German Enviroment Agency

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Priority measures towards a green and circular non-ferrous metals industry

Recommendation paper

Conclusions based on advanced multi-stakeholder industry foresight and recommendations for progression

New challenges for the non-ferrous metals industry are to be expected. These challenges result from:

- an intended transition to a green and circular economy ,
- the necessities of an economy-wide energy transition,
- growing product complexities, and - no less important -
- an increasing criticality of various non-ferrous metals.

This recommendation paper highlights seven priority measures towards a green non-ferrous metals industry, addressing the new challenges the non-ferrous metals industry is facing already today and even more so in the near future:

- **change in business ethics/ acceptance of longer payback times**
- **waste exports**
- **cascade use and downcycling**
- **design for recyclability**
- **understanding the complexity of the system to increase resource efficiency**
- **education for resource efficiency**
- **lack of interest in flexible electricity use.**

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Waste exports: illegal and legal exports

Challenge

Material is "leaking" from the EU economy.

➔ This material is lacking for the transition towards a circular economy.

Recycling outside of the EU is often less efficient (processes), recycled material is of lower quality (output), and EHS (environment, health & safety) requirements, regulations and their enforcement are often underdeveloped.

➔ Waste exports are detrimental from an environmental point of view.

Solution

Solution 1: Better monitoring and control of EOL (end of life) flows to avoid illegal exports.
Concerned stakeholder group: Primarily public administration at EU, national, and regional level

Solution 2: For legal exports: binding criteria on waste treatment (efficiencies, quality) and EHS requirements and regulations.
Concerned stakeholder group: Primarily public administration at EU and national level

Cascade use and down-cycling

Challenge

A significant share of recycled non-ferrous metals has a lower quality than the virgin (primary) material. Currently, this recycled material is used in products which have lower quality requirements.

➔ Such down-cycling still only works due to an increasing total demand (population growth, growth in per capita consumption). In the next few years, however, down-cycling will no longer work for some metals. The consequences: First, there will be a (theoretical) surplus of recycled material. Secondly, only high-quality recycling can fully substitute primary (virgin) material production.

Solution

Solution: Proactive measures need to be implemented to increase quality of recycling, like (i) separately collect different qualities of EOL products, (ii) implement legal requirements regarding the quality of recycled material (quality based collection and recycling targets; improve material specific recycling), (legal) design-for-recycling requirements to limit the complexity of EOL products or at least facilitate collection, sorting and separation.
Concerned stakeholder group: Primarily public administration at EU and national level.

Design-for-recyclability

Challenge

Product design is a powerful driver to increase both, recycling rates (quantities) and quality. Design-for-recyclability (DfR) needs to be promoted as a key principle.

➔ Although it is an often-used buzzword, DfR is very rarely implemented.

➔ The focus in product development is on improving "functionality" and not on facilitating recycling.

Solution

Solution 1: Binding legal requirement to implement DfR, e.g., incorporating DfR into the EU EcoDesign directive.
Concerned stakeholder group: EU Commission

Solution 2: A change in corporate marketing strategies: Using DfR as a driver to improve competitiveness.
Concerned stakeholder group: Industry

Improve system understanding

Challenge

To make the many (known) measures to increase resource efficiency and recycling actually work, a truly systemic view is needed. In particular, a thorough understanding of the interplay of technologies, material flows, regulations, innovations and market economics needs to be developed.

➔ Currently there is no adequate system understanding that includes all levels (from consumers to policy makers).

Solution

Solution 1: Development of educational measures and participatory research programs to improve system understanding.
Concerned stakeholder group: Public administration as well as academia and industry at EU, national, and regional level.

Solution 2: Inter- and transdisciplinary cooperation and advanced networking and/or round tables involving experts from different fields, integrating theory with practice.
Concerned stakeholder group: Public administration, industry and academia.

Solution 3: International cooperation among academics, industry (associations) and public authorities to exchange knowledge and discuss acceptable and harmonized solutions.
Concerned stakeholder group: Public administration, industry and academia.

Education for Resource Efficiency

Challenge

The non-ferrous metals industry faces a lack of skilled labor knowledgeable in issues of resource efficiency.

➔ This might lead to competitive disadvantages and lost opportunities to fully materialize and exploit potential resource savings.

An improved understanding in society about resource implications of consumption could increase the demand for products from (relatively) resource efficient or environmentally sound production creating incentives for companies.

Solution

Solution 1: Targeted educational programs for professionals regarding issues of resource efficiency.
Concerned stakeholder group: Public administration, industry and academia.

Solution 2: Implementation of environmental and resource efficiency aspects in the general education (schools, universities, …).
Concerned stakeholder group: Science / academia.

Change in business ethics/ acceptance of longer payback times

Challenge

Forward-looking projects like implementation of resource-saving technology and new processes often are not realized due to very short expected payback times or fast return of investment (ROI).

➔ Even though measures are profitable, returning the investment over a longer timeframe, they are not realised.

Solution

Solution: Support initiatives regarding sustainable expectations on ROI.
Concerned stakeholder group: Industry, EU Commission.

Lack of interest in “flexible” electricity use

Challenge

With increasing shares of renewables for reaching EU climate goals, electricity generation becomes more volatile and balancing electricity production with demand is getting more and more difficult. Also, electricity price fluctuations are more pronounced. In order to manage this volatility, electricity storage needs to be strongly increased in the near future, while at the same time demand needs to be flexible and different energy sectors need to be coupled.

- ➔ There are promising working examples for making demand more flexible and coupling energy sectors on a company level with economic benefits for the companies.
- ➔ Other examples show that certain industries can adapt processes to significantly making demand more flexible. For example: smelters and foundries can switch from fossil fuels to electricity, improving the carbon footprint and adding flexibility to the grid, or electrolytic refining can partially be synched to the availability of renewable electricity.
- ➔ Although technical and economic solutions exist, surveys show a lack of interest in such measures among companies.

Solution

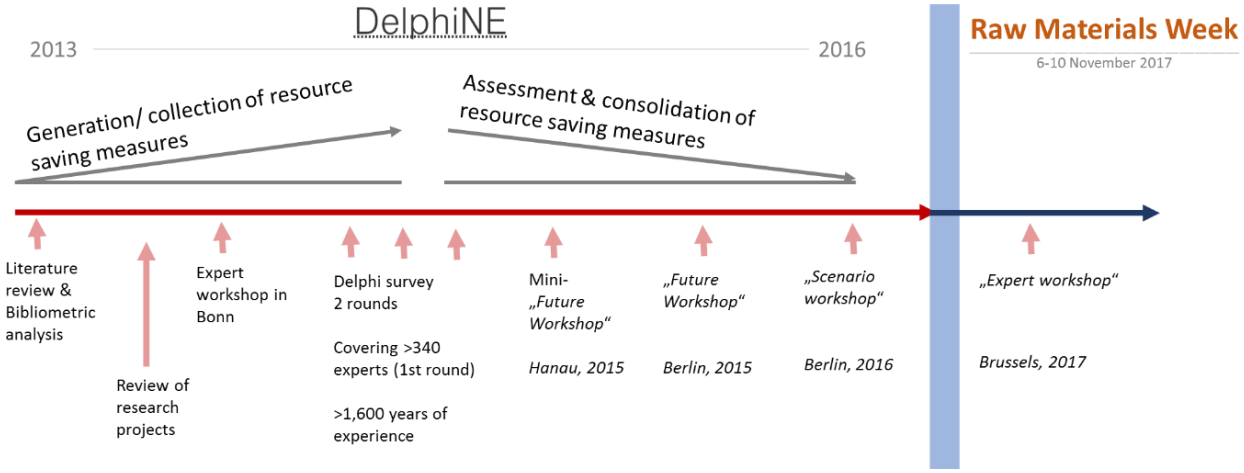
Solution 1: Promotion of the benefit and necessity of flexible demand and industrial electricity storage. Creating incentives for adoption.
Concerned stakeholder group: Public administration.

Solution 2: A tailored approach to inform and stimulate small and medium sized companies needs to be developed.
Concerned stakeholder group: Science and industry, public administration.

Background of the project

From 2013 to 2017, the German Federal Environment Agency (Umweltbundesamt, UBA) commissioned the project “DelphiNE - Investigating resource saving potentials in the non-ferrous metals industry in Germany” (FKZ 3713 93 306). The aim of the project was to initiate a discussion and fuel the debate on potential resource savings and to identify key measures towards a “green” non-ferrous metals industry. Various expert-workshops and a large-scale two-round Delphi-survey have been conducted. In total, more than 400 experts in non-ferrous metals and resource efficiency representing more than 1.600 years of experience have been involved in the project.

Figure 1: Methodology and timeline of the DelphiNE project and expert workshop in Brussels



Complementing the DelphiNE project, a workshop with leading experts has been conducted along the European Raw Materials Week in November 2017. This workshop elevated the insights in Germany to a truly European perspective, explicitly addressing issues like EU resource strategies and knowledge and technology transfer. Participants from European associations like European Aluminum, European Copper Institute, Eurometaux, Nickel Institute, EU Commission, as well as from academia and industry shared insights.

The seven key measures are considered the essence of both predecessors – the DelphiNE project in Germany and the European high-level expert-workshop in Brussels. These measures shall further fuel the discussion of pathways towards a green non-ferrous metals industry, and finally benefit all stakeholders affected.

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