Federal Ministry
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Annual Report on end-of-life vehicle reuse/
recycling/recovery rates in Germany for 2017
(English translation)

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Annual report on end-of-life vehicle reuse/recycling/recovery rates in Germany for 2017

pursuant to Article 7 (2) of the End-of-Life Vehicles Directive 2000/53/EC

COM tables and Quality Report (description of data used) pursuant to
Articles 1 and 3 of Commission Decision 2005/293/EC on end-of-life vehicles and
the COM guidance document "How to report on end-of-life vehicles according to
Commission Decision 2005/293/EC"

(English translation)

0   General information

Country
Germany

Title
"Description of the data submitted according to Commission Decision 2005/293/EC on the monitoring of the reuse/recovery and reuse/recycling targets on ELVs"

Organisation submitting the data and the description

Umwelt
Bundesamt

UBA – *Umweltbundesamt*
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and

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

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Reference period
Data for the year 2017

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We agree to make our Quality Report available to the national experts via *circa* (Y/N)
Yes

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1 COM Tables:
Tables pursuant to COM Decision 2005/293/EC for Germany, 2017

Notes:

- According to the guidance document "How to report on end-of-life vehicles according to Commission Decision 2005/293/EC"[1] (as at: 28 April 2017), pages 9-10 and 21-22, **all** metals are to be entered in Table 2 if the "metal content assumption" is applied. To avoid double counting, Table 1 and Table 3 must therefore contain non-metals only.

- The COM tables are repeated in the **Appendix** to this Report, in this instance with allocation of the respective metals to Tables 1, 2 and 3.

Materials from de-pollution and dismantling (in tonnes per year) of end-of-life vehicles arising in the Member State and treated within the Member State

COM Table 1 (dismantling) for Germany, 2017 Non-metals only!					
Materials from de-pollution and dismantling	**Reuse**	**Re-cycling**	**Energy recovery**	**Total recovery**	**Disposal**
	(A)	**(B1)**	**(C1)**	**(D1=B1+C1)**	**E1**
	in t	in t	in t	in t	in t
Batteries [a)]	64	2,364	0	2,364	263
Liquids (excluding fuel)	33	2,915	232	3,147	1,059
Oil filters [a)]	0	21	23	43	3
Other materials arising from de-pollution (excluding fuel) [a)]	1	19	72	91	8
Catalysts [a)]	12	388	0	388	3
Metal components [a) b)]	3	34	34	68	0
Tyres [a)]	618	6,785	4,715	11,500	103
Large plastic parts	108	908	0	908	2
Glass	98	883	0	883	11
Other materials arising from dismantling [a)]	4,810	15	1,426	1,441	16
Total	**5,746**	**14,332**	**6,502**	**20,834**	**1,467**

Explanatory comments, footnotes and source details for this table may be found on the following page.

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[1] http://ec.europa.eu/eurostat/documents/342366/351811/ELV-Guidance/57d66ed3-dec2-4e93-8dbc-4084a89a0fd8

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Explanatory comments:

This table contains a few rounding differences (of one tonne in each case) due to quantities being rounded up or down to the nearest whole tonne.

Footnotes:

a) Non-metal portion only. For metals see COM Table 2

b) Non-metals from cable fractions are also recorded under the heading of metal components.

Source:

From Federal Statistical Office data, Tables 1 and 15 of the Waste Management Survey 2017.

Materials from shredding (in tonnes per year) of end-of-life vehicles arising in the Member State and treated within the Member State

COM Table 2 (shredders) for Germany, 2017 Including all metals				
Materials from shredding	Recycling (B2)	Energy recovery (C2)	Total recovery (D2 =B2+C2)	Disposal (E2)
	in t	in t	in t	in t
Ferrous scrap (steel) [a]	342,830	0	342,830	472
Non-ferrous materials (aluminium, copper, zinc, lead etc.)	53,551	0	53,551	0
Shredder light fraction (SLF) [b]	50,515	34,149	84,664	8,233
Other [c]	903	0	903	0
Total	**447,798**	**34,149**	**481,948**	**8,705**

Explanatory comment:

This table contains one rounding difference (of one tonne) due to quantities being rounded up or down to the nearest whole tonne.

Footnotes:

a) The 472 t of metal scrap listed in the "Disposal" column originates from the metal portions of materials and components disposed of after dismantling.

b) Shredder light fraction and other non-metal shredder residues

c) Plastic fractions separated in the shredders

Source:

From Federal Statistical Office data, Table 15 of the Waste Management Survey 2017.

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Monitoring of (parts of) end-of-life vehicles arising in the Member State and exported for further treatment (in tonnes per year)

COM Table 3 (exports) for Germany, 2017 Non-metals only!					
End-of-life vehicles, body shells, components and materials disposed of abroad	Total weight of end-of-life vehicles exported, by country	Total recycling of (parts of) end-of-life vehicles exported (F1)	Total recovery of (parts of) end-of-life vehicles exported (F2)	Total disposal of (parts of) end-of-life vehicles exported (F3)	Remarks
	in t	in t	in t	in t	
1) End-of-life vehicles (WC 160104*)	0	0	0	0	No exports in 2017 according to the statistics on "Transboundary shipment of waste requiring consent" [a]
Breakdown by countries: -- not applicable --					
2) Body shells from dismantling facilities (WC 160106)	7,845	3,186	6,292	1,553	Exported body shells: 31,064 t in total. Calculation of non-metals from body shells recovered and disposed of abroad, see footnote [b]
Breakdown by countries: -- unknown --					
3) Components from dismantling facilities	156	98	150	6	Batteries [c], tyres [c], large plastic parts, glass etc.
Breakdown by countries, where known					
WC Waste		Destination countries for waste exports (total, not just from dismantling facilities) included in the waste export statistics:			
- 130205* Non-chlorinated machine oils etc.	Switzerland, Finland				
- 160601* Lead batteries	Belgium, the Netherlands, Austria, Poland, Slovenia, Czech Republic				
- 160807* Catalysts	Belgium, France, UK, Italy, the Netherlands, USA				
4) Non-metal shredder residues and plastic fractions from shredders	6,890	3,650	6,743	147	Export of non-metal shredder residues and plastic fractions: 27,153 tonnes in total. Of which approximately 25.4% from ELVs.
Breakdown by countries, where known [d]					
WC Waste		Destination countries for waste exports acc. to waste export statistics (total, not just originating from ELV shredders)			
- 191003* Fluff-light fraction	Austria				
- 191004 Fluff-light fraction	Belgium, the Netherlands, Austria				
- 191210 Combustible waste	Belgium, Denmark, France, Luxembourg, the Netherlands, Austria, Poland, Sweden, Switzerland, Slovakia, Czech Republic				
Total	**14,891**	**6,933**	**13,185**	**1,706**	

Explanatory comments, footnotes and source details for this table may be found on the following page.

Explanatory comments:

WC = Waste Code

This table contains a few rounding differences (of one tonne in each case) due to quantities being rounded up or down to the nearest whole tonne and percentages being rounded to just one place after the decimal point.

Footnotes:

a) Any ELV exports are recorded in the waste export statistics (see Sources below).
According to these statistics, in 2017, 16,263 t were exported to Turkey and 855 t to the Netherlands under waste code 160104* (end-of-life vehicles). In the time series table, these waste exports are allocated to no. 8.12 "Other scrapped vehicles." The exported vehicles refer to ships, and as such are not ELVs falling within the scope of the ELV Directive.

b) Calculation of non-metals from exported body shells recovered/recycled and disposed of:

		Total weight	Of which recycled	Of which recovered	Of which disposed of
			Assumption in line with the statutory provisions		
1	**Body shells,** from dismantling facilities, exported for further treatment abroad	100% = **31,064 t**	85% = 26,404 t	95% = 29,511 t	5% = 1,553 t
2	Of which recovered metal content	74.7% of 31,064 t = 23,219 t	23,219 t	23,219 t	0 t
3	Of which non-metals (line 1 minus line 2)	**7,845 t**	**3,186 t**	**6,292 t**	**1,553 t**

This table contains a few rounding differences (of one tonne in each case) due to quantities being rounded up or down to the nearest whole tonne and percentages being rounded to just one place after the decimal point.
As there is no data available on recycling and recovery levels of body shells abroad, the targets of the EC ELV Directive of 85% (recycling) and 95% (recovery) respectively have been assumed for calculation purposes.
The recovered metal content from body shells is approximately 75.5%*99% (= 74.745%), see metal content assumption in Table 4).

c) Non-metal portion only. For metals see COM Table 2.

d) There are no figures available for the destination countries of waste code 191204 (plastic and rubber) exports.
According to the waste statistics, no waste code items 191209 (minerals) and 160119 (plastics) incurred in shredders were exported abroad for disposal in 2017.

Sources:

– Exports of body shells and other waste from end-of-life vehicle dismantling facilities:
"*Erhebung über die Abfallentsorgung im Jahr 2017*" (Waste Management Survey, 2017), Table 15, Federal Statistical Office.

– German Environment Agency (UBA): "*Grenzüberschreitende Verbringung von zustimmungspflichtigen Abfällen 2017 - Export*" (Transboundary shipment of waste requiring consent, 2017 - Exports), https://www.umweltbundesamt.de/sites/default/files/medien/2503/dokumente/grenzueberschreitende_verbringung_von_zustimmungspflichtigen_abfaellen_export_2017.pdf,

– German Environment Agency (UBA): "*Grenzüberschreitende Verbringung von zustimmungspflichtigen Abfällen. Zeitreihe Export nach Abfallarten - Mengen in 1000 t. 2008-2017*" (Transboundary shipment of waste requiring consent. Time series: Exports by waste category - Volumes in 1,000 t. 2008-2017), https://www.umweltbundesamt.de/sites/default/files/medien/2503/dokumente/zeitreihe_export_notifizierungspflichtiger_abfaelle_nach_abfallarten_0.pdf.

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Total reuse, recovery and recycling (in tonnes per year) of end-of-life vehicles arising in the Member State and treated within or outside of the Member State

COM Table 4 (rates) for Germany, 2017					
From ...	Reuse (A)	Total recycling (B1 + B2 + F1)	Total recovery (D1 + D2 + F2)	Total reuse and recycling (X1=A+B1+B2+F1)	Total reuse and recovery (X2=A+D1+D2+F2)
	in t	in t	in t	in t	in t
COM Tab 1: Dismantling (A, B1, D1) (non-metals only)	5,746	14,332	20,834	20,078	26,581
COM Tab 2: Shredders (B2, D2) (incl. all metals)		447,798	481,948	447,798	481,948
COM Tab 3: Exports (F1, F2) (non-metals only)		6,933	13,185	6,933	13,185
Total	5,746	469,064	515,967	474,810	521,713

		Recycling and recovery rates, 2017	
W (total number of end-of-life vehicles)	506,531 vehicles	**89.5%**	**98.4%**
W1 (total vehicle weight)	530,311 tonnes	X1/W1	X2/W1

Explanatory comment:

This table contains a few rounding differences (of one tonne in each case) due to quantities being rounded up or down to the nearest whole tonne.

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2 Quality Report:
Description of the data submitted according to Commission Decision 2005/293/EC on the monitoring of the reuse/recovery and reuse/recycling targets for ELVs

2.1 Chapter A) Information according to Article 1 (1) of COM Decision 2005/293/EC – Description of data used to determine ELV recycling/recovery rates for Germany, 2017

2.1.1 Section 1: Source of information

The data used as a basis for determining end-of-life vehicle recycling and recovery rates in accordance with the End-of-Life Vehicles Directive 2000/53/EC consists of the waste statistics collected for the whole of Germany from ELV treatment facilities (dismantling facilities and shredder facilities) by the Statistical Offices of the Länder and the Federal Statistical Office under the Environmental Statistics Act (*Umweltstatistikgesetz*) [2] (Section 3 (1) No. 1). Tables 1.1, 14 and 15 of the "Waste Management Survey 2017" were used for this purpose.

At the end of each reporting year, the ELV treatment facilities (1,195 dismantling facilities and 49 shredder facilities with body shell treatment in 2017) enter their operational input and output quantities for the waste management survey on the statistical survey forms DBA (dismantling facilities)[3] and SHR (shredder facilities)[4]. These are then analysed, anonymised and summarised by the Statistical Offices of the Länder and subsequently by the Federal Statistical Office (see Figure 1). From the aggregated data, the German Environment Agency (*Umweltbundesamt*) determines the national recycling and recovery rates for end-of-life vehicles.

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[2] www.gesetze-im-internet.de/ustatg_2005/UStatG.pdf

[3] Sample waste disposal form 2017 - DBA for Bavaria:
https://www.statistik.bayern.de/mam/service/erhebungen/bauen_wohnen/abfall/dba_2017.pdf

[4] Sample waste disposal form 2017 - SHR for Bavaria:
https://www.statistik.bayern.de/mam/service/erhebungen/bauen_wohnen/abfall/shr_2017.pdf

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Figure 1: **Data streams for determining Germany's recycling/recovery rates under the ELV Directive**
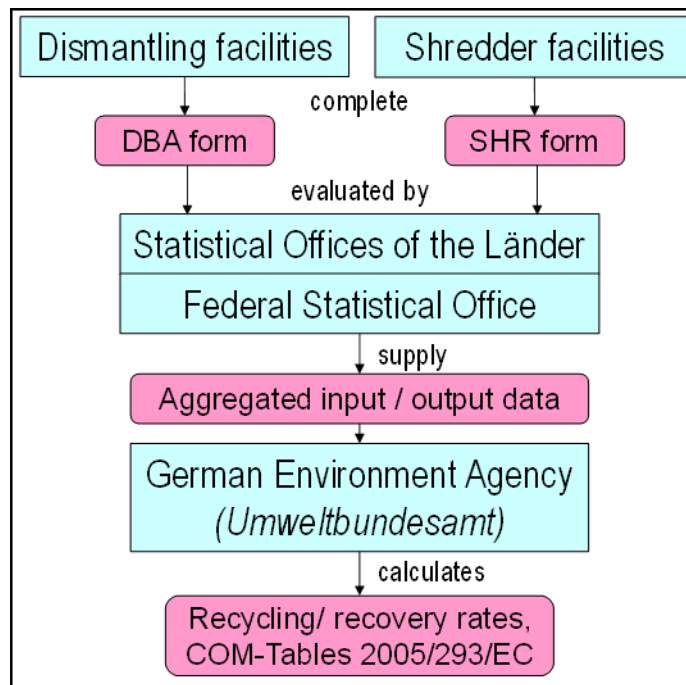
The statistical questionnaires differentiate the facilities' output as follows:

- For recycling/recovery in Germany,

- For recycling/recovery abroad,

- For disposal in Germany,

- For disposal abroad,

- For transfer to treatment facilities, secondary materials recovered and products.

In the case of shredder light fraction (waste codes 19 10 03* and 19 10 04), the statistical questionnaires are also used to ascertain whether the shredder light fraction sent for recovery is ultimately recycled as material, recovered as energy or disposed of.

In the case of dismantling facilities, only waste types originating from the end-of-life vehicles (excluding fuel) are included in the rate calculation.

The treatment of waste containing metals in shredder facilities produces, firstly, metal fractions and secondly, non-metal fractions (shredder light fraction and the non-metal portion of the shredder heavy fraction). Since shredder facilities also treat other metal waste apart from end-of-life vehicle body shells, the fractions produced were split into one portion originating from body shell treatment, and one portion originating from other input fractions. Only the portion originating from body shell treatment is included when calculating the ELV reuse/recycling/recovery rates.

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– Metals:

The quantity of recovered/recycled metals originating from body shells is included in the "metal content assumption".

– Non-metal fractions: Shredder residues and plastics:

Non-metal shredder residues include shredder light fraction, other non-metal shredder residues and plastic fractions separated by shredders.

The quantity of non-metal shredder residues originating from body shells was determined as follows:

The shredding of body shells produces approximately 77.5% metal fraction and approximately 22.5% non-metal shredder residues, see Table 1. Consequently, a non-metal shredder residue portion equivalent to 22.5% of the weight of the body shells (from Germany) treated in the shredder was allocated to ELV treatment and therefore entered in COM Table 2.

The following waste codes were considered, the final two having been included for the first time in the 2017 reporting year:

- 19 10 03*   Fluff-light fraction and dust containing hazardous substances,
- 19 10 04   Fluff-light fraction and dust other than those mentioned in 19 10 03,
- 19 12 09   Minerals (for example sand, stones),
- 19 12 10   Combustible waste (refuse derived fuel),
- 16 01 19   Plastics *(waste from dismantling of ELVs)*,
- 19 12 04   Plastic and rubber.

For details of methodological changes compared with the previous year, please refer to number 2.1.5 letter f).

2.1.2   Section 2: Quality of information sources

Coverage:

The data was collected from the whole of Germany from all 1,151 dismantling facilities for end-of-life vehicles and 49 shredder facilities with body shell treatment. This therefore indicates a high level of completeness.

Data quality:

In the preceding two years' reports, several of the assumptions and estimates previously used were updated based on the results of a study on monitoring methods, see footnote 14 of this annual report and number 2.1.5, letter f) of the 2015 annual report[5]. To calculate the 2017 rates, one assumption was further modified compared with 2016 to reflect the finalised

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[5] BMUB/UBA: Annual Report on end-of-life vehicle reuse/recycling/recovery rates in Germany for 2015. 24 August 2017. www.bmu.de/DL1997-1

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results of the study, see number 2.1.5, letter f) and Table 1. The well-established data collection process remained unchanged. The quality of the data is considered good.

The survey yields plausible values for average vehicle weight, and the achieved figure of 1,047 kg is once again a few percent higher than the previous year's figures (2015: 1,002 kg, 2016: 1,018 kg), reflecting the gradual rise in the average weight of vehicles generally. This figure is also consistent with the average weight of ELVs quoted by ARN for the Netherlands (2017: 1,035 kg, 2018: 1,043 kg)[6]. In relation to the empty weight of ELVs arising in 2017, a slightly smaller percentage of components and materials (15.6%) was dismantled by the dismantling facilities than in previous years (2016: 17.3% and 2015: 18.2%).

There are no new findings regarding the quality of on-site data collection by the facilities compared with previous years.

The breakdown of the dismantled components and materials into recycling and energy recovery, which is not evident from the waste statistics, is based on material types and a knowledge of the customary recovery paths in Germany. The updated breakdown into recycling and energy recovery used in the report for 2015 was retained; see number 2.1.5, letter f) of the report for 2015[7], and is therefore of good quality. Based on industry association figures on the recovery and recycling of waste tyres in 2017 (excluding reuse), the previous year's rates of 59% recycling and 41% energy recovery have remained the same.

Various waste types comprise both metals and non-metals. The metal portions were deducted due to application of the "metal content assumption". Since the average metal contents for the affected waste categories was updated when calculating the rates for 2015 – see number 2.1.5, letter f) of the annual report for 2015– the quality of this data remains good.

Imports:

In the statistical questionnaires, the end-of-life vehicle treatment facilities state whether the ELVs accepted come from outside of Germany or within Germany. Of the 534,264 t (510,307 vehicles) of end-of-life vehicles accepted, 3,953 t (0.74%, or 3,776 vehicles) came from outside Germany. The 530,311 t (506,531 vehicles) of end-of-life vehicles accepted for treatment from within Germany were entered as W1 (total vehicle weight). Given the low import share of less than one percent, we opted to dispense with a "correction factor" to eliminate ELVs accepted from abroad, since this would only reduce the overall recovery rate by 0.05%.

Metal content assumption:

The metal content of the vehicles and the breakdown into ferrous and non-ferrous metals are calculated based on extensive data from German and foreign vehicle manufacturers; see number 2.2. The quality of this estimate can therefore be considered very good. Given the

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[6] ARN: Key data car recycling 2018. https://arn.nl/wp-content/uploads/2019/05/190430-Key-Data_En_Print.pdf
[7] See footnote 5

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average vehicle age of approximately 17 to 18 years, for the reporting year 2017, we continued to use the weighted average metal content of ELVs based on new vehicles in 2000, updated in 2013. This covers 95% of the vehicle market.

Unchanged against the previous year's report[8], we assume a recycled portion of the metal content of ELVs of 99%, since metal separation levels are thought to have remained the same.

<u>Shredder light fraction:</u>

The input from the 49 body shell shredders totalled around 3.7 million tonnes in 2017. In line with the increase in the number of ELVs, the proportion of input attributable to body shells rose from 10.6% in 2016 to 13.0% in 2017. The other main input materials of ELV shredders in 2017 were iron and steel (54%), ferrous metals (17%), (mixed) metals (4%) and used electrical & electronic appliances (5%).

To calculate the ELV recovery/recycling rates, it was necessary to determine the proportion of shredder light fraction originating from the treatment of body shells. As such, a quantity of non-metal shredder residues equivalent to 22.5% of the weight of treated body shells was allocated to ELV recovery/recycling, see numbers 2.1.1 and 2.1.5, letter f). In line with the amended final results of the aforementioned study[9], this proportion was readjusted slightly when calculating the rates for 2017. The 447,506 t of body shells[10] (accepted from within Germany and) shredded in 2017 produced approximately 100,700 t of non-metal shredder residues. This equates to 25.4% of the 396,809 t of non-metal shredder residues (including plastic fractions)[11] produced in total by the 49 shredders – see also pages 42/43.

2.1.3 Section 3: Determination of the weight

In the statistical survey, the dismantling facilities state the total of the vehicle empty weights in accordance with Section 2 (1), no. 23 of the German ELV Ordinance (*Altfahrzeug-Verordnung*). For a definition of the vehicle empty weight in accordance with Section 2 (1), No. 23 of the Altfahrzeug-Verordnung, please refer to the Report for 2009.

2.1.4 Section 4: Recycling or recovery of exported ELVs / parts of ELVs

Recycling or recovery of exported <u>end-of-life vehicles</u>:

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[8] BMU/UBA: Annual Report on end-of-life vehicle reuse/recycling/recovery rates in Germany for 2016. 27 June 2018.www.bmu.de/DL1997-1, see number 2.1.5 letter f) of this report.

[9] See footnote 14

[10] On the issue of double counting, please refer to number 2.1.5, letter b).

[11] As well as the two waste codes 19 10 03* and 19 10 04 for shredder light faction, waste codes 19 12 09 (minerals) and 19 12 10 (combustible waste) together with 16 01 19 (plastics) and 19 12 04 (plastic and rubber) were also added as additional non-metal shredder residues; see numbers 2.1.1 and 2.1.5, letter f).

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In 2017, no ELVs falling within the scope of the EC ELV Directive were exported; see the explanatory comments on COM Table 3.

Recycling or recovery of exported <u>body shells</u>:

As in the previous year, in 2017 the export share of body shells from Germany totalled 5.9% of the total vehicle weight W1, or 31,064 t. The share of exported body shells therefore remained low: In 2017, the recovery of non-metals from exported body shells accounted for just 1.2 % of the overall recycling/recovery rate.

There is no statistical data available concerning destination countries and proportions of body shell components that are ultimately recycled or recovered abroad. As in Germany, therefore, a metal content assumption of 74.7% was used for calculation purposes, while overall recycling and recovery rates of 85% / 95% respectively were used as minimum levels in accordance with the targets of the ELV Directive applicable since 2015, since these figures were not available from abroad.

Recycling or recovery of exported components/materials from <u>dismantling facilities</u>:

For each type of dismantling facility output, the statistics show whether recovery/recycling or disposal took place in Germany or abroad. The breakdown into recycling and energy recovery is applied in the same way as for recovery within Germany (see number 2.1.5, letter c)). Overall, exports of dismantled non-metal components and materials were minimal in 2017.

Recycling or recovery of exported <u>shredder light fraction</u>:

The statistics show the quantity of shredder light fraction recycled/recovered outside Germany. They also differentiate the "recovered" shredder light fraction on the basis of "ultimate fate" into recycled, recovered as energy, and disposed of. When calculating rates, this breakdown is applied to disposal both within Germany and abroad.

2.1.5   Section 5: Other comments

a)   Explanations on export of shredder output in COM Table 2

Due to application of the metal content assumption, COM Table 2 – in line with the notes in the COM guidance document – contains all metals recovered, i.e. including those recovered abroad. Regarding the shredder light fraction, Table 2 contains only the shredder light fraction disposed of within Germany. The shredder light fraction disposed of abroad is included in COM Table 3.

b)   Description of actions undertaken by the country to avoid double counting of ELVs and components

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In accordance with Section 4 of the German ELV Ordinance (*Altfahrzeug-Verordnung*), end-of-life vehicles pass through a two- or three-stage disposal process in the following order:
(→ optional: acceptance or collection facility,)
→ dismantling facility,
→ shredder facility.

As a result of this predetermined treatment sequence, we can assume that the nationwide statistical surveys do not generally include any double counting of the end-of-life vehicles and components reported.

In a few cases "other further treatment facilities" ("*sonstige Anlagen zur weiteren Behandlung*" according to the German ELV Ordinance) are used to condition the body shells after dismantling and before shredding. For statistical purposes, these other further treatment facilities are summarised with shredders. The waste statistics for shredders in 2017 include an output of 5,532 t body shells. It can be assumed that this body shell weight originated from the other further treatment facilities. Double counting can therefore be assumed, in that the same body shells were first reported in the input of the other further treatment facility, and subsequently in the input of the downstream shredder facility. The corresponding 5,532 t body shells were therefore deducted from the body shell input of the shredder statistics to eliminate double counting.

For the entries in COM Tables 1 to 4, care has been taken to eliminate the possibility of double counting: All metals (in line with the metal content assumption) are entered in lines 1 and 2 of COM Table 2, and COM Tables 1 and 3 contain only non-metals; this is also true of the reuse column (A). Regarding non-metals, COM Tables 1 and 2 contain only output for Germany. All outputs of non-metals destined for other countries are covered by COM Table 3.

As an alternative, the data from COM Tables 1 and 3 has also been presented in a way that includes the metal portions. The resultant representation of COM Tables 1 to 4 is included in the Appendix to this Annual Report. Even with this alternative grouping, the final outcome is the same.

c) Description of estimates / calculations conducted (e.g. factors based on ELV treatment and recovery trials and data provided by manufacturers)

There are various points at which calculations were performed or assumptions made.

As mentioned above, the waste statistics do not provide a breakdown of the metal fraction of dismantled components and materials or the recovery path (recycling or energy recovery). It was therefore necessary to make certain assumptions. For many materials, the breakdown is derived from the type of material (e.g. glass and metal not recoverable as energy). For other waste types, as in the previous year, the findings from the study on ELV monitoring

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methods[12] were used – see number 2.1.5, letter f). The proportion of non-metal shredder residues per body shell, which has been adjusted to 22.5% compared with the previous year to reflect the finalised results of this project, and the metal yield from the "metal content assumption" (99%) were likewise taken from this study, see numbers 2.1.5, letter f) and 2.2.

In line with the COM guidance document, only non-metals are entered in COM Table 1 and COM Table 3. COM Table 2 shows all metals in accordance with the "metal content assumption".

d) Description of missing mandatory information; what measures are taken to provide all mandatory information in future?

One item is missing from the mandatory information in COM Tables 1 to 4: Information is incomplete regarding the destination countries in COM Table 3 (Exports).

Since no end-of-life vehicles falling within the scope of the ELV Directive (waste code 160104*) have been exported since these records began, destination countries are irrelevant here. In the body shells category, the proportion of exported body shells (31,064 t) is on a par with the previous year's low level, at 5.9% of total vehicle weight W1 (530,311 t). The proportion of exports of non-metal shredder residues (6,890 t; 1.3% in relation to W1) and components and materials from dismantling (metals and non-metals: 5,115 t or 1.0% of W1) was once again minimal in 2017.

For some of the exported dismantled fractions and for the non-metal shredder residues, we were able to obtain data on destination countries; see COM Table 3. Although the statistics used[13] do not give separate data on the volumes from ELV treatment and their destination countries, they do indicate the total quantities exported from Germany for the waste fractions concerned (generally considerably more than the quantities exported by the ELV treatment facilities) and the destination countries.

e) Description of validation process (how does Germany establish the validity of the data?)

The statistical questionnaires are checked for plausibility by the Statistical Offices of the Länder and the Federal Statistical Office. The statistical offices use their established statistical test routines for this purpose (e.g. input/output comparison, anticipated waste types, comparison with the previous year). The German Environment Agency checks the information from a technical point of view, e.g. on the basis of the anticipated quantities as a result of vehicle composition, see number 2.1.2 above, remarks on plausibility.

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[12] See footnote 14

[13] Refer to source information below COM Table 3.

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f) Description of changes in methodology relative to the previous year

ELV recycling and recovery rates

In the reporting years 2015 and 2016, the methods used to calculate recycling and recovery rates were updated, initially based on the provisional results and again considering the final results of the study to update the underlying data and assumptions for the monitoring of ELV recycling rates under the End-of-Life Vehicles Directive 2000/53/EC[14]; see previous year's report. For 2017, this method was applied almost unchanged, apart from two amendments:

− Proportion of shredder light fraction from body shells (correction compared with previous year's report):

When the above mentioned study was finalized, one value was corrected, and this corrected figure was used in the 2017 reporting year: The proportion of non-metal shredder residues in relation to body shell input has been slightly modified, from an average of 22.2% (see Table 1 in the previous year's report), to 22.5%; see Table 1.

Table 1: **Mono-shredder trials with body shells in Germany, 2016:**
Share of non-metal shredder residues, corrected from the previous year's report

Fraction	Shredder 1			Shredder 2		
	Fraction share of body shell weight	Propor-tion of non-metals in fraction	Non-metal residues in body shell weight	Fraction share of body shell weight	Propor-tion of non-metals in fraction	Non-metal residues in body shell weight
Shredder light fraction	16.4%	94%	15.4%	19.2%	95.3%	18.3%
Shredder heavy fraction	11.6%	50%	5.8%	11.0%	50.2%	5.5%
Total non-metal shredder residues			**21.2%**			**23.8%**
Mean of non-metal residues from both shredders			**22.5%**			

Orange figures = Corrected figures compared with the previous year's report. See study on ELV monitoring[14].

− Waste code non-metal shredder residues (updated from previous year's report):

Because shredders are increasingly obtaining plastic fractions, the list of relevant waste codes for non-metal shredder residues, extended in 2015, was further extended for the reporting year 2017 to include the extracted plastic fractions (see Table 2), which were

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[14] "Evaluating and updating the method to determine the ELV recycling and recovery rates by shredder trials under the EC End-of-Life Vehicle Directive 2000/53/EC" (REFOPLAN research code [FKZ] 3715 33 305 0)

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also taken into account when determining the disposal paths for non-metal shredder residues. It was assumed that the plastic fractions were recycled.

Table 2: **Relevant waste codes for the disposal of non-metal shredder residues from the treatment of body shells**

Waste code	Waste description	In case of recovery, the material is assumed to have been subject to	
		recycling	energy recovery
191003*	Fluff-light fraction and dust containing hazardous substances	Partly [a]	Partly [a]
191004	Fluff-light fraction and dust, other than those mentioned in 19 10 03	Partly [a]	Partly [a]
191209	Minerals (for example sand, stones)	Yes	
191210	Combustible waste (refuse derived fuel)		Yes
16 01 19 (new)	Plastics *(waste from dismantling of ELVs)*	Yes	
19 12 04 (new)	Plastic and rubber	Yes	

a) The ultimate fate of shredder light fraction sent for recovery/recycling is covered by the waste statistics.

Vehicle market / fate of vehicles

The method outlined in the previous year's report for determining the fate of vehicles was once again applied to the year 2017.

However, one aspect was updated: The deregistration rates for determining final deregistrations of M1 and N1 motor vehicles were updated by the Federal Motor Transport Authority; see number 2.3.1 and Table 5.

g) Description of the discrepancy between the number of ELVs with and without CoD and measures to be taken in order to improve the situation

Under Section 4 of the German ELV Ordinance (*Altfahrzeug-Verordnung*), end-of-life vehicles must be transferred to a dismantling facility (or alternatively, an acceptance or collection facility, which is required to pass the ELV on to a dismantling facility). Dismantling facilities are required to issue Certificates of Destruction (CoD) for the end-of-life vehicles

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they accept and to treat them in accordance with the provisions of the Ordinance. Certificates of Destruction must therefore be issued for all end-of-life vehicles.

As already mentioned under number 2.1.1, the annual notifications from dismantling facilities about their input volumes (i.e. the end-of-life vehicles accepted) are incorporated into the waste statistics prepared by the Federal Statistical Office.

Until now, this information has only been recorded in the Central Vehicle Register (ZFZR) at the Federal Motor Transport Authority (*Kraftfahrt-Bundesamt*, [*KBA*]) for those Certificates of Destruction submitted to it or the competent licensing authorities.

The relatively small "statistical gap" that arose in 2017 compared with previous years regarding the fate of finally deregistered vehicles (see Figure 3) may be interpreted as an indication that the statistics accurately reflect the number of ELVs arising. See also number 2.3.3.

2.1.6   Input/output balance

For 2017, the recommended mass balance X2+E1+E2+F3 = W1 revealed a good level of consistency between the output volumes from ELV treatment (difference 0.6%) and the mass of ELVs incurred; as such, the two figures are comparatively well-balanced, see Table 3.

Table 3:   **Mass balance, input and output of ELV treatment in Germany, 2017**

The abbreviations match the designations in the four COM Tables, see number 1.

Material flow output	Output volume in tonnes	Explanation
X2 =	521,713	Total reuse and recovery
E1 =	1,467	Disposal from dismantling, excluding metals
E2 =	8,705	Disposal of shredder light fraction and disposal of metals
F3 =	1,706	Disposal by export, excluding metals
Total	**533,592**	**Total output**
By way of comparison: **Input**	**530,311**	ELV input (total vehicle weight W1)
Difference	0.6%	Percentile difference, output – input

This table contains one rounding difference (of one tonne) because quantities were rounded up or down to the nearest whole tonne.

The good level of consistency also suggests that the assumptions made (see number 2.1.5 letter f) are accurate.

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2.2 Chapter B) Information according to Article 1 (2) of COM Decision 2005/293/EC – Metal content assumption

According to Article 1, paragraph (2) of Commission Decision 2005/293/EC, the "metal content assumption" is based on data relating to

a) the percentage of <u>metal content of the vehicles</u> and

b) the percentage of reuse, <u>recovery and recycling of this metal content</u>.

a) Metal content of the vehicles:
What investigations / data have been used (sources / quality / coverage) to derive the metal content?

For the reporting years 2012 and 2013, the assumed metal content of ELVs was updated based on new registrations of M1[15] and N1[16] motor vehicles in 2000, weighted according to the respective registration volumes per manufacturer; see annual report for the year 2013[17]. Based on an assumed average ELV age at that time of around 14 to 15 years, the values calculated were supposed to be applied to the reporting years 2012 to 2016. This long five-year period is justified because the average metal content of new vehicles only changes very slowly over time.

However, as the study into ELV monitoring methods[18] indicated an average vehicle age of around 17 to 18 years (see Table 6), the year 2000 represents the average year of first-time registration for ELVs arising in the years 2017/2018. Therefore, the data on new registrations of the year 2000 are still applicable and can still be used, probably until the reporting year 2019.

The metal content of vehicles and breakdown into ferrous and non-ferrous metals is calculated from extensive data material from the German and international vehicle manufacturers on the vehicle registration volumes for the various brands in the year 2000 and the metal content of vehicles. Table 1 of the annual report for 2013[17] shows the average metal content of new registrations (M1 and N1 motor vehicles) for the year 2000 by manufacturer (anonymised). The metal contents were further sub-divided into ferrous and non-ferrous metal contents, see Table 2 of the annual report for 2013.

The calculated weighted average metal content is 75.5%, 65.3% of which are ferrous metals and 10.2% non-ferrous metals (weighted averages), see Table 4.

b) Reuse/recycling/recovery of the metal content
What investigations / data / calculations have been used to derive the assumed percentage of reused, recycled and recovered metals?

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[15] Vehicle class M1: see footnote 19.

[16] Vehicle class N1: see footnote 20.

[17] Annual Report on end-of-life vehicle reuse/recycling/recovery rates in Germany for 2013, German: www.bmu.de/DL1997, English: www.bmu.de/DL1997-1

[18] See footnote 14

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According to the aforementioned study on ELV monitoring methods, ELV recycling achieves a metal yield of more than 99%, based on the ELV recycling/recovery and shredder campaign of 2016 (see footnote 14). As in the previous year's report, a value of 99% has been applied.

Using the formula

"metal content assumption" = metal content of ELVs * recycling/recovery of metal content

produces the following figure for metal content recycled/recovered in Germany:

"Metal content assumption" in Germany = 75.5% * 99% = 74.7%

Allowing for 99% recycling/recovery of the metal content, this yields 74.7% for the "metal content assumption", broken down into 64.6% ferrous metals and 10.1% non-ferrous metals recycled/recovered, relative to the vehicle empty weight (see Table 4).

Table 4: **"Metal content assumption", broken down into ferrous and non-ferrous metals**

Metal content	Total metals	Ferrous metal	Non-ferrous metal	Remarks
Weighted average metal content of M1 and N1 motor vehicles	75.5%	65.3%	10.2%	Statement on metal content valid for 95% of the German vehicle market in 2000; see annual report for 2013
Allowing for a recycling/recovery rate of 99%:				
"Metal content assumption"	**74.7%**	**64.6%**	**10.1%**	**Metal content recycled/recovered**

c) Coverage rate:
How does Germany ensure that it meets the required coverage of 95%?

The data supplied by 21 vehicle manufacturers on the metal content assumption covers 95.2% of new registrations in the year 2000 (3,406,164 out of 3,576,206 new registrations). This level of coverage therefore meets the minimum requirement of 95% as specified in Article 1 (2) of Commission Decision 2005/293/EC.

d) How have these data been broken down for COM Tables 1 to 3?

In line with the COM guidance document (page 10 and pages 21-22), all recycled/recovered metals resulting from the calculation for the "metal content assumption" are entered in COM Table 2. COM Tables 1 and 3 contain information about non-metals only.

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Notes on the Appendix to this Annual Report:

As an alternative, the data from COM Tables 1 and 3 has also been presented in a format which includes the metals. The resultant representation of COM Tables 1 to 4 is included in the Appendix to this Annual Report. In this instance, COM Table 2 only contains metals from the shredder output, calculated as the difference between the "metal content assumption", less the metals reused and recovered from dismantling and exports, see COM Tables 1 (dismantling) and 3 (exports). Consequently, as well as non-metal portions, COM Tables 1 and 3 also include the metal portions of components and materials from dismantling and export that were reused, recycled and disposed of.

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2.3 Chapter C) Information according to Article 1 (3) of COM Decision 2005/293/EG – Vehicle market, exports

2.3.1 Section 1: Information on the national vehicle market

In 2017, the number of new registrations of M1[19] and N1[20] motor vehicles rose by just under 3% compared with 2016. As in prior years, the number of motor vehicles registered increased again to 48.2 million M1 and N1 motor vehicles as at 1 January 2017. Over the course of 2017, the number increased by a further 1.6% to 49.0 million M1 and N1 motor vehicles.

The number of ELVs arising in Germany increased by around 20% against 2016, exceeding the half-a-million mark once again with 506,531 ELVs. At the same time, the number of used vehicle exports from Germany also increased. The increase in the number of ELVs may be partly linked to the exchange premium being offered for older diesel vehicles. As an outcome of the "National Diesel Forum" in August 2017, from the second half of the year, several vehicle manufacturers offered financial incentives for customers to trade in their diesel vehicles compliant with older emission standards for new models with state-of-the-art exhaust gas aftertreatment or e-vehicles[21]. These voluntary measures are intended to help reduce emissions of nitrous oxide. The precise terms differ among manufacturers.

Since 2007, final deregistrations are no longer recorded, because since then deregistrations are "off-road notifications". As deregistered a vehicle could still be re-registered at a later date up to the point when it has undergone waste treatment. Off-road notifications therefore include both temporarily and permanently deregistered vehicles. Based on the assessment used prior to 2007 which assumed that finally deregistered vehicles would never be re-registered, a deregistration rate of around 40% for all off-road notifications was assumed under the framework conditions existing at the time (data source: Federal Motor Transport Authority, see BMU/UBA Report for the year 2009, footnote 13). In the absence of more recent data, this rate was used up until the report for 2013 to estimate the number of finally deregistered passenger cars in a given year of reporting. The research project "Development of proposals, including legal instruments, to improve the data situation on the whereabouts of end-of-life vehicles" used a scientific approach to calculate a new rate of 33.3% for M1 motor vehicles and 41.4% for N1 motor vehicles (see Table 5 of the previous year's report), which was incorporated into the annual reports for the years from 2014 onwards.

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[19] Vehicle class M1: Passenger cars (motor vehicles predominantly for the carriage of passengers and comprising no more than eight seats, not including the driver's seat). Definition: See Annex II, section A, no. 1 of Directive 2007/46/EC establishing a framework for the approval of motor vehicles and their trailers.

[20] Vehicle class N1: Light commercial vehicles (motor vehicles predominantly for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes). Definition: See Annex II, section A, no. 1 of Directive 2007/46/EC establishing a framework for the approval of motor vehicles and their trailers.

[21] The Federal Government: Article entitled "*Nationales Forum Diesel – Nachbesserung auf Herstellerkosten*" of 2 August 2017 (German only). https://www.bundesregierung.de/Content/DE/Artikel/2017/08/2017-08-02-nationales-forum-diesel.html

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The final deregistration figures for M1 and N1 motor vehicles were calculated using the same method and parameters as in the previous year, but with updated factors, see Table 5. Based on the deregistrations (off-road notifications) for the years 2013 and 2017, the Federal Motor Transport Authority updated the proportions of multiple off-road notifications and the deregistration rates[22]. To calculate final deregistrations, initially an amount of 4% (M1 motor vehicles) / 3.5% (N1 motor vehicles) was deducted from the number of off-road notifications for vehicles taken out of service multiple times during 2017. This produces the number of motor vehicles taken out of service for that year. This number was multiplied by the deregistration rates of 34.1% (M1 motor vehicles) and 40.2% (N1 motor vehicles) respectively. In 2017 some 2.98 million passenger cars (M1 motor vehicles) and light commercial vehicles (N1 motor vehicles) were finally deregistered.

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[22] Federal Motor Transport Authority: Updated deregistration rates for motor vehicles taken out of service and updated correction factor for motor vehicles taken out of service multiple times (reference year 2017), expert report commissioned by the German Environment Agency, 27 August 2018.

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Table 5:   Off-road notifications and final deregistrations in Germany, 2017

	Off-road notifications Q1)	Multiple off-road notifications E1), Q2)	Motor vehicles taken out of service	Deregistration rate Q3)	Final deregistrations
Column 1	Column 2	Column 3	Column 4 = col. 2 * (100% - col. 3)	Column 5	Column 6 = col. 4 * col. 5
M1 – Passenger cars	8,633,154	Approx. 4%	8,287,828	34.1%	2,826,149
N1 – Light commercial vehicles	396,389	Approx. 3.5%	382,515	40.2%	153,771
Total M1+N1	9,029,543		8,670,343		**2,979,920**

Explanatory comments:

E1) Multiple off-road notifications = proportion of motor vehicles with more than one off-road notification in 2017.

Data sources:

Q1) For column 2 (number of off-road notifications):
Federal Motor Transport Authority (*Kraftfahrt-Bundesamt [KBA]*)*: Außerbetriebsetzungen von Kraftfahrzeugen und Kraftfahrzeuganhängern in den Jahren 2009 bis 2018 nach Fahrzeugklassen* (Off-road notifications of motor vehicles and trailers, 2009 to 2018, by vehicle class), http://www.kba.de/DE/Statistik/Fahrzeuge/Ausserbetriebsetzungen/FahrzeugklassenAufbauarten/a_fzkl_zeit reihe.html?nn=664274, and
Federal Motor Transport Authority*: Außerbetriebsetzungen von Lkw in den Jahren 2008 bis 2017 nach zulässiger Gesamtmasse* (Off-road notifications of trucks, 2008 to 2017, by permissible total mass), http://www.kba.de/DE/Statistik/Fahrzeuge/Ausserbetriebsetzungen/Groessenklassen/a_groessenklassen_lk w_zeitreihe.html?nn=664174.

Q2) For column 3 (correction factor for multiple off-road notifications):
Data source: Federal Motor Transport Authority: Updated deregistration rates for motor vehicles taken out of service and updated correction factor for motor vehicles taken out of service multiple times (reference year 2017), expert report commissioned by the German Environment Agency, 27 August 2018.
The correction factors equate to the rounded figures of 4% and 3.5% respectively calculated by the Federal Motor Transport Authority, which were derived from the base years 2013 and 2017.

Q3) For column 5 (deregistration rate):
Data source: Federal Motor Transport Authority: Updated deregistration rates for motor vehicles taken out of service and updated correction factor for motor vehicles taken out of service multiple times (reference year 2017), expert report commissioned by the German Environment Agency, 27 August 2018.
The deregistration rates equate to the deregistration rates calculated by the Federal Motor Transport Authority of 34.1% (M1 motor vehicles) and 40.2% (N1 motor vehicles) respectively, derived from the base year 2013.

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Table 6:   Information about the German vehicle market, 2017

National vehicle market Germany Reference year 2017	Unit	M1 and N1 motor vehicles		
		Total	Of which vehicle class M1 (passenger cars)	Of which vehicle class N1 (light commercial vehicles)
New registrations and fleet				
Motor vehicles newly registered [Q1]	Number	3,705,321	3,441,262	264,059
Motor vehicles registered on 1 January of the reference year [Q2], [E1]	Number	48,186,954	45,803,560	2,383,394
Motor vehicles registered on 1 January of the subsequent year [Q2], [E1]	Number	48,975,114	46,474,594	2,500,520
Average age of fleet [Q3], [E1]	Years		9.3	Trucks, total 7.9
Deregistrations [Q4] (calculation see Table 5)				
Total (deregistrations and temporary layups) [Q4]	Number	9,029,543	8,633,154	396,389
Final deregistrations [E2]	Number	**Approx. 2,980,000**	Approx. 2,826,000	Approx. 154,000
End-of-life vehicles				
CoDs issued in Germany	Number	506,531		
ELVs arising in Germany [Q5]	Number	506,531		
Average age of ELVs [E3] [Q6]	Years	approx. 17-18		

Explanatory comments:

E1) Reference dates 1/1/2017 and 1/1/2018, only registered motor vehicles excluding temporary layups.

E2)   Calculation of finally deregistered motor vehicles, see Table 5:
Initially, 4% (M1) and 3.5% (N1) respectively must be deducted from the number of off-road notifications to allow for motor vehicles taken out of service multiple times within the first year. This produces the number of motor vehicles taken out of service in a year. This number is multiplied by the deregistration rate of 34.1% (M1) and 40.2% (N1) respectively.

E3) 17.3 years as the mean of a random sample of 3,677 end-of-life vehicles from the years 2014 and 2016 from six ELV dismantling facilities in Germany.

Source details for this table may be found on the following page.

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Sources for Table 6:

Q1) Federal Motor Transport Authority (KBA): *Neuzulassungen von Kraftfahrzeugen und Kraftfahrzeuganhängern in den Jahren 1960 bis 2018 nach Fahrzeugklassen* (New registrations of motor vehicles and trailers, 1960 to 2018, by vehicle class), http://www.kba.de/DE/Statistik/Fahrzeuge/Neuzulassungen/FahrzeugklassenAufbauarten/n_fzkl_zeitreihe.html?nn=652406, and
Federal Motor Transport Authority: *Neuzulassungen von Lkw in den Jahren 2008 bis 2017 nach zulässiger Gesamtmasse* (New registrations of trucks, 2008 to 2017, by permissible total mass), http://www.kba.de/DE/Statistik/Fahrzeuge/Neuzulassungen/Groessenklassen/n_grossenklassen_lkw_zeitreihe.html?nn=657738.

Q2) Federal Motor Transport Authority: *Bestand an Kraftfahrzeugen und Kraftfahrzeuganhängern in den Jahren 1960 bis 2019 nach Fahrzeugklassen* (Registered motor vehicles and trailers, 1960 to 2019, by vehicle class), https://www.kba.de/DE/Statistik/Fahrzeuge/Bestand/FahrzeugklassenAufbauarten/b_fzkl_zeitreihe.html?nn=652402, and
Federal Motor Transport Authority: *Bestand an Lkw in den Jahren 2009 bis 2018 nach zulässiger Gesamtmasse* (Registered trucks, 2009 to 2018, by permissible total mass), http://www.kba.de/DE/Statistik/Fahrzeuge/Bestand/Groessenklassen/b_groessenklassen_lkw_zeitreihe.html?nn=662728.

Q3) Federal Motor Transport Authority: *Bestand an Kraftfahrzeugen und Kraftfahrzeuganhängern in den Jahren 2010 bis 2019 nach ausgewählten Fahrzeugklassen mit dem Durchschnittsalter der Fahrzeuge in Jahren* (Registered motor vehicles and trailers 2010 to 2019, by selected vehicle classes, with the average age of the vehicle in years) http://www.kba.de/DE/Statistik/Fahrzeuge/Bestand/Fahrzeugalter/b_alter_kfz_z.html?nn=645784.

Q4) Federal Motor Transport Authority: *Außerbetriebsetzungen von Kraftfahrzeugen und Kraftfahrzeuganhängern in den Jahren 2009 bis 2018 nach Fahrzeugklassen* (Off-road notifications of motor vehicles and trailers, 2009 to 2018, by vehicle class), http://www.kba.de/DE/Statistik/Fahrzeuge/Ausserbetriebsetzungen/FahrzeugklassenAufbauarten/a_fzkl_zeitreihe.html?nn=664274, and
Federal Motor Transport Authority: *Außerbetriebsetzungen von Lkw in den Jahren 2008 bis 2017 nach zulässiger Gesamtmasse* (Off-road notifications of trucks, 2008 to 2017, by permissible total mass), http://www.kba.de/DE/Statistik/Fahrzeuge/Ausserbetriebsetzungen/Groessenklassen/a_groessenklassen_lkw_zeitreihe.html?nn=664174.

Q5) Federal Statistical Office, survey of waste disposal in 2017, Table 14 "Input recovery/recycling of end-of-life vehicles". Wiesbaden 2019

Q6) Study on ELV monitoring methods, see footnote 14.

The waste statistics do not provide any information about the average age of end-of-life vehicles. The aforementioned study on ELV monitoring methods[14] calculated an average age of 17.3 years for 3,677 ELVs from the years 2014 and 2016.

As described in number 2.1.5, letter g), under the German ELV Ordinance (*Altfahrzeug-Verordnung*), dismantling facilities are required to issue a Certificate of Destruction (CoD) for every end-of-life vehicle.

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2.3.2 Section 2: National market information on export of used vehicles, ELVs and de-polluted body shells

Exports of used vehicles to other EU Member States:

As in prior years, exports of used vehicles from Germany into other EU Member States are taken from two sources: the re-registration statistics of the Federal Motor Transport Authority and the foreign trade statistics of the Federal Statistical Office. In order to determine the total number, the higher of the two values for each individual EU Member State were combined into an overall total, see Table 7.

Re-registration statistics

The majority of used vehicles exported to other EU Member States were ascertained from re-registrations in those countries and recorded in the re-registration statistics by the Federal Motor Transport Authority. The data originates from an information exchange between Member States regarding the re-registration of motor vehicles previously registered in another EU Member State, based on Directive 1999/37/EC on the registration documents for vehicles. According to this, 1,938,355 used vehicles were exported to other EU Member States in 2017 and re-registered there. For 2017, figures were available for all 27 other EU Member States[23].

Foreign trade statistics

Additionally, data from the foreign trade statistics was also consulted where a higher level of exports was indicated. As in the previous year's report, exports of the 11 relevant commodity codes (for used passenger cars, motor homes, trucks up to 5 t[24]) were evaluated to ascertain the total number of used vehicles exported.

An evaluation of the re-registration statistics and foreign trade statistics produces a statistically verified total of 1,988,620 used vehicles exported[23] from Germany to other EU Member States in 2017, see Table 7.

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[23] For the 2017 data for Romania and the Czech Republic, please refer also to Table 8.

[24] For commodity codes, please refer to Table 4 of the annual report for 2014. The classification of commodity codes under the Combined Nomenclature of the Common Customs Tariff is not fully consistent with the definition of EC vehicle classes as set out in Annex II, section A, no. 1 of Directive 2007/46/EC establishing a framework for the approval of motor vehicles and their trailers. Under Framework Directive 2007/46/EC, the total mass of a vehicle in class N1 must not exceed 3.5 tonnes. By contrast, under the Combined Nomenclature, the lowest grade of motor vehicles for goods transportation is "5 t or less". This produces a certain degree of data uncertainty; however, it can be assumed that the vast majority of trucks up to 5 tonnes are class N1 motor vehicles.

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Table 7:   Used vehicles exported from Germany to other EU Member States, 2017

Calculated from two sources: Re-registration statistics ("RRS") from the Federal Motor Transport Authority and foreign trade statistics ("FTS") from the Federal Statistical Office,
arranged in the protocol order of Member States

EU Member State (with country code)	Source	No. of vehicles	EU Member State (with country code)	Source	No. of vehicles
BE - Belgium	RRS	36,216	LU - Luxembourg	RRS	12,603
BG - Bulgaria	RRS	47,604	HU - Hungary	RRS	93,811
CZ - Czech Republic *)	RRS	82,104	MT - Malta	RRS	34
DK - Denmark	FTS	10,393	NL - Netherlands	RRS	**200,945**
EE - Estonia	RRS	10,921	AT - Austria	FTS	30,812
IE - Ireland	RRS	148	PL - Poland	RRS	**643,132**
EL - Greece	FTS	1,370	PT - Portugal	RRS	29,617
ES - Spain	RRS	39,126	RO - Romania *)	RRS	**396,443**
FR - France	RRS	**127,440**	SI - Slovenia	RRS	13,240
HR - Croatia	RRS	29,396	SK - Slovakia	RRS	33,264
IT - Italy	FTS	30,843	FI - Finland	RRS	14,817
CY - Cyprus	FTS	56	SE - Sweden	RRS	7,771
LV - Latvia	RRS	24,296	UK - United Kingdom	RRS	1,514
LT - Lithuania	RRS	70,704			
Total EU			**1,988,620**		

* Explanation: The data reported from the Czech Republic for 2017 only covers 9 months. The data reported from Romania in 2017 also includes vehicles from 2016. Refer to the relevant statistical corrections in Table 8.

<u>Sources:</u>

− Personal communication from the Federal Motor Transport Authority dated 12/04/2018.

− Federal Statistical Office: *Warenverzeichnis Außenhandelsstatistik 8-Steller (gebrauchte Pkw, Wohnmobile, Lkw bis 5 t) Länderverzeichnis, Daten für 2017* (Commodity classification, foreign trade statistics, 8-digit (used passenger cars, motor homes, trucks up to 5 t), country directory, 2017 figures). Wiesbaden 2018

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Additional estimate for other exports of used vehicles into EU Member States with re-registration not covered by the statistics

The Federal Motor Transport Assessment undertook a rough assessment of the quality of re-registration data from individual EU Member States that supply data. It concluded that some of the data is incomplete, particularly from countries whose exports according to the foreign trade statistics exceed the number of exports cited in the re-registration statistics. For this reason, we have included an additional estimate of incomplete data on used vehicle re-registrations. For details of the approach used, please refer to the comments on Table 8. The data reported by Romania for 2017 also included vehicles from 2016, thus overestimating the number of vehicles exported in 2017. To compensate for this, the figure for 2017 was adjusted downwards, and the figure for 2016 was retrospectively adjusted upwards.

The additional estimate of used vehicle exports to EU Member States in 2017 is around 150,000 vehicles, see Table 8. The corrected additional estimate for 2016 is around 370,000 (instead of 240,000 originally), see Table 9. These additional estimates are shown in light green hatching in Figure 3.

Table 8: **Additional estimate of used vehicles exported from Germany to EU Member States not fully covered by the statistics, 2017**

EU Member State	Statistically documented exports [a]	Amount of new estimate	New estimate	Additional estimate [b] (= New estimate minus statistically documented exports)
Denmark, Greece, Cyprus	11,819	Factor RRS / FTS [c] = 6.85	80,960	+69,141
Austria	30,812	Extrapolation of 2013 figures [d]	166,160	+135,348
Italy	30,843	Figures supplied by the Italian Ministry of Transport, June 2019	72,214	+41,371
Czech Republic	82,104	Extrapolated from 9 to 12 months [e]	109,472	+27,368
Romania	396,443	Combined with 2016 and averaged due to retrospective reporting of 2016 data in 2017 [f]	271,151	-125,292
Additional estimate total				+ 147,936
Additional estimate for EU Member States, rounded				≈ + 150,000

Sources:

- Federal Statistical Office: *Warenverzeichnis Außenhandelsstatistik 8-Steller (gebrauchte Pkw, Wohnmobile, Lkw bis 5 t) Länderverzeichnis, Daten für 2017* (Commodity classification, foreign trade statistics, 8-digit (used passenger cars, motor homes, trucks up to 5 t), country directory, 2017 figures). Wiesbaden 2018
- Personal communications from the Federal Motor Transport Authority dated 12/04/2018 and 04/06/2019.
- Personal communication from the Italian Ministry of Transport dated 07/06/2019.

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Footnotes:

a) Foreign trade statistics, see Table 7.
   Exception: For Czech Republic and Romania, figures from the re-registration statistics

b) For Romania: Deduction.

c) RRS = Re-registration statistics, FTS = Foreign trade statistics.
   For 2017: RRS = 1,938,355, FTS = 282,793. RRS / FTS = 6.85

d) **Austria:** Used vehicle exports 2013: Information for Austria (54,326), see Table 48 in chapter 5.2.2 of the study on the fate of finally deregistered vehicles[25]. As in 2014 and 2016, these figures were updated for 2017 proportionate to the development of foreign trade statistics (2013: Austria 10,074).

e) **Czech Republic:** The data reported for 2017 covers 9 months. For the additional estimate, we extrapolated this figure from 9 to 12 months proportionally. The figure of 109,472 vehicles is roughly on a par with the 2015 figure (103,110).

f) **Romania:** The data reported for 2017 also includes retrospective data transmissions for 2016 (personal communication from the Federal Motor Transport Authority dated 4 June 2019). We therefore added up the numbers for 2016 (145,859) and 2017 (396,443) and divided them equally between the two years. The number of re-registrations in Romania in 2017 is therefore lower than reported, whereas the number of re-registrations in Romania in 2016 has retrospectively adjusted upwards (see Table 9).

Table 9: **Retrospective amendment to the additional estimate of used vehicles exported from Germany to EU Member States not covered by the statistics, 2016**

EU Member State	Statistically documented exports	Amount of new estimate	New estimate	Additional estimate (= New estimate minus statistically documented exports)
Original additional estimate for 2016, EU Member States (as per annual report for 2016)				**+ 239,858 (rounded + 240,000)**
Romania	145,859	Retrospective data transmissions for 2016 reported in 2017. The reported data was therefore split between 2016 and 2017, see footnote e) to Table 8	**271,151**	Retrospective addition + 125,292
Updated additional estimate for 2016, EU Member States				**+ 365,150 (rounded + 370,000)**

Overall, the total number of statistically verified exports plus additional estimates of statistically unverified exports yields a total of some 2.14 million used vehicles exported to EU Member States in 2017, with an updated number of around 1.79 million vehicles for 2016.

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[25] Sander et al. (2017): *Entwicklung von Lösungsvorschlägen, einschließlich rechtlicher Instrumente, zur Verbesserung der Datenlage beim Verbleib von Altfahrzeugen* (Development of proposals, including legal instruments, to improve the data situation on the whereabouts of end-of-life vehicles). Hamburg, February 2017. On behalf of the German Environment Agency. FKZ 3714 33 315. Report in German: https://www.umweltbundesamt.de/publikationen/entwicklung-von-loesungsvorschlaegen, English version: https://www.umweltbundesamt.de/publikationen/development-of-proposals-including-legal

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Exports of used vehicles to non-EU countries

Exports to non-EU countries were small compared with exports to EU Member States, see Table 10. For 2017, the German foreign trade statistics and analysis of the 11 commodity codes indicate a total of 175,882 exports of used vehicles (passenger cars, motor homes, trucks up to 5 t) to non-EU countries. After several years of decreasing numbers, a slight increase (+5%) in exports to non-EU countries was reported for the first time, albeit without returning to 2015 levels. The main destination for used vehicles outside of Europe is still West Africa (around 36%), while the states of the former Soviet Union accounted for roughly 22%, see Table 10. According to the foreign trade statistics, only 661 used vehicles were exported to Russia in 2017.

Table 10:   Used vehicles exported from Germany to non-EU countries, 2017

As per the foreign trade statistics,
passenger cars, motor homes and trucks < 5 t, each with petrol or diesel engine

Country	No. of vehicles			
To non-EU countries, total	**175,882**			
Of which West Africa[26]	63,261	Of which:	Nigeria Ghana Cote d'Ivoire	14,668 8,879 7,191
Of which former Soviet Union countries (excluding Baltic States)	38,442	Of which:	Ukraine Georgia Rep. of Moldova	22,367 10,807 2,284
Of which Norway, Switzerland	14,878			

Source: Federal Statistical Office: *Warenverzeichnis Außenhandelsstatistik 8-Steller (gebrauchte Pkw, Wohnmobile, Lkw bis 5 t) Länderverzeichnis, Daten für 2017* (Commodity classification, foreign trade statistics, 8-digit (used passenger cars, motor homes, trucks up to 5 t), country directory, 2017 figures). Wiesbaden 2018

Additional estimate for other used vehicles exported to non-EU countries not covered by the statistics

As outlined in number 2.3.3 of the previous years' reports, transits of used vehicles from Germany via another EU Member State into a non-EU country are not always covered by the non-EU foreign trade statistics: Used vehicles from Germany which are exported in the single-stage process or exported by customs agents from another EU Member State (customs office of exit) are not systematically recorded by the German customs statistics (and hence are not included in the foreign trade statistics). Therefore, using the same method as in the previous year, we have included an additional estimate for these used

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[26] Collective term for 18 West African states: Angola, Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Liberia, Morocco, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo

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vehicles exported to non-EU countries not yet included in the foreign trade statistics. As in the previous year, applying an additional estimate of 54.4% of the statistically documented exports produces a figure of around 100,000 vehicles for 2017, see Table 11. These additional estimates are shown in dark green hatching in Figure 3.

Table 11: **Additional estimate of used vehicles exported from Germany to non-EU countries not covered by the statistics, 2017**

	Factor	No. of vehicles
Based on: Statistically verified exports of used vehicles M1+N1 from Germany to non-EU countries (see Table 10)		175,882
Additional estimate factor in relation to documented exports	54.4%	
Amount of additional estimate		95,680
Additional estimate for non-EU countries, rounded		**≈ 100,000**

Overall, the total of statistically verified exports and the additional estimate of statistically unverified exports to non-EU countries totals some 280,000 used vehicles exported to non-EU countries in 2017.

Total exports of used vehicles:

Figure 2 illustrates statistically verified exports of used vehicles from 2008 onwards and their development over time. Compared with 2016, 2017 saw a very sharp increase in statistically verified used vehicle exports of around 1.6 million to around 2.2 million vehicles. Allowing for the fact that some of these used vehicle exports to Romania were reallocated from the 2017 statistics to the 2016 statistics (125,292 vehicles), see Table 8 and Table 9, the number of vehicles has increased from approximately 1.7 million to approximately 2.0 million vehicles.

These statistically verified exports of used vehicles are supplemented with reasoned estimates of used vehicle exports not covered by the statistics as outlined above, totalling some 0.25 million vehicles in 2017.

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Figure 2: **Statistically verified exports of used vehicles from Germany, 2008 to 2017**

Statistically verified exports of used vehicles from Germany
(EU: Re-registrations and selected foreign trade statistics.
Non-EU: Foreign trade statistics)

Explanations:
- Exports to non-EU: until 2012: Exports of used passenger cars/motor homes,
  from 2013: plus exports of used trucks up to 5 t
- "Old" EU: EU Member States which have been members since before 2004
- "New" EU: EU Member States which have acceded since 2004

Sources: Federal Motor Transport Authority: Information from 2009 to 2018. Federal Statistical Office: Foreign trade statistics, 2008 to 2017.

Fate of finally deregistered M1 and N1 motor vehicles, 2016 (updated) and 2017

Based on the number of final deregistrations in 2017 of around 2.98 million M1 and N1 motor vehicles (see Table 5), the various statistical sources and the additional qualified estimates of used vehicle exports not covered by the statistics produces the following picture regarding the fate of finally deregistered M1 and N1 motor vehicles in Germany in 2017, see Figure 3, right.

Based on the available data including the aforementioned additional estimates, there were no statistical data available regarding the fate of some 60,000 finally deregistered M1 and N1 motor vehicles in 2017. In 2017, the "statistical gap" had therefore fallen to its lowest level since reporting began (see also under number 2.3.3 the sub-section on "Final deregistrations and balance of vehicle fate" together with Table 13).

The updated overview of the fate of vehicles following the retrospective reporting of used vehicle re-registrations in Romania in 2016 (Table 9) resulted in a reduction of the "statistical gap" for 2016 from 0.56 million to 0.43 million vehicles, see Figure 3, left.

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Figure 3: **Fate of finally deregistered M1 and N1 motor vehicles (used vehicles and end-of-life vehicles) in Germany, 2016 (updated) and 2017**
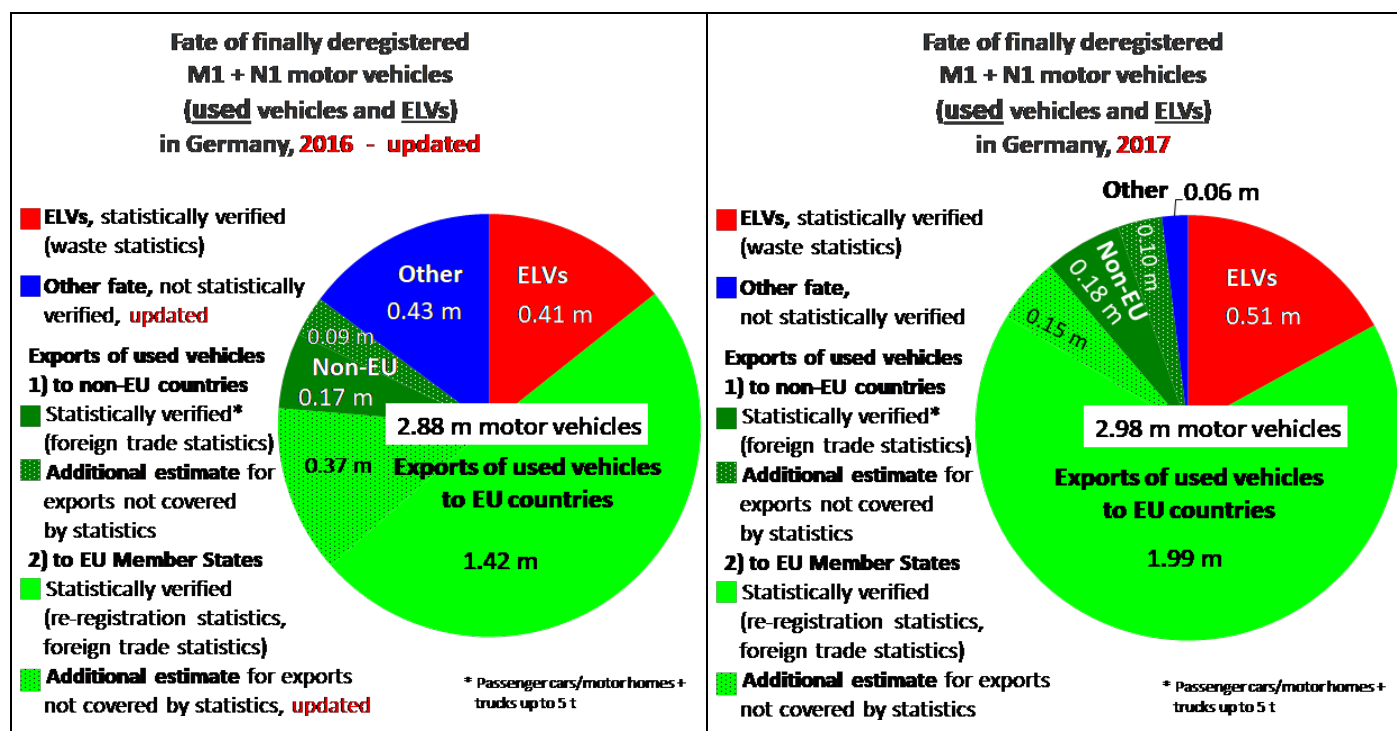
Sources:

- Federal Motor Transport Authority (KBA): Working figures on the volume of used vehicles re-registered abroad. Personal communications from the Federal Motor Transport Authority dated 04/04/2017 and 12/04/2018.

- Federal Motor Transport Authority: *Außerbetriebsetzungen von Kraftfahrzeugen und Kraftfahrzeuganhängern in den Jahren 2009 bis 2018 nach Fahrzeugklassen* (Off-road notifications of motor vehicles and trailers, 2009 to 2018, by vehicle class), http://www.kba.de/DE/Statistik/Fahrzeuge/Ausserbetriebsetzungen/FahrzeugklassenAufbauarten/a_fzkl_zeitreihe.html?nn=664274, and
Federal Motor Transport Authority: *Außerbetriebsetzungen von Lkw in den Jahren 2008 bis 2017 nach zulässiger Gesamtmasse* (Off-road notifications of trucks, 2008 to 2017, by permissible total mass), http://www.kba.de/DE/Statistik/Fahrzeuge/Ausserbetriebsetzungen/Groessenklassen/a_groessenklassen_lkw_zeitreihe.html?nn=664174.

- Federal Statistical Office: *Außenhandelsstatistiken, 2016 und 2017, 8-Steller, Gebrauchtwagenexport aus Deutschland (11 Warennummern)* (Foreign Trade Statistics, 2016 and 2017, 8-digit, exports of used vehicles from Germany) (11 commodity codes).
And: Federal Statistical Office: Table 14 of the Waste Management Surveys, 2016 and 2017, Wiesbaden, 2018 and 2019

- Additional estimates: own calculations, see Table 8, Table 9 and Table 11.

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Exports of ELVs and body shells:

- According to the waste export statistics[27], in 2017 no end-of-life vehicles (waste code 160104*) falling under the scope of the ELV Directive were exported from Germany.

- In 2017, the export of body shells for treatment abroad remained on a par with 2016, at 5.9% of total vehicle weight (W1).

Table 12:   **Exports of used vehicles, end-of-life vehicles and depolluted body shells from Germany, 2017**

Reference year 2017	Unit	To other EU Member States	To non-EU countries
Used vehicles exported (see Table 7, Table 8, Table 10 and Table 11)	Number	1,988,620 (+ additional estimate 150,000)	175,882 (+ additional estimate 100,000)
Average age of used vehicles exported	Years	(7.3) [28]	
ELVs exported (see COM Table 3)	Number	0	0
Depolluted (and dismantled) body shells exported (WC 16 01 06)	Number	37,398[29]	
	Tonnes	31,064	

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[27] See COM Table 3 and:
German Environment Agency (UBA): "*Grenzüberschreitende Verbringung von zustimmungspflichtigen Abfällen 2017 – Export*" (Transboundary shipment of waste requiring consent, 2017 – Exports),
https://www.umweltbundesamt.de/sites/default/files/medien/2503/dokumente/grenzueberschreitende_verbringung_von_zustimmungspflichtigen_abfaellen_export_2017.pdf

[28] This figure refers to motor vehicles with export licence plates in 2011. There are no more recent figures available. Source: Personal communication from the Federal Motor Transport Authority dated 9 July 2012.

[29] Converted with the average weight of body shells of 831 kg. The average weight was calculated from the total mass and the total number of body shells that left shredder facilities in 2017 (to Germany and abroad): Total mass 430,395 t / total number 518,157 units = 831 kg/unit.

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2.3.3 Section 3: Elements related to methods and quality of Sections 1 and 2

a) **How does Germany assess the quality of the information on both the national vehicle market and the export market?**

National vehicle market

The sources of data on the national vehicle market are stated beneath Table 6. The figures on new registrations, total registered fleet, average age and off-road notifications originate directly from the Federal Motor Transport Authority and are based on official vehicle registrations. Their quality is therefore considered very good. The data includes vehicle classes M1 and N1.

Final deregistrations and balance of vehicle fates

The final deregistrations are calculated based on statistical data on (temporary and final) deregistrations, the deregistration rate and a correction factor, see Table 5. Thanks to the updated deregistration rates and correction factors calculated by the Federal Motor Transport Authority as part of the aforementioned study into the fate of finally deregistered vehicles[25], the data quality improved significantly. Because these rates and factors may be subject to changes over time, they were updated by the Federal Motor Transport Authority based on the off-road notifications for 2013 and 2017 (correction factors) and 2013 (deregistration rates) respectively, resulting in some minor adjustments.

The updated deregistration rate was calculated for off-road notifications in the base year 2013, which were tracked in the records of the central vehicle register over a four-year period, among others, for possible re-registrations. Due to the required lengthy monitoring period, it is not yet possible to calculate the deregistration rates for the current reporting year.

The 2017 reporting year was characterised both by a sharp rise in the incidence of ELVs and an increase in used vehicle exports totalling some 470,000, whereas off-road notifications only increased by around 100,000. Thus, with a higher proportion of treated and exported vehicles, we anticipate a correspondingly higher deregistration rate, since no further activities for these vehicles will occur in the central vehicle register in subsequent years. We therefore assume that the deregistration rates of the base year 2013 underestimate the actual deregistration rates of 2017.

As the number of final deregistrations forms the baseline for the balance of vehicle fates, the deregistration rates in particular directly affect the size of the "statistical gap". Figure 3 reveals a lack of statistical evidence for the fate of just approximately 60,000 of the 2.98 million vehicles finally deregistered in 2017.

If the 2017 deregistration rates were one, two or three percentage points higher than in the base year 2013 for the reasons cited above, this would increase the "statistical gap" of unknown whereabouts of vehicles to 150,000, 230,000 or 320,000 vehicles respectively; please refer to the sensitivity calculation in Table 13.

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Table 13: **Sensitivity calculation of the "statistical gap" of unknown whereabouts of vehicles for various deregistration rates, 2017**

	Defined for base year 2013 [a]	Sensitivity calculation		
		+ 1 percentage point	+ 2 percentage points	+ 3 percentage points
Deregistration rate for M1 motor vehicles	**34.1%**	35.1%	36.1%	37.1%
Deregistration rate for N1 motor vehicles	**40.2%**	41.2%	42.2%	43.2%
Resulting number of final deregistrations (M1+N1)	**2.98 million**	3.07 million	3.15 million	3.24 million
Resultant "statistical gap"	**Approx. 60,000 [b]**	**Approx. 150,000**	**Approx. 230,000**	**Approx. 320,000**

Footnotes: a) See Table 5   b) See Figure 3

End-of-life vehicles

The number of end-of-life vehicles arising is taken from the waste statistics of the Federal Statistical Office, derived from a full-coverage survey of all dismantling facilities, we thus assume a good data quality. Given the trade-in premiums offered by several manufacturers for older diesel vehicles (see second paragraph of number 2.3.1), eligibility for which sometimes depends on submission of a Certificate of Destruction (CoD), the increase of almost 100,000 ELVs compared with 2016 appears plausible.

Exports of used vehicles to EU Member States

The data on exports of used vehicles to other EU Member States originates from two independent sources: The exchange of information under Article 9 of Directive 1999/37/EC on the registration documents for vehicles, which included information on re-registrations of used vehicles in other EU Member States, plus foreign trade statistics. The exchange of information under Directive 1999/37/EC is being expanded year on year, and the quality and level of coverage are continuously improving. For 2017, figures were available for all 27 other EU Member States.

For the first time in 2017, data reports from the Netherlands to Germany were submitted via EUCARIS[30]. There has been a year-on-year increase in notified re-registrations from 120,471 in 2016 to 200,945 vehicles in 2017. Duplications (as in prior years) cannot be ruled out. The statistics supplied by the Italian Ministry of Transport on exports of used vehicles from

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[30] EUCARIS: **EU**ropean **CAR** and driving licence **I**nformation **S**ystem, https://www.eucaris.net/

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Germany to Italy have also had a positive influence on data quality, because in previous years only rough estimates were available for Italy.

For some countries, the Federal Motor Transport Authority suspects that the statistics are incomplete. Meanwhile, the reported figures for Romania in 2017 were too high, because they included retrospective data reported for 2016. A correction of the overall figure by around 150,000 vehicles was therefore estimated for exports of used vehicles to EU Member States with re-registration, which were not (or, respectively, excessively) recorded in the 2017 statistics; see Table 8. Particularly given the retrospective reallocation of exports in Romania from 2017 to 2016 and the improved data situation for the Czech Republic, the additional estimate is considerably lower than in 2016 (updated to 370,000 vehicles).

Exports of used vehicles to non-EU countries

The figures for exports of used vehicles to non-EU countries are taken from the foreign trade statistics. This includes every country worldwide. We can assume a good level of coverage for vehicles registered in Germany for export to a non-EU country.

However, as the transit of used vehicles from Germany via another EU Member State to a non-EU country is not systematically recorded by the German customs authorities (and hence not included in the foreign trade statistics) when used vehicles are exported in the single-stage process or by customs agents from another EU Member State (customs office of exit), an additional estimate was undertaken for such cases, by applying the results of the aforementioned study into the fate of vehicles[25] to the 2017 data. It is estimated that some 100,000 extra-EU exports were not recorded in the German foreign trade statistics in 2017, see Table 11.

b) Describe the source of information, the quality of sources, the completeness (coverage rate) and the validation process

c) If Foreign Trade Statistics (FTS) are used as a source for the reporting of used car exports, please explain how Germany estimates the amount which is not reported due to the (monetary) reporting thresholds for exports

d) How did Germany correct for unofficial imports and exports, e.g. where used cars are exported but not for reuse as a car.

For information on items b) to d), please refer to point a) above.

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3 Supplement:
Development of end-of-life vehicle disposal and recycling/recovery rates since 2004

3.1 Development of ELV quantities

Compared with 2016, the year with the lowest number of ELVs since reporting began more than 10 years ago, the number of ELVs accepted from Germany and abroad rose by 22% (see Figure 4) in 2017, totalling some 510,000 ELVs, once again on a par with the years 2013 and 2014. The number of ELV dismantling facilities remained almost unchanged at 1,151 facilities.

Figure 4:   **Development of ELV quantities (total, delivered from within Germany and abroad) and number of dismantling facilities in the waste statistics, Germany, 2004 to 2017[31]**
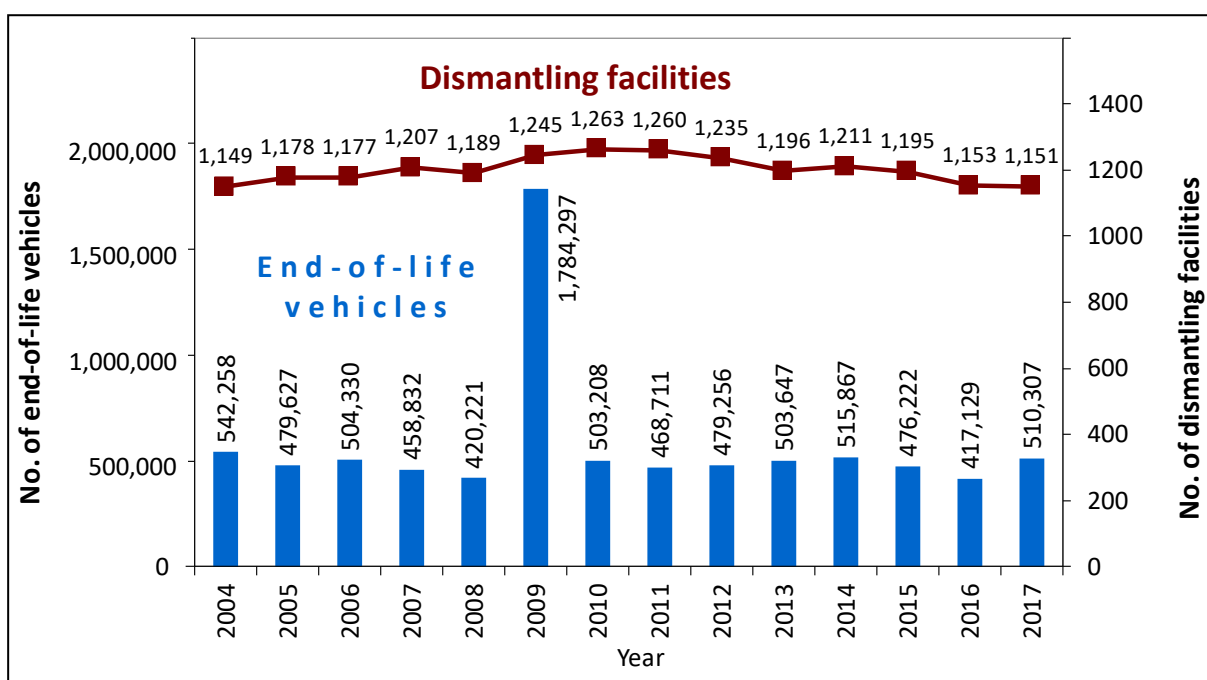
Source: Federal Statistical Office: Table 14 of the Waste Management Surveys, 2004 to 2017.

For the first time since 2009, the year of the Environmental Premium, there was a significant increase in the share of body shells among the input of shredders that treat them. In 2017 the proportion of body shells was 13.0% compared with a low of 10.6% in 2016, see Figure 5.

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[31] Note: Figure 4 shows the total number of end-of-life vehicles treated in the dismantling facilities.
The figure W (total number of ELVs), which is relevant for calculating the recycling/recovery rates, is lower, as ELVs received from abroad are deducted first.
The number of dismantling facilities corresponds to the information in the waste statistics of the Federal Statistical Office. Discrepancies are possible compared with the number of dismantling facilities recognised under the ELV Ordinance (*Altfahrzeug-Verordnung*) as determined by GESA (*Gemeinsame Stelle Altfahrzeuge* / Joint Agency for End-of-Life Vehicles) of the Federal Länder, for example because some recognised facilities may not actually have accepted any end-of-life vehicles.

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Figure 5: **Development of body shells as a percentage of input into German shredder facilities, 2004 to 2017**

Body shells as a proportion of shredder input *

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total input [in million t]	3.0	2.9	3.5	4.2	4.0	4.1	4.2	4.5	4.3	4.0	4.1	3.8	3.4	3.7

* Shredder facilities with body shells (waste code 16 01 06) in their input (2017: 49 facilities)
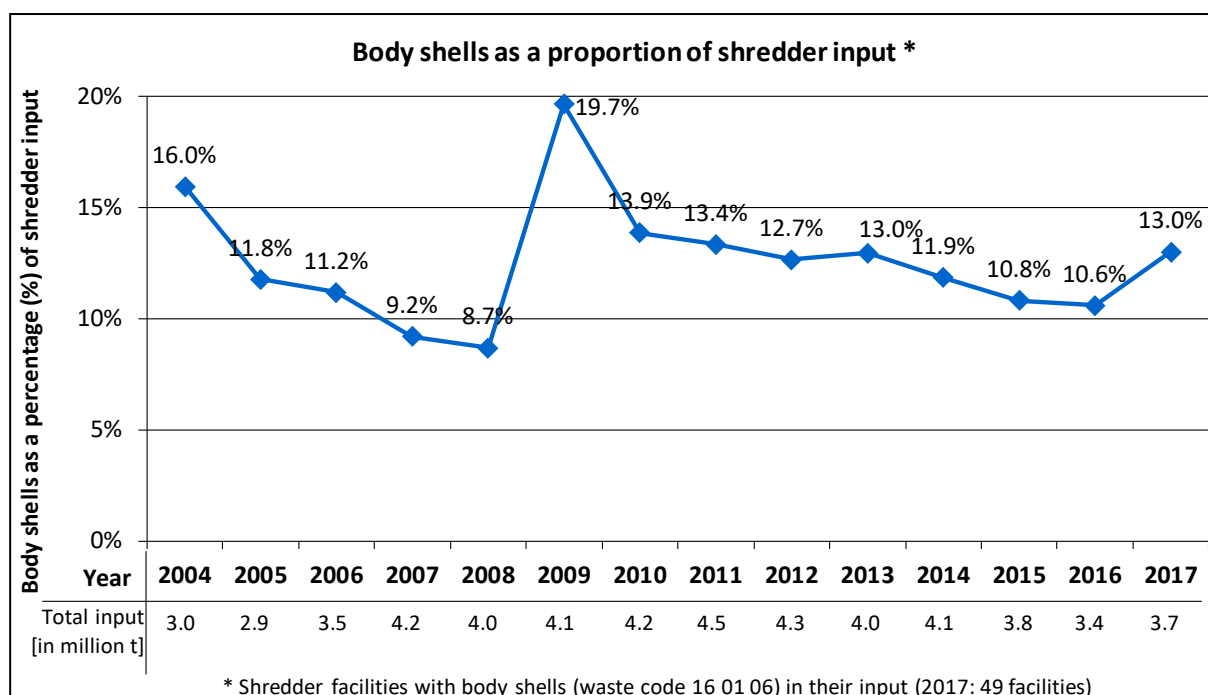
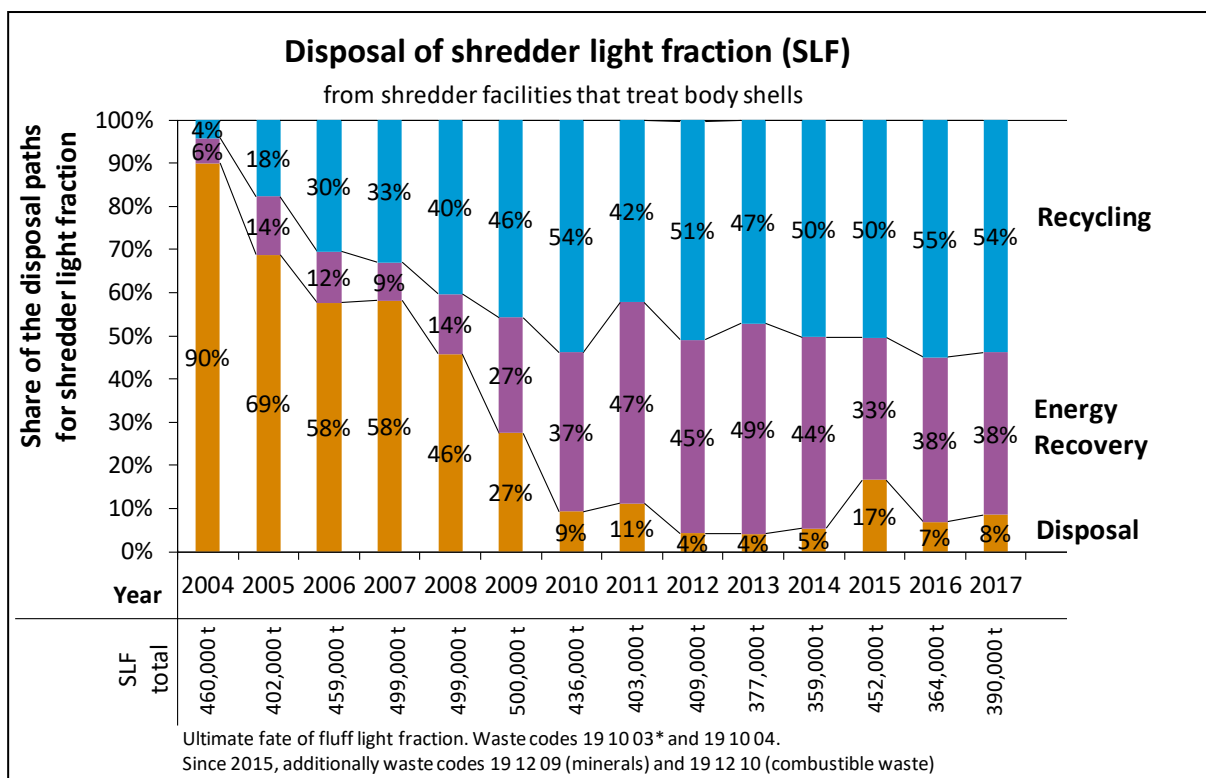Source: Federal Statistical Office, Table 1 of the Waste Management Survey, 2004 to 2017

3.2 Recycling / recovery of shredder light fraction

In terms of volume, shredder light fraction is the most important non-metal waste stream from the treatment of end-of-life vehicles. With this fraction increasingly being disposed of under different waste codes, since the 2015 reporting year we have taken into account the disposal paths of the waste codes for minerals (19 12 09) and combustible wastes (19 12 10) as well as the two waste codes for fluff-light fraction (19 10 03* and 19 10 04). Since 2010, the volume of shredder light fraction[32] sent for disposal (landfilling) has tended to be within the single-figure percentage range. 2017 was no exception with 8%, see Figure 6. In 2017, the majority of shredder light fraction was recycled (54%), followed by energy recovery (38%).

Figure 6 shows the total quantity of shredder light fraction treated in shredder facilities that accept body shells[32]. In 2017, around one-quarter of this (25.4% or approximately 98,800 t out of a total of 390,000 t shredder light fraction produced) originated from body shells. The 100,700 t (approximate figure) of non-metal shredder residues originating from body shells in 2017 also included some 1,900 t of plastic fractions originating from body shells obtained from shredders.

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[32] The statements in this paragraph and in Figure 6 refer to fluff-light fraction (191003* and 191004) and from 2015 onwards, additionally include waste codes 191209 (minerals) and 191210 (combustible waste), but do not include the plastic fractions separated in the shredder.

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Figure 6: **Disposal of shredder light fraction from shredder facilities that treat body shells in Germany, 2004 to 2017**

Disposal of shredder light fraction (SLF)
from shredder facilities that treat body shells

Ultimate fate of fluff light fraction. Waste codes 19 10 03* and 19 10 04.
Since 2015, additionally waste codes 19 12 09 (minerals) and 19 12 10 (combustible waste)

Source: Federal Statistical Office: Table 15 of the Waste Management Surveys, 2004 to 2017.

In 2017, non-metal shredder residues[33] recovered in Germany accounted for 16.1% of the overall ELV recovery rate, a level which remained on a par with the previous two years.

No further after-effects of the Environmental Premium have been observed since 2015. However, for the years 2009 to 2014, additional calculations were carried out to "eliminate" or allow for the effects of the Environmental Premium, shown as dotted lines in Figure 7. Explanatory comments can be found in the annual reports of the affected years[34]. Since 2009, non-metal shredder residues have contributed around 10% to recycling rates each year, having been adjusted to allow for the effects of the Environmental Premium in the years 2009 to 2014.

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[33] This includes shredder light fraction, other non-metal shredder residues, and plastic fractions separated in the shredder.

[34] See www.bmu.de/DL1997 (German) or www.bmu.de/DL1997-1 (English)

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Figure 7: **Contribution of the recycling/recovery of non-metal shredder residues to Germany's end-of-life vehicle recycling/recovery rates, 2004 to 2017**
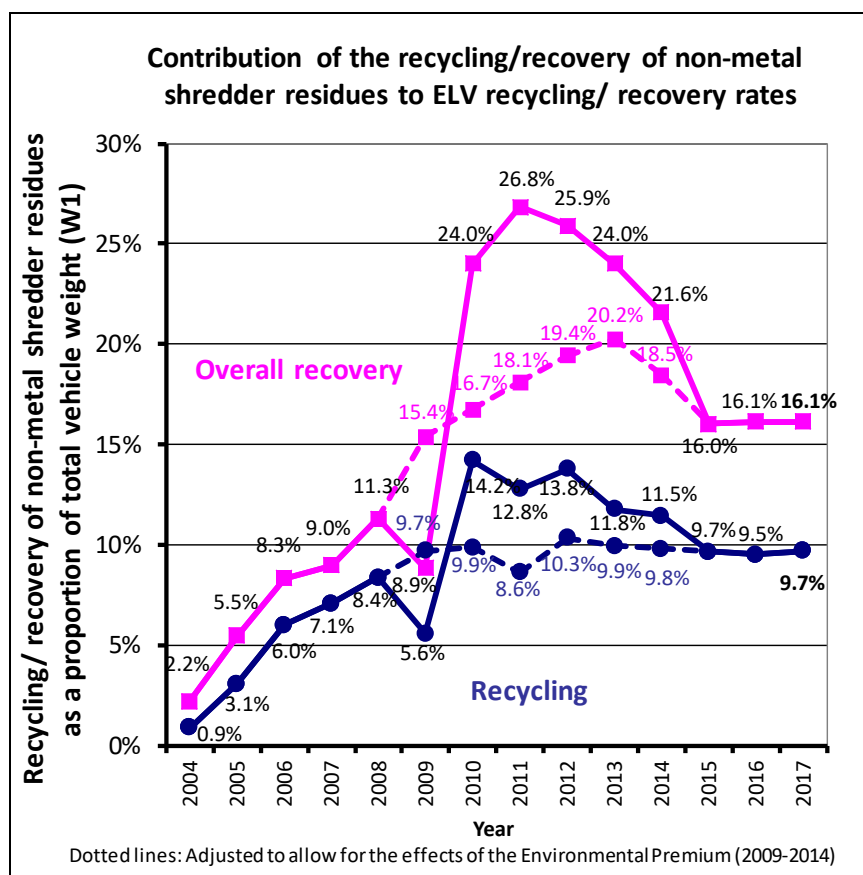
3.3 Development of ELV recycling/recovery rates

On the basis of the statistical data in combination with other documented parameters, such as the metal content assumption (74.7%), in 2017 Germany once again met or exceeded the new, increased (as of 2015) EU-wide targets of 85% for reuse/recycling and 95% for reuse/recovery. The development of these rates over time is depicted in Figure 8.

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Figure 8: Contributions of dismantling facilities, shredder facilities and recycling/recovery abroad to Germany's ELV reuse/recycling and reuse/recovery rates, 2004 to 2017
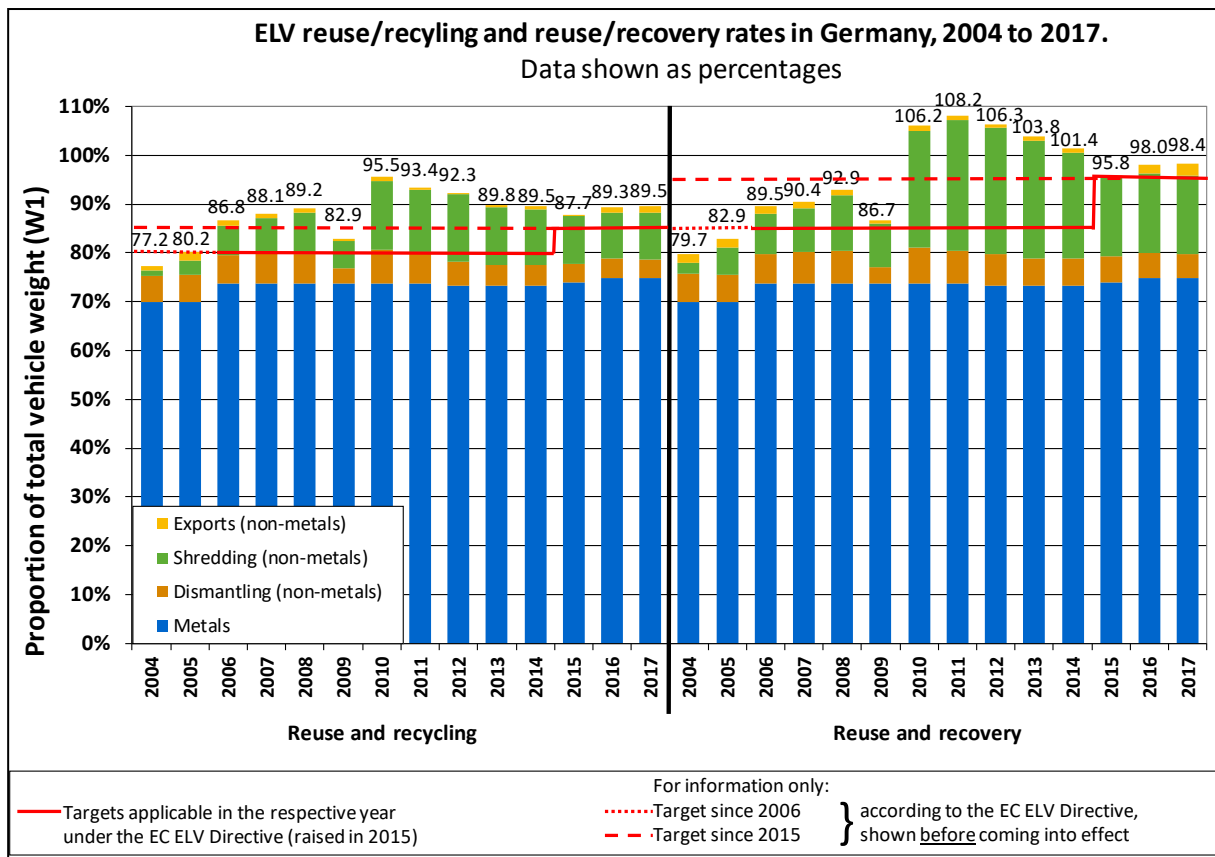
In 2017, the reuse and recycling rate was 89.5%, roughly on a par with the previous year's level (2016: 89.3%). The overall recovery rate was once again very high at 98.4% (2016: 98.0%).

In the years 2009 to 2014, ELV recycling/recovery rates were influenced by the 2009 Environmental Premium. During this period, additional calculations were therefore included to "eliminate" or adjust for the impacts and after-effects of the Environmental Premium, because the achieved recovery rates of more than 100% were not a true reflection of the actual level of ELV recovery. Explanatory comments can be found in the annual reports of the affected years[35]. Figure 9 shows the development of recovery/recycling rates including adjustments to allow for the effects of the Environmental Premium between 2009 and 2014.

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[35] See www.bmu.de/DL1997 (German) or www.bmu.de/DL1997-1 (English)

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Figure 9: **Contributions of dismantling facilities, shredder facilities and recycling/recovery abroad to Germany's ELV reuse/recycling and reuse/recovery rates, 2004 to 2017, with figures for 2009 to 2014 adjusted to allow for the effects and after-effects of the Environmental Premium**

ELV reuse/recyling and reuse/recovery rates in Germany, 2004 to 2017. Figures for 2009 to 2014 adjusted to allow for the effects of the Environmental Premium. Data shown as percentages

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4 Appendix:
COM Tables with allocation of metals to Tables 1 and 3

According to the COM guidance document, all recovered/recycled materials are to be entered in COM Table 2 (Shredders) if the "metal content assumption" is applied. However, this representation is not suitable for certain interpretations, such as calculating the specific dismantled battery mass per vehicle. For this reason, an alternative representation of COM Tables 1 to 4 is included in this Appendix, showing the distribution of recovered/recycled metals among COM Tables 1 to 3.

Materials from de-pollution and dismantling (in tonnes per year) of end-of-life vehicles arising in the Member State and treated within the Member State

Appendix: COM Table 1 (dismantling) for Germany 2017. Metals + non-metals					
Materials from de-pollution and dismantling	**Reuse** **(A)** in t	**Re-cycling** **(B1)** in t	**Energy recovery** **(C1)** in t	**Total recovery** **(D1=B1+C1)** in t	**Disposal** **E1** in t
Batteries	159	6,303	0	6,303	263
Liquids (excluding fuel)	33	2,915	232	3,147	1,059
Oil filters	0	85	23	108	7
Other materials arising from de-pollution (excluding fuel)	1	89	72	161	14
Catalysts	49	1,606	0	1,606	15
Metal components	12,844	27,707	34	27,741	403
Tyres	740	9,058	4,715	13,773	123
Large plastic parts	108	908	0	908	2
Glass	98	883	0	883	11
Other materials arising from dismantling	5,237	385	1,426	1,811	20
Total	**19,269**	**49,939**	**6,502**	**56,442**	**1,916**

Explanation:

This table contains a few rounding differences (of one tonne in each case) because quantities were rounded up or down to the nearest whole tonne.

Source:

From Federal Statistical Office data, Tables 1 and 15 of the Waste Management Survey 2017.

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Materials from shredding (in tonnes per year) of end-of-life vehicles arising in the Member State and treated within the Member State

Appendix: COM Table 2 (shredders) for Germany, 2017. Proportionate metal shares only				
Materials from shredding	**Recycling** **(B2)**	**Energy recovery** **(C2)**	**Total recovery** **(D2 =B2+C2)**	**Disposal** **(E2)**
	in t	in t	in t	in t
Ferrous scrap (steel)	275,987	0	275,987	0
Non-ferrous materials (aluminium, copper, zinc, lead etc.)	43,110	0	43,110	0
Shredder light fraction (SLF) [a]	50,515	34,149	84,664	8,233
Other [b]	903	0	903	0
Total	**370,514**	**34,149**	**404,663**	**8,233**

Explanatory comments:

- This table contains a few rounding differences (of one tonne in each case) because quantities were rounded up or down to the nearest whole tonne.
- Calculation of metal proportions for COM Table 2:
  1. Calculation of recovered/recycled metals (total) = 74.745% (metal content assumption, see Table 4) * 530,311 t (total vehicle weight W1) = 396,381 t.
  2. Deduction of metals already recorded in COM Table 1 (dismantling of metals: re-use and recycling/recovery) and COM Table 3 (metal exports).
  3. Breakdown into ferrous/non-ferrous on a ratio of 64.6% : 10.1% (see Table 4).

Footnotes:

a) Shredder light fraction and other non-metal shredder residues
b) Plastic fractions separated in the shredders

Source:

From Federal Statistical Office data, Table 15 of the Waste Management Survey 2017.

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Monitoring of (parts of) end-of-life vehicles arising in the Member State and exported for further treatment (in tonnes per year)

Appendix: COM Table 3 (exports) for Germany, 2017. Metals + non-metals					
End-of-life vehicles, body shells, components and materials disposed of abroad	Total weight of end-of-life vehicles exported, by country	Total recycling of (parts of) end-of-life vehicles exported (F1)	Total recovery of (parts of) end-of-life vehicles exported (F2)	Total disposal of (parts of) end-of-life vehicles exported (F3)	Remarks
	in t	in t	in t	in t	
1) End-of-life vehicles (WC 160104*)	0	0	0	0	No exports in 2017 according to the statistics on "Transboundary shipment of waste requiring consent" a)
Breakdown by countries: -- not applicable --					
2) Body shells from dismantling facilities (WC 160106)	31,064	26,404	29,511	1,553	Exported body shells: Total 31,064 t. Assumption: 85% thereof recycled / 95% recovered b).
Breakdown by countries: -- Unknown --					
3) Components from dismantling facilities	5,115	5,033	5,086	29	Batteries, tyres, large plastic parts, glass etc.
Breakdown by countries, where known					
WC Waste		**Destination countries** for waste exports (total, not just from dismantling facilities) included in the waste export statistics:			
- 130205* Non-chlorinated machine oils etc.		Switzerland, Finland			
- 160601* Lead batteries		Belgium, the Netherlands, Austria, Poland, Slovenia, Czech Republic			
- 160807* Catalysts		Belgium, France, UK, Italy, the Netherlands, USA			
4) Non-metal shredder residues and plastic fractions from shredders	6,890	3,650	6,743	147	Export of non-metal shredder residues and plastic fractions: 27,153 tonnes in total. Of which approximately 25.4% from ELVs.
Breakdown by countries, where known c)					
WC Waste		**Destination countries** for waste exports acc. to waste export statistics (total, not just originating from ELV shredders)			
- 191003* Fluff-light fraction		Austria			
- 191004 Fluff-light fraction		Belgium, the Netherlands, Austria			
- 191210 Combustible waste		Belgium, Denmark, France, Luxembourg, the Netherlands, Austria, Poland, Sweden, Switzerland, Slovakia, Czech Republic			
Total	**43,069**	**35,088**	**41,339**	**1,730**	

Explanatory comments, footnotes and source details for this table may be found on the following page.

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Explanatory comments:

WC = Waste Code

Because quantities have been rounded up or down to the nearest whole tonne and percentages are rounded to just one place after the decimal point, this table contains a few rounding differences (of one tonne in each case).

Footnotes:

a)   Any ELV exports are recorded in the waste export statistics (see Sources below).
     According to these statistics, in 2017, 16,263 t were exported to Turkey and 855 t to the Netherlands under waste code 160104* (end-of-life vehicles) In the time series table, these waste exports are assigned to no. 8.12 "Other scrapped vehicles". The exported vehicles refer to ships, and as such are not ELVs falling within the scope of the ELV Directive.

b)   As there is no data available on recycling and recovery levels of body shells abroad, the targets of the EC ELV Directive of 85% recycling and 95% recovery have been assumed for calculation purposes.

c)   There are no figures available for the destination countries of waste code 191204 (plastic and rubber) exports.
     According to the waste statistics, no waste code items 191209 (minerals) and 160119 (plastics) incurred in shredders were exported abroad for disposal in 2017.

Sources:

–   Exports of body shells and other waste from end-of-life vehicle dismantling facilities:
     "*Erhebung über die Abfallentsorgung im Jahr 2017*" (Waste Management Survey, 2017), Table 15, Federal Statistical Office.

–   German Environment Agency (UBA): "*Grenzüberschreitende Verbringung von zustimmungspflichtigen Abfällen 2017 - Export*" (Transboundary shipment of waste requiring consent, 2017 - Export), https://www.umweltbundesamt.de/sites/default/files/medien/2503/dokumente/grenzueberschreitende_verbringung_von_zustimmungspflichtigen_abfaellen_export_2017.pdf,

–   German Environment Agency (UBA): "*Grenzüberschreitende Verbringung von zustimmungspflichtigen Abfällen. Zeitreihe Export nach Abfallarten - Mengen in 1000 t. 2008-2017*" (Transboundary shipment of waste requiring consent. Time series: Exports by waste category - Volumes in 1,000 t. 2008-2017), https://www.umweltbundesamt.de/sites/default/files/medien/2503/dokumente/zeitreihe_export_notifizierungspflichtiger_abfaelle_nach_abfallarten_0.pdf.

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Total reuse, recovery and recycling (in tonnes per year) of end-of-life vehicles arising in the Member State and treated within or outside of the Member State

Appendix: COM Table 4 (rates) for Germany, 2017					
From ...	Reuse (A)	Total recycling (B1 + B2 + F1)	Total recovery (D1 + D2 + F2)	Total reuse and recycling (X1=A+B1+ B2+F1)	Total reuse and recovery (X2=A+D1+ D2+F2)
	in t	in t	in t	in t	in t
COM Tab 1: Dismantling (A, B1, D1) (metals + non-metals)	19,269	49,939	56,442	69,208	75,711
COM Tab 2: Shredders (B2, D2) (metals + non-metals)		370,514	404,663	370,514	404,663
COM Tab 3: Exports (F1, F2) (metals + non-metals)		35,088	41,339	35,088	41,339
Total	**19,269**	**455,541**	**502,444**	**474,810**	**521,713**

			Recycling and recovery rates 2017	
W **(total number of end-of-life vehicles)**	506,531 vehicles		**89.5%**	**98.4%**
W1 **(total vehicle weight)**	530,311 tonnes		X1/W1	X2/W1