Futu RaM

Future availability of secondary raw materials

Applying UNFC in the FutuRaM project: A Swiss Case Study on Embedded Electronics

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Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Education, Research and Innovation SERI

EU Framework Programmes

Funded by the European Union

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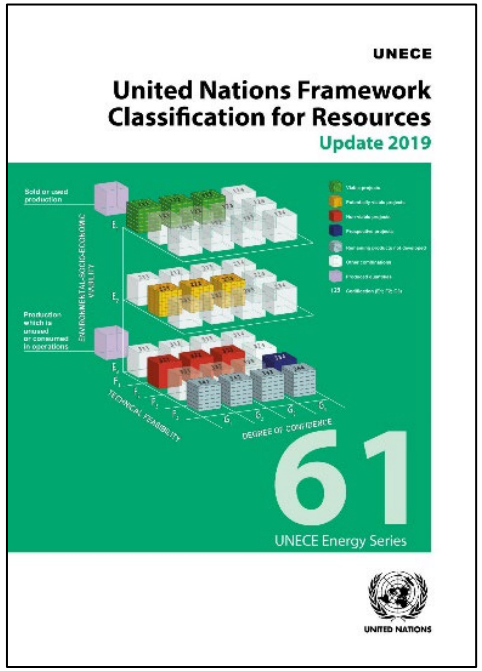
UNFC & Anthropogenic Resources

United Nations Framework Classification for Resources

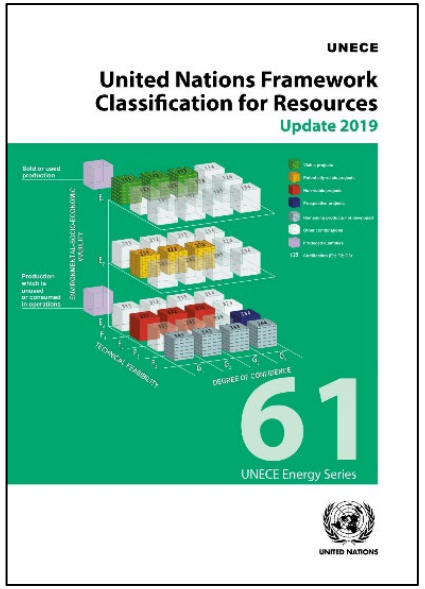


A global standard for **communicating recoverable quantities** based on the **maturity level of the recovery project**

- for all types of energy and materials
- universally acceptable
- internationally applicable

UNFC & Anthropogenic Resources

Generic principles



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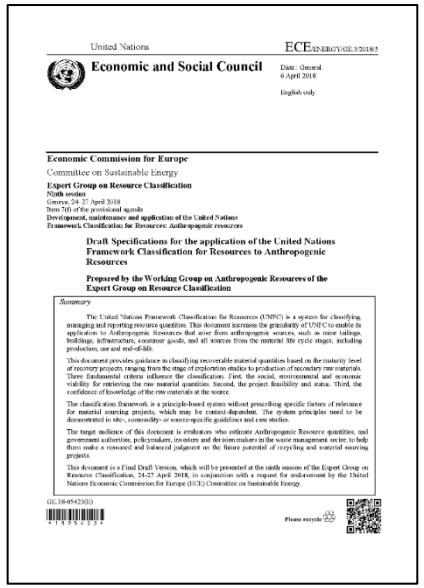
Specifications for Anthropogenic Resources



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Guidance documents

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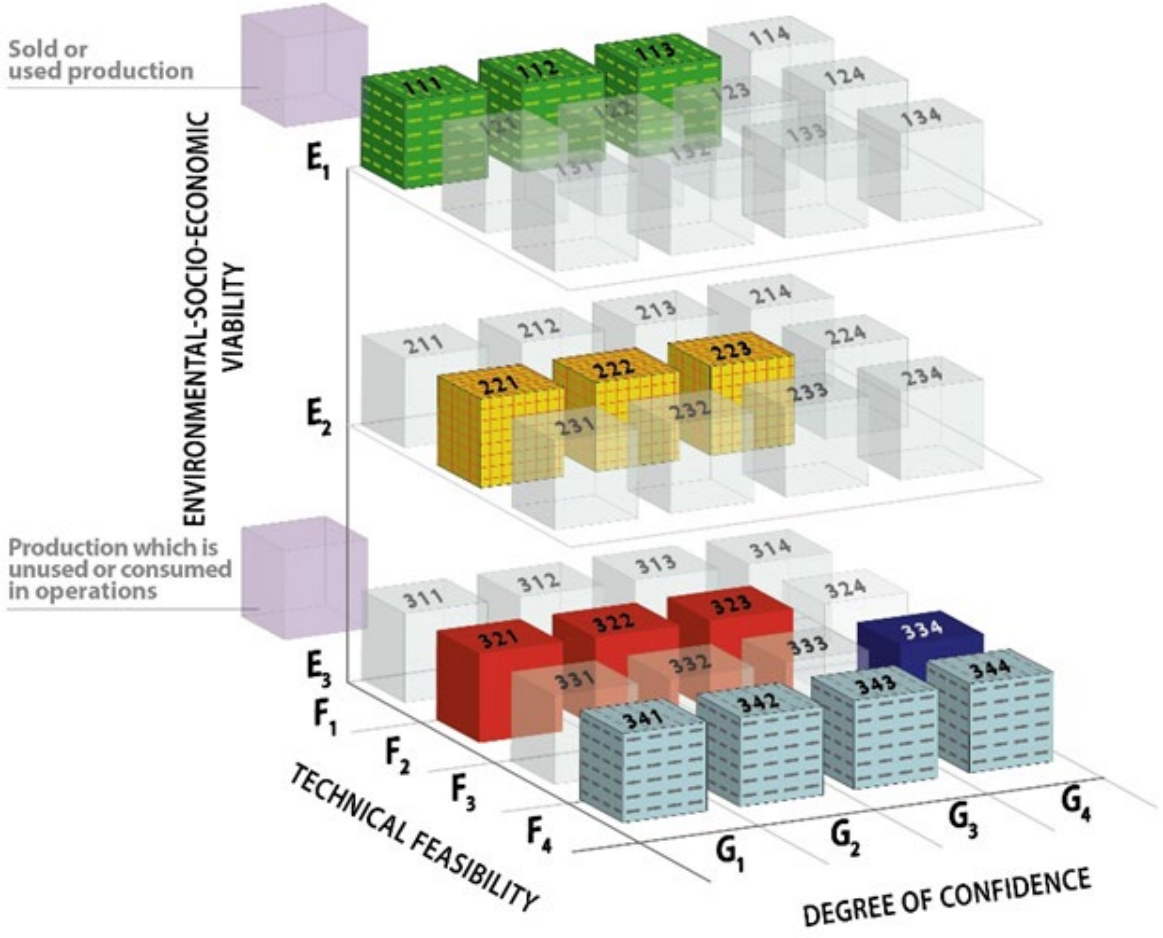
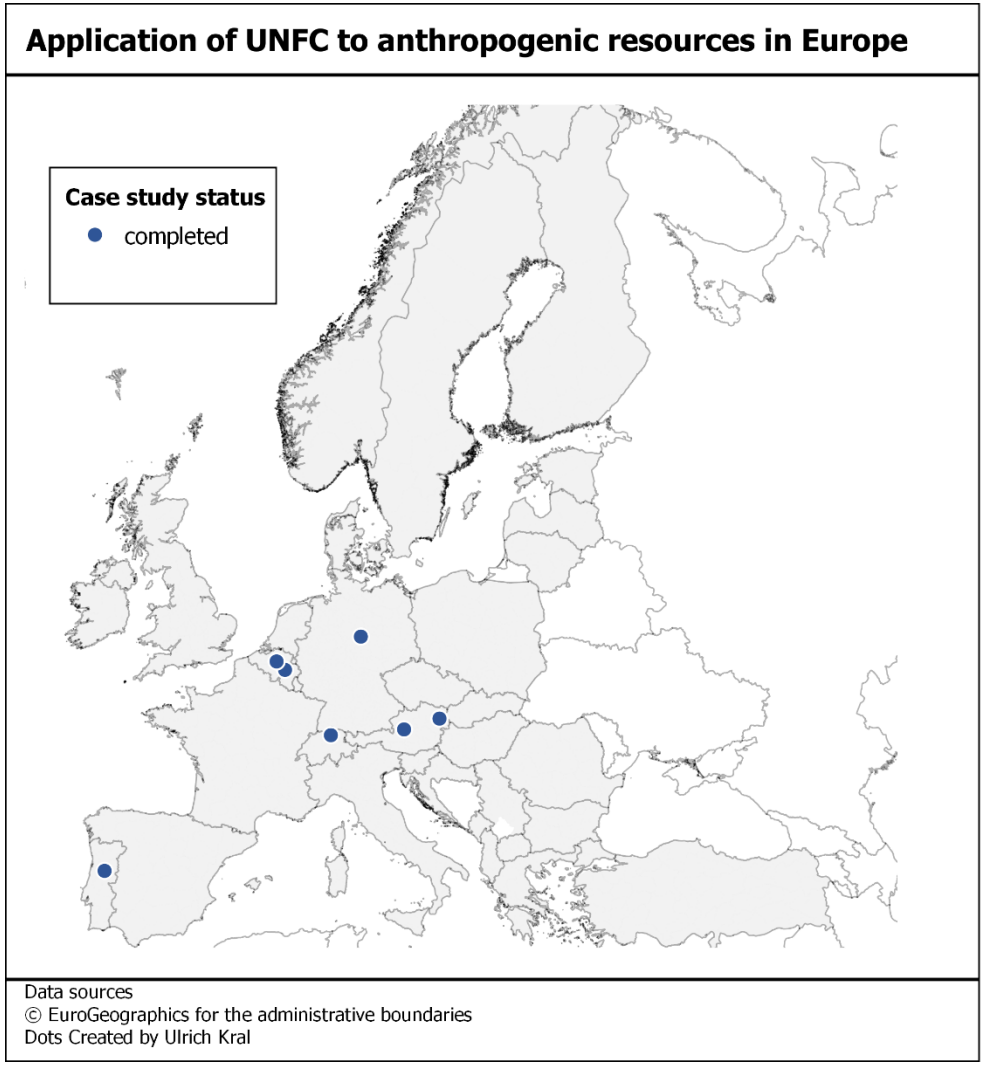


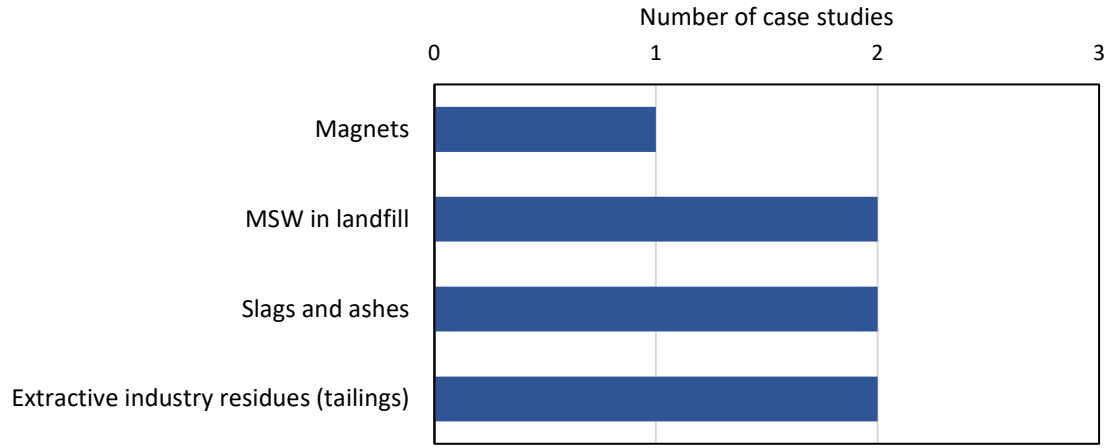
UNFC (2019)

UNFC & Anthropogenic Resources



- Case studies completed and published before 2022

Targeted material sources:



https://unece.org/unfc-and-anthropogenic-resources-0

FutuRaM project: Overview

- Horizon Europe, Research & Innovation project
- 4 years duration (started June 2022)
- 29 partners from 11 countries

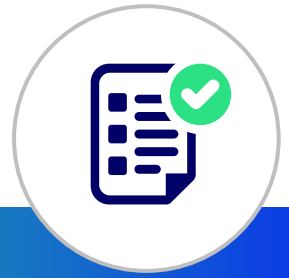
The FutuRaM project: Overview

- Develop knowledge on the availability and recoverability of SRMs within the EU
  - special focus on CRM;
  - scenarios up to 2050.
- Enable fact-based decision making for their exploitation in the EU+4 and third countries
  - through UNFC applied to SRM projects.
- Disseminate information via a Secondary Raw Materials Knowledge Base

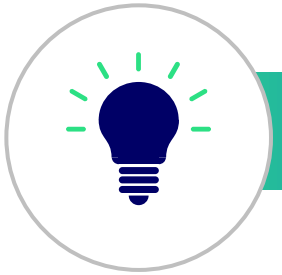
The FutuRaM project: Overview

FutuRaM & UNFC: Roadmap

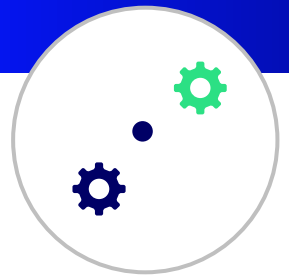
Develop of a consistent procedure to assess and classify SRM recoverability in line with the UNFC



Draft reporting standard for the attention of the UNECE EGRM

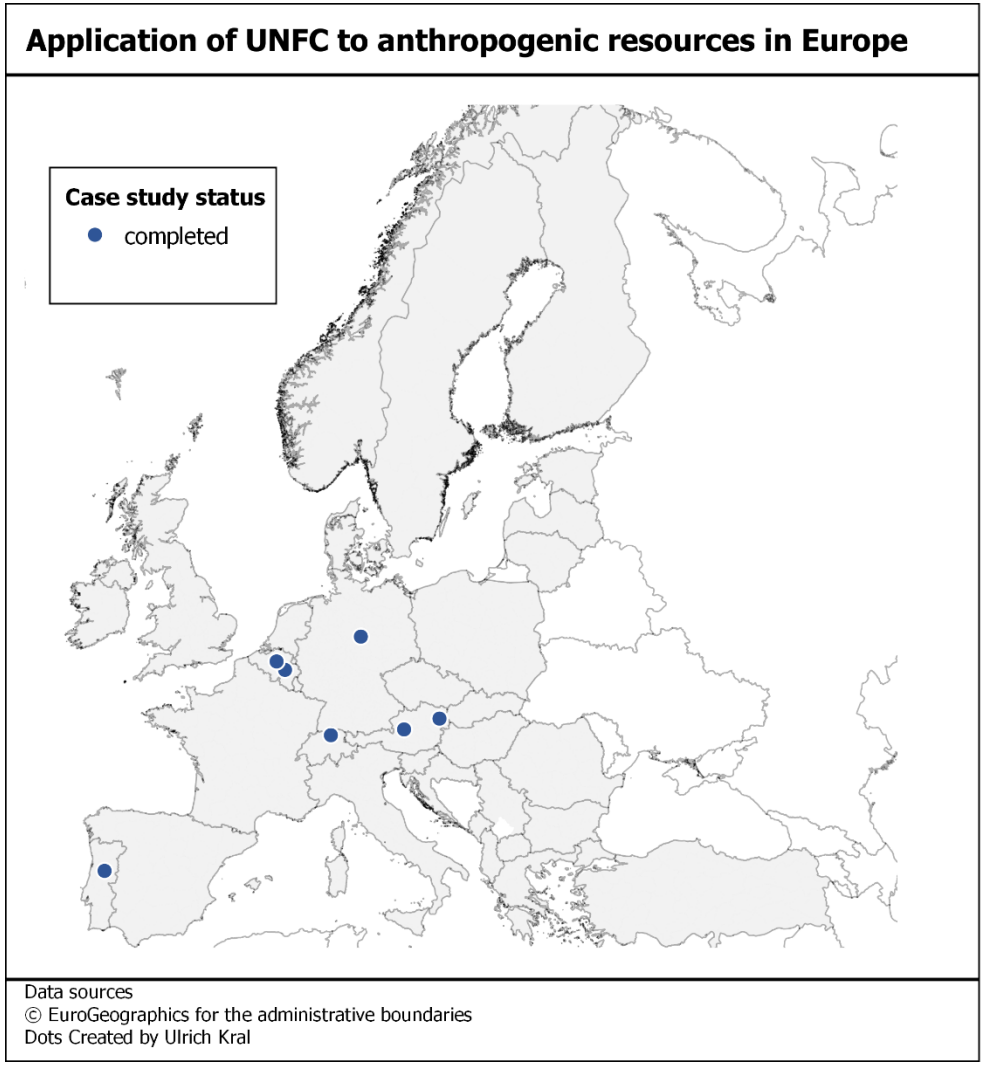


Initial phase



Use case studies to test, further develop, validate and demonstrate the procedure in line with the UNFC

FutuRaM & UNFC: Case Studies



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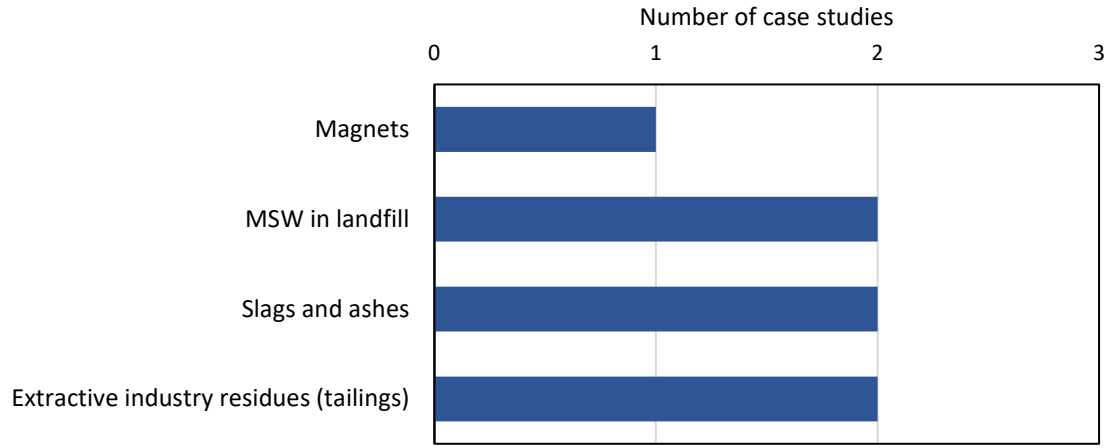

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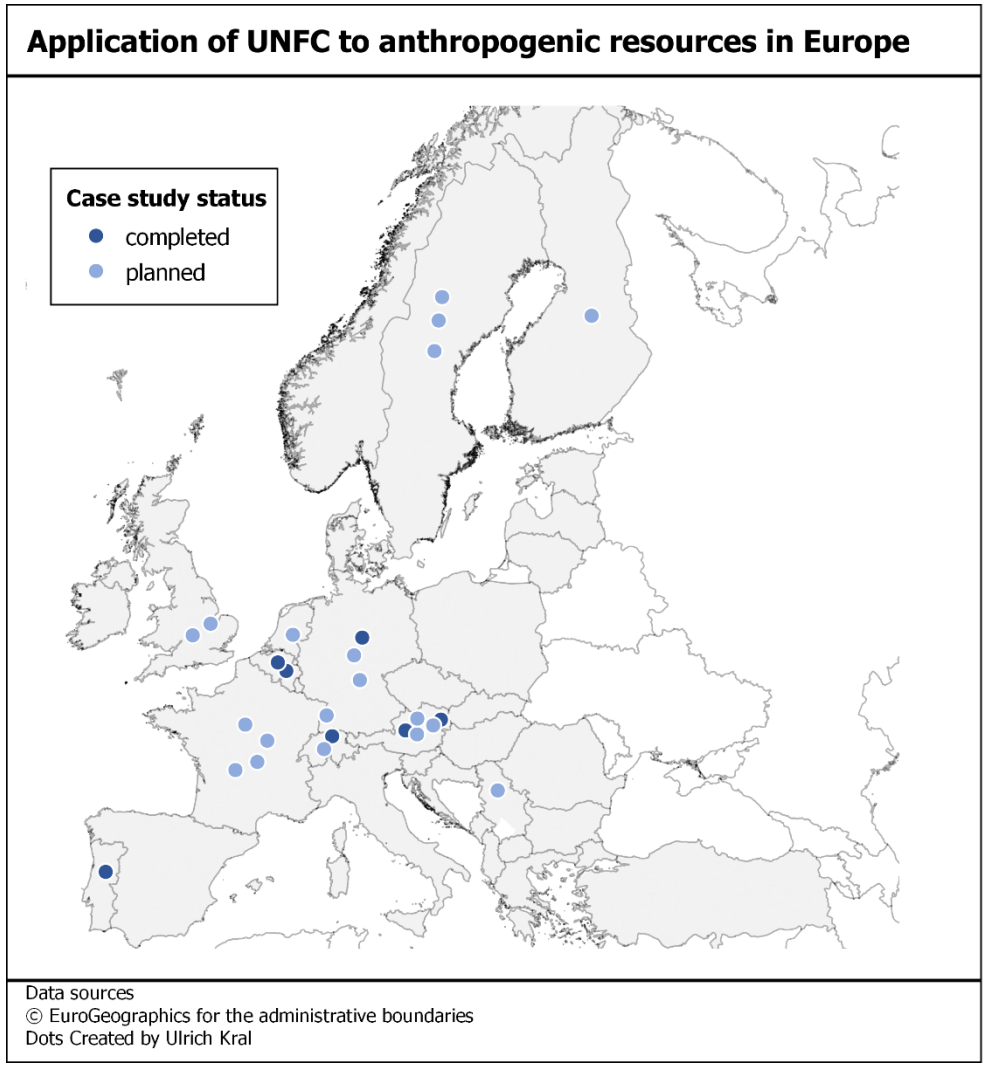
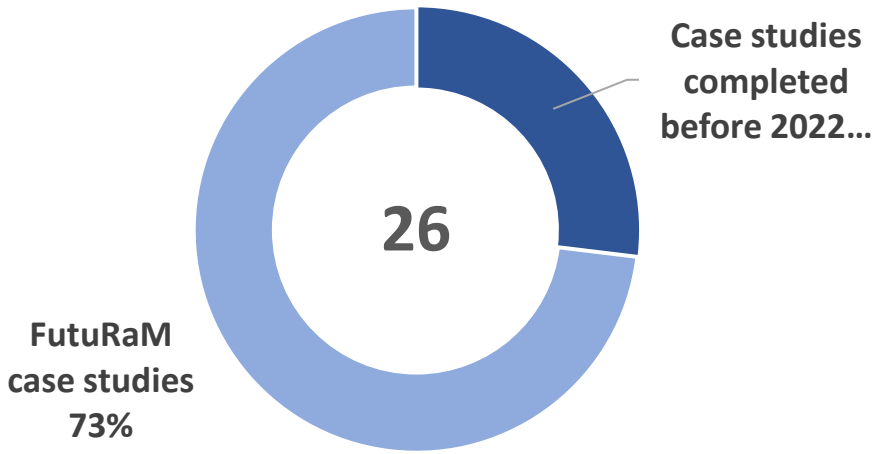
FutuRaM & UNFC: Case Studies



Status of case studies



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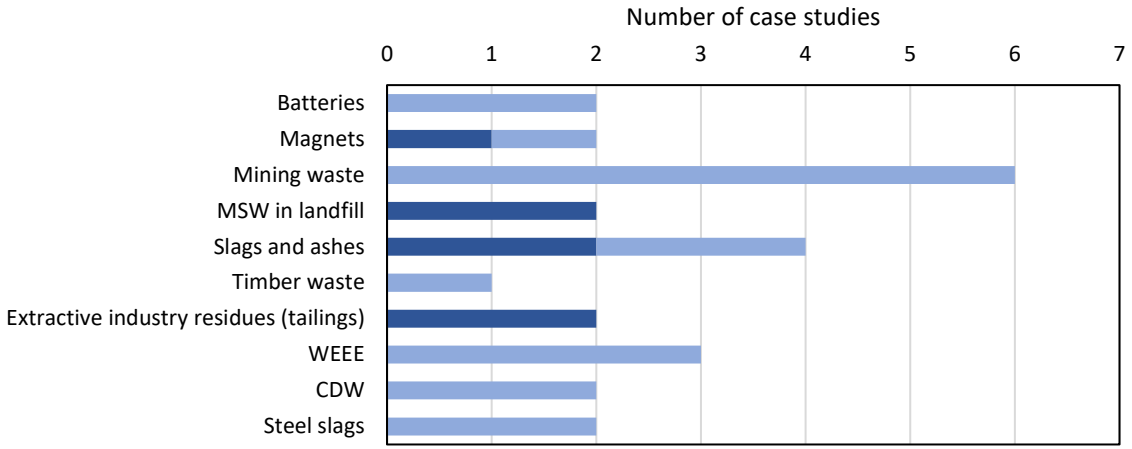
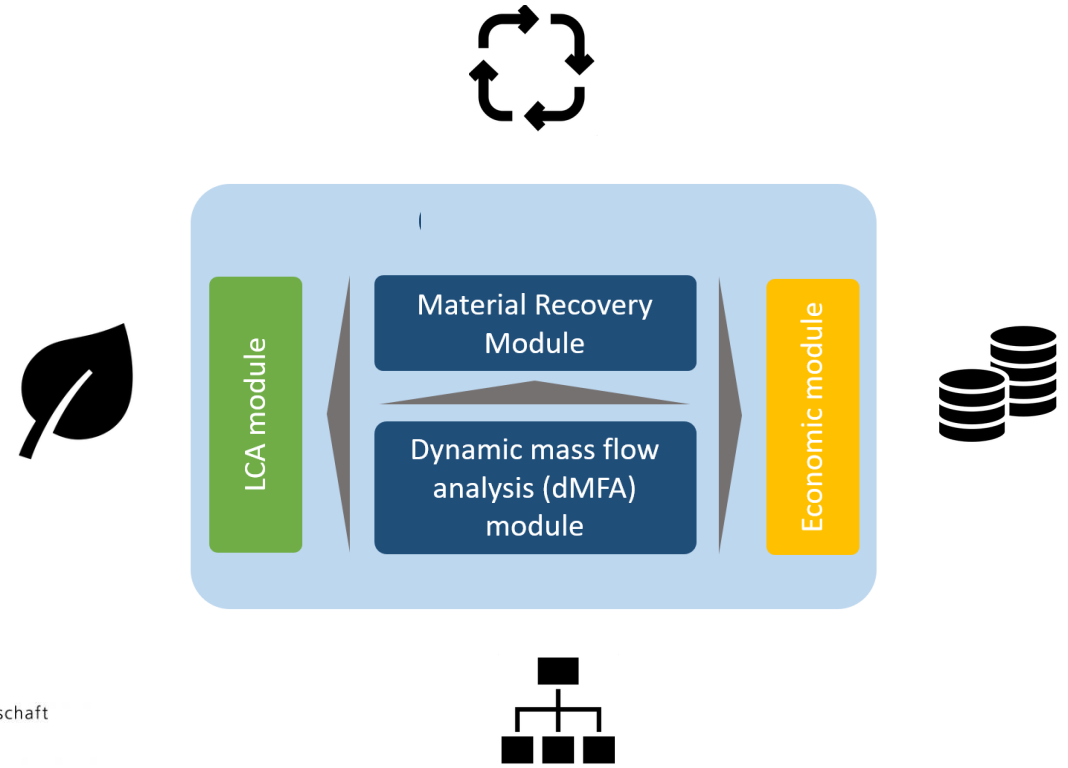


FutuRaM & UNFC: Swiss Case Study

Embedded Electronics in Vehicles – a national case study

Is separate recycling of vehicle embedded electronic devices (EED) economically viable and environmentally sound?



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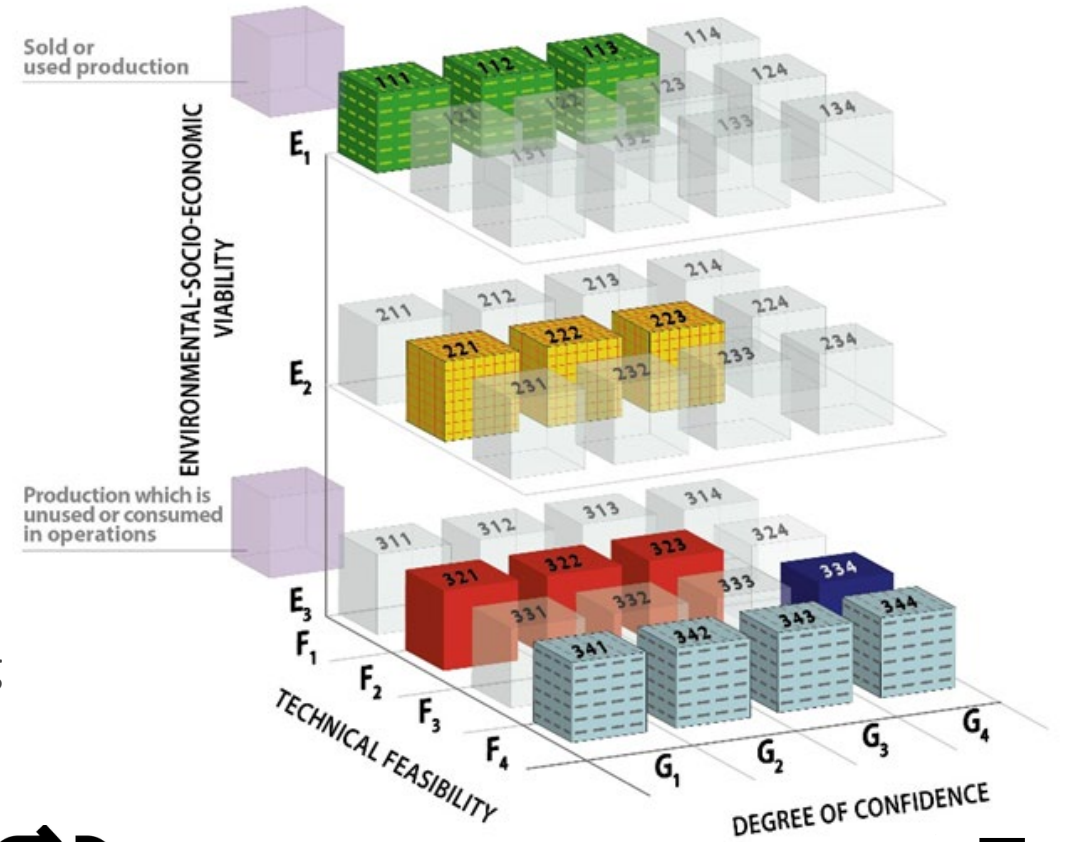
FutuRaM & UNFC: Swiss Case Study

Economic Module

Economic analysis of EED recycling

LCA Module

Environmental assessment EED recycling



Material Recovery Module

Recovery potential of materials

dMFA Module

Mass flows of EoL cars & devices in CH

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dMFA Module

Goal

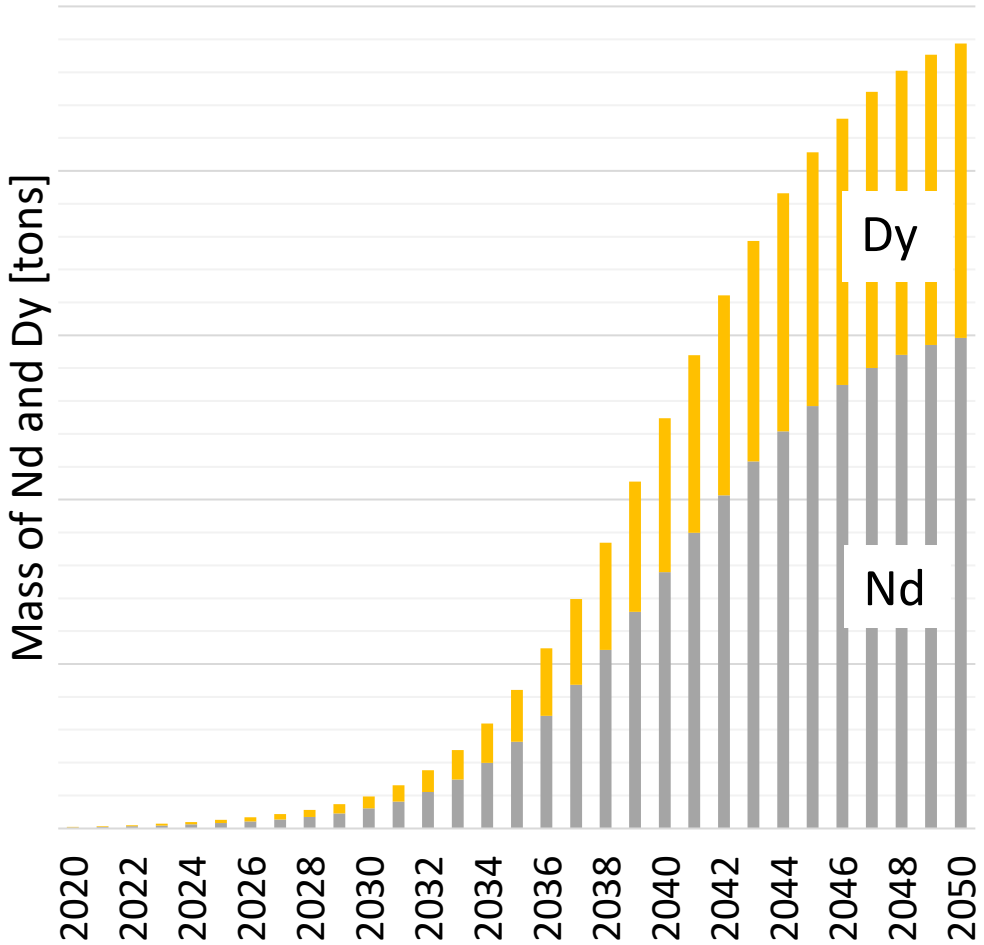
- Quantify mass flows of EoL cars, EED and CRMs[1)] in Switzerland

Methodology:

- Dynamic mass flow analysis (dMFA)

Outcomes:

- Scenario-dependent mass flows of EoL cars, EED and CRMs in in Switzerland



[1)] "Seltene technische Metalle"

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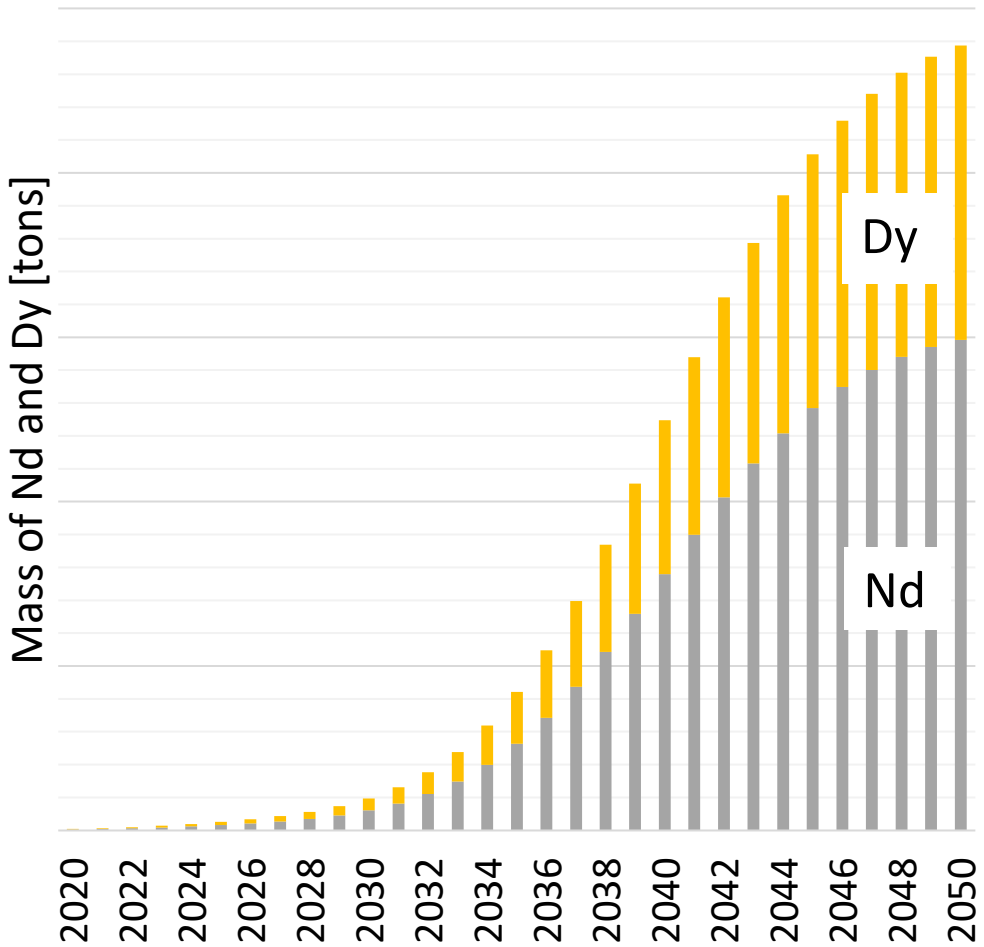
dMFA Module

Category	Definition
G1	Product quantity associated with a project that can be estimated with a high level of confidence
G2	Product quantity associated with a project that can be estimated with a moderate level of confidence.
G3	Product quantity associated with a project that can be estimated with a low level of confidence.
G4	Product quantity associated with a prospective project, estimated, or postulated primarily on indirect evidence



FutuRaM & UNFC: Swiss Case Study

LCA Module

Goal

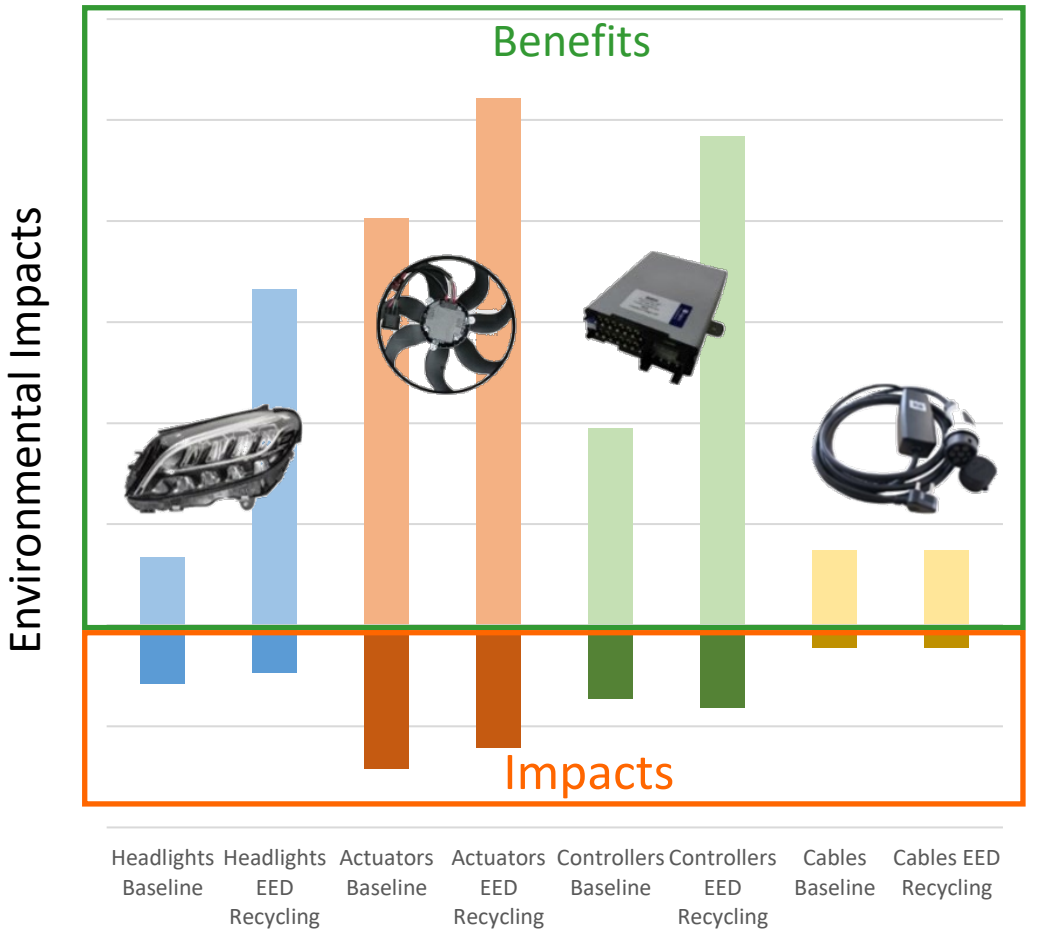
- Assess environmental impacts and benefits of separate EED recycling

Methodology:

- Life Cycle Assessment (LCA)

Outcomes:

- Separate EED recycling leads to an overall environmental benefit for headlights, actuators and controllers



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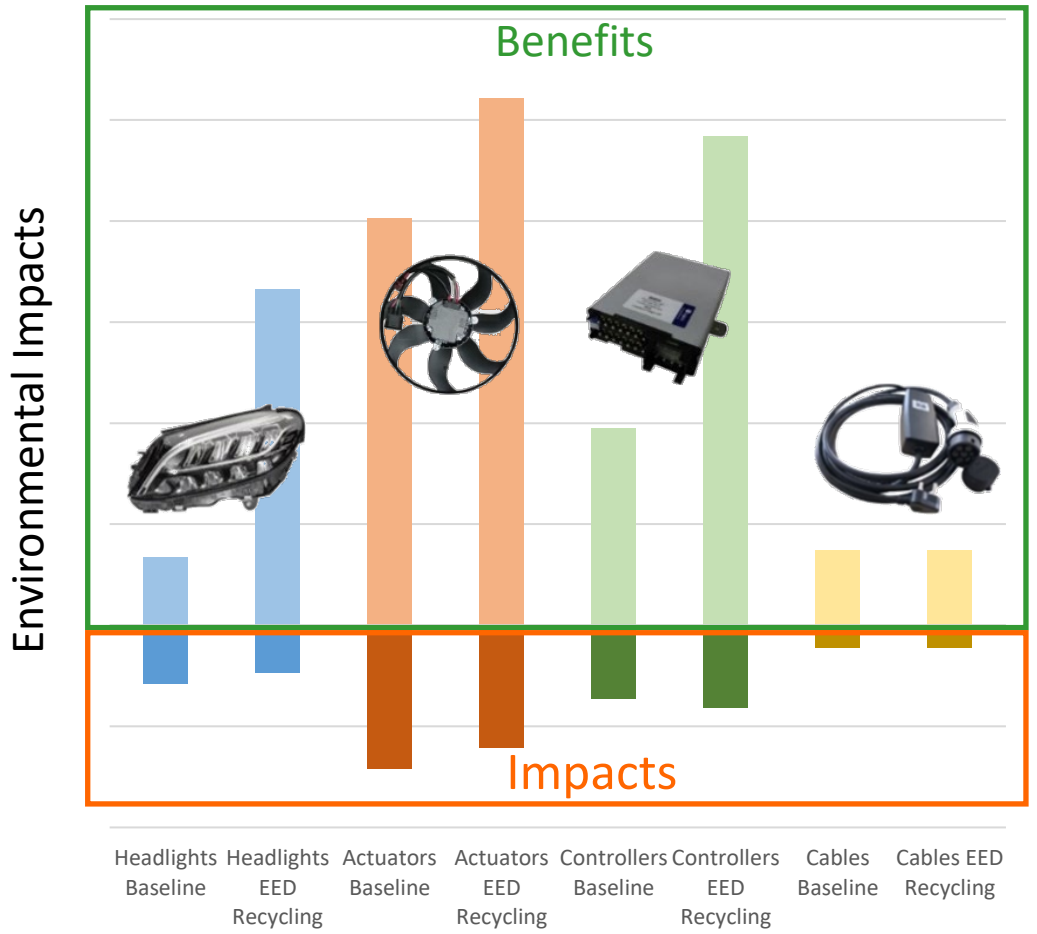
LCA Module

Category	Definition
E1	Development and operation are confirmed to be **environmentally**-socially- economically viable.
E2	Development and operation are expected to become environmentally- socially-economically viable in the foreseeable future.
E3	Development and operation are not expected to become environmentally- socially-economically viable in the foreseeable future or evaluation is at too early a stage to determine environmental-socioeconomic viability.

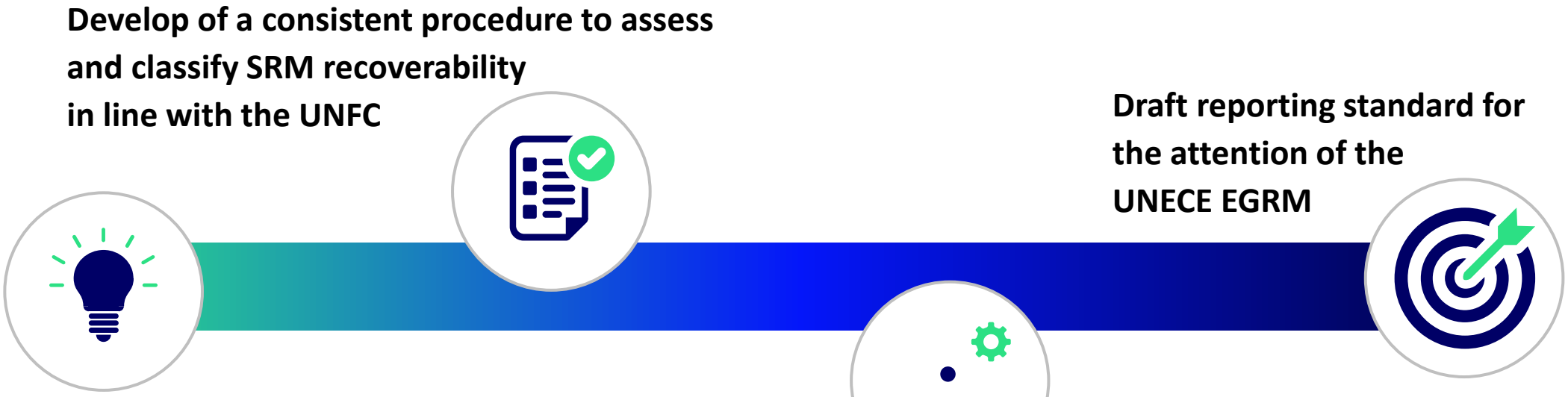


FutuRaM & UNFC: Challenges and Outlook

- Assessing the socio-economic viability and technical feasibility of materials recovery including
  - the identification of relevant factors;
  - the determination of appropriate quantification methods,

  in particular also for the regional / national level.
- Translation into UNFC categories (e.g. E2) and UNFC classes (i.e. project maturity)
- Consistent and standardized assessment and classification procedures

FutuRaM & UNFC: Challenges and Outlook



→ next update on UNFC-related activities in the FutuRaM project at Resource Management Week in Geneva, April 25 -28, 2023

Thank you for your attention!

Futu RaM

Future availability of secondary raw materials

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