



## CEWASTE WORKSHOP

23 October 2019, Geneva, Switzerland

Chair: Mathias Schluep

World Resources Forum Association

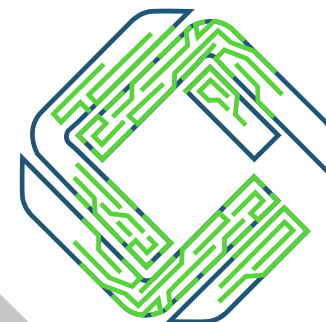


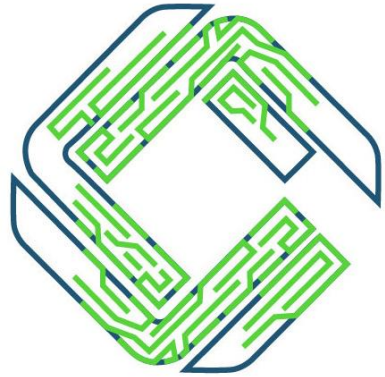
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 820859



# Workshop Programme

WEDNESDAY, 23 Oct. 2019		
16:00 – 16:10	<b>Opening and Welcome</b>	Mathias Schluep (WRFA)
16:10 – 16:40	<b>Introduction to the CEWASTE Project</b> General overview of the objectives and approach Baseline and Gap Analysis CEWASTE Normative Requirements CEWASTE Certification Scheme	Shahrazad Manoochehri (WRFA) Otmar Deubzer (UNU) Sonia Valdivia (WRFA) Yifaat Baron (Oeko Institute)
16:40 – 17:00	<b>Stakeholder Perspective</b> Invited Speaker: Michael Gasser, Heinz Boeni (Empa) <i>“Challenges in conformity assessment of CRM recovery”</i>  Invited Speaker: Julio Alejandro Giraldo B. (ICONTEC) <i>“Conformity Assessment for aste and E-waste”</i>  Invited Speaker: Tatiana Terekhova (Basel Convention)	
17:00 – 17:45	<b>Group discussions on key elements of the CEWASTE Certification Scheme following the value chain stages</b>	Moderator: Pascal Leroy (WEEE Forum)
17:45 – 17:50	<b>Wrap up of the Group Discussion</b>	Pascal Leroy (WEEE Forum)
17:50 – 18:00	<b>Next Steps and Closing</b>	Mathias Schluep (WRFA)





# CEWASTE

Voluntary certification  
scheme for waste treatment

## Introduction to the CEWASTE Project

Shahrzad Manoochehri

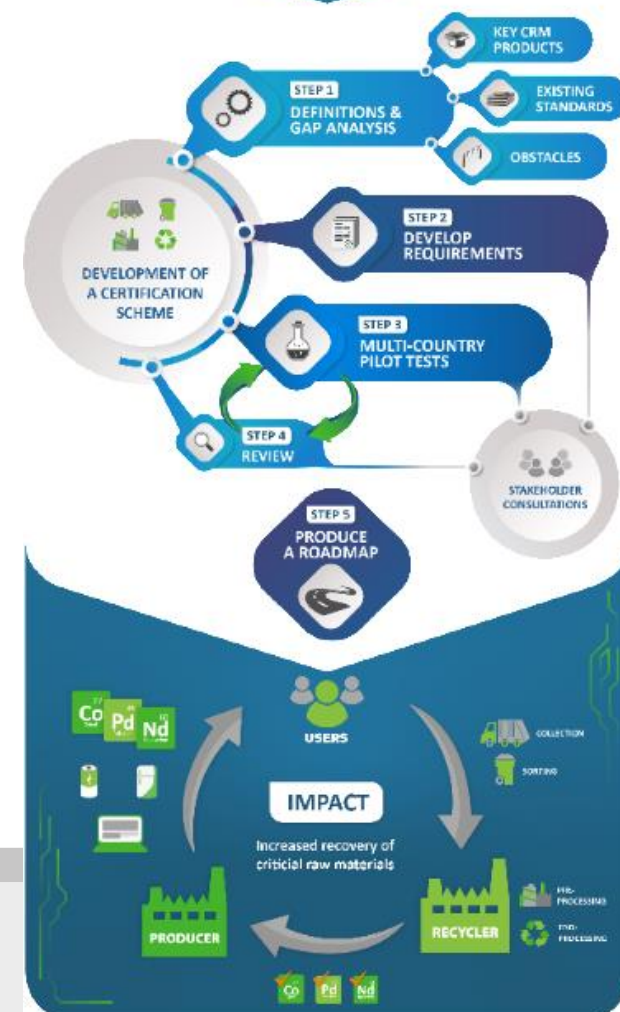
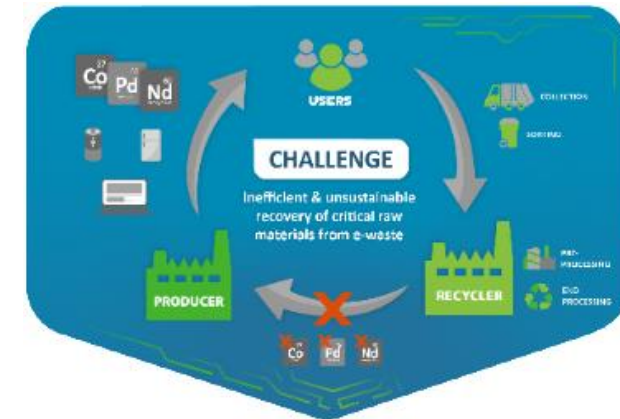
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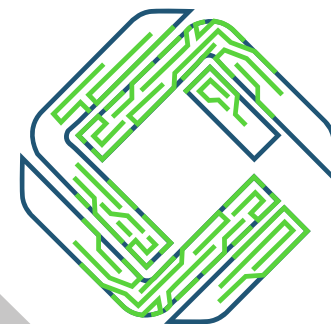
# Main Objective of the CEWASTE project

The project “Voluntary Certification Scheme for Waste Treatment” (CEWASTE) aims to **develop and validate a voluntary certification scheme** for collection, transport and treatment facilities of key types of waste containing significant amounts of **valuable and critical raw materials (CRMs)**.



## Response to which challenges?

- Need for sustainable access to valuable and critical raw materials (CRMs) for the EU economy,
- CRMs not circular in Europe
- Issue of illegal trade of waste
- Need for standardization activities in support of policy actions
- Need to support the development of environmentally and socially sound recycling systems globally.



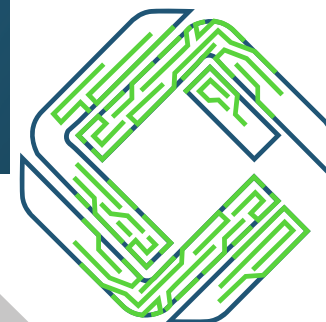
# Approach

- Understand existing recovery practices, standards and verification schemes related to valuable and critical raw materials.
- Leverage existing normative requirements to **develop new requirements for CRM recycling**.
- Develop an **assurance system and related verification procedures**.
- Validate the new voluntary scheme through **pilots**.
- Ensure long term sustainability of the scheme, resulting in a **roadmap**.
- Ensure a **transparent stakeholder process** that allows for broad acceptance and dissemination of the essentials of the scheme.



# Project's Resources

- A two-year project funded by the European Union's Horizon 2020 research and innovation programme
- Strong Consortium Partners, Linked Third Parties and Advisory Board



# Project's Resources

## ADVISORY BOARD

Agence de l'Environnement et de la Maitrise de l'Energie (ADEME)

Aluminium Stewardship Initiative (ASI)

CENELEC TC111x Environmental Standards (CENELEC)

Colombian Institute of Technical Standards and Certification (ICONTEC)

International Union for Conservation of Nature (IUCN)

DG Joint Research Center (JRC)

Public Waste Agency of Flanders (OVAM)

Regional Environmental Center (REC Turkey)

Southern African e-Waste Alliance (SAEWA)

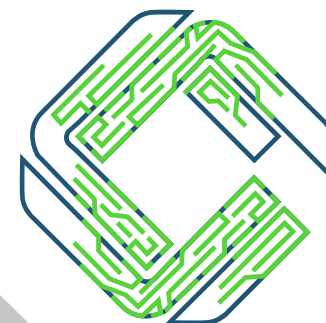
Swiss Federal Institute for Materials Science and Technology (Empa)

Umwelt Bundesamt (UBA)

WEEELABEX

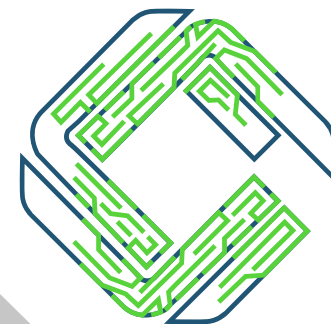
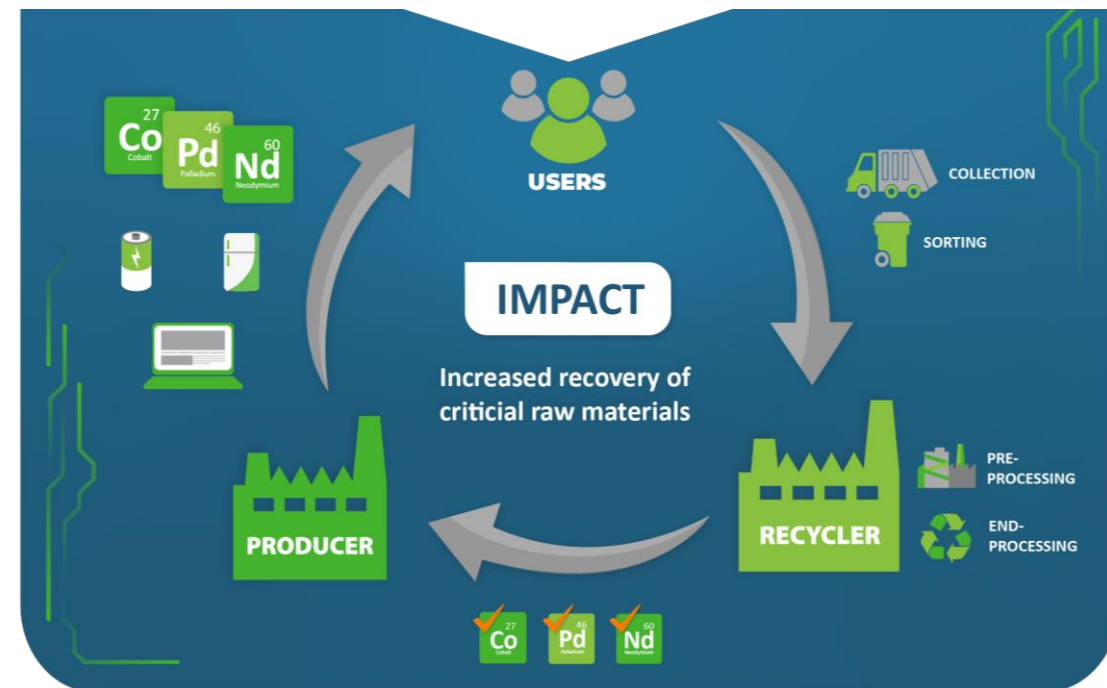
Eurometaux

Basel Convention

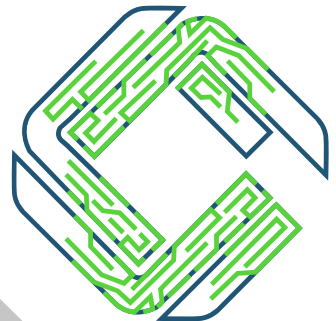
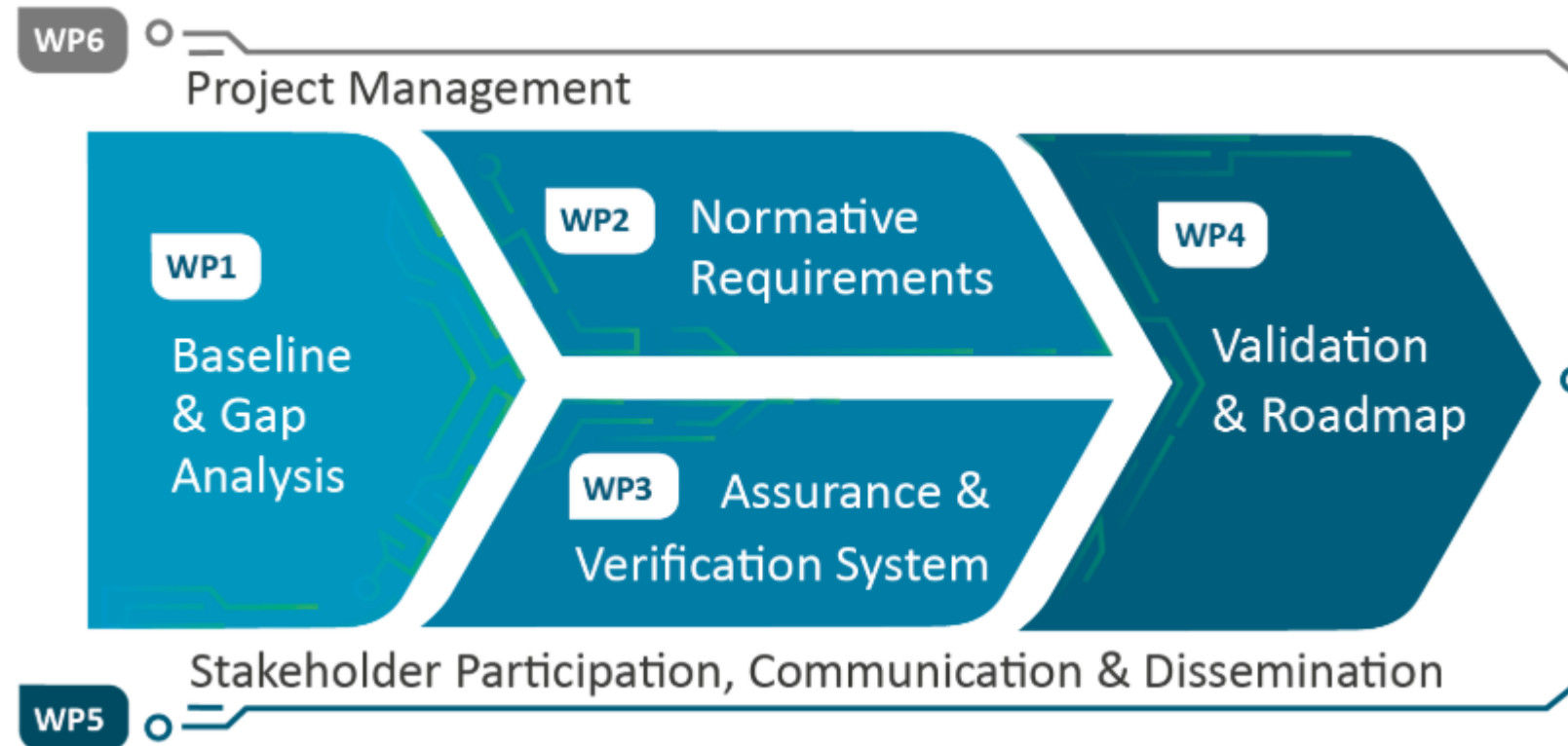


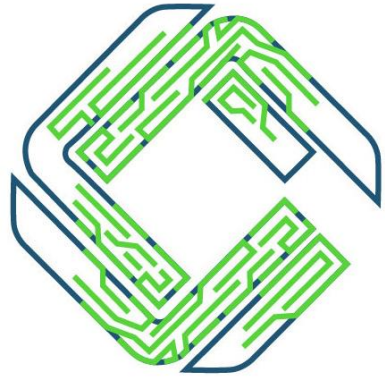
## Expected Impact

- Increased recovery rates of valuable and critical raw materials from key types of waste in the EU,
- More environmentally and socially sound recycling systems for CRM recycling are developed globally,
- Framework conditions for the sustainable development of and investment in innovative solutions in the EU are improved,



# Project Structure and Timeline





# CEWASTE

Voluntary certification  
scheme for waste treatment

## Baseline and Gap Analysis

Otmar Deubzer

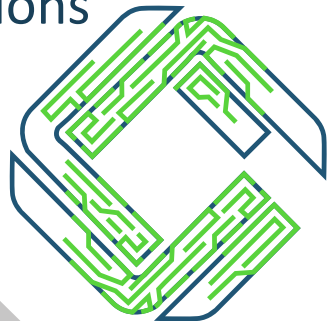
United Nations University

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# Criteria for Identification of Key CRM Equipment

- Material focus: Raw materials on the COM's Critical-Raw-Materials (CRM)-list
- Product focus: WEEE, batteries from WEEE and ELV
- Final processing technically feasible (but possibly not practiced)
- Pre-processing can provide input required for end-processing
- Economic feasibility under current economic framework not necessary
- CRM concentration within “reasonable limits” (exclusion of hopeless cases)
  - Share of use in product negligible compared to global use/consumption
  - Concentration/content below technical limits even after separation of components
  - Economic viability highly questionable even under optimum economic conditions
- Exclusion of CRMs if recycling conflicting with PM/PGM recycling



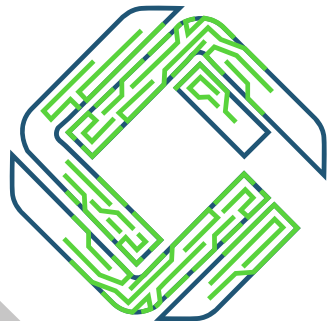
# Key CRM Equipment

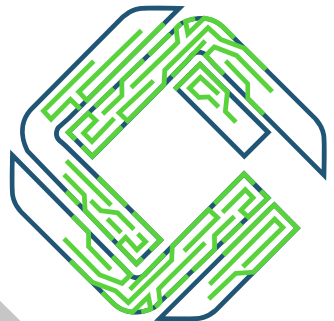
Source Component	KCE	Waste Type	CRMs	Required/Viable Input for End-processing	Current Economic Feasibility	
Fluorescent powders	Fluorescent lamps	WEEE	Eu, Tb, Y, Ce,	Fluorescent powder	No	
	CRT monitors and TVs		Y, Tb, Eu, Gd,La, Ce	Fluorescent powder		
Nd-magnets	Temperature exchange equipment (engine, compressor)	WEEE	Nd, Pr, Dy, Gd, Tb	Magnets	No	
	Household appliances other than temperature exchange equipment (motors/drives)					
	Laptops (HDD)					
	Desktop Computers, prof. IT (HDD)					
	BEV, (P)HEV (electro engine)	ELV				
PCBs	Desktop computers, prof. IT	WEEE	Au, Ag, Bi, Pd, Sb	Entire devices w/o battery (mobile phones), PCBs (shredded, unshredded), CuPM granulate	Yes	
	Laptops					
	Mobile phones					
	Tablets					
	External CDDs, ODDs, devices with internal CDDs/ODDs					
Li-ion batteries	Laptops	WEEE	Co	Batteries	Yes	
	Mobile phones					
	Tablets					
	Li-ion batteries in other WEEE					
	BEV, (P)HEV	ELV				
NiMH battery	NiMH batteries in WEEE	WEEE	Co, Ce, La, Nd, Pr	Batteries	Yes (Co)	No (REEs)
	HEV	ELV				
Lead acid batteries	Lead-acid batteries	WEEE	Sb	Batteries	Yes	
		ELV				



## Recycling Processes for KCE

- Well established for PCBs (recycling of precious and other metals)
- (Formerly) practiced for recycling of REEs from fluorescent powders (Rhodia, La Rochelle), Relight has technical capabilities available
- Nd-magnets
  - Exclusion of SmCo-magnets (~ 3 % market share only)
  - Presence in household equipment depending on models → Database?
  - REE-recycling (and pre-treatment) processes available
  - No practical experiences with recycling of REEs from Nd-magnets
  - Processes could be established in case of sound financing and stable supply





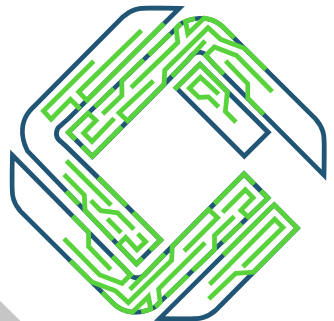
## Recycling of CRMs from Nd-magnets

- Hitachi Metals pyrometallurgical process with molten Mg as extraction medium to recycle Nd and Dy
- Santoku Corporation process started in 2012 recycles Nd and Dy from Nd-magnets of air conditioner motors and magnet production scrap
- Momentum's hydrometallurgical MSX technology recycles more than 99 % of REE content from HDDs dissolved in acid
- Ames Laboratory acid-free dissolution recycling technology recycles Nd from shredded HDD samples without pre-concentration of magnet contents
- Urban Mine magnet-to-magnet process for Nd-magnet production
- In EU only one major producer of Nd-magnets as potential downstream buyer for REE oxides
- Several EU-projects, e.g. the REE4EU (pilot scale plant) or REEcover



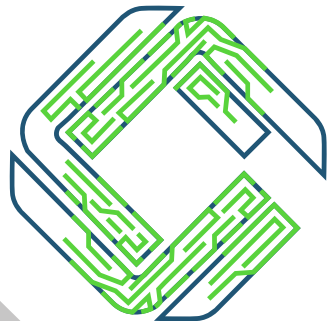
## Normative Requirements

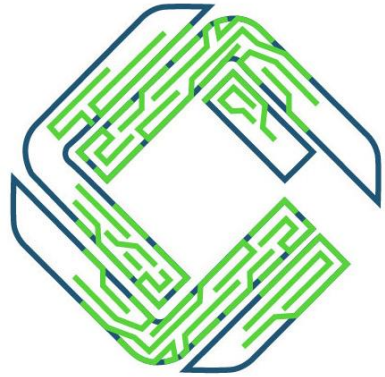
- Analysis of more than 60 normative requirements with relevance to KCEs
- Generally relevant non-technical requirements identified (EHS, tracking, documentation, ...)
- Very few CRM-specific non-technical requirements
- Very few technical requirements for KCE (removal of PCBs, batteries, ...)
- Hardly any technical requirements specifically for CRM recycling



## General Approach

- CEN 50625-series adopted as general reference
- References to other standards if 50625 not sufficient
- Development of new requirements if no appropriate references available
- **Most CRM-specific technical requirements to be developed by CEWASTE consortium (in WP2)**





# CEWASTE

Voluntary certification  
scheme for waste treatment

## CEWASTE Normative Requirements

Sonia Valdivia

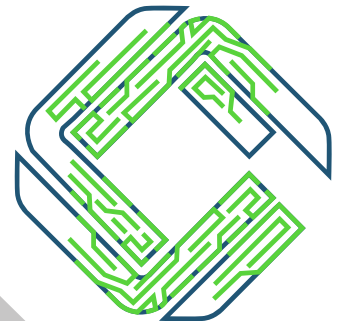
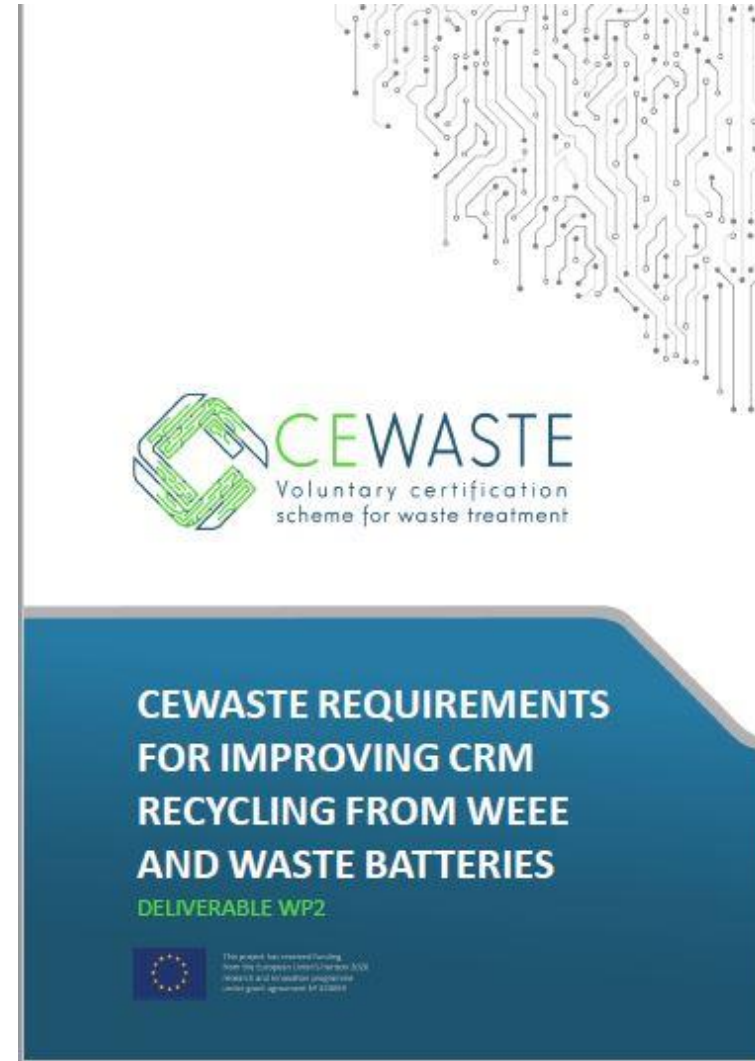
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# Main Outcome

- A new set of normative requirements for improving CRM recycling from WEEE and waste batteries,
- These include management, sustainability and technical requirements for collection, logistics and treatment facilities.
- Recommendations on traceability and on few other specific issues are also included



## General Approach

Based on the results of the baseline analysis:

- EN 50625-series was adopted as general reference. Starting point
- If 50625 were not sufficient, references to other standards or international references (EC, OSHA, ISO, etc.)
- Development of new texts if no appropriate references were available
- **CRM-specific technical requirements are developed by the CEWASTE consortium**

Batteries

Magnets

Fluorescent  
powders

Traceability

Sustainability



# Structure

Notes to the reader

Introduction

1. Scope

2. Normative references

3. Definitions

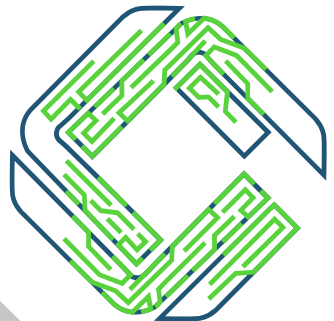
4. Management requirements

5. Technical requirements

6. De-pollution Monitoring

Annexes

- 4.1 Management Principles
- 4.2 Compliance with national and local regulations
- 4.3 Management system
- 4.4 Risk management
- 4.5 Continuous improvement
- 4.6 Monitoring
- 4.7 Documentation
- 4.8 Communication and awareness raising
- 4.9 Personnel Management
- 4.10 Sustainability requirements

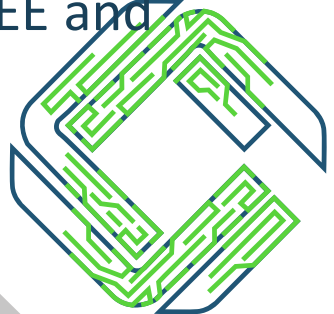


# Risk Management

Identifying, monitoring and managing potential risks of handling WEEE and waste batteries in order to minimize negative impacts. Risks relate to health and safety, **materials quality**, CRM losses and environmental damage.

## Material Quality Factors:

- CRM metals contained
- Levels of purity of CRM metals
- Existing alloys that may hinder the recovery
- Presence of hazardous substances
- Feasibility of subsequent steps and level of effort required
- Minimum amounts to be processed (typically, larger amounts of identical WEEE and waste batteries increase the recycling yield)



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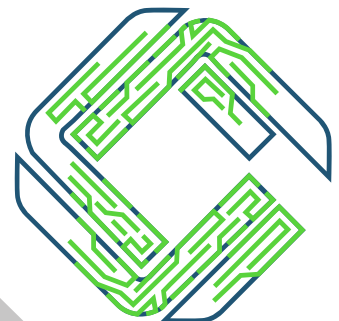
Traceability. **Voluntary**

Upstream, CoC

Employees & stakeholders

Environment & Local community

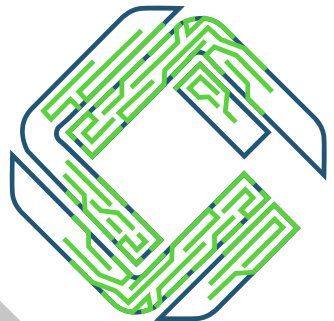
Sustainability.



## Traceability & Compliance Claims - Recommended

**CEWASTE encourages ensuring the accuracy and verifiability of various aspects throughout the value chain e.g. records of material inputs and outputs**

- Due diligence and chain-of-custody procedures (documentation and records)
- Material accounting model of mass balance
- Documented agreement regarding the implementation of the CEWASTE standard throughout the supply chain.



# Structure

Notes to the reader

Introduction

1. Scope

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4. Management requirements

5. Technical requirements

6. De-pollution Monitoring

Annexes

5.1 General technical requirements -

5.2 Technical and infrastructural pre-conditions

5.3 Handling

5.4 Receiving

5.5 Storage at collection and treatment facilities

5.6 Shipping

5.7 Acceptance by collection and logistics operators— \_General -

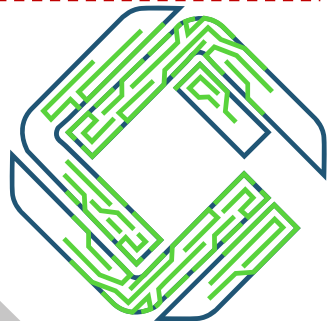
5.8 Preparing for re-use at collection facilities

5.9 Sorting

5.10 De-pollution at treatment facilities

5.11 Treatment of non-depolluted WEEE and fractions

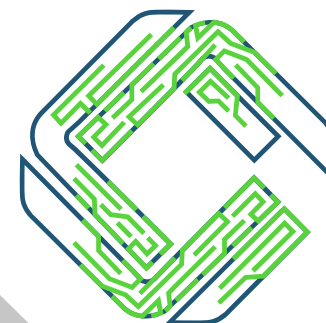
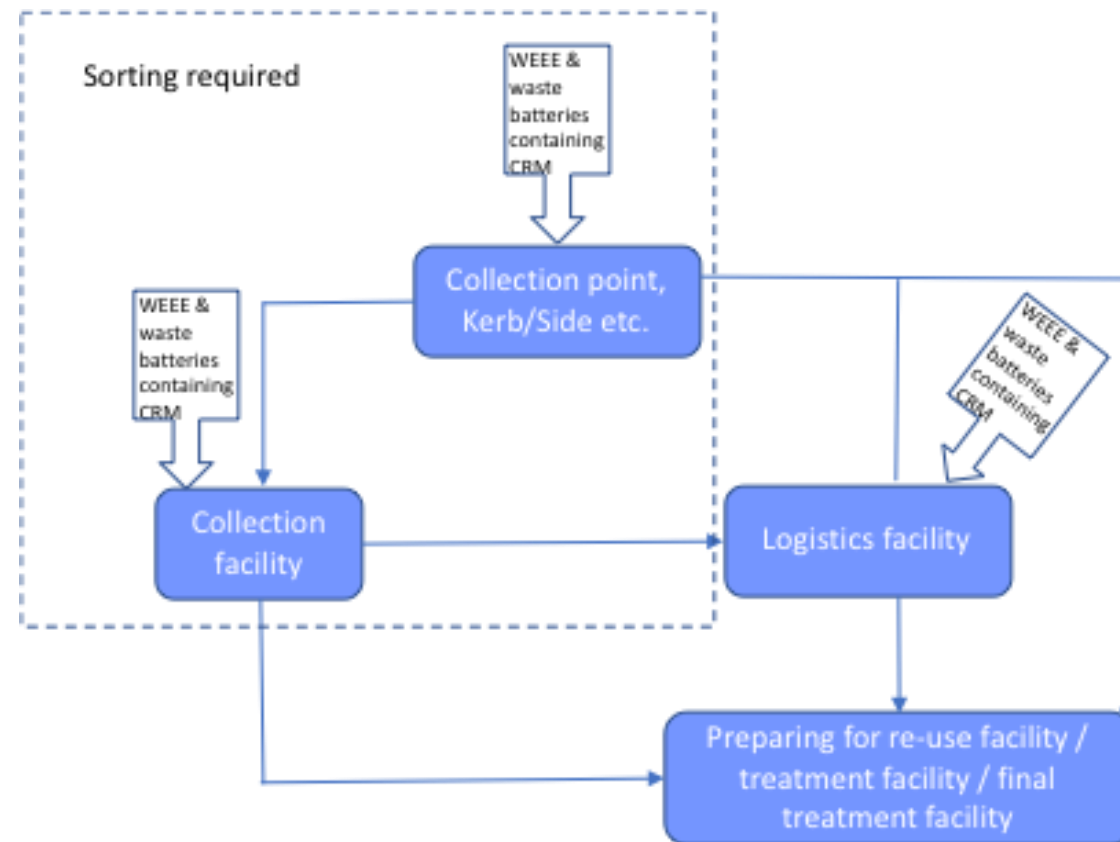
5.12 Final treatment for recovering CRM fractions and disposal of waste fractions



# Collection, Logistics & Sorting

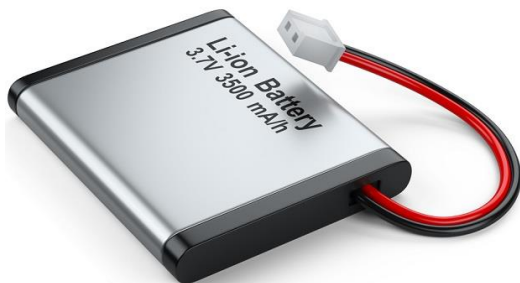
WEEE suitable for (preparation for) reuse are also separated, not destined for recycling

Sorting is crucial in collection points or collection facilities in separate waste streams

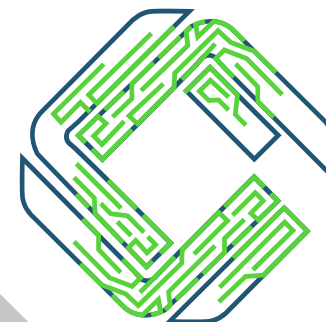
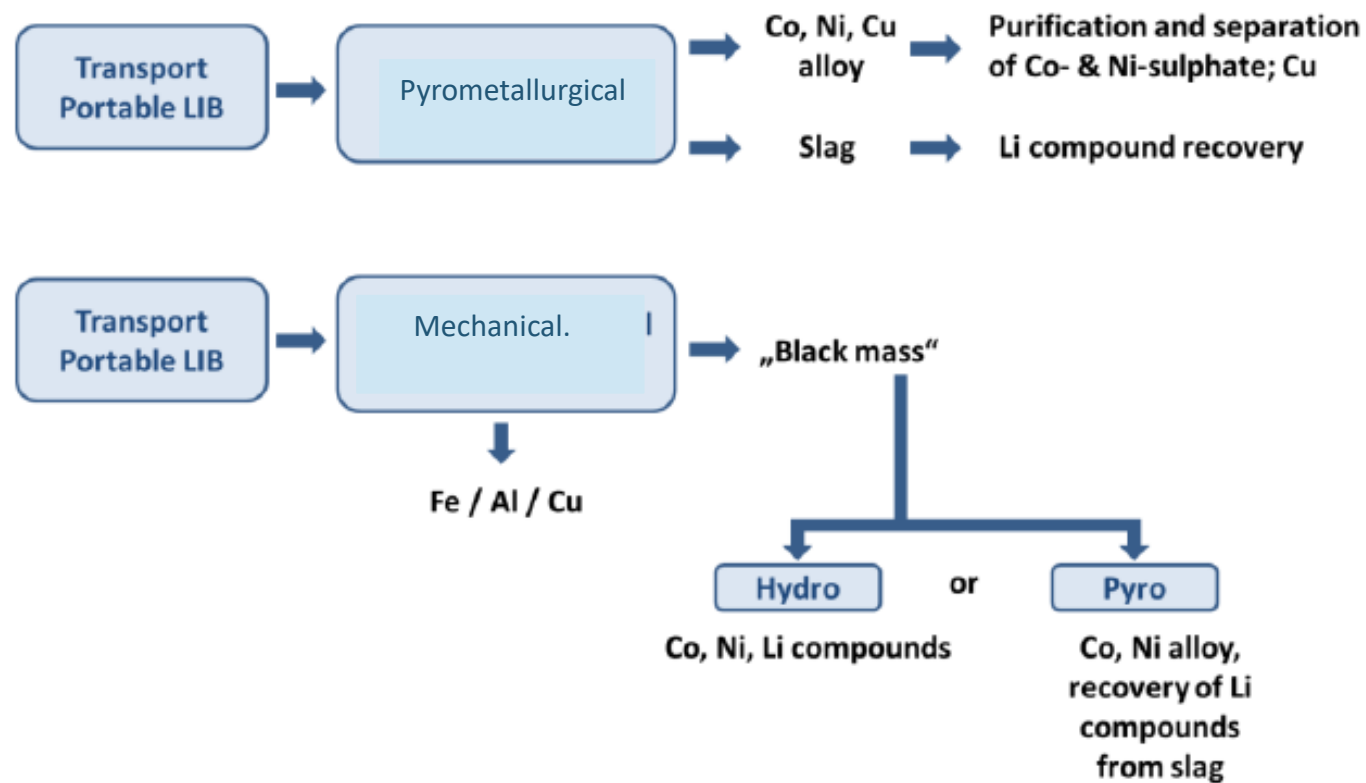


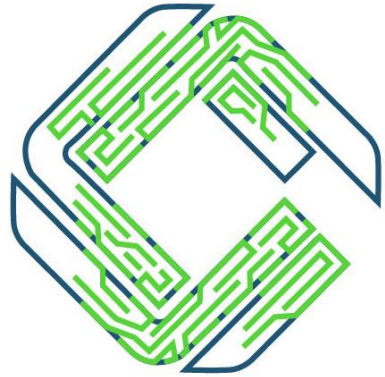
# Batteries Treatment & Recycling Methods

- Lithium-ion (LIB) batteries



- Lead-acid





# CEWASTE

Voluntary certification  
scheme for waste treatment

## Assurance & Verification System

**Yifaat Baron**

Oeko-Institut / Germany



**Öko-Institut e.V.**  
Institut für angewandte Ökologie  
Institute for Applied Ecology

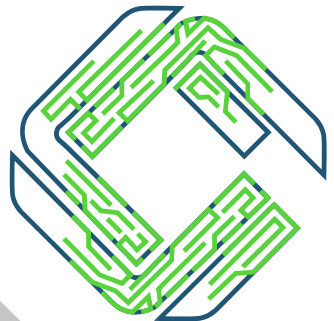
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## WP 3 Objective and scope

**Develop a voluntary certification scheme for actors of the EEE and battery waste management industry who comply with the CEWASTE sustainability and traceability requirements, thereby promoting sound CRM recovery from WEEE.**

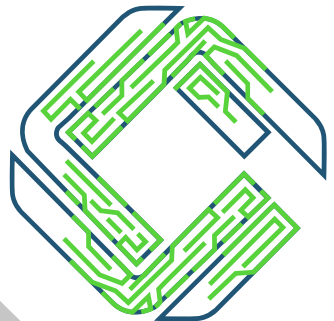
→ CEWASTE certification may be issued by CEWASTE Certification Bodies for **operators** of **collection, transport or treatment facilities** who **comply** with the sustainability and traceability **requirements** defined in Work Package 2 of this project.



## Included tasks and planning

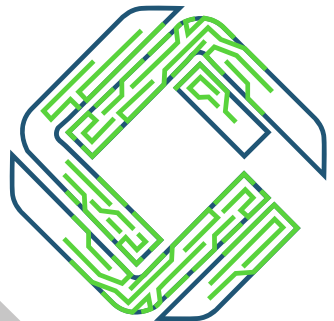
WP 3 includes three tasks:

- Task 3.1: Develop an effective assurance system.
  - First version is being drafted
- Task 3.2: Specify verification procedures
  - First version is being drafted
- Task 3.3: Develop assurance and verification manuals
  - Shall commence with the completion of a first version of the first two tasks



## CEWASTE Scheme rules (assurance system)

- **The organisation of the CEWASTE scheme** – structure, how decisions are made and by whom
- **Requirements for registered Certification Bodies** – criteria for acceptance, process to apply and maintain CEWASTE registered CB status, resource requirements (incl. auditors qualification) etc.
- **The certification process**
  - **Application, tender, application review, agreement**
  - **Conformity assessment (incl. audit)** - rules, templates and guidance's have been established covering the audit planning and execution both for certification applicants and maintenance of certification
  - **review process** - rules, templates and guidance's have been established covering the review of audit results and the certification decisions.
- **Registry of certificates**



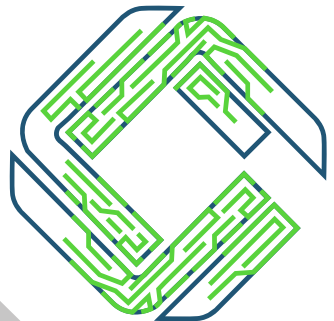
## CEWASTE Scheme tools (verification procedures)

- Here various tools are being developed to support the verification system, i.e. the auditing and assessment of operators applying for the CEWASTE certification. For the actual ordering and performing of audits, this includes:
- **CEWASTE Application template:** for the operator who requests an audit in order to be certified
- **CEWASTE Audit Plan template:** for the conformity assessors to plan and coordinate the audit with all participants (auditors, operator).
- **Auditing checklist:** for the conformity assessors to assist in the assessment of the operators compliance with the CEWASTE requirements (to harmonize interpretations of the requirements by auditors)
- **CEWASTE audit report template:** for the conformity assessors to document the audit and its assessment
- **CEWASTE CB Assessment guidance:** to harmonize how audit results are assessed
- **(CEWASTE auditor training material:** to train and test auditors for eligibility)



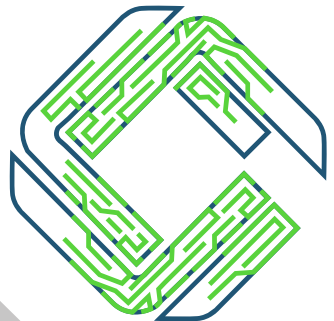
## THE CEWASTE assurance and verification manuals

- The **assurance manual** is to provide clear guidance on what protocols, procedures, documents, etc. would be considered as acceptable for the verification procedures established in the certification scheme. **It aims to assist operators** in complying with the CEWASTE standard and preparing for the certification (audit)
- The **verification manual is to assist the auditors** by providing more detail for the verification procedures and thus also helping to ensure a more harmonised application of the CEWASTE scheme and of the results of the various activities.



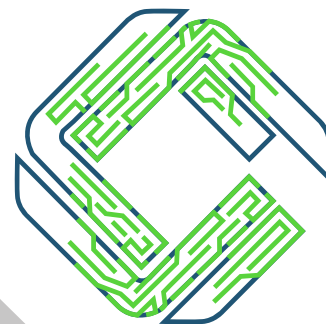
## Interactions with other work packages

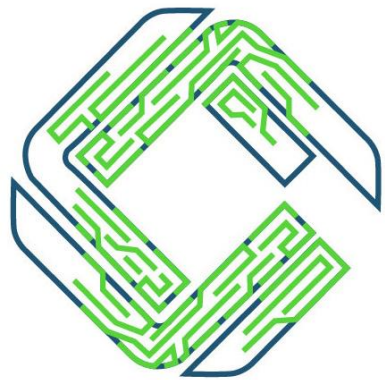
- Generally, development is iterative
  - Authors of the CEWASTE requirements must take into account the needs of the conformity assessors (assurance and verification)
  - While designing the compliance assessment steps (assurance and verification) it could become relevant to send feedback and update requests to developers of the CEWASTE requirements and/or to consult as to the feasibility of implementation in the auditing pilots to be held in the next step
  - When designing and conducting the pilot audits, again feedback and update requests will be sent to the certification scheme designers and to the authors of the CEWASTE requirements





# Questions?





# CEWASTE

Voluntary certification  
scheme for waste treatment

## Plenary Discussion

Moderator: Pascal Leroy

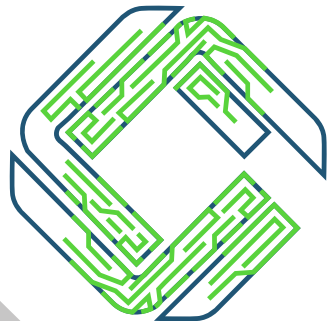
WEEE Forum

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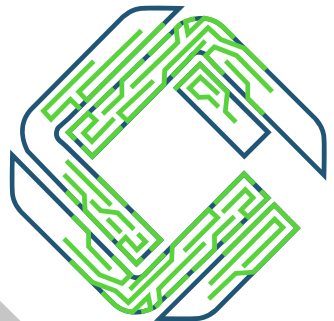
# Sustainability

- Training (handling)
- Training (Auditors)
- Enforcement
- Quit CRM practices if conflicting with PM recycling
- 



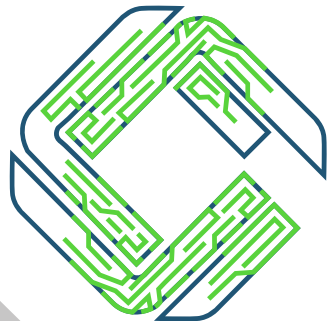
# Traceability

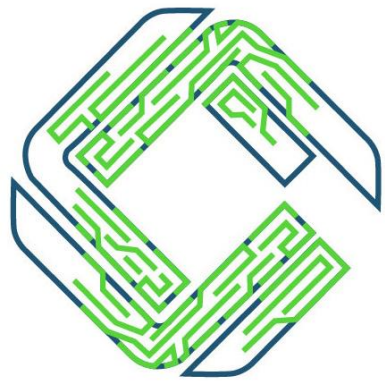
- Clear transfer records
- Cash transactions
- Digital marking of products
- Proper book keeping
- Customs codes
- Training of custom officials
- Why do WEEE go to wrong streams?



# Advancing CRM Recovery

- Collection infrastructure
- Awareness
- Economic viability
- Import taxation
- Third country state of art operations
- EPR fees
- Societal challenge





# CEWASTE

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## Wrap up, next steps and closing

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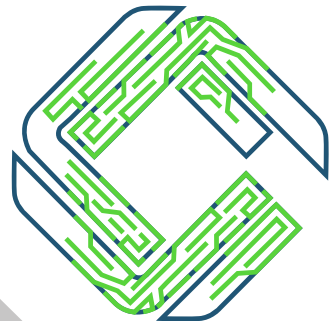
# Stakeholder Participation

- Identified and invited relevant experts and stakeholders to join the CEWASTE Network



113 stakeholders already registered

To join our network visit: <https://cewaste.eu/get-involved/>



# Stakeholder Participation

- Identified and invited relevant experts and stakeholders to join the CEWASTE Network



- Face-to-face consultation process: Today's meeting



- Two rounds of online stakeholder consultations:

*If not yet, register for the CEWASTE Network to receive updates about the process: <http://cewaste.eu>*

