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# CRM Data Management Workshop

26th November 2018, BAM, Berlin, Germany

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# Department Environmental and Reliability Engineering

- **ProSUM** (2015-2017, EC H2020)
  - centralised database containing all available data on market inputs, stocks in use, compositions and waste flows of batteries, WEEE, vehicles and mining waste for all EU 28 Member States plus Switzerland and Norway.
- **ORAMA** (2017-2019, EC H2020)
  - Optimizing data collection practices for improved SRM information on battery flows in the future
- **Study on the durability and environmental impact of ICT device batteries** (published June 2016; German Environmental Agency)
  - Lifetime testing of tablet batteries under laboratory conditions
  - Durability assessment of notebook batteries in the field
  - Life Cycle Assessment of lithium-ion polymer batteries
- **PolyCE** (2017-2021 , EC H2020): Enhancing plastics recycling from e-waste
- **sustainablySMART** (2015-2019 , EC H2020): Sustainable Smart Mobile Devices Lifecycles through Advanced Re-design, Reliability, and Re-use and Remanufacturing Technologies
- Etc.



# Why do we need an Urban Mine knowledge base ?

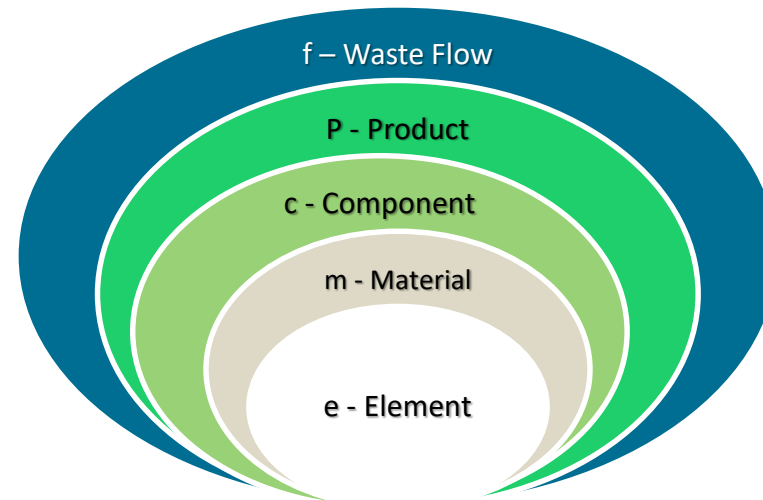


- Fast changing technologies → causing significant shifts in resource demands for strategic metals such as (for batteries) graphite, Cadmium, Cobalt , Copper, Lithium, Manganese, Nickel, Lead and Zinc
- Valid Information on **market trends, battery composition and CRM concentration, lifespan, turn-over time** as well as **unknown whereabouts of product** flows in Europe

- Material flow analysis for certain elements important to work against potential shortcomings in the future
- Data-based policy-making! E.g. definitions and calculation of realistic collection and recycling targets
- Better data and intelligence can help to improve collection and recycling volumes in the future!

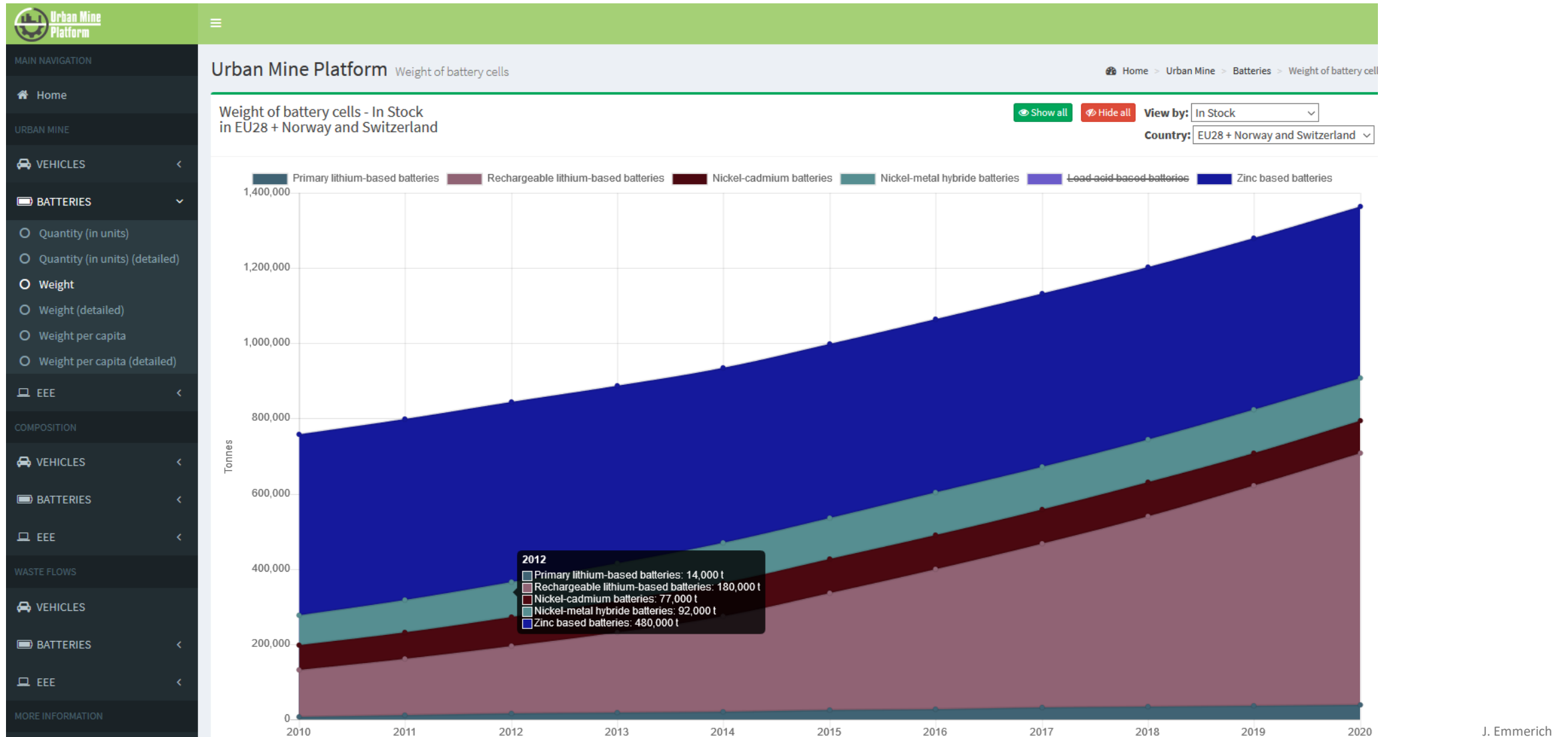
# Urban Mine Platform - What is it and why do we need it?

- Aim of the ProSUM project was to provide a state of the **art knowledge base**, using best available data in a harmonised and updateable format.
  - The Urban Mine Platform (<http://www.urbanmineplatform.eu/>) provides in a single place, all data and information related to urban wastes – WEEE, ELV, spent batteries – and mining wastes
- An inventory for state of the art data on secondary raw materials with a focus on CRMs

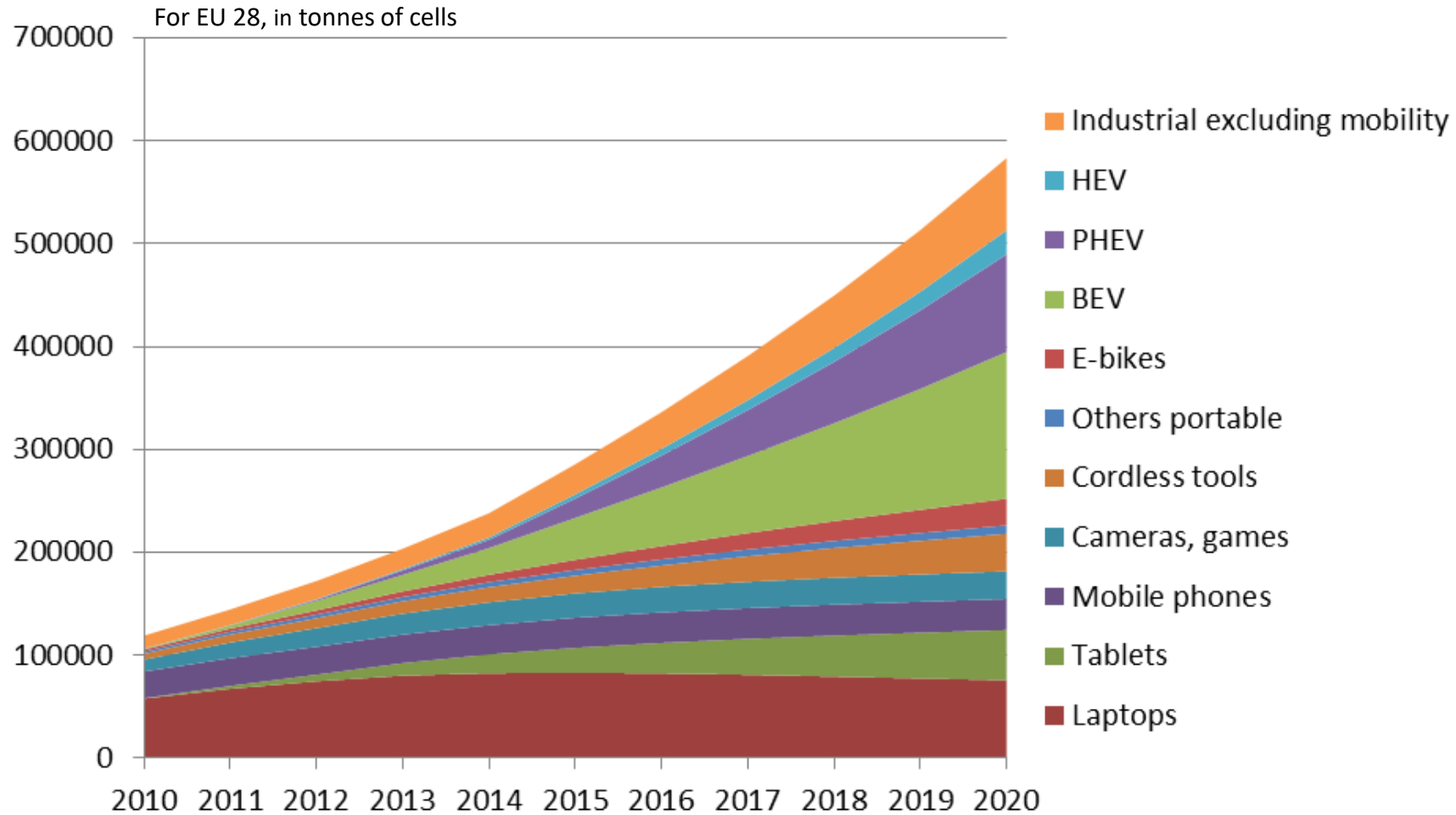


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# The EU Urban Mine Knowledge Data Platform



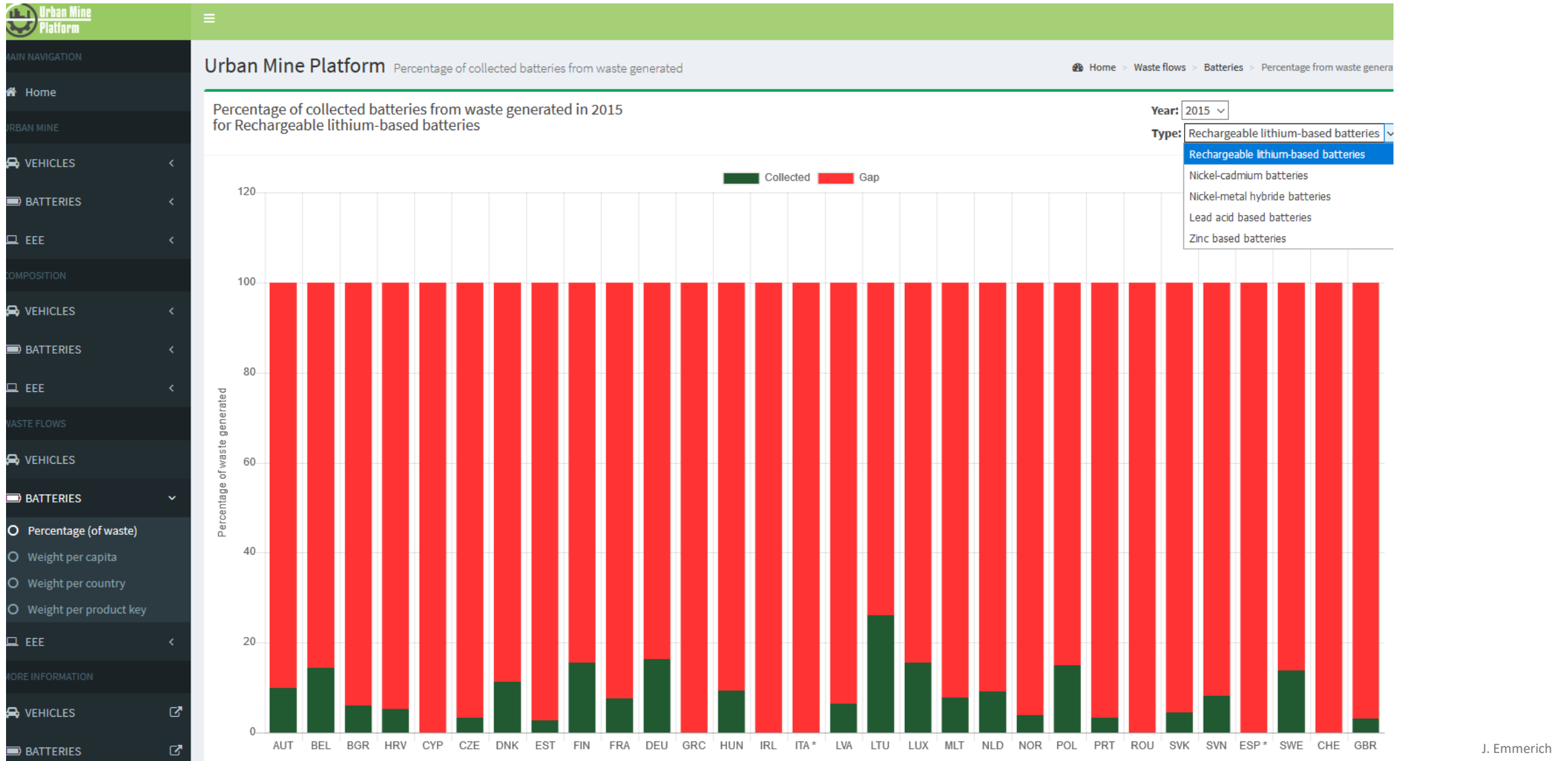
# Lithium-ion batteries in stocks according to the stocks and flows modelling



Source: P. Chancerel, C. Chanson, P. Binnemans, J. Emmerich, P. Mährlitz *et al.*, 2017

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# The EU Urban Mine Knowledge Data Platform



# Battery Stocks und Flow Model



Placed on Market

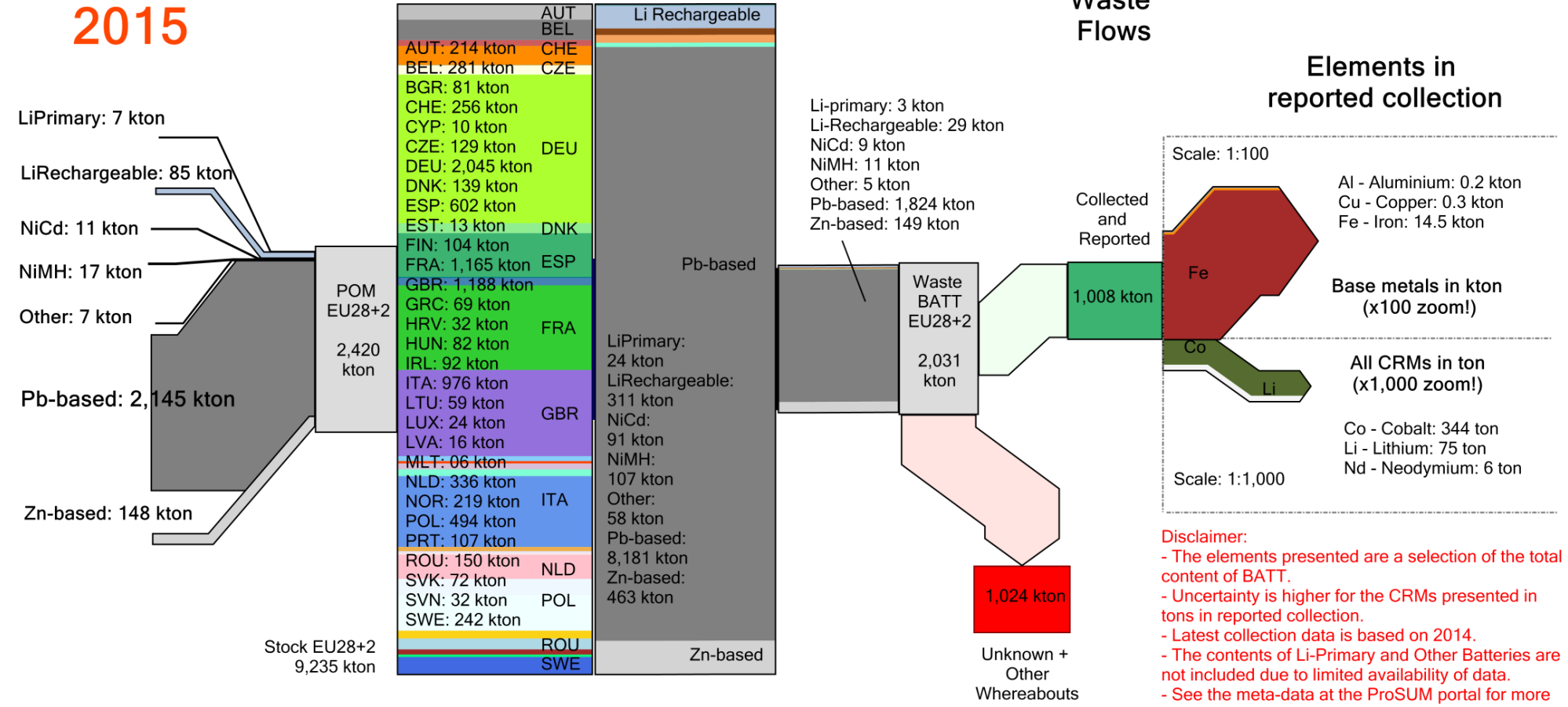
2015

Stock per country

BATT Waste Generated

Waste Flows

Elements in reported collection



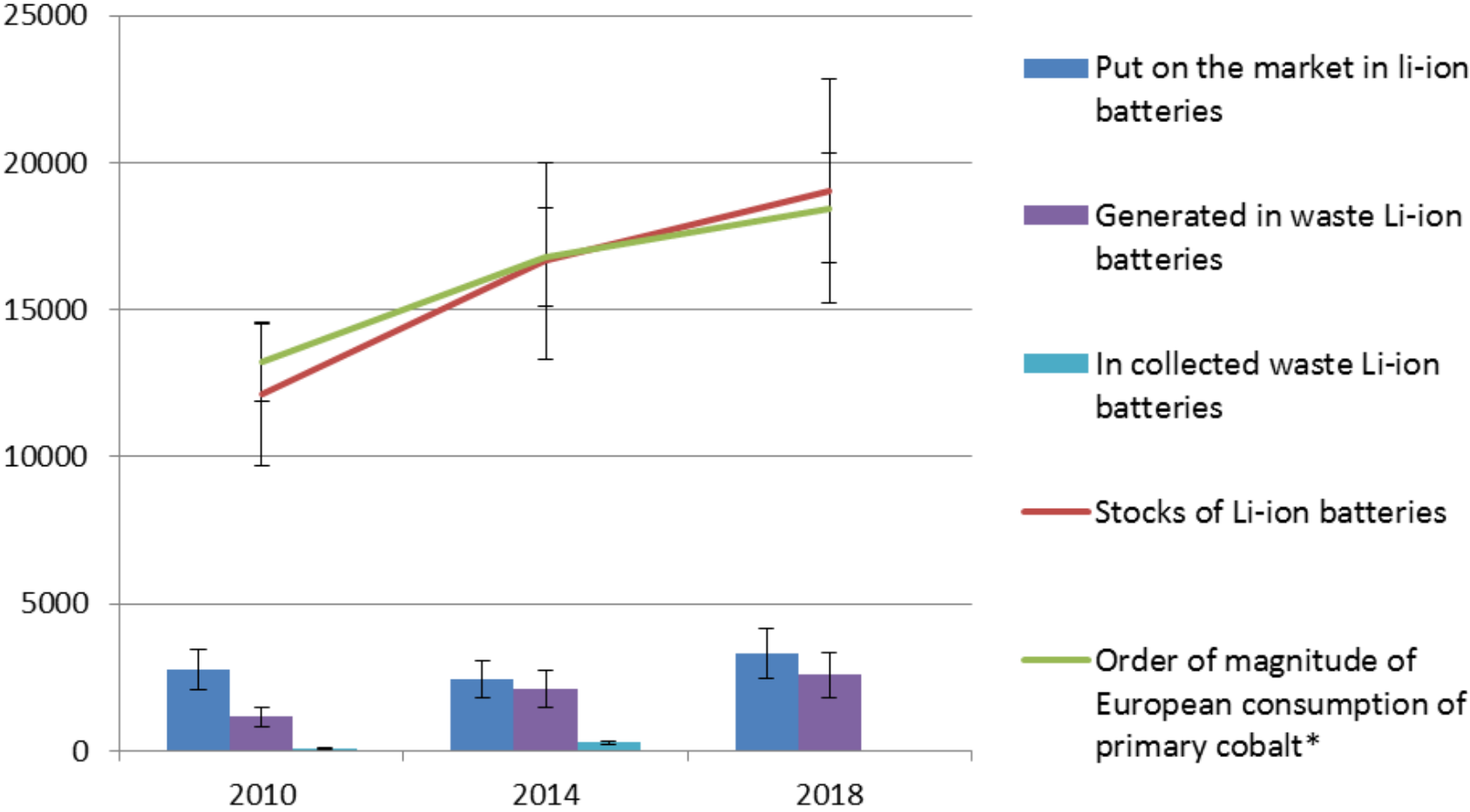
**Disclaimer:**

- The elements presented are a selection of the total content of BATT.
- Uncertainty is higher for the CRMs presented in tons in reported collection.
- Latest collection data is based on 2014.
- The contents of Li-Primary and Other Batteries are not included due to limited availability of data.
- See the meta-data at the ProSUM portal for more details, incl. an overview of all data sources used and their constraints.

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# Cobalt Stock and Flows in Li-ion Batteries (in tonnes)



Source: P. Chancerel, C. Chanson, P. Binnemans, J. Emmerich, P. Mählitz *et al.*, 2017

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# Who benefits from Urban Mine Knowledge base?

## Industry

- Users of CRMs and raw materials
- Recyclers, pre-processors, materials producers
- Smelters
- Manufacturers of batteries, electrical and electronic equipment and vehicles
- New markets entrants (start-ups)
- Producer compliance schemes
- Concentrators (mines)

## Policy-makers

- Member States: Ministries for Economic Affairs (CRM supply), Environment Affairs, Foreign Affairs, Defense, Statistics, Research
- European Commission: European Innovation Partnership on Raw materials, DG Grow, DG Environment
- Eurostat, Member States statistics agencies

## Researchers

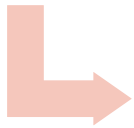
- DG Joint Research Centre of the European Commission
- Research institutes
- Universities
- Competence centres
- Consultants
- LCA software providers

# ORAMA- Optimising quality of Information in RAW MAterials data collection across Europe

Working towards improved datasets from CRM content in batteries

## 1st Step

- Inventory of available battery related data sources (completed)



## 2nd Step

- Screening of data collection methods of MS (completed)



## 3rd Step

- Formulation of recommendations and the selection of case studies (ongoing)

# Preliminary results

- Major data gaps in Eurostat relate to **coverage and harmonization issues**.
- Different interpretations of definitions and methods used to collect the data **lead to divergences between countries** and battery categories in the reporting of data.
- In addition to the data gaps related to completeness and coverage, the remaining **challenge relates to the interoperability and internal consistency of the data**, which conditions the estimation of the amount of secondary raw materials, including **CRMs contained in batteries and waste batteries**.

→ Requirements for harmonizing interpretations of definitions, classifications and (partly) data collection methods.

# Overview data reporting practices across EU

Country	POM Reporting	Level of detail POM	Collection Reporting	Level of detail collection	Country	POM Reporting	Level of detail POM	Collection Reporting	Level of detail collection
AT	volume	low	volume	low	IE	ChemTypes/BatType	high	ChemTypes/BatType	high
BE	prim/sec, ChemTypes, Bat sold in EEE	high	prim/sec, ChemTypes, Bat sold in EEE	high	IS	n.a.	low	n.a.	low
BG	ChemTypes	moderate	ChemTypes	moderate	IT	ChemTypes, prim/sec	Moderate	volume	low
CH	ChemTypes (7), Batt sold in EEE	high	ChemTypes (7)	high	LT	11 ChemTypes, EWC	high	EWC	moderate
CY	units, weight groups	moderate	ChemTypes	moderate	LU	ChemTypes, Batt sold in EEE, BatType	high	prim/sec, ChemTypes, Battype	high
CZ	ChemTypes, BatType	moderate	ChemTypes	moderate	LV	ChemTypes/BatType	moderate	ChemTypes/BatTypes	moderate
DE	(detailed) ChemTypes, prim/sec, BatType	high	(detailed) ChemTypes, prim/sec, BatType	high	MT	ChemTypes, prim/sec	moderate	volume	low
DK	ChemTypes, BatType	moderate	ChemTypes	moderate	NL	ChemTypes, BatWeight	moderate	Volume	low
EE	BatType, prim/sec	high	prim/sec, ChemType	high	NO	BatTypes	low	volume	low
ES	volumes	low	volumes	low	PL	ChemTypes	moderate	volumes, EWC	moderate
FI	ChemTypes	moderate	ChemTypes	moderate	PT	n.a.	low	EWC codes	low
FR	ChemTypes	moderate	ChemTypes	moderate	RO	BatType, ChemTypes	moderate	Battype, ChemTypes	moderate
GB	ChemTypes (3 groups)	low	ChemTypes (3)	low	SE	ChemTypes, Batt sold in EEE	high	ChemTypes/BatTypes	high
GR	prim/sec	low	n.a.	low	SI	prim/sec, ChemTypes	moderate	prim/sec	moderate
HR	n.a.	low	n.a.	low	SK	ChemTypes (EWC), BatType (Port&Ind)	high	Units, ChemType, Battype (ind)	high
HU	prim/sec, ChemTypes	high	prim/sec, ChemTypes	high					

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# Conclusions and key messages

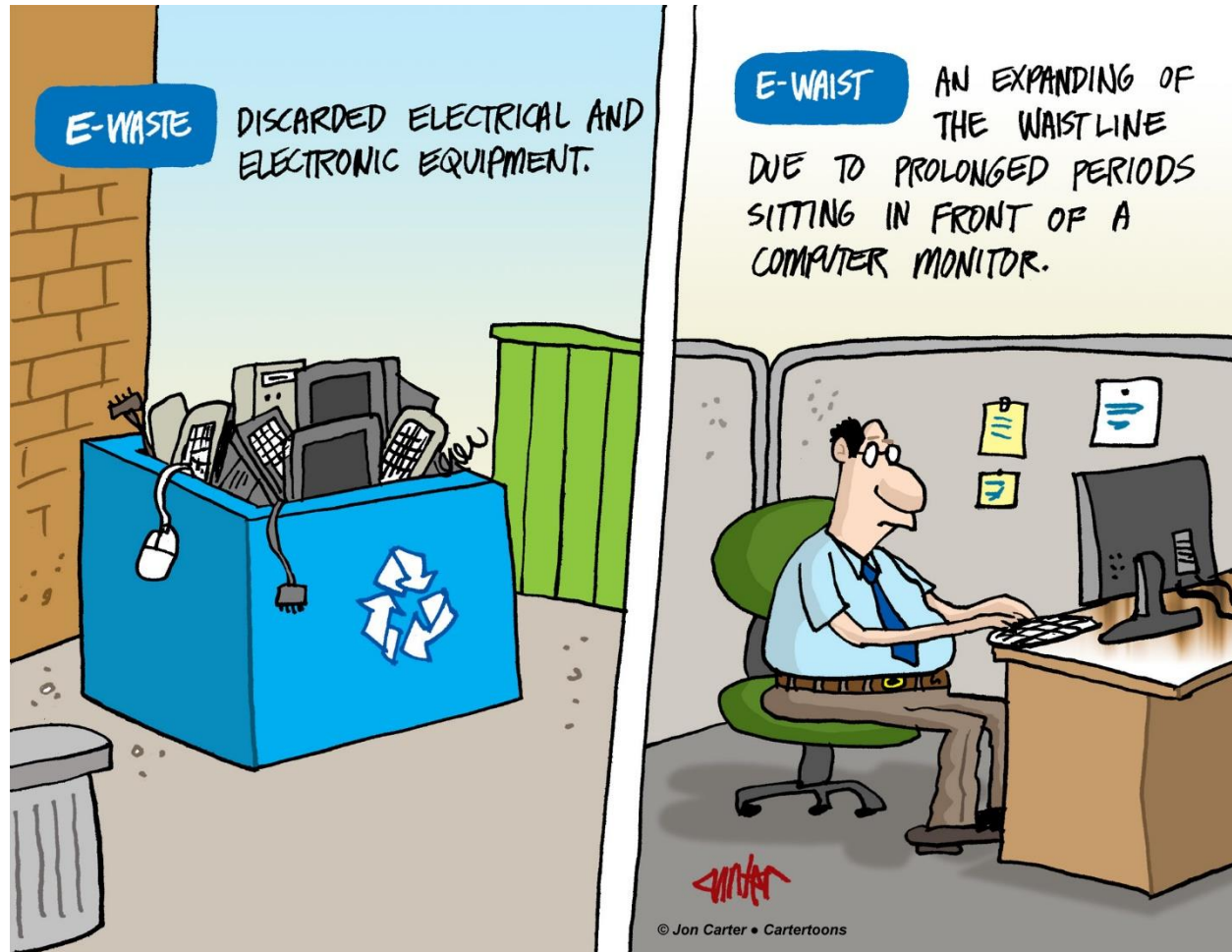
**Informed decisions for policy making must be based on solid data!**

In order to work towards circular material loops from waste batteries in the future we need better data, e.g. on unknown whereabouts :

- Updates on battery lifespan (EV, EEE considering re-use)
- Improved data collection methods (e.g compliance schemes)
- Current level of scavenging, cherry picking and export channels?
- Future resource flow scenarios ?

If we do not know the whereabouts of material flows from batteries,  
if we do not know the magnitude of EU Urban Mine,  
if we do not know what is coming and where to make efforts –  
we cannot move on to circular material flows!

# Let's get to work!



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