



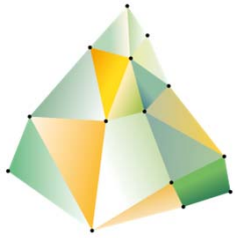
Policy Lab Parallel Session 3 Recycling and Handling of Processing Rejects

Anders Sand

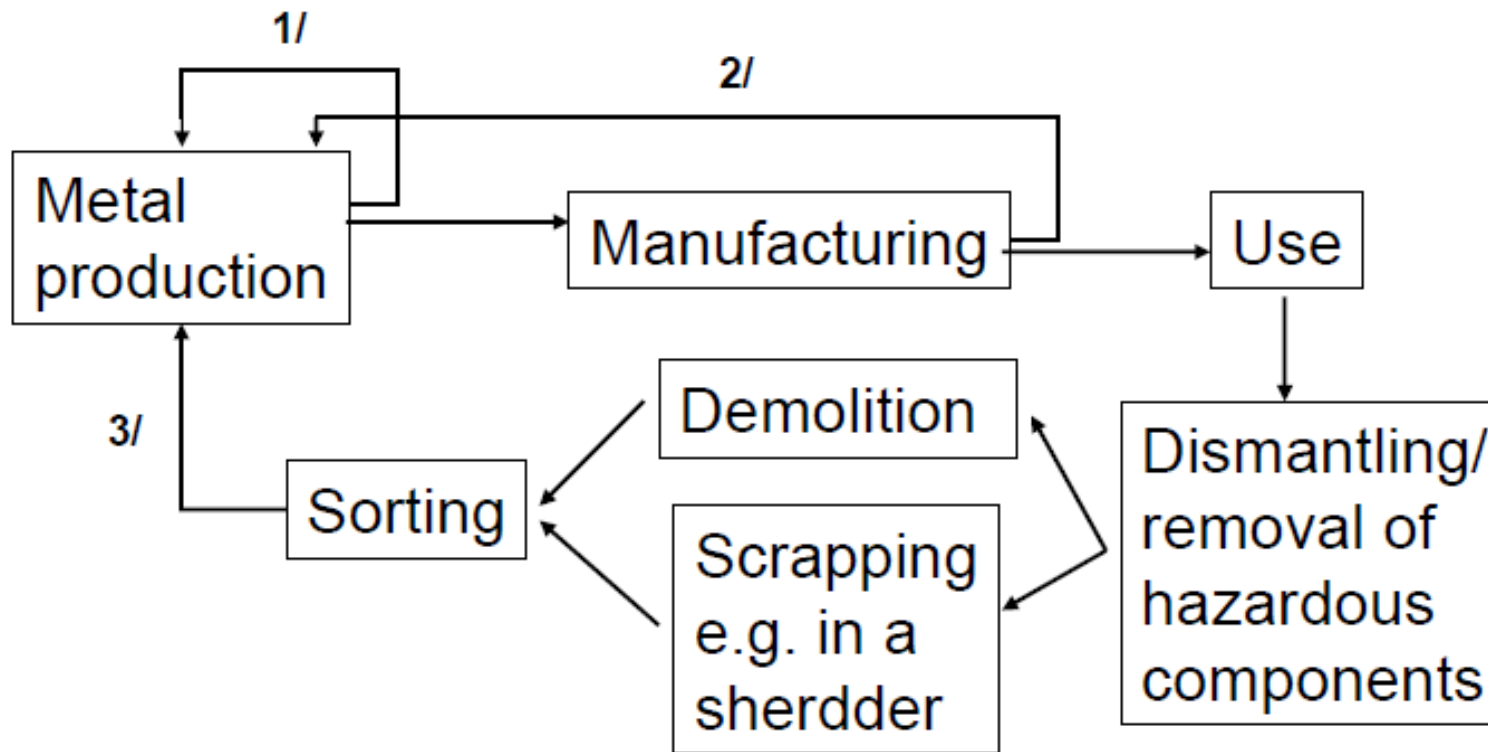
Luleå University of Technology

Division of Minerals and Metallurgical Engineering

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What is meant by secondary raw materials, and where does recycling take place

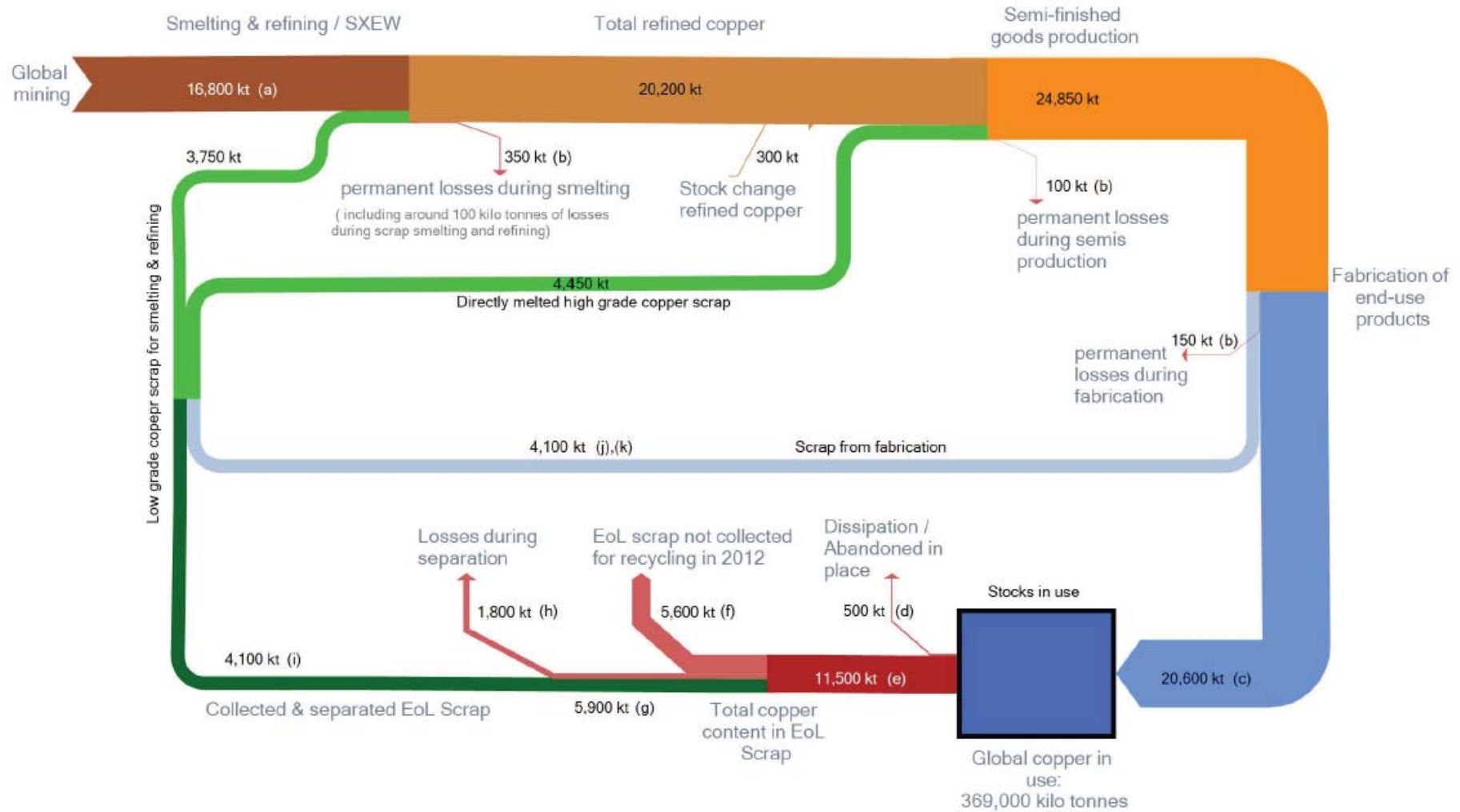


- 1) Internal recycling e.g. at smelter (waste recycling, slag, etc)
- 2) Manufacturing wastes
- 3) From recyclers (collected wastes from society)



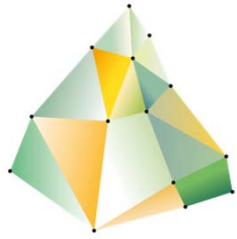


Is there still potential to improve recycling?



Global flow pattern of Copper 2012 (ICSG)





Recycling in SIP Raw Materials (2013)

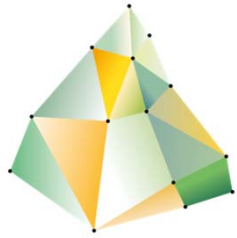
Secondary raw materials strongly emphasised along primaries (Technology Pillar I.A-I.B)

Priority area: Raw material research and innovation coordination (both primary and secondary)

Priority area: Technologies for primary and secondary raw materials' production

Recycling in focus in many national mineral strategies in countries with strong manufacturing industry (Netherlands, Germany, France, etc)

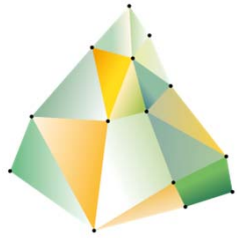




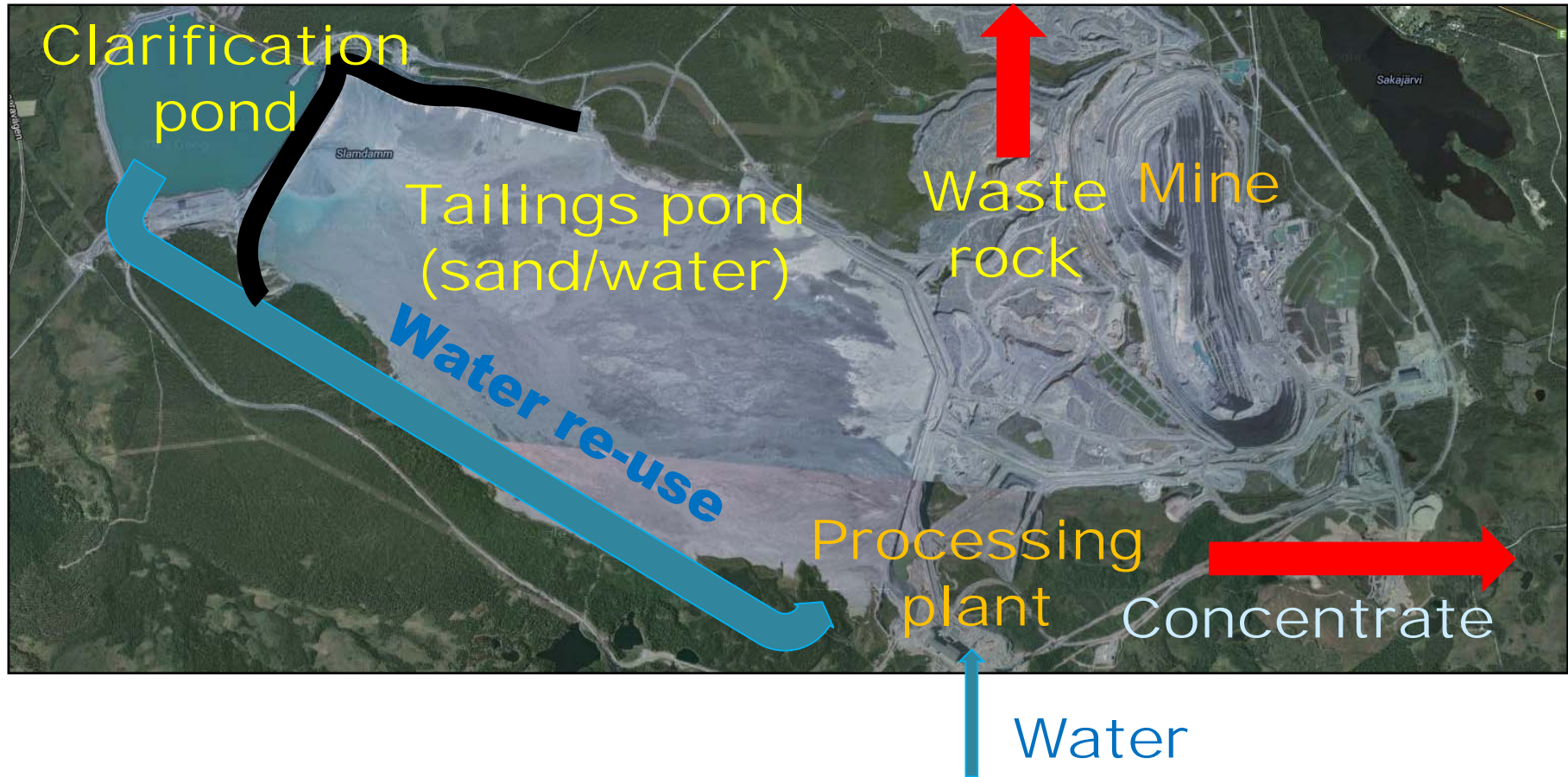
Challenges in recycling

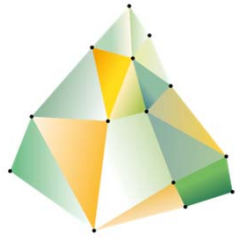
- "Resource efficiency" earlier in the value chain, e.g. minimising use of valuable metals in products, can be a challenge for recyclers
- Still lack of holistic view of raw material cycles, e.g. Design for Recycling, Reduction on Hazardous substances (RoHS), etc.
- Trends in society towards more complex products (more different compounds contained -> difficult to recycle, recycling schemes not developed for "exotic" metals)
- Lack of coherent approach in directives and legislation



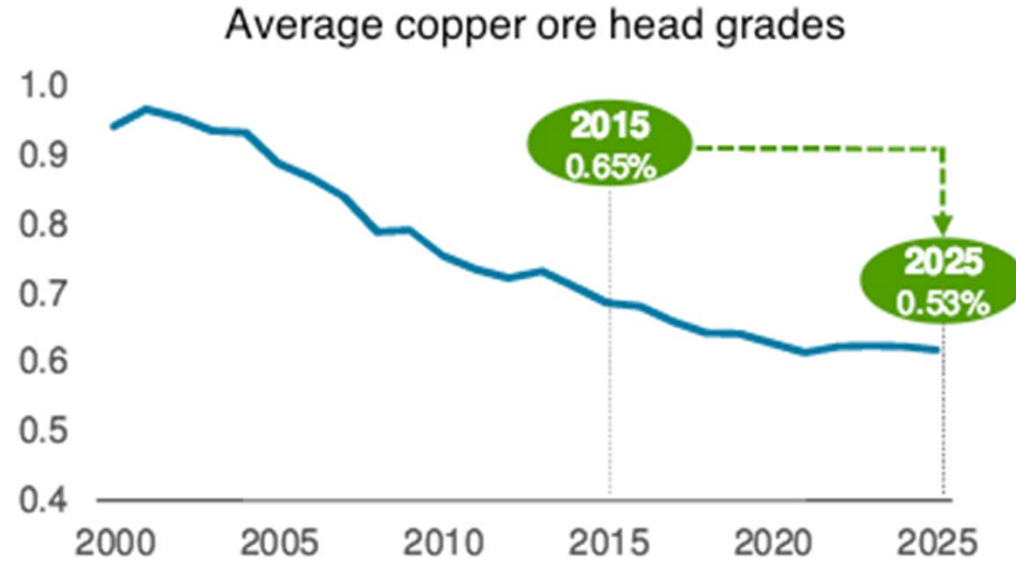


Handling of processing rejects in the mining industry



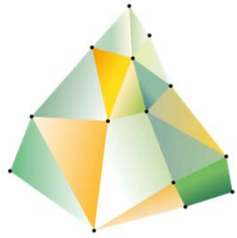


Handling of processing rejects in the mining industry



Decreasing head grades (almost always) means more waste (per ton product)...





Handling of Processing Rejects in SIP Raw Materials (2013)

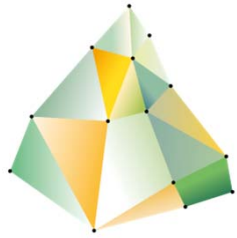
Minimising waste generation and improved waste management (Non-Technology Pillar II.A-II.B)

Priority area: Improving Europe's waste management framework conditions and excellence

Priority area: Framework conditions for enhancing efficiency in raw material use and in waste prevention, ...

Waste management issues covered in national mineral strategies in countries with strong mining industry (Austria, Sweden, Finland)

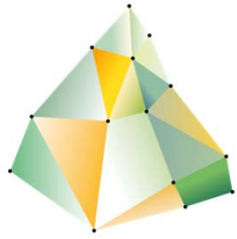




Challenges in handling of processing rejects

- Difficult to establish best practice, as any technology option will create a "sustainability trade-off" (environmental-social-economic)
- By-product standards, as for instance building material standards, are poorly adapted to processing residues
- Lack of societal understanding for co-mining of different metals (compare – the metal cycle)
- Good-practice handling of processing rejects starts with process (flowsheet) planning, e.g. pre-sorting, avoiding excessive fines production, etc.





Case Presentations

Recycling and Handling of Processing Rejects

Facilitator: Anders Sand

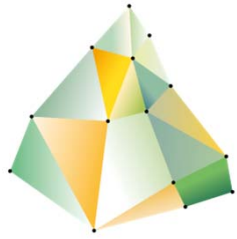
Sensing and Robotic Sorting of End of Life Products

Sverker Sjölin (Stena Technoworld)

Innovations in Backfill Handling

Barrie O'Connell (Wardell Armstrong Intl.)

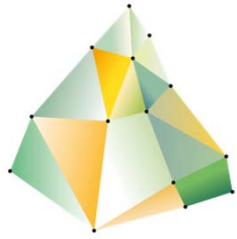




Guiding questions 1

- What was the innovation case about? Problem formulation and rationale for the case?
- What were the outcomes/results from the innovation case?
- Project team, setting and implementation? What were the major barriers or challenges during design?
- Connection to policy framework? What were the drivers in terms of policy and legislation? Obstacles/promotion with respect to policies and legislation?





Guiding questions 2

- What is the most important thing to consider for successful transfer of the policy/non-policy factors to other countries?
- What could be the major driving institution/body/ministry to implement the policy and/or support non-policy factors after transfer to another country?
- What is the necessary first step to successfully transfer the policy/non-policy factor into another country?
- Which key stakeholders need to be involved?





Thank you for your attention

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