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Umwelt **Bundes UBA - German Federal Environment Agency** Amt 💿 · Largest scientific agency in the field of environmental protection in Germany. • More than 1000 employees. • Wide range of environmental issues, from e.g. noise and drinking water to climate change and waste management. Main tasks • Scientific support for the German Federal Ministry for the Environment • Collecting and assessing data on the environment Federal Environment Agency in Dessau, Germany Copyright: Linnart Unger Informing the public on environmental issues

19 September 2012

ational Workshop on 3R Strategy and ELV Recycling September, 19 to 21, 2012, in Nagoya, Japan















Umwelt Bundes Amt () Für Mensch und Umwelt	Extended Producer Responsibility: The 4 Main Waste Streams				
	Waste Electrical and Electronic Equipment	End-of-life vehicles (ELV)	Waste Batteries	Packaging	
EU Legislation	WEEE 2002/96/EC new: WEEE II 2012/19/EU ROHS 2011/65/EU	ELV Directive 2000/53/EC	Batteries Directive 2006/66/EC	Packaging Dir. 94/62/EC	
German legislation	Electrical and Electronic Equipment Act (2005)	ELV Ordinance (2002)	Batteries Act (2009)	Packaging Ordinance (1991)	
Design for Recycling	yes	yes	yes	yes	
Heavy metal ban	Hg, Cd, Pb, Cr(VI) + organ.	Hg, Cd, Pb, Cr(VI)	Hg, Cd	Hg, Cd, Pb, Cr(VI)	
Financing (Germany)	Shared: municipalities (take back), producers (recycling)	Producer: free take back. In fact: ELV value	Producers (take back systems)	Producers (take back systems)	
Take back (Germany)	Communal collection points, (+ retailers, producers)	Dismantlers for producers (50 km) + free dismantlers	Retail stores (+ municipalities); car + indust. batt: further options	Retail stores	
Collection target	Now: 4 kg/a per capita in 4 y: 45 % / in 7 y: 65 %	-	2012: EU: 25 % / D: 35 % 2016: 45 %		
Deposit (Germany)	ny) automotive ba		automotive batteries	beverage packaging	
Recovery rate	e.g. large equipment: 75/80 %, in 3 years: 80/85 %	2006: 80 % / 85% 2015: 85 % / 95 %	Recycling efficiency: Pb – 65%, Cd – 75 %, other – 50 %	55%/65% of all pack. + material specif. rates	
Treatment requirem.	yes	yes	yes		
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ensch und Umwelt	0.000 topped per year in Cormany, 20 % from ELVe
	stor
	ites
 Landfill cons 	struction, backfilling of mines (for mainly fine, mineral fraction)
> Landfill ban	for untreated waste (since 2009)
Post-shredd	er treatment (PST)
Post-shred	ler treatment (PST)
 Large PST Mechanical Outputs: 	plant operating in Saxony (Scholz AG in Espenhain): 100 000 t/a treatment (sorting, classification). mineral fraction (< 2mm), 3 light fractions, heavy fraction, metal fraction.
> Treatment	activities on shredder site
e.q.	classification in fine grain (mineral) and coarse grain (high-caloric)
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Umwelt VW Sicon - Post-shredder Treatment Process **Bundes** Amt 💿 → Complex mechanical process with Pre-treatment, Treatment and "Refining" of output fractions. ightarrow No VW Sicon plant operating in Germany, but large scale plants in other EU countries (Netherlands; pilot plant: Belgium; similar concept: Austria) **Output fractions** Fraction **Recycling/ Recovery Options** (circa) (1) 5 % Ferrous and Metal recycling non-ferrous metals 3% Shredder granulate 33% Reducing agent in blast furnaces (plastic, low chlorine, low metal) Plastic fraction 3% **PVC** recycling (high PVC content) Shredder fibres 31 % Dewatering agent for sewage sludge (textile fibres and seat foam) Shredder sand + other Disposal (Recovery ?) 26 % (glass, residual metal, dust)

Sources: 19 September 2012 (1) GHK: A Study to Examine the Costs and Benefits of the ELV Directive – Final Report, Annex 3 (2006) (2) JRC: Environmental Improvement of Passenger Cars (IMPRO-car) (2008)

Umwelt Bundes Amt () Für Mensch und Umwelt	Challenge: High Grade Recycling				
	Dismantling ver	sus <mark>Po</mark>	ost-shredder treatment		
Plastic components	Material recycling (e.g. of bumpers)		Energy recovery		
Glass	Material recycling, e.g. container glass, gla	ss wool	Landfill construction, backfilling		
Metal residues in SLF	More comprehensive dismantling		Metal separation from shredder leight fraction		
Future challenge					
Automobile electronics					
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Umwelt Bundes Amt ()	Disn	nantling	of autom	otive elec	tronics	
Mass of electronics parts in ELVs increasing Challenge: Inventory of automotive electronics, Dismantling time, Value and demand of control units as spare parts, Content of valuable material (PCBs, copper, rare earths (?)) for recycling Example: VW Golf series: Development of the electronic control units						
Vehicle ^g	Year of manufacture	^F Vehicle ^g weight	Potential number of control units	Dismantling time	Potential val as spare part	ue (2008) as new
Golf 1	1974 - 1983	750 kg	1 Stck.	10 min.	130€	514€
Golf 2	1983 – 1992	845 kg	5 Stck.	80 min.	240€	1.750€
Golf 3	1991 - 1998	960 kg	9 Stck.	170 min.	487€	2.379€
Golf 4	1997 - 2003	1050 kg	16 Stck.	240 min.	1.530 €	3.798 €
Golf 5	2003 - 2008	1155 kg	28 Stck.	360 min.	2.744 €	6.268€
Source: Martin Knode, RETEK. Presentation on final workshop ReECar, 13.11.2008. http://www.reecar.org/servlet/is/951/06-Knode-Demontage.pdf?command=downloadContent&filename=06-Knode-Demontage.pdf						

	Umwelt Bundes Amt (i) Für Mensch und Umwelt	Extended producer responsibility: Other waste streams	_
•	<u>Waste electric an</u> → EU	<u>d electronic equipment</u> Commission's websites: <u>http://ec.europa.eu/environment/waste/weee/index_en.htm</u> <u>http://ec.europa.eu/environment/waste/rohs_eee/index_en.htm</u>	
	→ WEEE <u>http://eur-lex.e</u>	Directive 2002/96/EC on Waste Electrical and Electronic Equipment uropa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2002L0096:20080321:EN:PDF	
	→ WEEE II <u>http://eur-lex.e</u>	Directive 2012/19/EU on Waste Electrical and Electronic Equipment uropa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:197:0038:0071:EN:PDF	
	→ ROHS II Hazardous Sul <u>http://eur-lex.e</u>	Directive 2011/65/EU on the Restriction of the Use of Certain ostances in Electrical and Electronic Equipment uropa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:174:0088:0110:EN:PDF	
	→ Germany <u>http://www.bmp</u>	Electrical and Electronic Equipment Act (ElektroG) (as of 2005) J.de/english/waste_management/acts_and_ordinances/acts_and_ordinances_in_germany/doc/655	4.php
•	Packaging → EU → EU http://eur-lex.er → Germany http://www.bm/	Commission's website: http://ec.europa.eu/environment/waste/packaging/index_en.htm Directive 94/62/EC on Packaging and Packaging Waste uropa.eu/LexUriServ/LexUriServ.do?uri=CELEX:01994L0062-20050405:EN:NOT Ordinance on the Avoidance and Recovery of Packaging Wastes u.de/english/waste_management/downloads/doc/37115.php	
	→ EU <u>http://eur-lex.e</u>	Waste Framework Directive 2008/98/EC, especially Article 21 uropa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:en:PDF Waste Oil Ordinance (as of 2002)	
•	<u>Http://www.bmu</u> <u>Waste in general</u> → Recycling Mana → German Ministry http://www.bmu.de	u.de/english/waste management/doc/39581.php ment Act (German, 2012): http://www.gesetze-im-internet.de/bundesrecht/krwg/gesamt.pdf v for the Environment: Booklet on recycling and waste management (English, 2011): "files/odfs/allgemein/application/odf/broschuere, kreislaut/wirtschaft en bf.pdf	
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