in the following way [Article 1 (3)]:

Annex I contains the complete list of information for the purposes of EC vehicle type-approval. Item 2.6 describes the mass of a vehicle in running order. It includes liquids, tools, spare wheel, if fitted, and driver. The mass of the driver with luggage is assessed at 75 $\rm kg^{31}$, the fuel tank is filled to 90% and the other liquids containing systems to 100% of the capacity specified by the manufacturer. Member States shall adopt the laws, regulations and administrative provisions necessary to comply with this Directive before 1 July 2002 and apply them from this date on [Commission Directive 2001/116/EC Article 4] 32 .

For the determination of the weight of an ELV, it would not be appropriate to include the weight of the driver with luggage. Furthermore it must be taken into account that the tank is usually not filled up to 90%. Some institutions state that the average remaining fuel amount is 5 l or 10% of the volume of an average tank of 65 litres. However, only little information is available about the factual amount of fuel in ELV in the European Member States.

Even if the vehicle weight indicated by the car manufacturer would be corrected by the weight of the driver and the weight of the fuel some uncertainties remain:

- The weight of a vehicle is stated in the car documents by the car manufacturer in a way to ensure that it will not be exceeded by car of the respective type in any way. That means that the weight tends to be at the upper end of the typical weight range in a model series.
- Changes made during the lifetime of the car (e.g. additional equipment, changing of rims and tires) cannot be reflected.

²⁹ Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers

³⁰ Commission Directive 2001/116/EC of 20 December 2001 adapting to technical progress Council Directive 70/156/EEC

 $^{^{31}}$ subdivided into 68 kg occupant mass and 7 kg luggage mass

³² It has to be clarified from which date on the mass of the vehicle has been indicated according to Dir. 2001/116/EC. If the vehicle mass has been indicated according to other norms , e. g. like to DIN 70020 where the weight of the driver was not included, this information has to be taken into account. For this reason the German ELV Law differentiates between vehicles which have been registered for the first time before 31.12.1996 and after 01.01.1997.



Measurements of ARN for the Netherlands³³ and of ARGE Altauto for Germany³⁴ showed that the average measured weight in the ELV mix matched the weight mentioned in the registration documents minus the weight of the driver with luggage quite well, although there were big deviations for the single car.

Conclusion

Balancing the risk of inaccurateness and the effort of achieving precise information, it seems to be appropriate to determine the weight of the individual car based on the empty vehicle weight given in the registration documents minus the weight of a driver with luggage (75 kg) and minus the amount of fuel included in the calculation method of Directive 70/156/EEC. This approach shall be adjusted to the relevant changes made in Directive 70/156/EEC in recent years.

Fuel removed during dismantling shall not be taken into account for the calculation of the recycling and recovery rates because reliable information of its amount is not available for all Member States

We propose that the congruence between the factual weight of an ELV and of the corrected weight given in the registration document should be regularly checked by weighing campaigns.

6.2 Determination of mass relevant activities at dismantling sites

According to Annex I and II of the ELV Directive removal of hazardous substances and stripping of materials for recycling or recovery will be mandatory as first treatment steps. This refers to e. g. tyres, batteries according to Annex I and lead-containing components according to Annex II (see also chapter 6.5.3). In some cases these operations will not be done at specialised dismantling sites but at installations within shredding sites.

Additionally, dismantling of spare parts for reuse will be a relevant activity especially in an economic point of view.

In most cases the weight of the dismantled hazardous substances, materials for

³³ ARN: Milieuverslag 2000, Amsterdam, 2000

³⁴ ARGE Altauto: 1. Monitoringbericht, Frankfurt, 2000





recycling, recovery and disposal and of the dismantled body shell will be determined by weighing notes at those points where they are handed over to the next treatment step (see chapter 6.5.3) or to recycling, recovery or disposal operations (needed for cost calculation).

The weight of spare parts or parts for re-use is presently not determined with the same reliability because this would require relatively high efforts (weighing of every single part). Additionally it has to be taken into account that information about sold spare parts is economically sensitive because it is closely related to the financial calculation and credits of most dismantling companies. Therefore the amount of sold spare parts will always be connected with high uncertainties. In view of the calculation of recycling and recovery rates different approaches are conceivable:

- Weighing: as described this would mean high efforts, but would achieve the most precise results;
- Using key figures: In this approach the weights would be determined for the most relevant standard spare parts by a central institution and published using a system like IDIS³⁵. With such a database determination of the weight of sold spare parts can be done without individual weighing at every dismantling site. Since it will not be possible to cover all parts and car types the results will be less precise than in the first approach.
- Calculation: The weight of the output material streams and the dismantled body shell will mainly be determined by weighing notes. It would be therefore possible to calculate the weight of spare parts if the weight of the incoming ELV is determined with sufficient accuracy (ELV minus dismantled materials from depollution minus dismantled materials for recycling, recovery and disposal minus body shell). Even if all mentioned weights would be determined precisely there would be a relatively high risk of malpractice. It is possible, that materials which have been submitted to energy recovery or disposal operations will not be mentioned in the balance sheet of a dismantling company. The calculation method would automatically credit this amount to the recycling (re-use) rate. The mass relevance of possible malpractice may be minimised if effective controls are realised concerning the disposal paths of tyres, batteries and other mass relevant parts.

³⁵ International Dismantling Information System; see: www.idis2.com



Conclusions

Given the fact that weighing of dismantled materials for further treatment, recycling, recovery and final disposal will be the basis for cost calculation between the dismantling company and installations for further treatment or disposal, it will be appropriate to determine the weight of those materials based on weighing notes.

In order to determine the weight of spare parts two approaches are conceivable:

- 3. Counting of sold spare parts combined with using key factors for the determination of the weight,
- 4. The calculation of spare parts

 $m_{s.p.} = m_{i.w.} - [m_{o.w.} + m_{h.z.} + m_{d.m.} + m_{o.m.}]$

 $m_{s.p.}$ = mass of spare parts

 $m_{i.w.}$ = input weight of ELV

 $m_{o.w.}$ = output weight of body shell

 $m_{h.s.}$ = mass of hazardous substances from depollution

 $m_{d.m.}$ = mass of dismantled materials for recycling

 $m_{o.m.}$ = mass of other materials for disposal

If the input weight or the output weights can not be determined in a reliable way only the first approach or the weighing of all spare parts would lead to sensible results.

In case that the second approach is chosen, effective controls of the activities of the dismantling companies and a stringent monitoring will be necessary (see chapter 6.5).



6.3 Export of body shells

Depolluted body shells are green listed waste³⁶ and can be transported cross-border without the restraints that apply for ELVs. Their export is facilitated by the fact that it is allowed to compress body shells³⁷ which reduces transport costs. Furthermore it is possible to operate treatment systems under the management of car manufacturers or cross border cooperations in the treatment chain (e. g. dismantler and shredder) which will not be restricted by borders of Member States.

Therefore a solution must be found for the allocation of the recycling and recovery outcome from the exported body shell. Different allocation and calculation methods are conceivable:

- a) Only the body shells actually recycled or recovered in the respective Member State will be credited to the recycling and recovery rates of the Member State. In this case it must be considered that, if the denominator for the recycling rate is not corrected by the mass of the exported body shells, the exporting Member State must invest more efforts per ELV entering the treatment system to achieve the recycling rates. Vice versa the importing Member State will have reduced efforts to achieve its targets. If the denominator shall be corrected intense monitoring of the export and import of body shells will be necessary.
- b) The recycling and recovery outcome from the body shell will be assigned to the recycling and recovery rate of the exporting Member State. In this case it will not be necessary to adopt the denominator of the recycling and recovery rates. It must be ensured that information about the achieved recycling and recovery outcome after the shredder in the receiving country will be available for the exporting country. This could be achieved in different ways:
- Determination of data from every single shredder would ensure the most differentiated results but would be combined with high monitoring efforts. As a prerequisite for this approach the respective shredding companies must gather information about recycling and recovery outcome of downstream disposal steps³⁸.

 $^{^{\}rm 36}$ according to Annex IV of Council Regulation(EEC) No. 259/93

³⁷ Some Member States will restrict compression rates with the aim to keep the body shell recognizable.

³⁸ There are some legal uncertainties whether it is possible to oblige the receiving shredding companies in other countries to

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- Using the recovery rate achieved as an average in the receiving country, would reduce the monitoring efforts, but a differentiation between well and bad performing shredding companies will not be possible. Furthermore, this approach may run into difficulties in countries where post shredder situations as intended by the ELV Directive are missing.
- If general recovery rates (e. g. minimum rate as demanded by the ELV Directive)
 would be used, then differences in the factually achieved rates cannot be taken
 into account. Additionally it must be considered that the recovery rate may be
 achieved in different ways in the Member States, e. g. by intense dismantling or
 exclusively by intense post shredding activities.

This approach would only be possible in EU Member States where the ELV Directive is implemented, and in countries with similar systems³⁹.

Conclusion

In order to minimise allocation problems in view of the recycling and recovery rates from exported body shells and to avoid extensive monitoring and calculation efforts, the achieved recovery outcome shall be credited to the recycling and recovery rate of the Member State where the respective ELV <u>first</u> entered the treatment system (exporting Member State).

The recycling and recovery outcomes achieved by the receiving country during the last balance period should be used as a calculation basis.

This approach will include some uncertainties which cannot be clarified in

the current state of implementation of the ELV Directive in Europe.

Therefore the mass relevance of the export of depolluted body shells and its influence on the recycling and recovery rates shall be monitored.

deliver the necessary information, to oblige dismantling companies to ship body shells only to shredding companies which deliver the required information, or to restrict the cross border shipment of depolluted body shells if the shredder is not willing to deliver those data.

³⁹ The German ELV ordinance requires dismantling and shredding companies to achieve separate recycling and recovery targets. If in this structure depolluted body shells would be exported to a large extend to countries which do not achieve the necessary recycling and recovery rates it would be possible that the national targets will not be achieved. In effect the national state is responsible to the EU for achieving the targets, although presently it would not be able to restrict the described export practice.



6.4 Determination of mass relevant activities and mass flows at shredding sites

Usually the input of a shredder will be a mixture of different scraps, e. g. electric appliances, machines and installation scrap and ELVs. For the calculation of recycling, recovery or disposal rates it is therefore necessary to assign portions of the output to the ELVs in the input mixture and to determine the relation of output streams (e.g. ferrous scrap, SHL, SLF) connected with the ELV input.

While information about the portion of ELV in the shredder **input** mixture should be available in most cases based on weighing notes (see previous section) the determination of the relation of **the shredder output** will be influenced by the composition of the input. The input of ELVs changes by region (proportion of car types, makes and classes) and over time (e.g. increasing amount of plastics), by dismantling activities (e. g. by dismantling of core scrap, see chapter 3.1). Type, condition and the way of operation of the shredder will have an additional influence on the relation of output streams.

Separate shredding of body shells would lead to the most reliable information source, but would be connected with technical problems and economic disadvantages for many existing shredders.

Some Member States intend to organise shredder campaigns to determine the relation of output streams to each other. During a shredder campaign the shredder is fed with ELVs only. After a defined number of ELVs has been shredded, the output ratio between the metal fraction, the SHF and SLF for ELVs is known and can be used for the calculation of the recycling and recovery rates. To cover the differences in type, condition and way of operation it is in one case intended to oblige every individual shredder to perform a shredder campaign with 60 to 100 body shells once a year⁴⁰.

A determination of the relation of output streams based on the analysis of the body shells will not give precise results due to the fact that shredders do not separate precisely to 100%. Whether projections based on shredding campaigns, determination of the composition of body shells and differences in shredder type and operation would lead to results with sufficient exactness can not be stated because of insufficient databases.

⁴⁰ Even this approach would not be able to avoid uncertainties completely because the relation of output streams of a single shredder may change from one day to another due to changes in the adjustment of some aggregates like the cyclone or over the time with the wearing off of the shredder hammers.



Conclusions

The portion of ELV body shells in the input mixture of a shredder shall be proven based on weighing notes.

The most feasible way to determine the relation of output streams of a shredder, and their changes over time and differences by regions will most likely achieve a balance between effort and accuracy is to perform regular shredding campaigns. A reliable information basis for a decision about the intensity of those campaigns necessary to achieve sufficiently precise results or about the appropriateness of the method of projections for all Member States is not yet available. A differentiation between shredder types during the shredding campaigns seems to be appropriate.

6.5 Definition of system boundaries

6.5.1 General considerations

One of the most relevant points for the calculation of recycling and recovery rates is to determine when waste is considered as recycled or recovered (see chapter 3.1 and 3.2). The relevance shall be demonstrated by an example:

The heavy fraction from shredding is handed over to a company which at first performs a sorting step for the separation of metals. 60% of the input leaves the process as waste for final disposal. 20% are sent to one metal smelter and the other 20% to another metal smelter. At the first plant 5% end up as secondary waste and 15% as metal product and at the other 10% as secondary waste and 10% as product. Depending on where the system boundaries are set, the recovery rate will be 100% (entrance of the company), 40% (after the sorting step) or 25% (if only the final product is calculated as recycled) (see Figure 6).



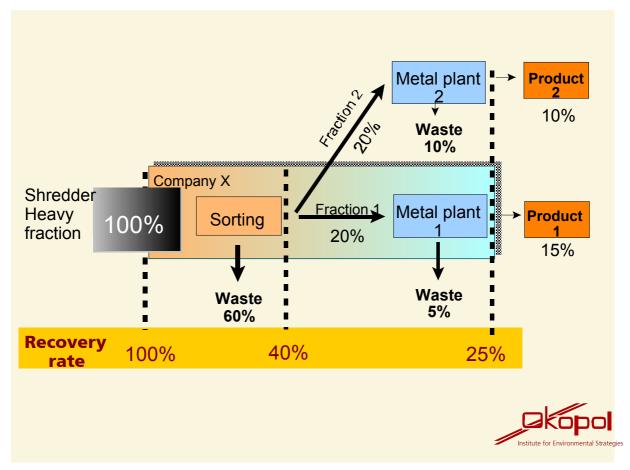


Figure 6: Example of system boundaries and recovery rates

With respect to system boundaries in the ELV treatment chain, we propose to make a logical distinction between the monitoring interface where outgoing material streams are measured and process-specific key factors.

In order to minimise the monitoring efforts, the monitoring interface should be set at the earliest possible stage in the treatment chain where meaningful results can be achieved. The characteristics of processes following after the monitoring interface can then be expressed by process-specific *key factors* which will show the aggregated recycling and recovery outcome of the respective treatment method. By combining the proof of amount issued at the monitoring interface and the key factors a determination of recycling and recovery rates will be possible.



6.5.2 Setting of the monitoring interface

The monitoring interface indicates until which step of the treatment chain waste shall be observed. The position of the monitoring interface within the treatment chain has to be determined.

The relevance of a detailed monitoring and the appropriate setting of monitoring interfaces depends on several criteria:

- mass relevance of the individual material stream,
- environmental priority of the respective waste stream,
- malpractice potential.

Mass relevance of a material stream must be put into perspective of the relevance of

- the different protagonists in the treatment chain (e.g. at the steps of dismantling in many systems currently in practise or under development in Member States 10% of the recycling or discovery rate will be achieved while 75% will be achieved after shredding),
- the different targets and the necessary efforts to achieve those targets (e.g. it is technically seen less difficult to achieve the energy recovery portion of the recovery targets than to achieve the material recycling targets of the ELV Directive),
- the different material streams deriving from ELV disposal (while recycling of the ferrous content of around 70% of a car is well established and economic feasible since several years the material recycling of plastics is more problematic and a major concern of the ELV Directive).

The metal portion of an average vehicle is currently around 70%. This material stream is recycled quite effectively because it is profitable. The higher recycling targets of the ELV Directive aim at promoting e.g. the recycling of plastics and elastomers, meaning that monitoring of the recycling of such fractions needs to be done with priority.

Since manual dismantling is cost intensive and the disposal costs of hazardous substances removed by the dismantler are high, there is a high malpractice potential. In other words, a second focus of monitoring should be devoted to dismantling practice.



We propose not to fix global system boundaries for waste streams from ELV recycling, but rather to differentiate depending on the mentioned criteria.

In order to minimise the monitoring efforts the monitoring interface should be set at the earliest possible stage in the treatment chain where meaningful results can be achieved. The characteristics of processes following after the monitoring interface can then be expressed by process-specific *key factors* which will show the aggregated recycling and recovery outcome of the respective process or process chain (see Figure 7). Recycling and recovery rates will then be determined by combining the proof of amounts issued at the monitoring interface and the key factors of subsequent processes. The key factors shall be determined or at least validated by independent auditors.

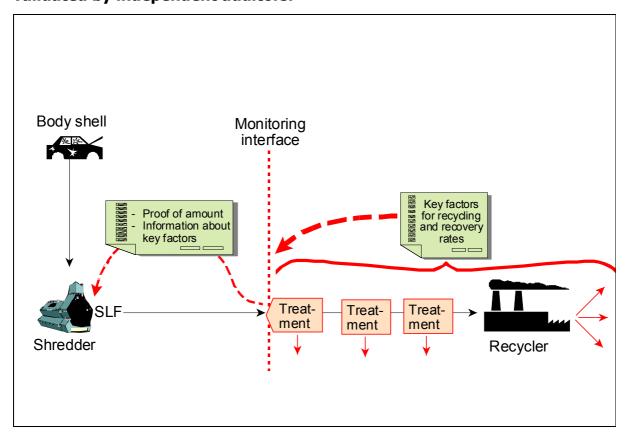


Figure 7: Determination of system boundaries through key factors and monitoring interface



6.5.3 Determination of the calculation method and monitoring interface for priority materials

6.5.3.1 Materials and parts from dismantling

Tyres: Tyres from dismantling may be re-used, re-processed, recycled or recovered. The average weight per car will be around 40 kg (including spare wheel). No detailed information is available about the mass of tyres from dismantling which are reused or submitted to the different disposal paths. To keep the monitoring efforts appropriate for this waste stream we propose to credit fixed recycling and energy recovery rates for all tyres which are submitted to competent recycling institutions based on statistical data about the fate of used tyres in Europe. The monitoring interface should be set at the point where tyres are handed over to a competent recycling institution.

The overall data and figures for tyres are dominated by replacement tyres from repair car shops. It can be assumed that tyres from dismantlers are in relatively better conditions than from car shops and thus the re-use and re-processing rate for tyres from dismantlers will be higher. Thus the recycling rate credited for used tyres from dismantling may be corrected by using higher recycling portions. If the tyres are not submitted to a competent recycling institution, the monitoring interface must be set at the end of the treatment chain.

Glass (20 – 30 kg per ELV as a rough average): Presently there is relatively high uncertainty about future recycling paths for glass from dismantling. However, environmental relevance of the material is relatively low. Usually the weight of the dismantled glass will be documented by weighing notes from the recycling companies. It seems to be appropriate to set the monitoring interface at the entrance of the recycling chain following the dismantling. Presently there is no reliable data available about the ratio between recycling and final disposal. Therefore data shall be collected about the factual recycling and disposal paths during the coming year 2003. Based on the gathered information key indicators for recycling and final disposal shall be fixed.



Large plastic parts: The treatment and recycling processes for dismantled large plastic parts (which makes up to 22 kg in the Dutch ARN system⁴¹) include often several steps and plastic streams from different sources will be mixed up. A detailed reconstruction of the fate of plastics which are dismantled from ELV is therefore very difficult. Recycling of plastics as material is a high ranking target of the ELV directive⁴². Presently this is only possible from dismantled monofractions and not from shredder residues.

Most of the time plastic parts will be removed by dismantling companies aiming at submitting them to recycling. Only in some cases negative effects for downstream recycling or recovery processes are driving forces⁴³.

Therefore it seems to be appropriate to differentiate the proof of recycling by recycling routes (paths where the plastic is "effectively recycled as material" [Annex I of the ELV Directive], other possible recycling paths, energy recovery), to determine the amount by weighing notes and to fix the monitoring interface at the point where the plastic parts are handed over to further treatment.

Batteries (15 kg per vehicle as a rough average): Batteries are hazardous waste according to the European Waste Catalogue. Therefore precise information shall be available about the amount submitted for further treatment and recycling. Recycling of metallic lead from batteries is well established and profitable for recyclers. Concerning lead oxide, sulphuric acid and plastic different recycling, energy recovery and final disposal paths are available. Two possible approaches are conceivable:

⁴¹ ARN:Environmental Report, Amsterdam 2001, p.32

⁴² "The recycling of all plastics from end-of life vehicles should be continuously improved." [Recital Clause 12 of Directive 2000/53/EC]. Treatment operations to promote recycling is e. g. the "removal of [...] large plastic components, if these materials are not segregated in the shredding process in such a way that they can be effectively recycled as materials" Annex I (4) Directive 2000/53/EC.

⁴³ As far as known until now this may become relevant only for large PVC parts, which are rare.



- a) Fixed portions (according to a European wide average) of the battery will be credited as recycled, energetically recovered and disposed of (use of key factors). This approach will limit the monitoring efforts.
- b) The recycling and recovery rates of the respective process or process chain are credited. This approach will have a better supporting effect for those processes with higher recycling rates.

The monitoring interface could be set in both approaches at the step where the batteries are handed over to the recycler. Mass determination can be based on disposal documents.

Liquids (15 I per car as a rough average without fuel) are hazardous wastes and weight information shall be available at the dismantling sites or may be calculated if volume information is given in disposal documents. For oils the usage of a key factor based on legal requirements may be appropriate. For all other liquids it seems to be justifiable to use global rates of 100% according to the information given by the recovering or collecting company. The monitoring interface shall be set in every case at the point where the wastes are collected by competent companies.

Process parts: Process parts are those parts which occur during the dismantling of mandatory parts. If for example the wheel balance weights shall be dismantled the wheel covers must often be removed before. These parts are available for e.g. recycling without additional dismantling efforts. Their mass varies widely. We propose to treat these materials in the same way as mentioned in the paragraphs above, depending on the respective material category.



6.5.3.2 Materials from shredding

It is a basic requirement for all output streams that only those portions shall be credited to the recycling or recovery rates which actually derive from ELVs (see chapter 6.4).

Ferrous scrap: Current vehicles have a steel content of around 70%. Therefore shredder scrap is the most mass relevant output stream from the vehicle recycling. It usually has a ferrous content of 92% to 95%. The remaining 5% to 8% are minerals and organic components. One tonne of crude steel is produced in electric arc furnaces (EAF) in Europe from around 1.1 tonne of steel scrap as an average. The recycling paths have been well established for several years and economic factors are supporting recycling. In many countries large portions of EAF slag is recycled. Therefore it appears to be justifiable to credit ferrous scrap as 100% recycled and to define the exit of a shredder site as monitoring interface.

Shredder light fraction (SLF): The shredder light fraction makes up to around 25% of the output streams of a shredder (if only vehicles are shredded). Until now most of the SLF is disposed of to landfills. The amount of SLF, its content of plastics and the presence of hazardous substances give a high priority to SLF recycling within the targets of the ELV Directive. Induced by the requirements of the ELV Directive new recycling or recovery processes are under development However, their suitability to achieve the targets of the directive must still be proven. Therefore priority should be given to monitoring of SLF recycling within the proof of recycling and recovery. Intense monitoring seems to be justifiable, both for quantitative and qualitative reasons.

Some recycling and recovery processes currently under development are combinations of different categories of waste treatment, recycling and / or recovery. In the example of the RESHMENT process (see textbox below) energy recovery and separation of metals (for recycling) is combined in one installation. Differentiated balancing of those processes would result in the need to include an analysis of the last step of the recovery process into the development of the key factors. On the other hand an additional portion of recycling could be credited. The example of the VW Sicon process (see textbox

Rules on compliance with Article 7.2 of Directive 2000/53/EC





below) shows the need to include all steps of the treatment chain if the differentiated process shall be credited in an appropriate way. It also shows the need of a profound fixing of system borders (e.g. are the fibres used to support the drying of sewage sludge to be seen as recycled in the drying process or recovered in the incineration process?).

Reshment-Process

From 2005 on it is intended to process all Swiss ASR in a newly built facility in Switzerland.

The process consists of a sorting step of ASR where small amounts of copper, steel and aluminium are separated. Coarse ASR is separated as well and used for energy production. The mass relevant intermediate material is fine ASR which accounts for around 80% of the total input. This fine ASR is mixed with fly ash from municipal sewage waste and introduced into a smelting cyclone. The main output from the cyclone is a melt granulate. Further outputs are a metallic phase, heavy metal dust as well as electric power. It has been stated by CT Umwelttechnik AG⁴⁴ that if only ASR is introduced into the process 37% of the output is melted granulate, 47% is energetically recovered, 2% of Zinc and nearly 10% metal scrap are recycled through the metal Industry. The melted granulate is either landfilled or used as construction material (e. g. road construction). In Switzerland it is not possible at present to use the granulate as construction material. The material will be landfilled to survey its long-term behaviour. Because the facility will be operated with a mixture of ASR and fly ash the output will differ from the above mentioned data. 53% of melted granulate will occur, 26% will be recycled energetically and nearly 10% metal scrap will be recycled by the metal industry.

VW-SiCon

Being a cooperation project between Si-Con, the University of Witten Herdecke and VW the process consists of grinding and mechanical sorting, producing mainly feedstock streams from the SLF. It has been stated that by this system 95% of an ELV will be recycled.

⁴⁴ Fax from Mr. Daniel Howald, 09.09.02, CT Umwelttechnik AG



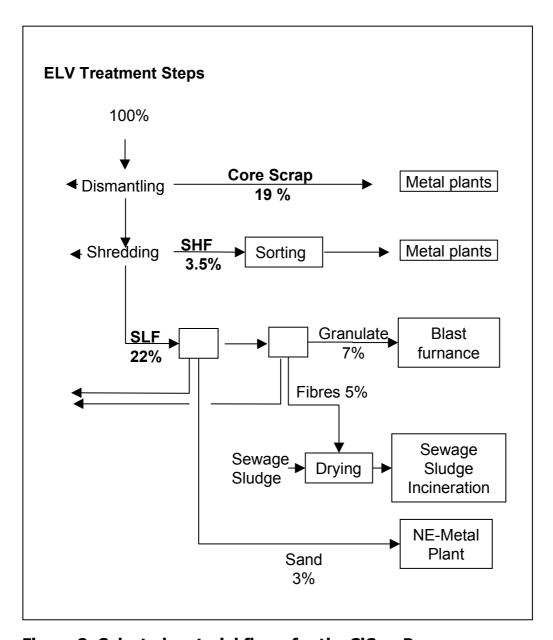


Figure 8: Selected material flows for the SiCon-Process



The more complex the input mixture of a process is, the more difficult it is to determine the recycling, recovery or final disposal rates related to a specific input. One example is the "Centre for the recovery of secondary raw materials 'Schwarze Pumpe'" (see textbox below). It has to be clarified if / how input specific rates could be determined in those cases or whether general output ratios of the processes shall be used.

Centre for the recovery of secondary raw materials "Schwarze Pumpe"

The facility of "Schwarze Pumpe" in Germany also processes, beside SLF, municipal waste, sewage sludge, used plastics, rests of varnish and paint and other waste streams. A gasifier is used to convert waste into methanol, electricity, ash, slag and gypsum. Around 20 % of the output is methanol which can be sold. The amount of electricity, slag etc was not quantified. The slag is used for road construction.

Momentarily the centre has a limited capacity to treat SLF of 10,000 t per year. Test series have been started to increase the amount of introduced SLF. The results of these tests will be available approximately until the end of 2002. "Schwarze Pumpe" has never operated the facility with a single waste stream and therefore it is not possible to indicate the output composition or amount if only SLF is introduced into the system. For the generally introduced waste composition an input-output comparison is not available. Only occasionally single components can be allocated to certain waste streams, if the waste leaves extraordinary traces (e. g. in the waste water).

A possible way to develop key factors which would substantially reduce monitoring efforts would be that the company operating or managing a SLF treatment chain determines the respective recycling and recovery rates which shall be checked by independent auditors. Taking into account that most of those processes are currently still under development an examination and validation once per year seems to be appropriate.

Shredder heavy fraction (SHF): At many shredder sites a non-ferrous shredder heavy fraction is produced which contains non-ferrous metals, elastomers and polymers. Often the installations are adjusted in a way that the SHF makes up to around 6% of the output streams as a roughly estimated average. Recycling of the non-ferrous metals in the SHF is technically feasible. The separation and recycling of the metals is not always supported by economic factors in Europe. The non-metallic part of SLF has similar characteristics as shredder light



fraction. For the calculation of recycling and recovery rates the differentiation of material streams shall be considered. Taking into account the requirements of the Landfill Directive it seems to be appropriate to credit the metal content of the SHF as recycled, the organic content to the recovery rate and the mineral content depending on the disposal path as recovered or disposed of if the SHF is submitted to a sorting or separation installation in a country where the Landfill Directive is actually implemented.

Table 1 and Table 2 are presenting an overview of the proposed calculation method and monitoring interfaces for selected waste fractions.

Waste	Calculations method	Monitoring interface
Tyres	Fixed recycling rates (based on adapted statistics about the fate of used tyres in Europe); for energy recovery: key factors	Generally: first treatment step; valid if submitted to certified disposal company: collection point
Glass	Actual recycling rates during the first year of balance, afterwards global statistics if available; credit as 100%	First treatment step or recycling company
Large plastic parts	Differentiated proof of recycling and recovery plus general statistical data	First treatment
Batteries	Differentiated proof of recycling and recovery plus key factors	First treatment or recycling company
Liquids	Different approaches	First treatment or recycling company
Process parts	Different approaches, differentiated proof of recycling and recovery	First treatment or recycling company

Table 1: Calculation method and monitoring interface for materials from dismantling



Waste	Calculations method	Monitoring interface
Ferrous scrap	Credit as 95% or 100% recycling	Scrap dealer, recycling company
Shredder light fraction	Actual usage of material properties or / and energy content; key factors	Last step in the treatment chain; with key factors: first treatment step
Shredder heavy fractions	If submitted to further treatment aiming at recovery of metal content in a country where the requirements of the European Landfill Directive (or similar) are actually implemented and enforced: Metal content: 100% recycling; organic content: 100% energy recovery; mineral content: actual disposal path	First treatment step

Table 2: Calculation method and monitoring interface for materials from shredding

6.6 Assignment of processes to recycling, energy recovery or final disposal

The question whether a process is considered as recycling, energy recovery or final disposal is not clarified for every case. Council Directive of 15 July 1975 on waste (75/442/EEC)² defines recovery and disposal operations. While Article 1 e and 1 f differentiate between recovery and disposal, Annex II A and Annex II B are respectively listing recovery and disposal operations. The wording of the entries does not enable an unambiguous assignment of the operations and some are controversially discussed because they are not clearly defined. As a consequence current national legislation in the Member States sometimes vary widely even between the regions within federal states.

Figure 9 shows two exemplary fictitious scenarios. Both are legal possibilities in different Member States.

² amended by Council Directive 91/156/EEC of 18 March 1991, Council Directive 91/692/EEC of 23 December 1991, Commission Decision 96/350/EC of 24 May 1996



In scenario 1 the shredder light fraction (SLF) is used in a blast furnace as coke substitute for feedstock recycling which is in this case considered as a recycling process. The SHF is submitted to a municipal solid waste incinerator (MWI). In this scenario the incineration process is considered as energy recovery.

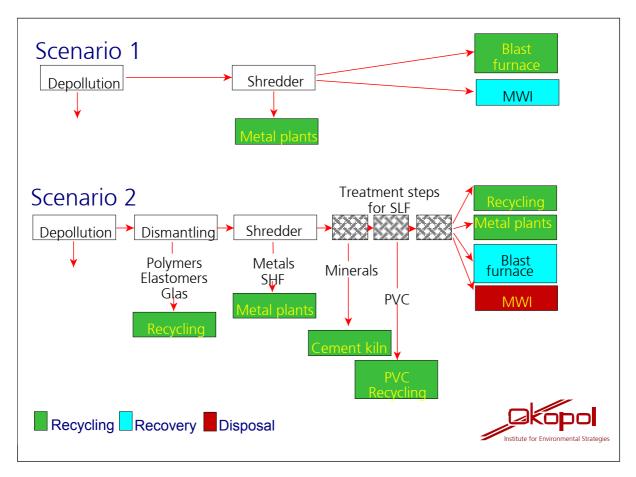


Figure 9: Example of scenarios for the classification of processes

In scenario 2 the SHF is submitted to metal plants and the SLF is treated in steps. One part of the SLF is used for feedstock recycling in a blast furnace. This process is considered as energy recovery. Another part is incinerated in a MWI which is considered as a final disposal process.

Some Member States have included an assignment of processes to the categories of recycling or energy recovery in their national implementation of the ELV Directive (e. g. feedstock recycling is defined as recycling in the German ELV law) or enabled specific assignments in the national waste law (e. g. Austria).





If the recycling and recovery rates in the different Member States shall become comparable in the future, it will be essential to find a harmonised approach towards this assignment of processes in general and in particular for the disposal of shredder residues. In order to give the Member States and the car manufacturers planning reliability and because the future of existing and planned treatment systems will be affected it seems to be necessary to clarify the disposal of shredder residues already for the 2006 targets.



7 Cross-border shipment of used vehicles and ELVs

During the survey information about the deregistration procedure and cross border shipments have been collected through Questionnaire A (see Annex 1.1). The results are presented in the following two chapters. In order to get a consistent picture about the real exports of vehicles, the import statistics of some Accession Countries are analysed in chapter 7.4.

7.1 Deregistration procedure of the Member States

7.1.1 Austria

A vehicle can be deregistered if it shall be exported, disposed of or sold within Austria. If a vehicle is not re-registered again after 6 months it is assumed that those cars are mostly exported or disposed off.

The COD can be issued by collection points (if they have contracted dismantling companies) or by dismantling companies to the last owner who gives it to the registration institutions.

The dismantling companies are obliged to submit information (VIN) of treated vehicles to the Ministry of Environment every year.

7.1.2 Finland

The owner of the vehicle deregisters the vehicle after it has already been exported (in order to stop the insurance fees and taxes) through submitting a copy of the new foreign registration certificate. The second possibility to deregister a vehicle for export is by removing the registration plates by the Customs. Afterwards the registration plates are sent to the Finnish Vehicle Administration.

Measures concerning the Certificate of Destruction have not been finalised so far. It has been planned that the authorised collector is allowed to deregister the vehicle.

7.1.3 Germany

The owner of a vehicle deregisters his car at regional registration authorities. The data are then submitted to the central registration authority ("Kraftfahrtbundesamt"). The COD is a prerequisite for deregistration.



The information about the fate of the car (export or disposal) is not forwarded to the central registration authority. The temporary deregistration is possible for one or one and a half year. After one and a half year latest the information about the vehicle will be automatically deleted from the central database.

7.1.4 Greece

Momentarily no COD is issued during the deregistration procedure in Greece. Regarding deregistration, the COD will be issued by treatment facilities or "collection points" that are in any case affiliated (both the collectors and the treatment facilities) with the approved system(s). The COD will comprise a series of "technical" information (such as the name of the owner/holder, the licence plate, the name of the treatment facility, the date, the type of the vehicle, identification number of the vehicle etc.) described in Annex III of the Presidential Mandate. It will be issued in 4 copies (for the owner, the local tax authorities, the system of alternative management and the treatment centre).

7.1.5 Netherlands

Every export of vehicles is recorded through the export papers of which the last owner has to submit a copy to the Central Registration Authority RDW⁴⁵ to be released from tax. RDW forwards all data of exported vehicles to ARN. After three months of temporary deregistration a vehicle will automatically fall back into obligatory tax.

As soon as a vehicle is deregistered permanently it is considered as being an ELV and it may not be traded anymore except between dismantling companies (Appendix B, no. 2 Decree on Management of End-of-Life vehicles) and for export. Once a car dismantling company has started dismantling a wreck that wreck must be dismantled completely by that car dismantling company.

7.1.6 Sweden

An authorised car breaker informs the Swedish National Road Administration (SNRA) through a COD of a received ELV. The deregistration is then recorded in the national vehicle register.

⁴⁵ Rijksdienst vor het wegverkeer

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Deregistration is accompanied by a COD the SNRA pays a scrapping premium to the car owner. A deregistration without COD is possible under certain conditions and is regulated in the national legislation.

In autumn 2002 Directive 2002/151/EC on minimum requirements of the certificate of destruction is expected to be incorporated in Swedish legislation and the COD will be adapted in accordance with that Directive.

7.2 Deregistration in Non-Member States

7.2.1 Norway

As soon as an approved dismantler has issued a COD for an ELV the last owner gets a deposit from the Norwegian Customs and Excise. After that the vehicle will be deleted from the registration database ("autosys") through the Directorate for public roads.



7.3 Export Data

Only few countries have replied in detail about exports of used vehicles and ELVs from its territories.

The information received is presented in Table 3.

Country	Export of used vehicles (in 2001)	Export of End-of-life vehicles (in 2001)
Member States		
Austria	No data available during timeframe	0
Belgium	No data available during timeframe	No data available during timeframe
Denmark	No data available during timeframe	No data available during timeframe
Finland	~ 1,000	No data available during timeframe
France	No data available during timeframe	No data available during timeframe
Germany	No data available during timeframe	0
Greece	0	0
Netherlands	158,000	0
Sweden	17,069	0
Non-Member States		
Japan	No data available during timeframe	~ 1 million (not registered officially ⁴⁶)
Norway	No data available during timeframe	~ 25,000 (send depolluted to United Kingdom)
Switzerland	83,319	No data available during timeframe

Table 3: Data on exports of used vehicles and ELV from Member States and Japan, Norway, Switzerland

⁴⁶ E-mail from Kyoko Tanaka, 26.07.02, Senior Economic Officer, Delegation of the European Commission in Japan

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Additionally, some Western European Countries submitted statistical information to export directions (CH) and to the age distribution of

- ELVs (NL),
- exported vehicles (NL),
- total running car fleet (NL, D).

Switzerland has provided detailed data on the destination countries of exported vehicles.

Around 83,000 vehicles were exported in 2001. The predominant countries of export are indicated in Figure 10.

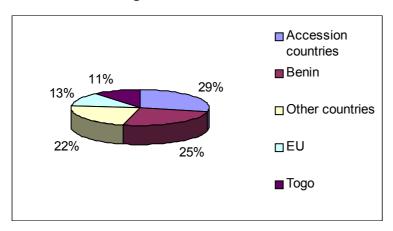


Figure 10 : Destination Countries for vehicles exported from Switzerland (2001)⁴⁷

The biggest portion of 29% is exported to Accession Countries. Figure 11 shows the detailed split-up for those countries. 36% are exported to the African countries of Benin and Togo and 22% to a variety of around 50 different countries around the world. 13% are exported to States belonging to the European Union.

⁴⁷ Data from the Swiss National Customs Authority, E-mail from Mr. Balmer, 02.09.02



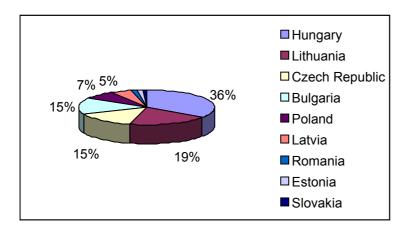


Figure 11: Export of vehicles to Accession Countries from Switzerland (2001)

Figure 11 shows that 85 % of all exported vehicles to the accession countries have only four destinations. Hungary is the predominant country within the Accession Countries, followed by Lithuania, Czech Republic and Bulgaria.

The age of the exported vehicles is not recorded, but the Swiss Customs Authority presumes that the majority of exported vehicles are used vehicles.

Because the distinction of vehicles and ELVs is not clear and often subject to discussions, the age distribution of the exported vehicles will be an instrument to get a picture of the sorting efficiency of the ELV collection system. The age distribution of the exported vehicles can be important if being (nearly) identical with the age distribution of ELVs. In this case, they are closer to be ELVs than a used vehicles.



Auto Recycling Netherlands has published data in the Environmental Report 2001 on the age distribution of ELV as indicated in Figure 12.

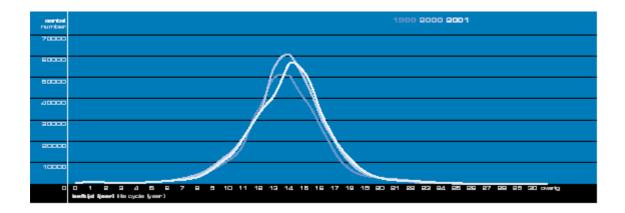


Figure 12: Age distribution end-of life vehicles in the Netherlands between 1999-2001

In 2001 the average age of dismantled ELVs was 14.4 years in comparison to 14.3 years in 2000. ARN expects that the lifespan of cars will continue to rise over the next few years⁴⁸.

The age distribution of exported used vehicles is indicated in Figure 13.

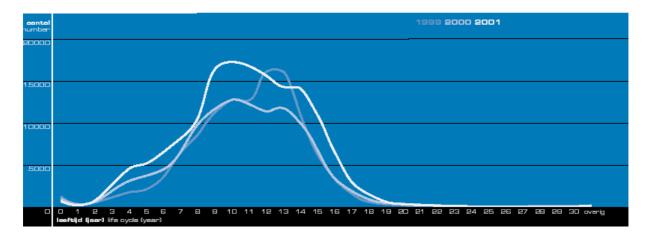


Figure 13: Age distribution of exported vehicles in the Netherlands between 1999-2001

⁴⁸ ARN: Environmental report 2001, p. 31



The majority of exported vehicles are older than 9 years in 2001.

The number of exported old exported cars rose considerably from 115,000 in 2000 to 158,000 in 2001^{49} .

The age distribution of the Dutch vehicle fleet as shown in Figure 14 corresponds with the information provided above.

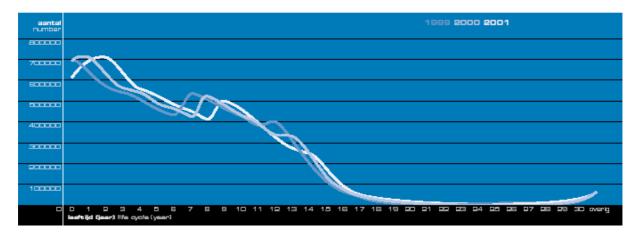


Figure 14: Age distribution of the Dutch vehicle fleet between 1999-2001

The number of registered vehicles decreases constantly from the age of 2 years. The numbers are increasing slightly for vehicles of the age of nine. Only very few cars with an age above 19 years are registered (except some old-timers of 30 years and older).

Due to the lack of a clear definition of ELVs and used vehicles it cannot be judged, whether the exported used vehicles from the Netherlands are ELVs or not. It can only be stated, that the exported vehicles are about 4-5 years younger in average than the ELVs which are depolluted and dismantled within the Netherlands.

⁴⁹ ARN: Environmental report 2001, p. 31



The age distribution of registered vehicles in **Germany** shows almost the same allocation (see Figure 15) as in the Netherlands.

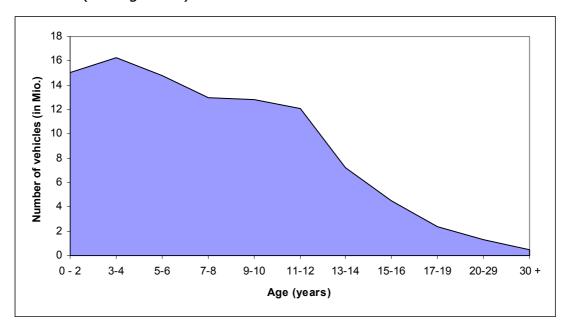


Figure 15: Age distribution of the vehicle fleet in Germany (2001)

Approximately 3,5 million vehicles are deregistered every year in Germany⁵⁰. The Federal Environmental Ministry assumes that about 50% of the deregistered vehicles are exported annually⁵¹.

⁵⁰ Ökopol: General requirements for monitoring the recycling of long-lived, technically complex products with an in-depth analysis of ELVs, 1999, p. 6

⁵¹ Fax from the German Federal Environmental Ministry, 04.09.02



Conclusions

Although the information is scarce and somewhat heterogeneous, a first orientation about the exports of used vehicles can be given:

- a relevant number of used vehicles is exported to Accession Countries;
- in the Netherlands, a vehicle becomes an ELV after ~ 14 years;
- the average age of the running car fleet in the Netherlands and Germany is less that 7 years with a maximum between 0 to 3 years;
- a significant difference between the statistical age distribution of exported cars and ELV will give valuable information about the sorting efficiency of the ELV collection system in a Member State.

However, due to the incomplete database, it would be premature to draw generalised conclusions for all Member States about the number of vehicles that are deregistered but exported to third countries before treatment.



7.4 Import Data

Information about imports of used vehicles was submitted by Bulgaria, Estonia, Latvia, Lithuania, Poland and Slovenia. For this section, data are presented about the number of new car imports in comparison of used imports. Additionally, either the age distribution of vehicles registered for the first time or the age distribution of the whole registered vehicle fleet is given (where available).

7.4.1 Bulgaria

The National Traffic Authority (KAT) has collected the following data:

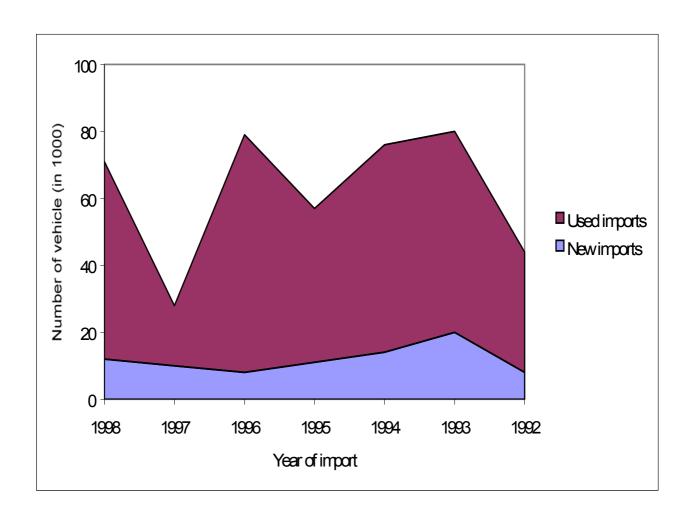


Figure 16: Number of imported cars in Bulgaria (1999)

Figure 16 covers not only passenger cars but also truck and busses. The number of



registered imported used cars is constantly much higher than the number of imported new cars.

Instead of information about the age distribution of the imported vehicles, the age distribution of the vehicle fleet of Bulgaria has been made available.

Figure 17 shows that the majority of registered vehicles are between 11 and 20 years old.

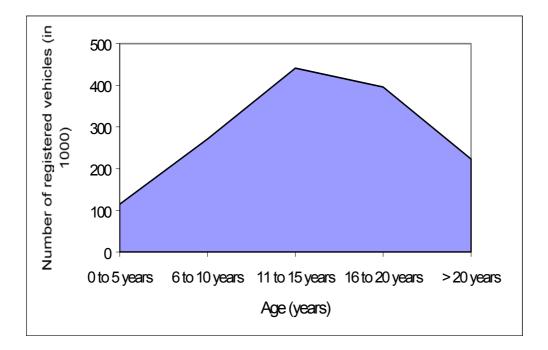


Figure 17: Age distribution of registered vehicles in Bulgaria (1999)

Comparing the distribution of Figure 17 with the Netherlands and Germany (see Figure 14 and Figure 15) it is evident that the curves evolve exactly opposite to each other. While in Germany and the Netherlands the number of registered vehicles older than 10 years decreases, the Bulgarian curve still increases.



7.4.2 Estonia

The Estonian Motor Vehicle Registration Centre (ARK) has published summarised information about registration and deregistration activities in Estonia for the year 2001.

Figure 18 shows import data for the years 1992 until 2001, subdivided into the import of newly produced and used vehicles.

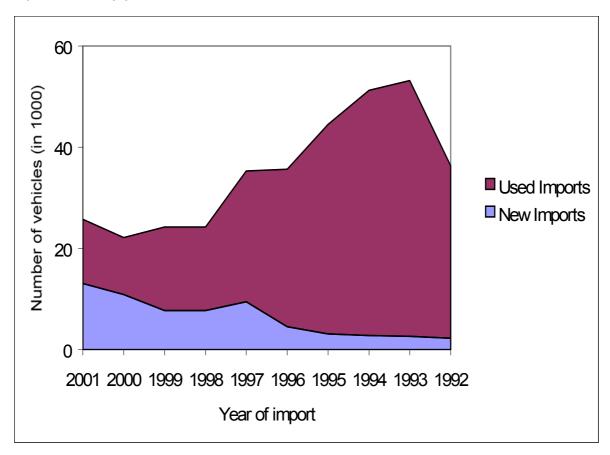


Figure 18: Number of imported vehicles into Estonia (2001)

The peak of used imports is met in the year 1993. Except for 2000 and 2001 the number of imported used vehicles is higher than the import of new vehicles.

Even though the number of imported new vehicles rises, the number of imported used vehicles is still relevant.



Splitting up column 2001 of Figure 18 shows that most imported cars have been produced between 1991-1993 (see Figure 19).



Figure 19: Age pattern of vehicles registered for the first time in Estonia (2001)



7.4.3 Latvia

The data from Latvia shows that the majority of first time registrations consists of used vehicles (see Figure 20).

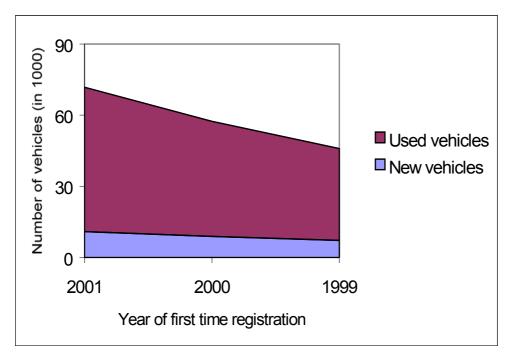


Figure 20: Number of imported vehicles in Latvia



7.4.4 Lithuania

The composition of the vehicle fleet for 2001 in Lithuania displays that quite few new cars are registered. The majority of vehicles is older than 10 years. The data does only cover western car makes, which hold a fraction of 87% of the total of all registered vehicles in Lithuania.

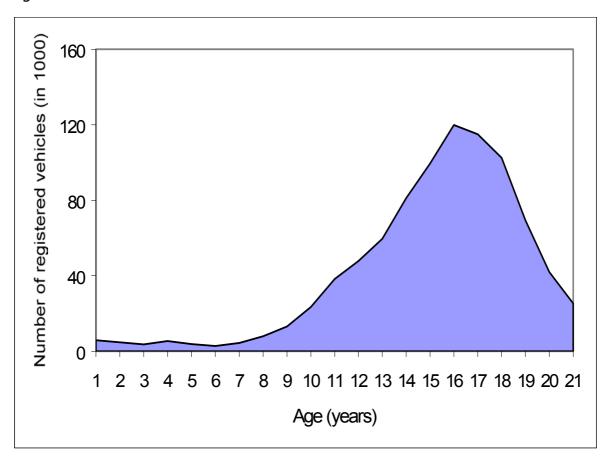


Figure 21: Age distribution of the vehicle fleet of Lithuania (2001)

The age distribution of Lithuania shows even more distinct than the distribution of Bulgaria (Figure 17) the oppositional progression in comparison with the Netherlands and Germany (Figure 14 and Figure 15).

Figure 22 displays that the majority of imported vehicles into Lithuania is older than 10 years.



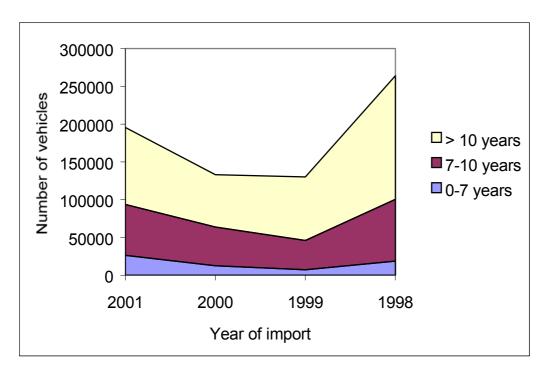


Figure 22: Age distribution of imported vehicles in Lithuania between 1998-2001

Figure 23 shows that a prominent number of those imported vehicles are actually not registered in Lithuania, but exported further.

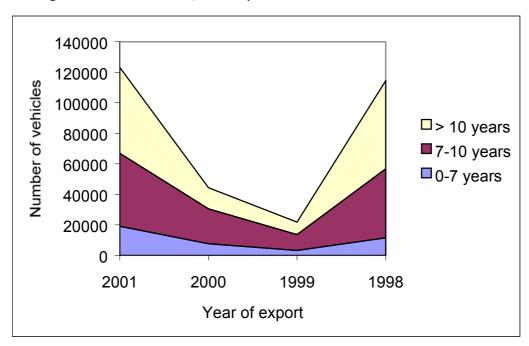


Figure 23: Age distribution of vehicles exported from Lithuania



7.4.5 Poland

The Ministry of Environment, Department of Environmental Policy of Poland has published following data.

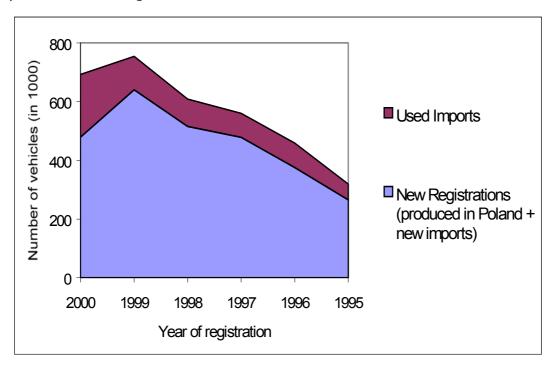


Figure 24: Number of imported vehicles in Poland

The number of new imported vehicles registered in Poland is constantly much higher than the number of used imports. This can be due to minimum technical requirements which imports have to meet.



7.4.6 Slovenia

The Slovenian government has provided the following information.



Figure 25: Age distribution of the vehicle fleet in Slovenia (2001)

Figure 25 shows a similar pattern like the overall age distribution of Germany and the Netherlands. The majority of vehicles is below 10 years old.

The relatively small amount of old cars in comparison with Bulgaria, Estonia and Lithuania can be explained by the technical standards for imports. Since 1998 the import of vehicles older than 5 years is not allowed anymore. Additionally imported vehicles must be equipped with a catalyst.



The information provided by the Accession Countries is more consistent than from the Member States. It can be stated that:

- Relevant amounts of used vehicles are imported by into Accession Countries from Western European Countries;
- For many Accession Countries the number of imported used vehicles is significantly higher than the number of imported new vehicles (Bulgaria, Estonia, Latvia, Lithuania);
- In Lithuania for example, the majority of imported vehicles is already 10 years old, or even older. The situation is similar for the majority of first time registrations in Estonia.
- In several Accession Countries the majority of registered vehicles are older than 10 years;
- Data from Lithuania indicate that the number of 2nd hand cars which are exported further eastwards can be much higher than the number that will stay inside the country;
- Some Accession Countries have made attempts to influence the average age of the imported vehicles by setting minimum technical requirements (e. g. catalysts).

Conclusions

To summarise, the overall flow of used vehicles from European Member States to Third Countries is not fully known. What can be stated so far is that many cars brought on the market in Member States will become ELVs elsewhere. Due to the large number of 2nd hand imports, the ELV problem in Accession Countries is already significant and expected to grow further.

The older a 2nd hand car already is at the time of import, the less time will remain until it will turn to be an end-of life vehicle. In order to avoid a situation where Member States dispose their ELVs through exports, it is suggested to check the sorting efficiency of the collecting systems and to improve collection *via* age statistics where appropriate(see chapter 7.1).

Possibly, the Accession Countries can influence the average age of the imported vehicles by setting minimum technical requirements.



Annex

1.1 Cover letter

Ökopol is contacting you on behalf of the European Commission DG Environment concerning the Study on "Detailed rules on compliance with the targets of Directive 2000/53/EC" (Tender ENV.A.2 / ETU / 2002 / 0001r).

The objective of the study is to collect data and information about existing end-of-life vehicles collection and recycling schemes in all Member States, and to provide the Commission with a full overview of the re-use, recycling and recovery schemes in existence in all Member States of the European Union, with a particular focus on the way how the re-use, recycling and recovery rates are calculated and monitored. Similar information on current practice in Japan, Norway and Switzerland under their respective schemes for end-of-life vehicles will also be gathered. As an additional task, we will collect data on vehicles which are deregistered in Member States and exported to third countries, and on cross-border shipments of end-of-life vehicles between the European Union and third countries.

For developing a reliable information basis Ökopol asks you to kindly provide the following information:

- 1. Please send us all relevant information and official documents regarding the state of implementation of Directive 2000/53/EC in your country,
- 2. Depending on your status quo concerning the ELV Directive, please send us your answers to the questions in the attached questionnaire:

Part A: Registration/Deregistration

Part B: Calculation of Reuse/Recovery Rate

Your reply should preferably be forwarded before 28.06.2002 June to the attention of: name@oekopol.de, FAX +49-40-39900633.

The timeframe of our study is scheduled for four months, starting from June to the

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end of September 2002. In order to be able to represent your country as accurately as possible, we ask you to forward all relevant documents which will be published after June to ensure that any ongoing developments in your country will be taken into account in an appropriate way.

In case you are not the right contact person, we would be grateful if you could bring us in contact with the responsible institution or person as soon as possible. We thank you in advance for your support.



1.2 Questionnaire Part A: Registration/Deregistration

1.	Please describe the current practice in connection with the Destruction (COD) according to Article 5 (3) of Dir. 2000/53 deregistration of a car.	
	1.1. Who issues the COD?	
	1.2. In what form (paper, electronically)?	
	1.3. Which Data does the COD contain (concerning car/owner)	?
	1.4. How is this information further forwarded/proceeded?	
2.	Is there a central institution which is collecting and aggregating these data at the national level?	Yes No
	2.1. If yes: Which institution? (Please include contact details)	
3.	Is the export of vehicles (as defined in Article 2 (1) 2000/53/EC) registered and recorded ?	Yes No
	3.1. If yes: How exactly? (e. g. at deregistration, at actual expor	t)



4.	Is the nu	Yes No		
	•	defined in Article 2 (2) 2000/53/EC) rumber of ELV	ecoraea :	piece/year
5.′	1. Do yo	ou distinguish between exported EL'	V which are:	
	5.1.1.	incompletely or not-depolluted/draine	Yes No	piece/year
	5.1.2.	fully depolluted and drained	Yes No	piece/year



1.3 Questionnaire Part B: Calculation of Recycling/Recovery Rate

	 What method is used to determine the average weight per ELV and year according to Article 7 of Dir. 2000/53/EC ? 					
		weighing of every individual ELV,				
		weighing campaign of representative samples of E	ELV,			
 conversion based on manufacturer's data of theoretical weight in car documents, 						
		any other method (measured, calculated or estimated)	ited):			
			[please explain]			
			_			
2. [Dep	pollution				
2.1	•	Please mark the materials which are separated from Annex I (3.)	om the ELV according to			
		of the Directive during DEPOLLUTION and before	shredding:			
		batteries	☐ liquefied gas tanks			
		potentially explosive components (e.g. air bags)	☐ fuel			
		motor oil	☐ gearbox oil			
		transmission oil	☐ hydraulic oil			
		cooling liquid	□ antifreeze			
		brake fluids	☐ air-conditioning system fluids			
		components containing mercury like:	□ other fluids:			
		other materials:				
		case that materials are not separated from the ELV plain	prior to shredding, please			
	ho	w they are neutralised during subsequent treatmen	t steps:			



2.2.		determine the weight of the extracted material				
2.3.		es for the treatment of materials from escribe	Yes No			
3. Di	smantling					
3.1.	Is DISMANTLING of certain r	materials after depollution to promote	Yes No			
	recycling according to Annex I (4) of Dir. 2000/53/EC mandatory in your national implementation ?					
If yes:						
3.2.	Is there a minimum mass to o	dismantle ?				
3.3.		nich are separated from the ELV according to 3/EC during DISMANTLING after depollution				
	☐ catalysts	☐ metal components				
	□ tyres	☐ large plastic components (e bumpers)	e.g.			
	☐ glass	☐ other materials:				
3.4.	_	aterials (esp. removed spare parts for reuse) nated ?				
3.5.	Are there mandatory measure dismantling?	es for the treatment of materials from	Yes No			
351	If ves please describe:					



4.	Shredding	Yes No
4.1.	Is shredding of depolluted and dismantled ELV mandatory?	
4.2.	Are there mandatory measures for the treatment of materials from shredding?	Yes No
If y	es please describe:	
4.2	Shredder light fraction:	
4.2	2. Shredder heavy fraction:	
	Re-use (as defined in Article 2 (6) 2000/53/EC):	
5.2.	Recycling (as defined in Article 2 (7) 1 2000/53/EC):	
5.3.	Energy Recovery (as defined in Article 2 (7) 2 2000/53/EC):	
5.4.	Disposal (as defined in Article 2 (9) 2000/53/EC):	



6.		ow do you calculate re-use, recycling and recovery rates according to ticle 7 of Dir. 2000/53/EC ? Please explain:					
7.	de	Which is the local legal regulation in your country used as a basis for a decision whether the respective process is assigned to recycling, recovery or final disposal ?					
8.	20	hen is a material recycled or recovered according to Art. 7 of Directive 00/53/EC ?[Please tick the statement, which represents the situation in our country best – multiple answers possible].					
		"Materials for recycling or recovery are quantified on the basis of outgoing materials from the dismantling companies and shredders, depending on their destination."					
		"Materials for recycling or recovery are quantified on the basis of incoming materials at the recycling companies, based on reports from recyclers."					
		"Materials for recycling or recovery are quantified on the basis of incoming materials at the recycling companies, based on reports from recyclers, but corrections are made for secondary wastes for disposal. The proportion of secondary wastes for disposal is specifically assigned to the particular waste stream."					



1.4 Overview about the documents provided by the responding countries

If the name of document is not indicated in English, it was not available. The text in brackets is either the official translation of the document in English or the translation by Ökopol

Country	Legal Texts	Other texts
Austria Belgium	Altfahrzeugverordnung (Austrian ELV ordinance), Abfallwirtschaftsgesetz 2002 (Waste management law) - Vlaamse Reglement inzake	Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft: Vorblatt Altfahrzeugeverordnung, Entwurf, April 2002 (Comment paper by the Austrian government) Avant-projet d'arrêté du
	Afvalvoorkoming en —Beheer"(Flemish Waste Law): Afdeling 3.3.; Voertuigwrakken (Order of the Flemish Government for the Establishment of the Flemish Regulations Relating to Waste Prevention and Management) - Arrêté du Gouvernement wallon instaurant une obligation de reprise de certains déchets en vue de leur valorisation ou de leur gestion. - Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à l'agrément des exploitants de centres d'élimination de véhicules hors d'usage habilités à délivrer un certificat de destruction, et aux conditions d'exploitation desdits centres - Arrêté du Gouvernement de la Région de Bruxelles-Capitale instaurant une obligation de reprise de certains déchets en vue de leur valorisation ou de leur élimination	recyclables, des installations de regroupement, de tri ou de récupération de pièces de véhicules hors d'usage, des centres de démantèlement et de dépollution des véhicules hors d'usage et des centres de destruction de véhicules hors d'usage et de traitement des métaux ferreux et non ferreux



Country	Legal Texts	Other texts		
Denmark	Bekendtgrørelse om håndtering af affald i form af motordrevne køretøjer og affaldsfraktioner herfra, (Statutory Order No. 480 of June 19, 2002 on Management of Waste in the form of Motor Vehicles and derived Waste Fractions)	Müller, Klaus (2001): 16 Monate mit der Dänischen Altautoverordnung (16 months with the Danish ELV ordinance)		
Finnland		Ministry of the Environment (2001): Summary of proposals presented by the working group for end-of life vehicles		
France		Projet de décret relatif à la mise sur le marché des véhicules, la reprise, la valorisation et l'élimination des véhicules hors d'usage		
Germany	Altfahrzeuggesetz (Law on End of Life Vehicles)	ARGE Altauto: 1. Monitoringbericht, Frankfurt, 2000		
Nether- lands	Besluit Beheer Autowrakken, Decree on Management of End-of-Life Vehicles	 Auto Recycling Nederland: Environmental Report 2001, Amsterdam, 2002 § 25 no. 5 of the draft version of national waste management plan 		
Sweden	National Environmental Protection Agency regulations and General advice on scrap vehicle operations (NFS 2002:2 Naturvårdsverkets föreskrifter och allmänna råd om skrotbilsverksamhet) Vehicle dismantling Act 2000/01:47 in german	 National Environmental Protection Agency: Summary on producer responsibility, July 2002 Quarterly report 3/98 BPS Final Technical Report:Shredder Waste Recycling, 2001 Bilindustrieföreningen: Reporting on recovery, 1999 		

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Country	Legal Texts	Other texts
United Kingdom		Department of Trade and Industry: Directive 2000/53/EC on End of Life Vehicles, UK Government Consultation paper, 2001
NON-EU		
Norway	Forskrift om kasserte kjøretøy	
Japan	Summary and Translation of the ELV Recycling Law	
Switzer- land		 Society of automotive engineers (2001): Reshment-An ASR process for maximized recycling, reuse and recovery, Swiss Auto Recycling Foundation Info Nr. 7 (2002): Pioneer technology- decision and choice of operatin company, Stiftung für umweltgerechte Entsorgung von Motorfahrzeugen (2000): Jahresbericht, (Annual report from the foundation for environmental sound disposal of motor vehicles)



1.5 Overview about the contact flow between Ökopol and the contacted countries

Country	Organisation	Ques- tionnaire sent:	Ques- tionaire returned	Phone	Inquiries	Reply
Austria	Federal Ministry of Environment	19.06.02	19.06.02	19.06.02 29.07.02 01.08.02		
Belgium	Ministry of Health and Environment	18.06.02	Ques- tionnaire forwarded	18.06.02 20.06.02 27.06.02		17.06.02 18.06.02 21.06.02 28.08.02 12.09.02
	Flemish Public Waste Agency	18.06.02	02.08.02 10.07.02	09.08.02	15.07.02 08.08.02 21.08.02 27.08.02	02.08.02
	Brussel Environmental Agency	18.06.02			27.08.02	05.07.02 30.08.02
	Wallon Ministry of Environment	18.06.02	26.08.02	07.08.02	15.07.02 17.07.02 27.08.02 29.08.02	15.07.02 17.07.02, 26.08.02 28.08.02
	DIV Federal car registration service	18.06.02			17.07.02	
Denmark	Environmental Protection Agency	21.06.02	23.08.02		26.08.02 02.09.02	26.08.02 04.09.02



Country	Organisation	Ques- tionnaire sent:	Ques- tionaire returned	Phone	Inquiries	Reply
Finnland	Ministry of the Environment	18.06.02	02.07.02		02.09.02	16.07.02 05.09.02
	Kuusakoski Shredder company				11.07.02	22.07.02
	Finnish Vehicle Administration	06.08.02	16.08.02		02.09.02	09.09.02
France	Ministry of the Environment	20.06.02	08.07.02	03.07.02 30.07.02 27.08.02	15.07.02 24.07.02 27.08.02	09.08.02 28.08.02
Germany	Federal Environmental Ministry	03.07.02	11.09.02	11.09.02	11.09.02	11.09.02
	Environmental Agency			19.08.02 26.08.02		
	Waste Centre Schwarze Pumpe			19.08.02 22.08.02	19.08.02 22.08.02	22.08.02
Greece	Ministry for the Environment	17.06.02	26.08.02		02.09.02	06.09.02
Ireland		19.06.02				
Italy	Environment Protection Agency	17.06.02				
Luxem- bourg	Ministry of the Environment	14.06.02				
Nether- lands	ARN Auto recycling Nederlands	20.06.02		27.06.02 09.08.02	24.06.02 03.07.02 02.09.02	24.06.02 10.07.02 09.09.02



Country	Organisation	Ques- tionnaire sent:	Ques- tionaire returned	Phone	Inquiries	Reply
Nether- lands	Ministry of the Environment	05.07.02		15.07.02, 12.09.02	25.07.02 15.07.02 31.07.02 02.09.02 09.09.02 11.09.02	25.07.02, 09.09.02, 11.09.02, 16.09.02
	AVR Netherlands		03.09.02	20.08.02	20.08.02 26.08.02	26.08.02
Portugal	Ministry of the Environment	19.06.02				
Sweden	Environmental Protection Agency	13.06.02		05.07.02	02.09.02	
	National Road Administration (SNRA)	08.07.02	08.08.02		14.08.02 02.09.02	04.09.02
	Bilsweden, Association of car manufacturer and importer	08.07.02		07.08.02	08.07.02 15.07.02 27.08.02 02.09.02	05.08.02 06.08.02 28.08.02 02.09.02 09.09.02
Spain	Ministry of the Environment	19.06.02				
United Kingdom	Department of Industry and Trade	20.06.02				
	Department for Environment	16.08.02 27.08.02		27.08.02		



Country	Organisation	Ques- tionnaire sent:	Ques- tionaire returned	Phone	Inquiries	Reply
NON-EU						
Norway	Norwegian pollution control authority	19.06.02	28.06.02			05.07.02 29.07.02 04.09.02
	Norwegian Customs and Excise	07.08.02	19.08.02			
	Statistics Norway	19.08.02	21.08.02			
Japan	Japan Automobile Manufacturers Association (JAMA)	19.06.02			02.09.02	01.07.02
	Delegate of the European Union in Japan	15.07.02			02.09.02	26.07.02 09.09.02
Switzer- land	Agency for the Environment	17.06.02	15.07.02	26.06.02 09.07.02	15.07.02 14.08.02 02.09.02	16.07.02 26.08.02 02.09.02
	Customs Authority				28.08.02	02.09.02
	Tommen AG (for Reshment-process)	17.07.02		15.07.02	15.07.02 14.08.02 19.08.02	20.07.02, 28.08.02