

# ANNUAL REPORT

FOUNDATION  
AUTO RECYCLING  
SWITZERLAND

2014



# 1 RETROSPECTIVE AND OUTLOOK

For some years now the Foundation has been verifying the recycling of end-of-life vehicles on the basis of the cancelled vehicle log books submitted by the shredder plants for vehicles which have been scrapped. This procedure has proved successful. It is unbureaucratic and at the same time provides meaningful information. We know the quantity, the vehicle models with the date of their first registration and unladen weight and are therefore able to keep track of developments. The shredder plants receive compensation for the extra work involved in handling the log books and for the higher cost of recycling the automobile shredder residue as compared to the situation in other countries.

Automobile shredder residue (ASR) has been disposed of by thermal treatment with domestic refuse in municipal waste incineration plants since 1996. However, this is not done entirely in Swiss plants; half of the total is in fact dealt with in German facilities. The Foundation is currently seeking ways of achieving a much larger share for the Swiss plants. The low waste disposal prices in Germany are the main reason why ASR is exported. Many German facilities find it difficult to use the full capacity of their incineration furnaces. With future technical developments, municipal waste incineration plants (MWIP) will achieve an environmental advantage primarily in the treatment of slag and fly ash residue; the export of ASR on this scale will then cease to be acceptable. The initial results of the recovery rates from these residues are awaited with keen interest.

Although in Europe stringent criteria are being laid down with progressive re-use and recycling rates for many types of waste including end-of-life vehicles, the practical situation differs widely. As a rule, only small quantities undergo genuine material recycling with a large part of the fractions «pseudo-recycled», being used for example as covering material for landfill sites, as a backfiller for disused mines or incinerated. Hundred per cent recycling can only be wishful thinking because there are always harmful substances – including some of natural origin – which are separated out and require definitive disposal. Efficient incineration plants as well as secure and well-organised landfill sites are essential features of a responsible waste economy.

The business with end-of-life vehicles, especially vehicles involved in an accident, remains good. However, in recent years the long-established vehicle recycling businesses have been in competition with other firms that focus on exports. Vehicles involved in an accident are offered for sale by the insurance companies on a number of auction platforms known as residual value exchanges, generally in the B2B sector. Because of the keener competition, prices for the purchase of vehicles after an accident are rising. End-of-life vehicles are not concerned because no demand for spare parts exists in view of their age but the cost of removing harmful substances is just as high. Metal prices fell in 2014 but remain on the same average level as in recent years.

The technical demands placed on vehicle recycling businesses are becoming increasingly stringent. The number and diversity of electronic components are growing and in some cases require special knowledge. With the growing number of model series and shorter intervals between facelifts the volume of spare parts is rising disproportionately fast. This necessitates modern EDP-assisted warehouse management without which the overview is soon lost. Private and free garages are among the regular clients of the vehicle recyclers, as too are many brand agents.

The Foundation established cooperation with the Association of the Free Automobile Trade in Switzerland (VFAS). Members of this Association include some 120 direct and parallel importers who were responsible for the first registration or sale of 23,120 passenger cars in the year under review (-3.8% against the previous year). VFAS supported the idea of vehicle recycling but was not willing to make a fair contribution. Negotiations were therefore broken off.

The Foundation has become a branch partner of Swiss Recycling, the umbrella organisation of the separate collection systems. As the Foundation does not itself engage in any collection activity it cannot be a fully-fledged member. However, as a branch partner it can benefit from the contacts and opinion-forming opportunities when amendments are proposed to laws. Swiss Recycling works closely with the Federation of local authorities and municipalities on the subject of waste; in that regard, familiarity with vehicle recycling in Switzerland is valuable.

# 2 ACTIVITIES

The recycling industry is in constant motion – and so too is our Foundation. In 2014, a great deal of new knowledge was acquired about the recycling of end-of-life vehicles.

## A) CENTRE FOR SUSTAINABLE WASTE AND RESOURCE UTILIZATION (ZAR)

A delay occurred in the planning procedure for the construction of the first processing facility for dry extracted slag from refuse incineration plants in Hinwil. The difficulties have now been resolved and construction is proceeding on schedule. Commissioning is due to take place in mid-2015. The delay is problematic for the Foundation because the donation agreement terminates at the end of 2014 and is linked to an ASR trial which cannot be run until the plant as a whole has been completed. Possible future cooperation will be agreed in 2015.

ZAR has established a second centre of expertise at the Kehricht-beseitigungs-AG (KEBAG) in Zuchwil SO for the wet chemical recovery of valuable materials and has recruited two specialists for this purpose. KEBAG uses the FLUREC technique to process fly ash and hydroxide sludge including zinc recovery. The criteria for further innovations are therefore perfectly satisfied. The recovery of phosphorus from sewage sludge ash is the principal area of investigation at present. However, for the Foundation the main emphasis is on rate of metal recovery from ASR.

## B) «VEHICLE ELECTRONICS» STUDY

The investigation of the potential for the recycling of rare technical metals from vehicle electronics must be seen in the context of the review of the Ordinance on the Return, Take-Back and Disposal of Electrical and Electronic Equipment (ORDEE, see Chapter 3). A final decision has now been taken to the effect that electrical and electronic devices from vehicles will fall within the scope of application of ORDEE. A discussion between the Foundation and the Federal Office for the Environment (FOEN) led to an understanding that vehicle electronics will not be included in the list of appliances, at least for the time being. The Foundation was able to show credibly that the ratio between costs and bene-

fits is disproportionate. The topic of vehicle electronics is on the agenda not just in Switzerland but also in Germany. The work done to date was presented at a conference of the German Federal Office for the Environment. It turned out that knowledge of the material composition of electronic components is still limited. End-of-life vehicles with an average age of fifteen years today do in any case still contain only modest quantities of rare technical metals. In a few years' time the situation might be completely different because the use of electronics is growing with the increasing importance of alternative drive technologies, the many power-assisted systems and internet access.

The aim of the working group on «Vehicle Electronics» led by the FOEN is to determine the present state of the art. Depending on the assessment, electrical and electronic appliances from vehicles may in due course be placed on the ORDEE list of appliances. The Foundation will advocate implementation at the lowest possible cost without complex administrative procedures and verifications.

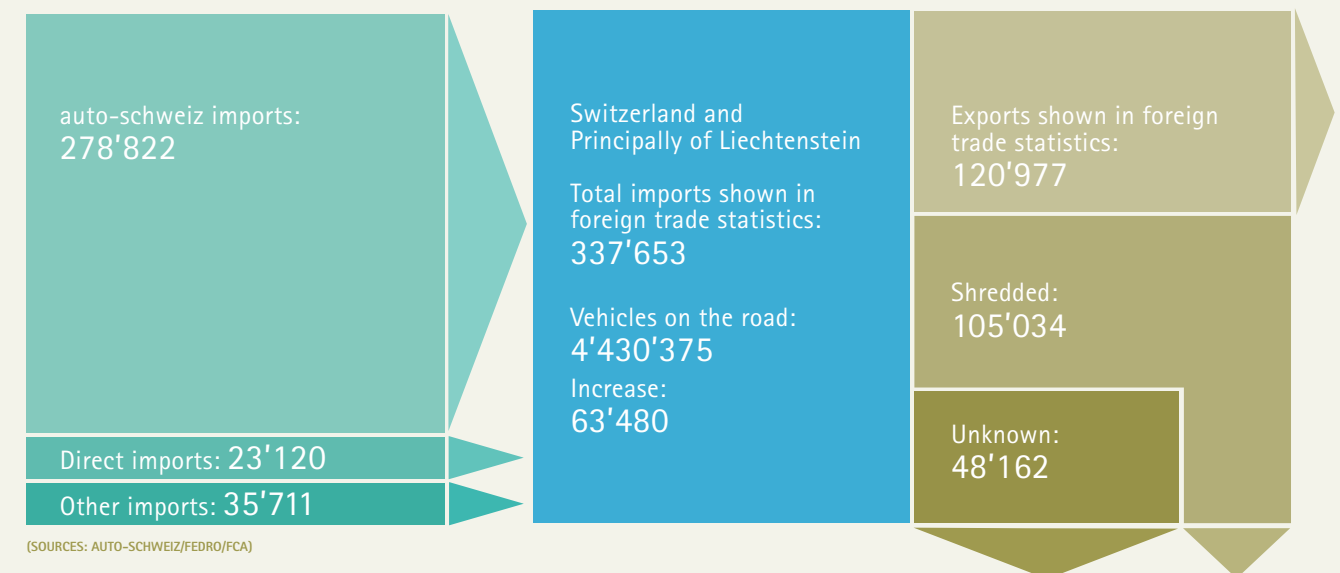
## C) RECYCLING END-OF-LIFE VEHICLES AND AUTOMOBILE SHREDDER RESIDUE

The number of new passenger car registrations fell less steeply than expected: 301,942 new vehicles (-1.9%) were registered. The Swiss Foreign Trade Statistics show that 337,653 passenger cars were imported into Swiss customs territory. The figure for new vehicles also includes some previously used vehicles and others brought in with removals. The number of passenger cars on the road therefore increased to 4,430,375 (+1.5%). On the other hand, 120,977 vehicles (-3.5%) were officially exported and 105,034 end-of-life vehicles demonstrably scrapped. As a result, the destination of just under 50,000 vehicles therefore remains unknown. Clearly the bulk of them were also exported but through different channels. There was little change on the previous year. The average life of a passenger car is roughly 16 years.

Official exports show a pattern similar to that of previous years. Around 60% of all previously used vehicles finish up in Africa where they continue to be driven for several more years and many kilometres. Niger now ranks in 2nd

position after Libya, despite the fact that it has no direct access to the sea. Many vehicles also go to Poland. It may be supposed that at least some of these vehicles then move on eastwards.

## PASSENGER CAR STATISTICS SWITZERLAND 2014



The days when valuable metal particles simply ended up in a landfill site are over. In 2013

**ZAR 14 kg**  
RECOVERED  
OF GOLD FROM MWIP SLAG.



**EXTRACT FROM FOREIGN TRADE STATISTICS;  
EXPORTS OF PASSENGER CARS 2014**

2014	VEHICLES	WEIGHT (kg)	PRICE (CHF/VEHICLE)
<b>Total (143 countries)</b>	<b>120977</b>	<b>1 394</b>	<b>2 758</b>
Libya	25936	1389	1184
Niger	17933	1268	1093
Poland	13693	1524	1565
Benin	13103	1302	1410
Germany	7327	1573	8918
Togo	7288	1235	1144
Bulgaria	6775	1489	807
France	4459	1392	5311
Lithuania	3620	1472	2811
Nigeria	2773	1480	1405
Czech Republic	1779	1491	4366
Cameroon	1401	1288	1769
Macedonia	1205	1367	1114
United Kingdom	1156	1545	26186
Ivory Coast	866	1376	1437
Austria	849	1524	7327
Kosovo	838	1351	1989
Serbia	812	1340	1756
Hungary	804	1387	2440
Guinea	708	1344	1403

(SOURCE: FCA)

Seven shredder plants processed 105,000 scrapped Swiss automobiles and returned some 75,000 tonnes of metal to the materials cycle. As metal production from scrap requires less energy than the equivalent from primary raw materials, metals recovery from end-of-life vehicles economises around 100,000 tonnes of CO<sub>2</sub>, equivalent to the consumption of 43,000,000 litres of petrol.

The non-metals occur as automobile shredder residue (ASR) after shredding. In all, this amounted to just under 70,000 tonnes – the same figure as in the previous year. Of this total just over 23,000 tonnes come from end-of-life vehicles. ASR continues to be disposed of by thermal treatment in waste incineration plants (MWIP) both at home and abroad. The ASR from end-of-life vehicles enabled enough electricity and district heating to be produced to cover the annual power consumption of 4,500 households. 36,235 tonnes of ASR were disposed of in ten Swiss MWIPs and 33,241 tonnes in six German plants. The Foundation is endeavouring to increase the share of ASR disposed of at home. Because of the significant price difference between Swiss and German plants this venture is not easy. The export of ASR must be authorised by the Federal Office for the Environment (FOEN) which regularly inspects the plants. With 13,645 tonnes of ASR, the Zurich Oberland Waste Recycling Plant (KEZO) in Hinwil leads the field. Since 1996 when the co-incineration of ASR in MWIPs began until today more than 1,000,000 tonnes of ASR have undergone thermal treatment in MWIPs.

## POTENTIAL MWIP SLAG:

Prof. Rainer Bunge of the HSR estimates the potential precious metal content of household refuse which is incinerated each year in Switzerland at

**300 kg OF GOLD**  
**7500 kg OF SILVER**

## ASR RECYCLING (IN METRIC TONNES)

DISPOSAL PLANT	2011	2012	2013	2014
Hinwil	25259	17775	14016	13645
Winterthur		685	4053	6113
Zurich Hagenholz	5113	5408	2987	3957
Thun	3404	1238	2360	3886
Niederurnen	4939	3214	3271	2850
Zurich Josefstrasse		2884	3164	2733
Monthey	2023	124	514	1354
Weinfelden	3840	3933	2173	718
Zuchwil		1771	899	555
Buchs SG	378	292	435	425
Posieux	322	1012		
Bern	1632	786		
Trimmis	2059	426		
Mannheim D	5839	17227	17852	16158
Helmstedt D	2125	1053	3364	6080
Bremen D			2308	4163
Espenhain D (SRW)		1375	1910	3126
Weissenhorn D		1358	2651	2033
Ingolstadt D	1443	3122	2044	1681
Olching D		2432	2281	
Iserlohn D		1269	1737	
Tredi F	4885	1259	683	
<b>Total</b>	<b>63 382</b>	<b>68 643</b>	<b>68 702</b>	<b>69 476</b>

(SOURCE: AUTO RECYCLING SWITZERLAND FOUNDATION)

## D) MEDIA RELATIONS

The publication of last year's annual report was followed by a number of media articles about the Foundation and vehicle recycling:

- RECYCLING Magazine No. 18/2014
- European Economic Service EUWID No. 34/2014
- BIEL BIENNE newspaper of 24.09.2014
- «auto&wissen» journal No. 5/2014
- Journal of the Aargau Trade Association of 16.10.2014
- Solothurner Zeitung of 22.10.2014
- Migros Magazine of 3.11.2014
- «Environmental Technology Switzerland» magazine of 24.11.2014



# 3 LAWS AND REGULATIONS

In the year under review, the Federal Office for the Environment laid the Environmental Protection Act (EPA), the Technical Ordinance on Waste (TOW) and the Ordinance on the Return, Take-Back and Disposal of Electrical and Electronic Equipment (ORDEE) open for public consultation. The Foundation delivered an opinion on each of these texts.

In the case of the TOW the bone of contention resides in the de facto export ban on ASR. The state of the Swiss WIP engineering art is to be enhanced in the area of fly ash treatment so that the export of ASR to foreign plants will no longer be possible. Although the Foundation itself aims to achieve a high rate of domestic recycling, exports have a very important bearing on the certainty of disposal and on the price trend.

ORDEE concerns automobile electronics among other things. The foundation has now been laid for the recycling of electrical and electronic components from vehicles. As in the case of

other types of electronic scrap, the valuable raw materials are to be recovered from the electronic components. Previous studies, including one by EMPA, have shown contents of 6 to 8 grams of rare technical metals per vehicle in the case of fairly recent vehicles. That is far too little to permit an economically viable solution, when account is taken of the cost of dismantling by hand and the resulting expenditure. The Foundation has therefore called clear attention to the mismatch between costs and benefits. Representatives of the Foundation and of auto-schweiz are taking part in the relevant working group and are able to influence the process of determining the state of the technical art.

METALS CONTAINED IN THE ELECTRONIC SYSTEMS OF EACH VEHICLE:

**7.6 g** RARE EARTHS

Modern vehicles are equipped with more and more electronics and contain a substantial quantity of valuable metals. (Source: EMPA)

**0.22 g** GOLD  
**SILVER 3.65 g**



# 4 CONFERENCES

In 2014 the Managing Director of the Foundation attended a number of instructive and interesting conferences about recycling and the waste economy.

#### INTERNATIONAL AUTOMOBILE RECYCLING CONGRESS (IARC) IN BRUSSELS

The Foundation has been a sponsor of this major event for many years. The Managing Director therefore has a seat on the Steering Committee. The conference deals with a number of important topics in the area of vehicle recycling, including the illegal export of end-of-life vehicles, compliance with the recycling rates for end-of-life vehicles, battery recycling and technologies for ASR recycling.

#### WORKSHOP OF THE GERMAN FEDERAL OFFICE FOR THE ENVIRONMENT IN BERLIN

Not only the FOEN but also the German Federal Office for the Environment is conducting research into the potential for the recovery of critical (or rare technical) metals from vehicle electronics. A cross-comparison of the results helps to gain a better overview of the present situation.

#### WASTEVISION AT UMTEC IN RAPPERSWIL

This conference dealt with the subject of urban mining and the question of whether it is better to collect waste separately or all in the same bin. The question was of course intended somewhat provocatively because both methods are needed. The issue is where the limits between the two should be placed.

#### SWISSCLEANTECH WORKSHOP IN BERN

The Foundation is represented in the focus group on Urban Mining and Recycling. In that group issues surrounding the waste economy and the relevant legislation are discussed.

#### EUROPEAN MEETING OF SCHOLZ AG IN BRUSSELS

The biggest German metal recycler Scholz AG invited representatives of the public authorities, motor vehicle manufacturers and metal recyclers to attend a meeting. Oliver Scholz called attention to the gap between the legislation and practice. The EU is requiring its Member States to achieve a recycling rate of 95% for end-of-life vehicles after 2015 but a large proportion of these end-of-life vehicles are simply leaving the system. These vehicles are exported without any form of control or disposed of illegally. As a result the recycling industry which is investing in processing plants and ultimately the European production countries are losing important raw materials. Implementation of the current regulations leaves much to be desired.

#### VB SA CONFERENCE

To mark the 40th anniversary of the Federation of Operators of Swiss Waste Treatment Plants (VB SA), Federal Councillor Doris Leuthard spoke of the aim of the Federal Council to complete the material cycles and by doing so economize on the use of natural resources. The professional presentations revealed competition between the processing of dry and wet slag from MWIPs. The work of the ZAR had raised the bar. The proponents of wet disposal were now reacting. On the political side, a cantonal representative discussed the question of implementation. This was going ahead well in most cases but depended on personnel and financial resources.

#### VARIOUS SEMINARS DEALING WITH THE INVESTMENT OF ASSETS

The low interest environment, uncertain and volatile financial markets and the unpredictable monetary policy of the national banks were making the safe and profitable investment of the Foundation's capital increasingly difficult. A serious yield-risk study remains vitally important. The Foundation is performing well by comparison with the pension funds.

## THE INCINERATION OF VEHICLE WASTE COVERS THE POWER CONSUMPTION OF

# 4500 HOUSEHOLDS

Recycling scrapped vehicles is expensive, but the bottom line is that it saves and supplies a great deal of energy. The Foundation always endeavours to keep as much of the added value as possible in Switzerland.

## END-OF-LIFE VEHICLES AND ASR RECYCLING:

# 16 YEARS

the average age of a passenger car is around 16 years. In other words, there has been relatively little change on the previous year (2013).



# 5 MOTOR VEHICLE STATISTICS

## STATISTICS FOR PASSENGER CARS IN SWITZERLAND IN 2014

YEAR	NEW REGISTRATIONS <sup>1)</sup>	IMPORTS <sup>2)</sup>	TOTAL ON THE ROAD	TAKEN OFF-ROAD <sup>3)</sup>	EXPORTS <sup>2)</sup>	VEHICLES CANCELLED IN CH <sup>4)</sup>	VEHICLES SHREDDED IN CH <sup>5)</sup>	DIFFERENCE CANCELLED/SHREDDED
2000	315 398	332 880	3 545 247	254 908	73 404	181 504		
2001	317 126	330 541	3 629 713	246 075	83 319	162 756		
2002	295 109	302 763	3 700 951	231 525	90 034	141 491	166 198 <sup>6)</sup>	-24 707
2003	271 541	288 192	3 753 890	235 253	94 682	140 571	153 412 <sup>6)</sup>	-12 841
2004	269 211	281 588	3 811 351	224 127	108 235	115 892	147 096 <sup>6)</sup>	-31 204
2005	259 426	287 371	3 864 994	233 728	90 354	143 374	129 704 <sup>6)</sup>	13 670
2006	269 421	284 182	3 899 917	249 259	106 857	142 402	104 600	37 802
2007	284 674	305 102	4 002 584	202 435	131 695	70 740	88 261	-17 521
2008	288 525	310 841	4 031 205	282 220	108 205	174 015	82 195	91 820
2009	266 018	276 833	4 051 832	256 206	82 967	173 239	58 279	114 960
2010	294 239	333 808	4 119 684	265 956	91 965	173 991	78 657	95 334
2011	318 958	367 961	4 209 672	277 973	96 430	181 543	90 338	91 205
2012	328 139	374 379	4 300 036	284 015	127 806	156 209	99 448	56 761
2013	307 885	342 762	4 366 895	275 903	125 325	150 578	107 282	43 296
2014	301 942	337 653	4 430 375	274 173	120 977	153 196	105 034	48 162

(FEDRO CH)

(FCA)

(FEDRO CH)

(FCA)

FEDRO: Federal Roads Office (status as of 30 September)

FCA: Federal Customs Administration (foreign trade statistics)

1) New registrations in Switzerland, including direct and parallel imports

2) All imports and exports shown in the foreign trade statistics

3) Calculated: imports less increase in number of vehicles on the road

4) Calculated: cancelled vehicles less exports

5) Vehicles proven to have been shredded (at present vehicle log books; up to 2005 weighing certificates)

6) Calculated from weighing certificates (850 kg/vehicle); from 2006 cancelled vehicle log books



# 29 MILLION FRANCS

is the value of the materials from all vehicles shredded each year in Switzerland.

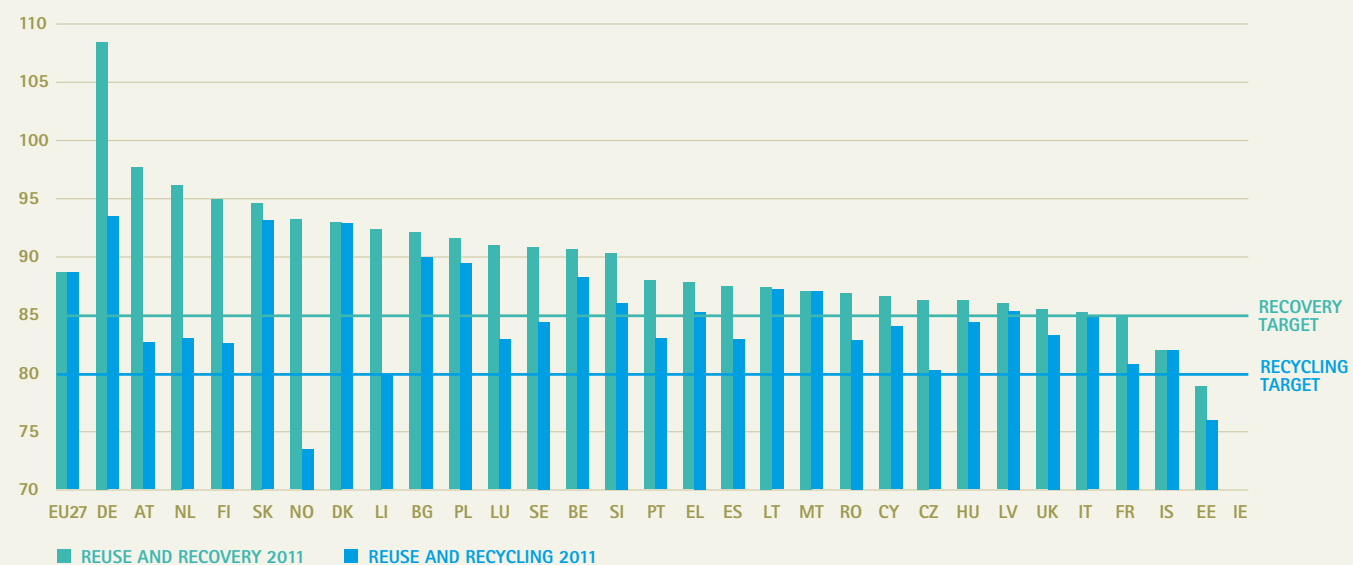
## METALS FROM END-OF-LIFE VEHICLES:

# 75,000 t

The recovery of metals from end-of-life vehicles saves around 100,000 tonnes of CO<sub>2</sub> in annual metal production.

# 6 DEVELOPMENTS ABROAD

In Europe vehicle recycling is determined by the recovery and recycling rates which have risen from 85 or 80 % to 95 or 85 % with effect from 1.1.2015. Most EU Member States already met the requirements in 2011.



Overall the number of end-of-life vehicles on EU territory is estimated at 14 million. However, only some 6.8 million were covered by the records for 2011. What happened to the remaining end-of-life vehicles is unknown.

The shredder plants must make an important contribution to meeting the recycling rates. A few specific ASR processing plants use mechanical/physical processes. On the other hand most

shredder plants separate the fine fraction with a high content of harmful substances and then dispose of it as mine backfill or as a covering material for landfill sites. In many places this is treated as recycling. Residual metals and in some cases other fractions are separated off from the high-calorie fraction for material recycling while the remainder is either used as fuel or dumped on landfill sites as before. The limits stipulated in the EU regulations are often not being respected.

## ANNEX

### DOCUMENTATION

Publications such as press releases, annual reports, INFO newspapers etc. can be consulted on the Foundation's website: [www.stiftung-autorecycling.ch](http://www.stiftung-autorecycling.ch)

### MEMBERSHIP OF THE FOUNDATION BOARD

Foundation Board President	Dr iur Hermann Bürgi*
auto-schweiz	Christine Ungricht, Vice President*
	Max Nötzli* (until 30.06.2014)
	François Launaz* (from 01.07.2014)
	Walter Frey
	Andreas Burgener
	Tobias Lukas
Automobile Club of Switzerland	Niklaus Zürcher (until 16.06.2014)
	Mathias Ammann (from 16.06.2014)
Motor Trade Association of Switzerland	Urs Wernli
Swiss Commercial Vehicles Association	Dr Michael Gehrken (until 31.08.2014)
Department of the Environment, Aargau Canton	Dr Peter Kuhn
Swiss Shredder Association	Dr Tobias Thommen*
Touring Club of Switzerland	Christoph Erb*

\*Members of the Foundation Board Committee

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