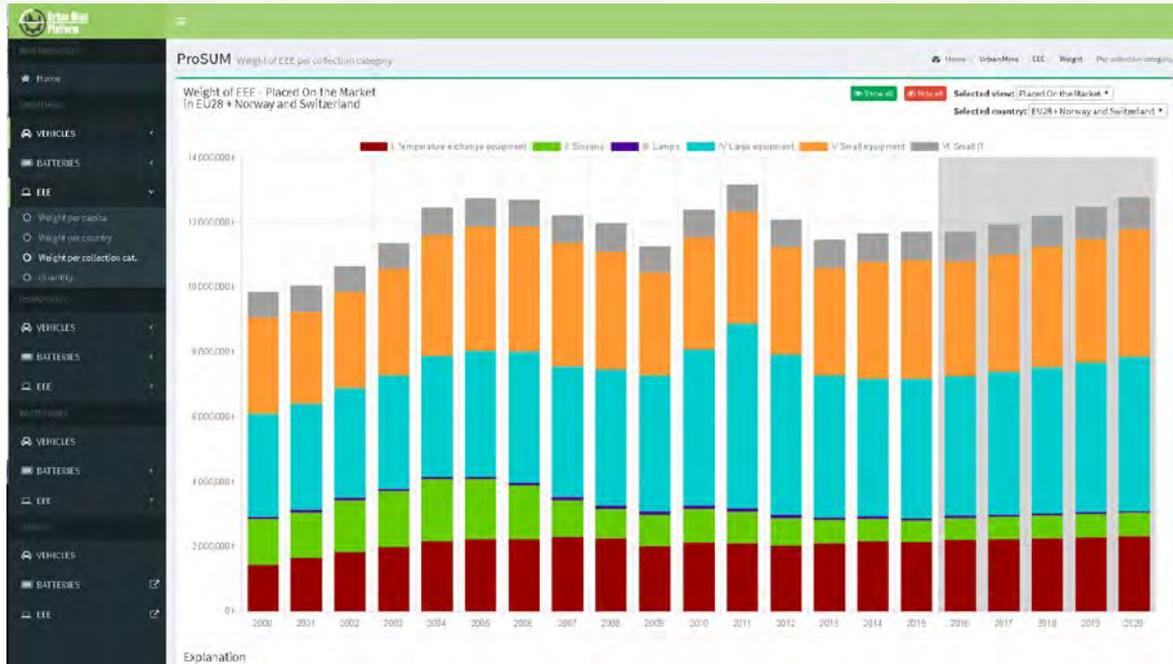


# Workshop on Friday 9:00 - 12:30



## WORKSHOP

**WEEE Recycling Prospects – State-of-the-Art Data on Stocks and Flows of (Waste) Electrical and Electronic Equipment, Components and Materials in the Urban Mine**

At the workshop, participants will learn more about data availability for secondary, including critical raw materials in WEEE.

**Organizer:** WEEE Forum  
**Date:** Friday, January 19, 2018  
**Time:** 09:00 – 12:30  
**Location:** Hotel Sheraton, Salzburg  
**Price:** EUR 70 – per person  
 EUR 90 – per person after November 30, 2017 (incl. coffee break)

**WHO SHOULD ATTEND THE WORKSHOP?**

- WEEE recyclers
- Producer Responsibility Organizations
- EEE producers
- Researchers
- Policy makers

The ProSUM project, funded under the European Union's Horizon 2020 research programme, comes to an end in December 2017. Join us to see the results of three years' work to produce an inventory of secondary raw materials, hosted at the EU-Urban Mine Knowledge Data Platform. The inventory includes data on secondary raw materials for WEEE, batteries, end-of-life vehicles and mining waste.

**AT THE WORKSHOP**

- Learn about the most up-to-date and elaborate WEEE composition datasets and intelligence on materials in the EU product categories as well as stocks and flows of WEEE within the EU.
- See a demonstration of how to use the EU-Urban Mine Knowledge Data Platform to generate charts and access reports.
- Hear how to overcome specific challenges in data availability.

For more information on the project see [www.prosumproject.eu](http://www.prosumproject.eu)  
 The workshop will be held with a minimum of 6 participants.



Have a look at [urbanmineplatform.eu](http://urbanmineplatform.eu)





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**WEEE Recycling Economics –  
The shortcomings of the current business model?**

**IERC, Salzburg, 17/1/2018**

Jaco Huisman – Huisman[at]vie.unu.edu  
Federico Magalini – Magalini[at]vie.unu.edu

Commissioned by:

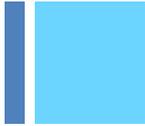


# 4 yrs ago: Countering WEEE Illegal Trade Project



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€300-600  
million

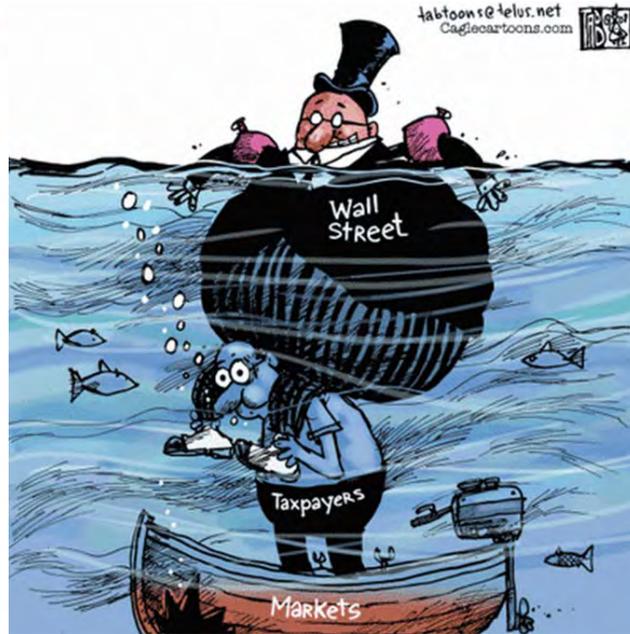
due to **bad disposal  
behaviour  
consumers**

€200-500  
million

Of **scavenging** of  
valuable components, only  
considering compressors  
from temperature exchange  
equipment, hard disks,  
memory and other small IT  
components

€800-1,700  
million

represents the  
**intrinsic  
material value**  
not available for compliant  
processing in Europe



**+ 150 to 600 M € in avoided  
compliance costs?**

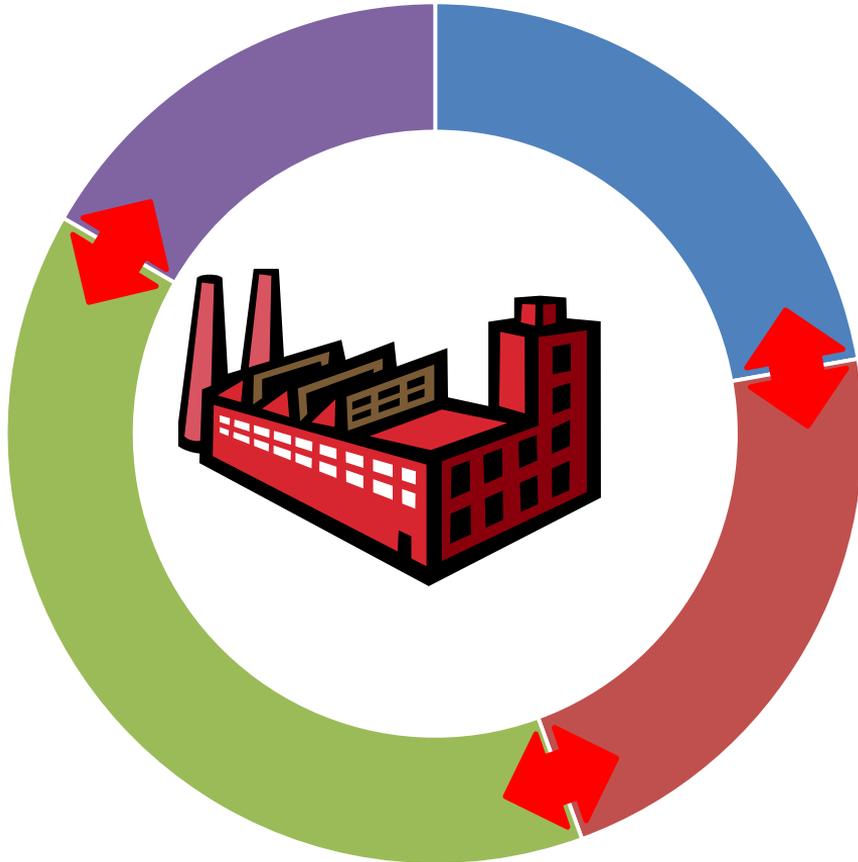
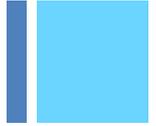


# The cost of recycling



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- **Capital Cost:** All assets related to the processing of waste (warehouses, machines, equipment, patents,...)

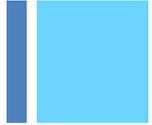
- **Office, Administrative & Overhead:** All costs related to personnel and not directly on working of the line

Technical Costs

- **Operational Costs - basics:** All costs related to depollution, processing, proper waste disposal,..
- **Operational Costs – quality & service:** All costs related to standards, quality, waste characterization, proper reporting,...

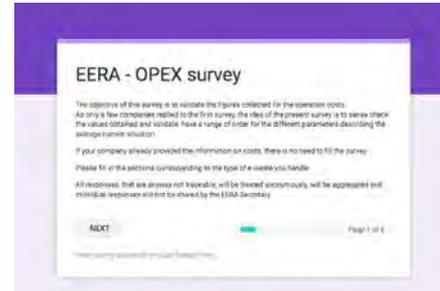
OUR FOCUS

# 2 surveys conducted:



## Economics of compliant recycling

Survey with selected EERA members plus verification round on the ranges identified (20 responses)



Via: Anonymous Google form

## Quality of collection

Survey with all EERA members on scavenging levels: 13 responses, covering 27 treatment locations



ENG, FRA, DEU, ESP Google Form

# Operational costs directly related to compliance\*

(average in EUR/ton)



\* These costs are **not** total treatment costs per cat. Excluded are capital, depreciation, other staff, office costs, etc

# Effect of avoiding certain compliance efforts for C&F\* (average in EUR/ton)



\* These costs are **not** total treatment costs per cat. Excluded are capital, depreciation, other staff, office costs, etc

# Effect of avoiding certain compliance efforts for CRTs\*

(average in EUR/ton)



\* These costs are **not** total treatment costs per cat. Excluded are capital, depreciation, other staff, office costs, etc



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# Programme

Quality of collection

QUESTIONS    RESPONSES: 11

Section 1 of 8

### EERA UNU Collection Quality Survey

This survey is meant to investigate the quality of collection of EERA members, the level of scavenging of products and components from WEEE and to take inventory of best practices supporting more complete collection of WEEE.

Please fill in one form for 1 or more locations per SINGLE country

All answers are collected by UNU (not by EERA Secretariat) and aggregated and made anonymous before being discussed and disclosed. If you wish to sign a mutual NDA with UNU before filling this in, please contact [huirom@unu.edu](mailto:huirom@unu.edu)

Email address \*

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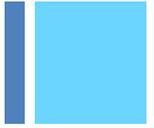
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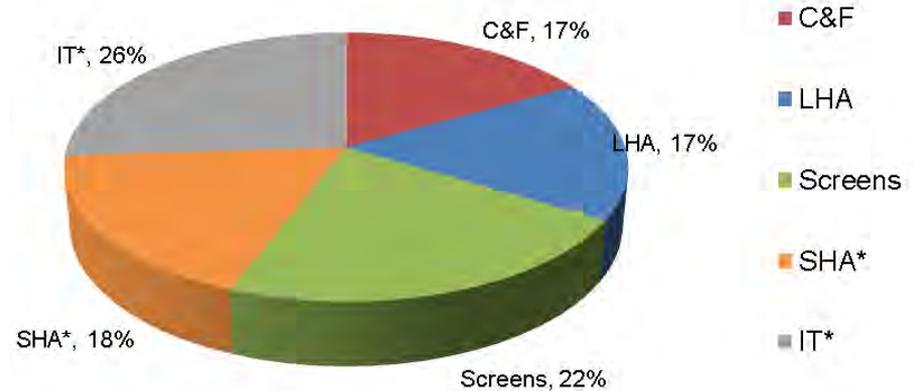
EUROPEAN ELECTRONIC REPAIR ASSOCIATION



# Scavenging levels - Coverage



- 13 companies, covering 27 locations
- 'Sample size': 465,000 tons
- Data for 2016
- 51 collection category - country combinations:
- LHA 9; C&F 6; Screens 10; LMP 3; LHA 9; SHA 12; IT 11
- **Well-distributed over Europe**



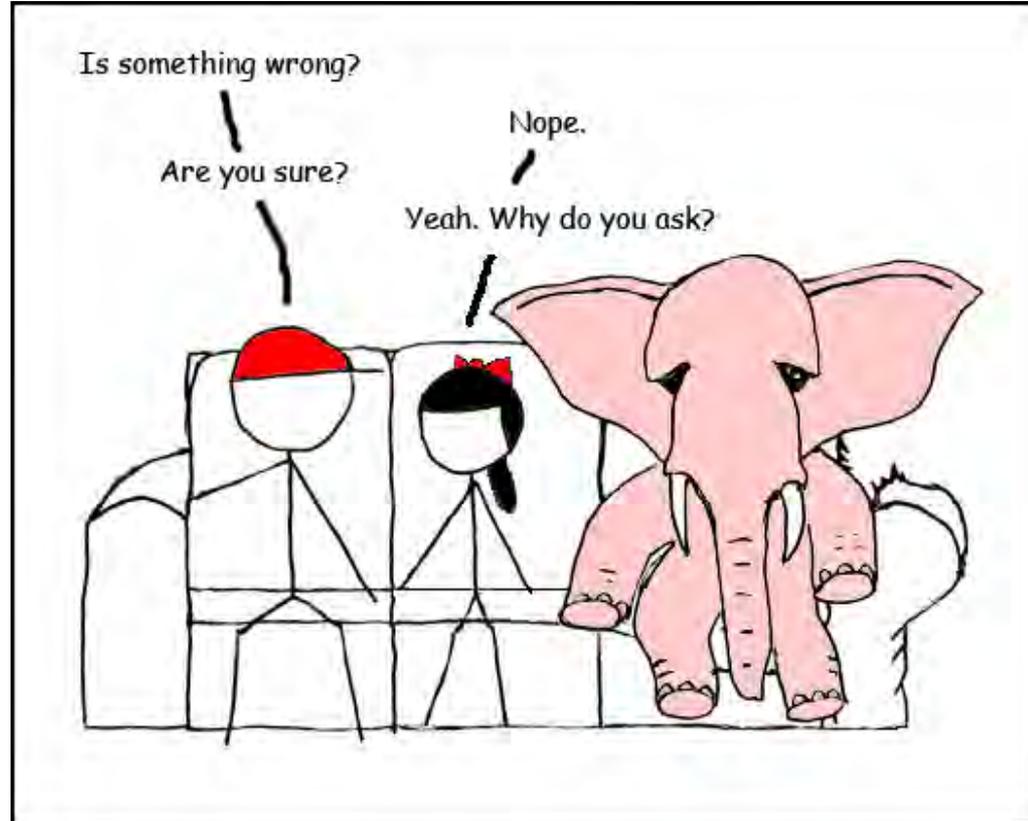
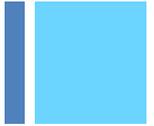
\* Some overlaps and double counts

# The elephant in the room...



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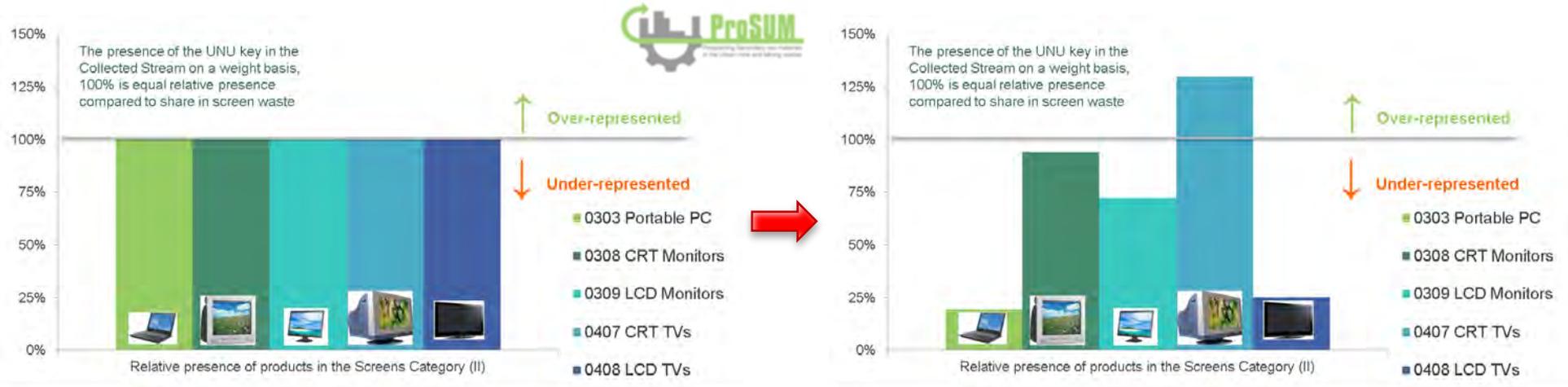
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# Scavenging levels - General



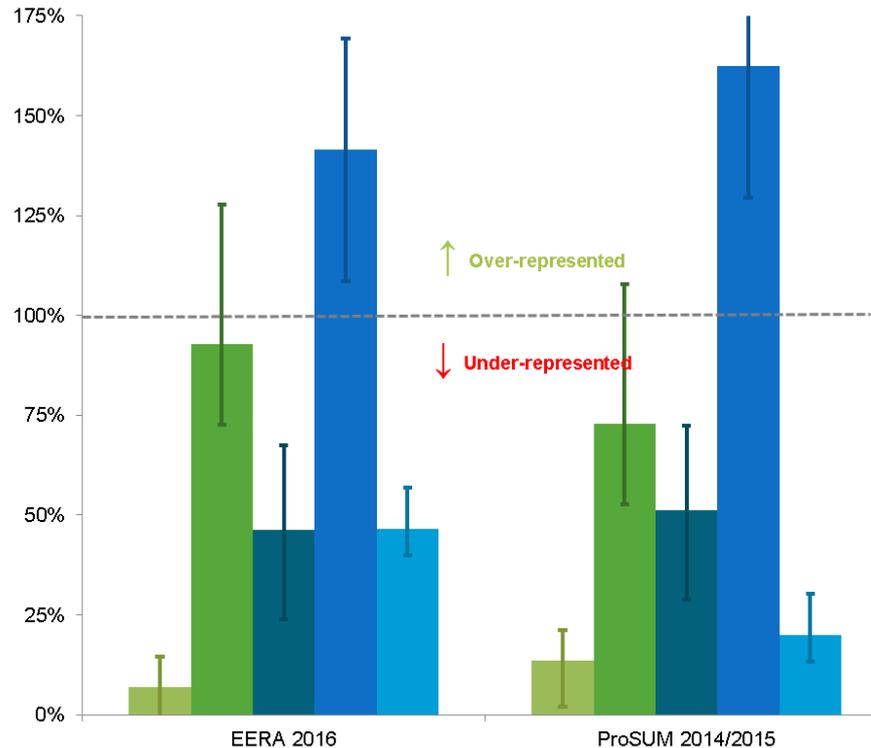
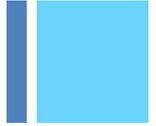
Scavenging is not just components missing, but also valuable products!



It however seriously affects the values of the contracted recycling!

Scavenging ≠ Materials are Lost!

# Scavenging screens EERA vs ProSUM

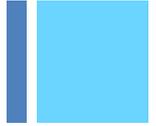


□ Precise value of € missing per ton is very country dependent

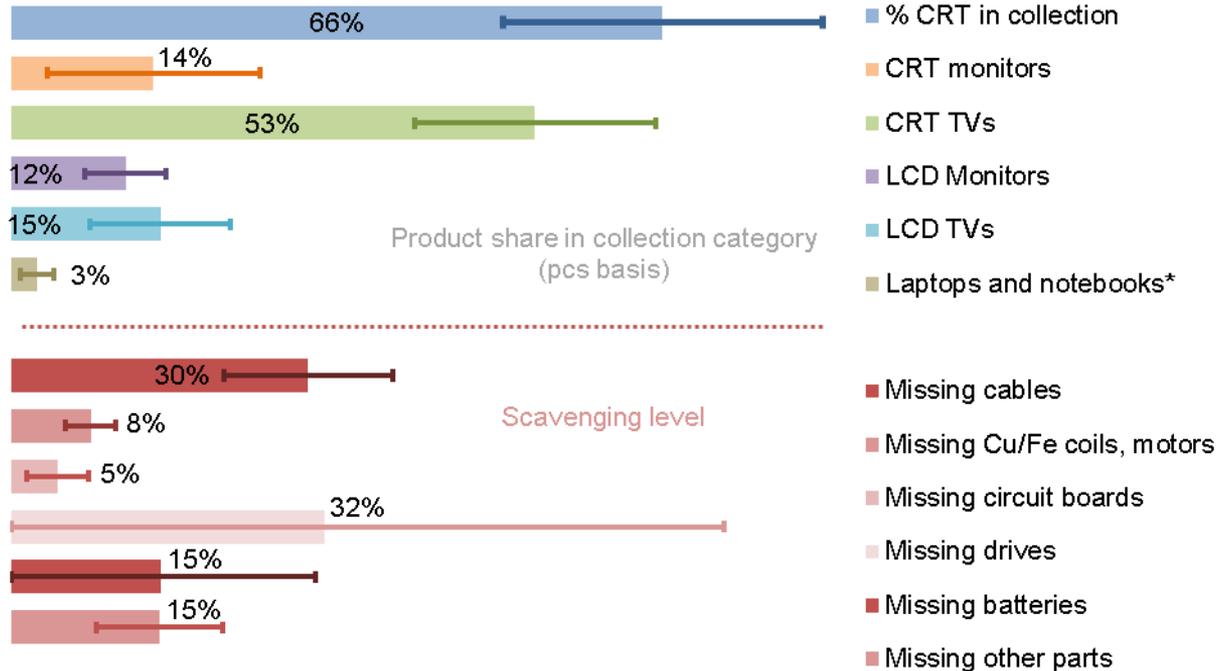
Commissioned by:



# Scavenging levels - Screens



## Collection Quality SCREENS



**CRT% in pieces quickly dropping now in richer countries**

❑ Average dropped from 86% to 66% in 4 yrs!

### Scavenging levels:

❑ High for cables due to detachable power chords

❑ High for drives from laptops (large deviations)

❑ Some scavenging of CRT deflection coils/ electron guns in Southern and Eastern Europe

# Scavenging levels – C&F

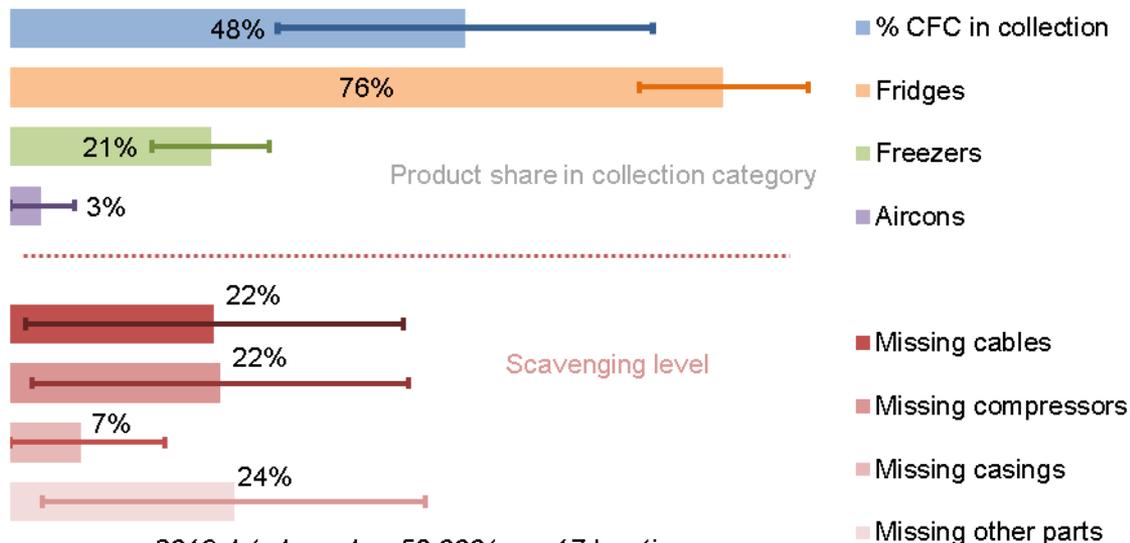


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## Collection Quality C&F



2016 data based on 58,000 tons, 17 locations  
Error bars reflect Standard Error

### EERA survey amounts:

- ❑ Countries with high CFC level also have high scavenging level!
- ❑ CFC level was 58% 4 yrs ago

### EERA survey:

**280,000 tons of CO<sub>2</sub>**  
= annual emissions of  
**200,000 cars!**

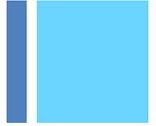
**When extrapolated to EU C&F  
WEEE volume:**  
**8 million tonnes CO<sub>2</sub> equiv.**  
≈ annual emissions of  
**6 million cars!**

# Scavenging levels – C&F



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Scavenging compressors, when  
extrapolated to EU volume:  
8 million tonnes CO<sub>2</sub> eq =



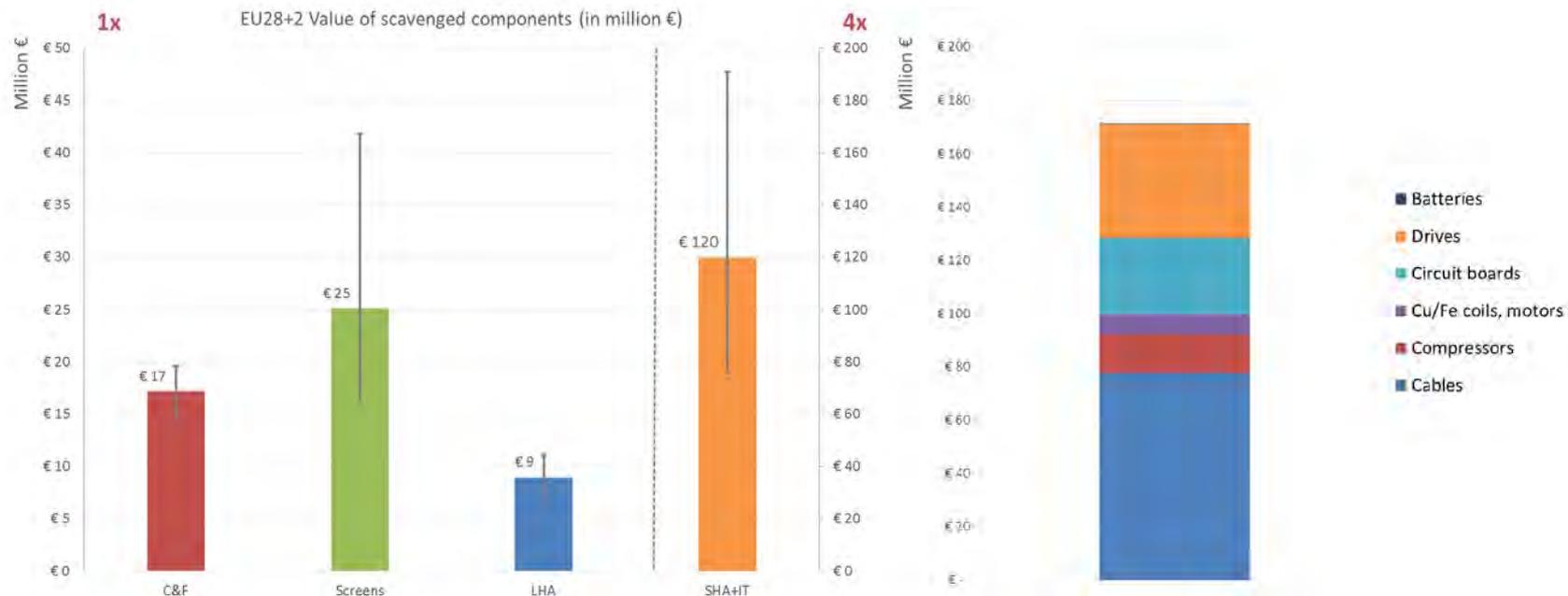
2 of these...

# Estimations of 'losses' due to scavenging



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WEEE Generated  
EU28+2, 2016

1.7 Mt

1.3 Mt

3.4 Mt

4.1 Mt

Based on scavenging level and the price per components.  
'Losses' for 2016 are against total WEEE Generated  
EU28+2 = 10.4 million tons in total

Largest contributions from:

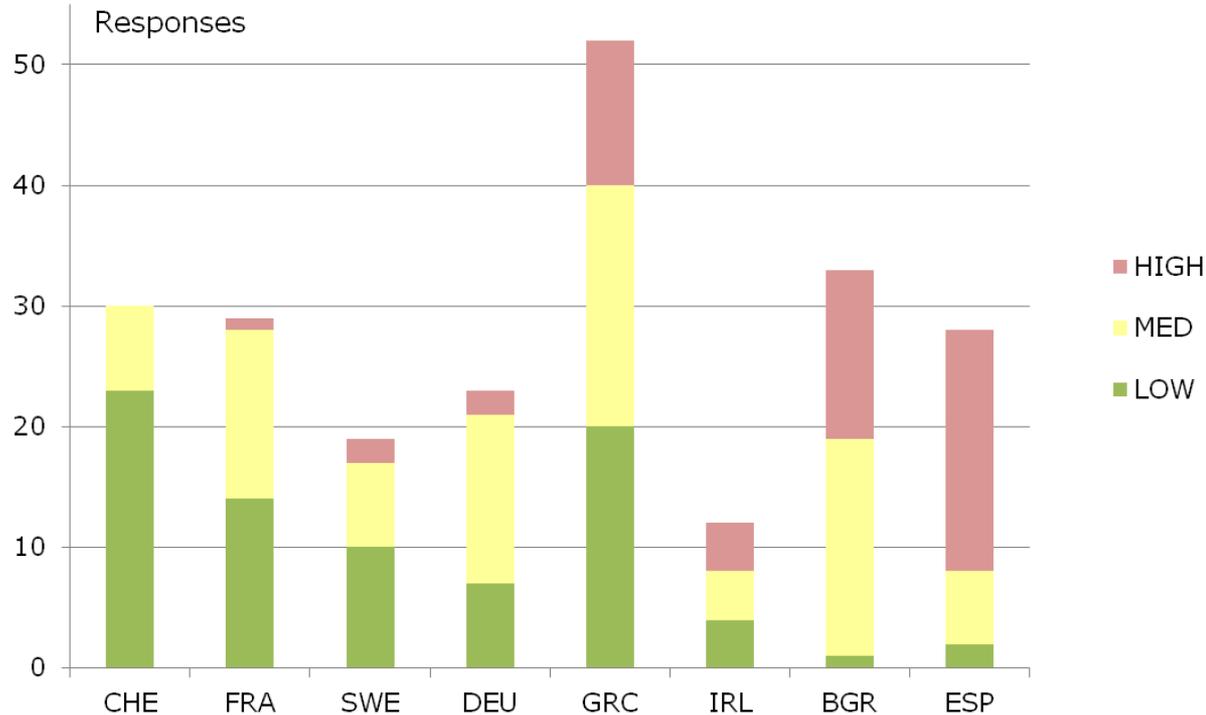
1. Cables, 80 million €
2. Drives, 40 million €
3. Circuit boards, 30 million €
4. Compressors, 15 million €

# Is scavenging country dependent?



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2016 data

Based on 226 individual responses

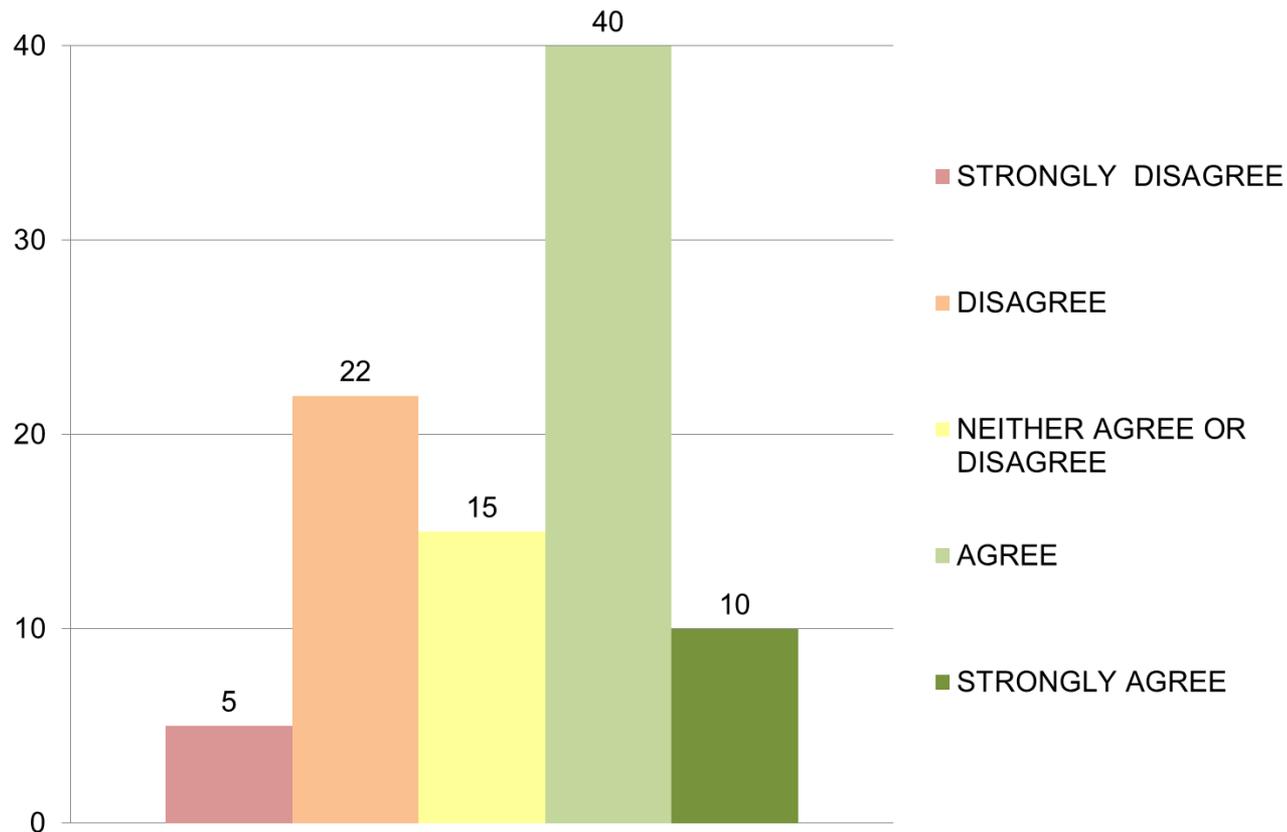
HIGH = Highest 1/3 scavenged  
MIDDLE = Middle 1/3 scavenged  
LOW = Lowest 1/3 scavenged

# The officially reported WEEE data are reliable:



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Conclusions

What Next?





- **The effect of avoided compliance costs is much larger than margins**
  - Avoiding reporting reduces operational costs with +/- 20%
  - Avoiding depollution and waste disposal reduces operational costs with +/- 50%
- The losses associated to scavenging of components are substantial:
  - Up to 70 €/t, EU28+2: +/- 170 million €/yr
  - The elephant in the room needs to be quantified as well

# What next?



## Technical requirements should come prior to pricing quotations!

### Ideas:

- Responsible negotiating:
  - Technical and Financial offers could be f.i. 70/30 or 60/40 in procurement contracts
  - Share best contracting practices and mechanisms!
  - Develop a scavenging index; include impact of in (€/t) directly in pricing discussions,
- Research:
  - Repeat the collection quality survey annually to determine scavenging levels
  - Incorporate a standardised product count when running batch tests
- Report and communicate:
  - Report anomalies on a recurring basis to inspectorates (f.i. compressors)
  - Request an Annex VII reporting requirement at Member State level