

# “Norwegian ELV Recycling Account”

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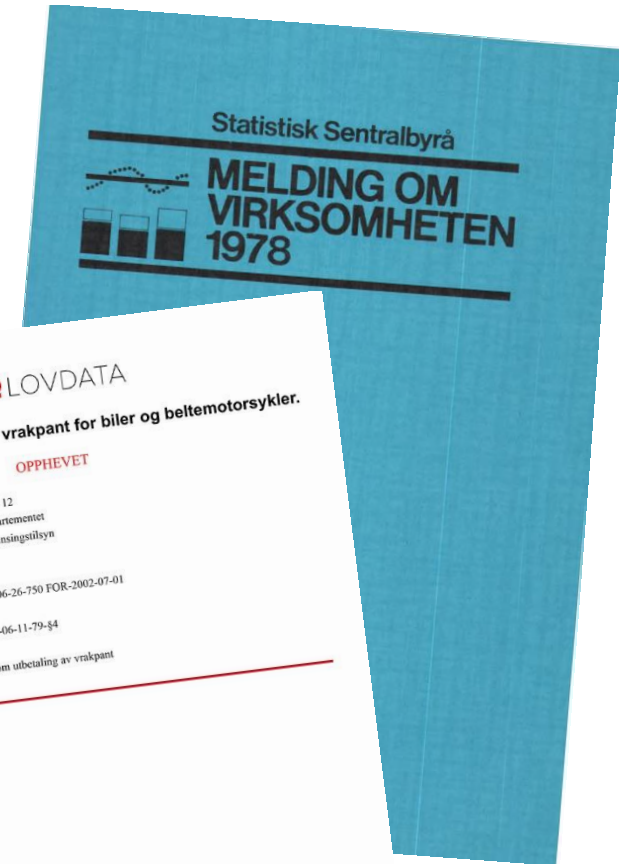


# The car is dumped in a shredder



# 1. The story 1978-2006

- Norwegian Parliament created the first national ELV collection system in 1978
- Norway introduced the ELV return scheme as the first country in the world
- Netherlands, Sweden and Denmark introduced various schemes in the 1990's



## 2. Producer responsibility

- EU directiv 2000/53/EC (ELV)
- Norwegian national ELV directive (FOR-2002-06-26-750)
- Car importers established the return company Autoretur (2004)
- Norwegian Environment Agency's (NEA) approval of Autoretur as return company in 2005



# 3. Autoretur's approval as ELV "take back" company

## Terms

- Autoretur's member list -> all importers of new vehicles
- Determination of producer responsibility compared to members' import share of new cars (2016) = 91,4%
- Facilitating reuse of second hand parts from ELV
- Autoretur's right to claim environmental fees
- Annual accounting/finance/financial strength to be able to take charge of the state governed wreckage incentive scheme if the Parliament decide terminating

## 4. Return rate

**Obtain return rate (>95%) -> Nationwide network of ATFs with reasonable short access for delivery of ELV for the last owner**

A: New registered vehicle (AutoSys) 2016 -> 208.554

B: Total number of vehicle (AutoSys) 2016 -> 3.132.805

C: Total number of vehicle (AutoSys) 2015 -> 3.075.047

D: Change number of vehicle from 2015 to 2016 -> B-C =57 758

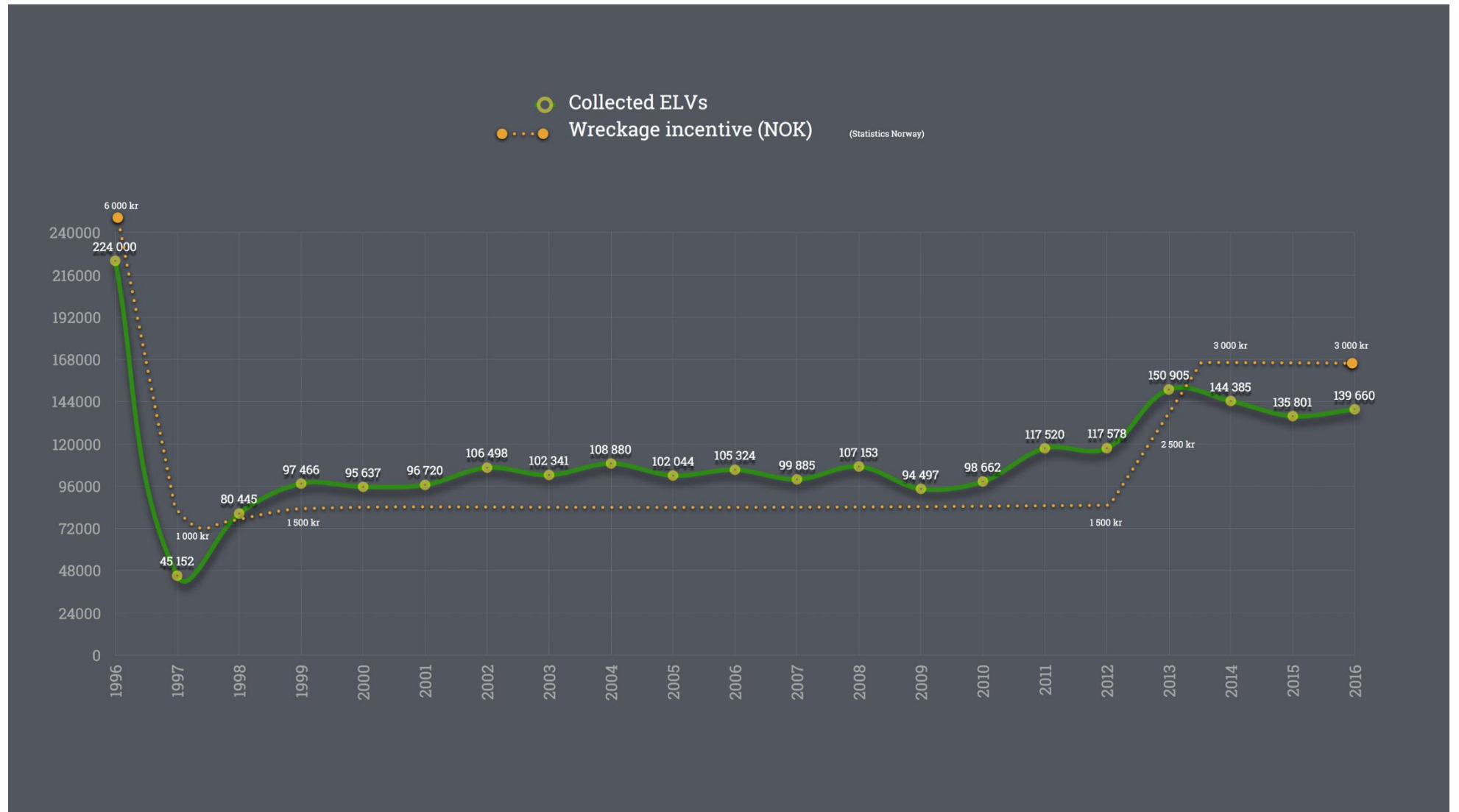
E: Net de-registered cars -> A-D = 150 796

F: Number of ELV (VrakSys) 2016 -> 139.600

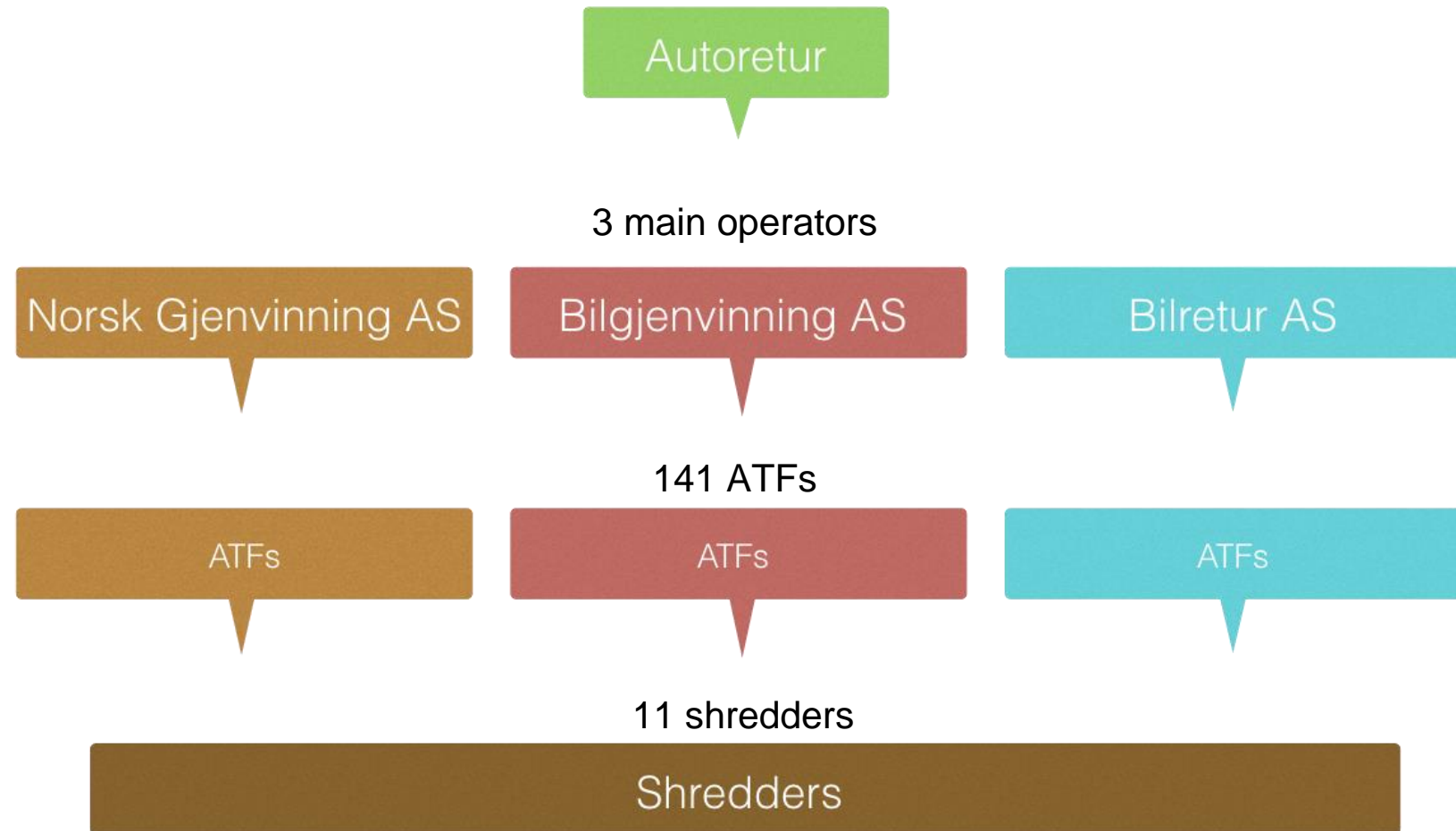
**Return rate 2016 =  $F/E * 100\% = 92,6\%$**

2016	2015	2014	Average 2007-2016
<b>92,6%</b>	95,5%	100,7%	95,9%

# 5. Collection rate vs. wreckage incentive



## 6. Autoretur's organization



# 7. Autoretur's return system 2016

141 ATFs and 11 Shredders

## Shredders

1. Stena Recycling, Skien
2. Hellik Teigen, Hokksund
3. Norsk Gjenvinning Metall, Fredrikstad
4. Metallco Stene, Fredrikstad
5. Norsk Metallfragmentering, Gjøvik
6. Norscrap West, Hanøytangen
7. Hermod Teigen, Egersund
8. Vartdal Gjenvinning, Vartdal
9. Norsk Gjenvinning Metall, Orkanger
10. Kuusakoski, Skjellefteå, Sverige
11. H.J. Hansen, Odense, Danmark

**Norway – 2.400 km from South to North**



## 8. Contract - Quality assurance

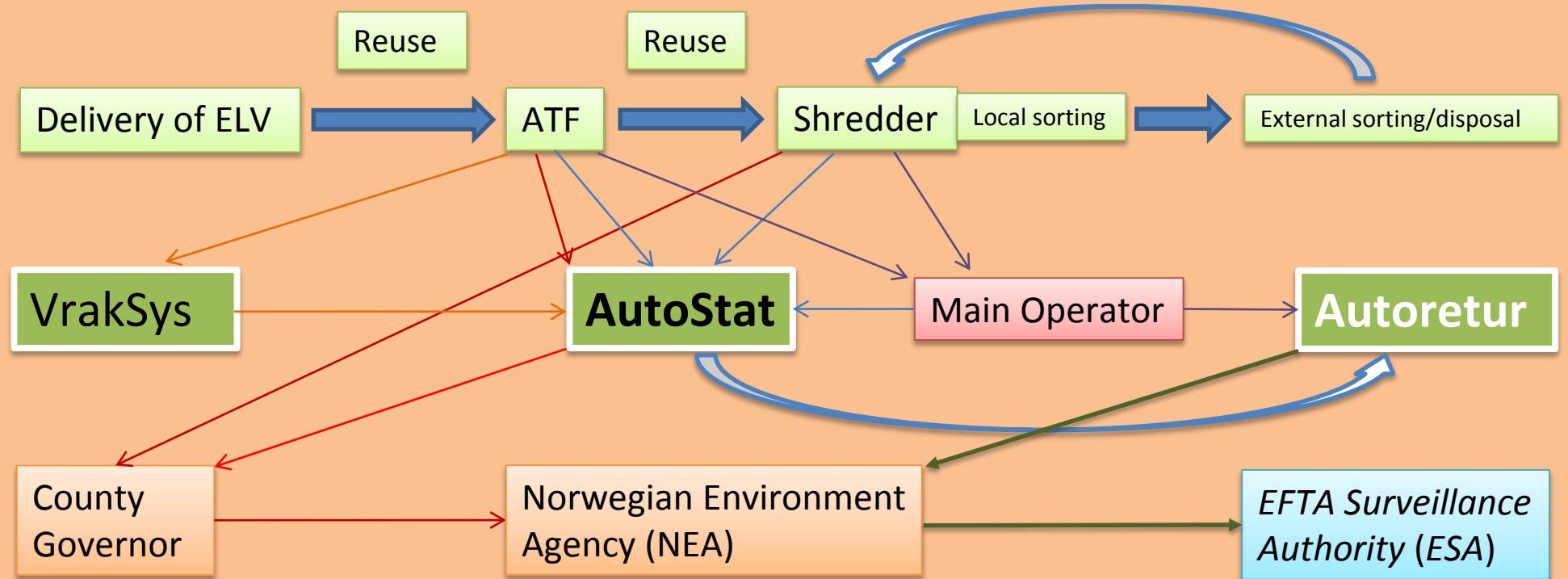
### **Autoreturs Contractors -> 3 Main Operators**

- Authority Terms and Conditions are mirrored to Main Operators
- Compliance between Operation and Regulations
- Compliance between Production and Reporting
- Traceable Reporting Data to the source

### **Main Operators Sub-contractors -> 11 Shredders and 141 ATFs**

- Main operators Terms and Conditions are mirrored to sub-contractors
- Main operations has to set up and revise Quality Plans for key operations annually during the contract periode (5 years)

# 10. Reporting scheme



- ELV Logistic
- Hazardous waste and parts for Reuse
- ELV data
- Recycling data
- Plan for Improvement and increased recycling rate
- Recycling Account

# 11. ATF's reporting-recycling Account 2016

- De-pollutions (kg) reports comply with records by approved waste contractor
- Dismanteled parts (kg) calculated by fixed average weights (kg/pcs)
- ATF's annual report-hazardous waste/pollutants prepared for The County Governor

Table 1	Reuse (A) tonnes	Recycling (B1) tonnes	Energy recovery (C1) tonnes	Total (D1 = B1 + C1) tonnes	Disposal (E1) tonnes
Batteries	391	2 000		2 391	11
Liquids	1 460	149	1 009	1 609	
Oil filters		47		47	
Other materials arising from de-pollution			74	-	116
Catalyst	14	386		400	
Metal components	123	4 955		5 079	
Tyres	319	1 859	3 919	2 178	
Large plastic parts	133			133	
Glass	46	88		135	
Other materials arising from dismantling	3 067	6		3 074	0,1
<b>Total</b>	<b>5 553</b>	<b>9 491</b>	<b>5 002</b>	<b>15 044</b>	<b>127</b>

Table 1	Reuse (A)	Recycling (B1)	Energy recovery (C1)	Total (D1 = B1 + C1)	Disposal (E1)
<b>Total</b>	<b>27,5%</b>	<b>47,0%</b>	<b>24,8%</b>	<b>71,8%</b>	<b>0,6%</b>

## 12. Shredder's reporting

- Registration of received number of hulks and quantities by weight (kg)
- ATF's control/approving the number of hulks and quantities (kg) delivered from ATF to shredder
- Reported parameters for disposing of fractions after sorting at shredder
- Reported parameters for disposing of fractions after incineration of residue
- Reported parameters for disposing of residue as non-recyclable waste

# 13. Disposing parameters 2016

## Parameters for different disposing forms after 11 shredders (weighed sum)

Deposing Parameter	Fraction	Parameter
1	Recycling ferrous scrap (steel) after shredder	71,05%
2	Recycling non-ferrous metal after shredder	6,91%
3	Recycling of sorted shredder light fraction (SLF)	5,42%
4	Recycling of sorted shredder other fraction (SOF)	1,72%
5	Residue for disposal after sorted SLF	1,84%
6	Residue for disposal after sorted SOF	0,48%
7	Non-ferrous metal to recycling after incineration of sorted SLF	0,13 %
8	Non-ferrous metal to recycling after incineration of sorted SOF	0,06 %
9	Energy recovery by incineration residue of sorted SLF	9,29 %
10	Energy recovery by incineration residue of sorted SOF	1,96 %
11	Ash fraction for waste disposal after incineration residue of sorted SLF	0,26 %
12	Ash fraction for waste disposal after incineration residue of sorted SOF	0,02 %
13	Ash fraction for recycling after incineration of sorted SLF	0,84 %
14	Ash fraction for recycling after incineration of sorted SOF	0,01 %
	Sum	100 %

# 14. Shredder recycling Account 2016

## Total 11 shredders

Table 2	Recycling (B2) tonnes	Energy recovery (C2) tonnes	Total Recovery (D2 = B2 + C2) tonnes	Disposal (E2) tonnes
Ferrous scrap (steel)	107 600	-	107 600	-
Non-ferrous materials	10 754	-	10 754	-
Shredder Light Fraction (SLF)	9 469	14 075	23 544	3 195
Other	2 631	2 961	5 593	761
<b>Total</b>	<b>130 454</b>	<b>17 036</b>	<b>147 491</b>	<b>3 956</b>

Table 2	Recycling (B2)	Energy recovery (C2)	Total Recovery (D2 = B2 + C2)	Disposal (E2)
Ferrous scrap (steel)	71,1 %	0,0 %	71,0 %	0,0 %
Non-ferrous materials	7,1 %	0,0 %	7,1 %	0,0 %
Shredder Light Fraction (SLF)	6,3 %	9,3 %	15,6 %	2,1 %
Other	1,7 %	2,0 %	3,7 %	0,5 %
<b>Total</b>	<b>86,1 %</b>	<b>11,3 %</b>	<b>97,4 %</b>	<b>2,6 %</b>

# 15. ELV Recycling Account parameters

## Norwegian national ELV directive

### Terms

- Total recovery  $\geq 95\%$
- Reuse + Recycling (material)  $\geq 85\%$
- Disposal  $\leq 5\%$
- Energy Recovery -> residue  $\leq 15\%$

### The calculation basis for the ELV recycling rate (%)

$V_{\text{reg}}$  = ELVs registration weight (license card)

$V_{\text{adjusted}}$  =  $V_{\text{reg}}$  - 40 kg fuel - driver 75 kg + 9,3 kg fuel (average weight) dropped at ATF

$V_{\text{parts before ATF}}$  = Weight parts for reuse calculated as removed before ATF

$V_{\text{de-pollution}}$  = De-pollution fractions recorded at ATF

$V_{\text{parts at ATF}}$  = Weight parts for reuse recorded dismantled at ATF

$V_{\text{shredder}}$  = Hulk (pressed de-polluted ELV) weight recorded at shredder

## 16. ELV Recycling Account formula

$$V_{\text{parts before ATF}} = V_{\text{adjusted}} - V_{\text{parts at ATF}} - V_{\text{de-pollution}} - V_{\text{shredder}}$$

$$V_{\text{reused}} = V_{\text{parts before ATF}} + V_{\text{parts at ATF}}$$

$$V_{\text{material}} = V_{\text{material ATF}} + V_{\text{material shredder}}$$

$$V_{\text{energy}} = V_{\text{energy ATF}} + V_{\text{energy shredder}}$$

$$V_{\text{disposal}} = V_{\text{disposal ATF}} + V_{\text{disposal shredder}}$$

$$\text{Total recovery (\%)} = [(V_{\text{reuse}} + V_{\text{material}} + V_{\text{energy}}) / V_{\text{adjusted}}] * 100 \%$$

# 17. ELV Recycling Account 2016

## Achieved recycling and recovery rate

Table 4	Total
ELV number (W)	142 280
ELV(W1) tonnes	176 216
Reuse (A) tonnes	10 150
Recycling (B1+B2+F1) tonnes	139 945
Recovery (D1+D2+F2) tonnes	161 984
Reuse+Recycling (X1 = A+ B1 + B2 + F1) tonnes	150 095
Reuse+Recovery (X2 = A+ D1 + D2 + F2) tonnes	172 134
Reuse and recycling rate (X1/W1)	0,852
Reuse and recovery rate (X2/W1)	0,977

# 18. Electric vehicles-high energy batteries

## Electric vehicles, hybrids and rechargeable hybrids

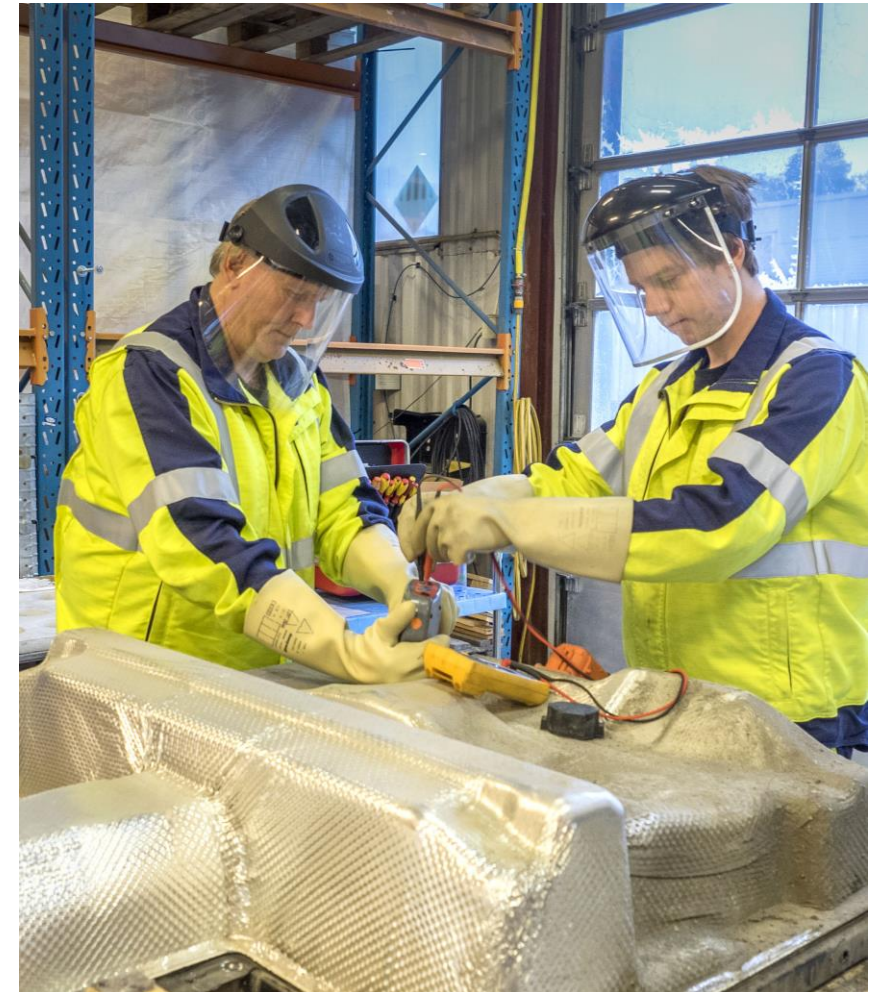
- The increasing number of electric vehicles, hybrids and rechargeable hybrids in Norway surpassed 120 000 June 2017
- Forecast for 2017 predict approx. 150.000, of which half (50%) will be electric

## Handling of high energy batteries (Litium ion)

- High energy battery in ELVs disassembled by expert personnel on ATF according to special course/authorization
- Collection organized by the return company for batteries (Batteriretur)
- Batteriretur handles high energy batteries properly and according to agreement with car importers

## Authorized personnel operate according to:

- Instruction from IDIS
- National regulation on the safety operation of electrical equipment and
- Regulations on land transport of dangerous goods



## 19. Electric vehicles – simulated crash



Thank you for your attention

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