

A SUSTAINABILITY ASSESSMENT APPROACH COMPLIANT WITH THE UNFC FOR ON-SITE EXPLORATION DATA TO IDENTIFY THE RAW MATERIALS RECOVERY POTENTIAL FROM BASE METAL TAILINGS

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BACKGROUND

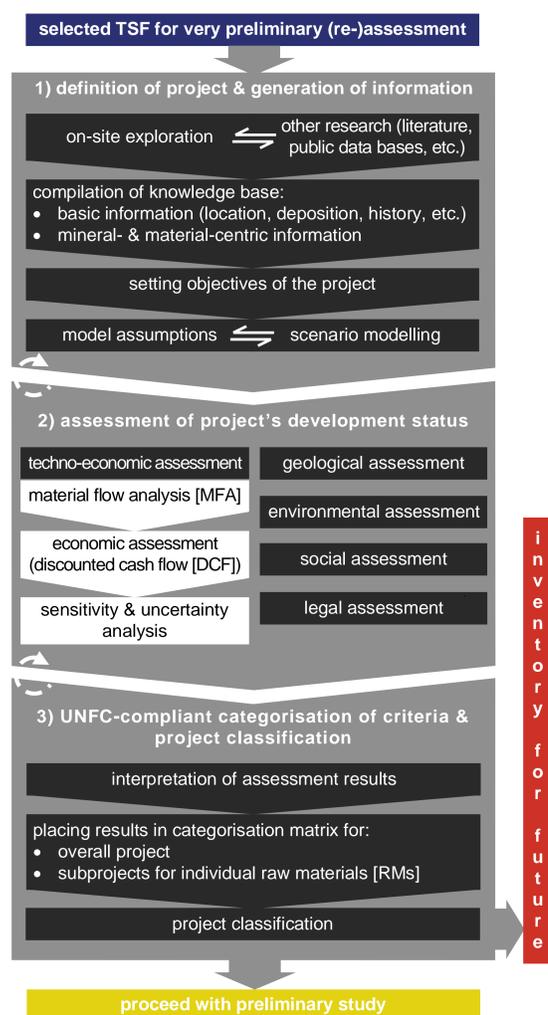
- early consideration of environmental & social aspects is essential for raw materials recovery from base metal tailings
- conventional exploration of base metal tailings with techno-economic focus omits these aspects [1]
- hence, raw materials recovery project potentials & barriers are often not visible so that competitiveness is unclear

OBJECTIVES

- assessment & classification under consideration of all dimensions of sustainability using on-site exploration data [2]
- application of the approach to the case study base metals tailings deposit Bollrich (Germany) at very preliminary level
- evaluation of 3 scenarios: rehabilitation (NRR0), recovery with a focus on economic (CRR1) & sustainability aspects (ERR2)

METHODS

- systematic assessment & classification approach in 3 steps compliant with the UNFC* (cf., figure 1)
- summary of results in a heat map-like categorisation matrix for a quick overview of project potentials & barriers



RESULTS

- 44 factors assessed (adapted & modified after a literature review on established assessment factors from primary mining, sustainability in mining, & case studies)
- net present values of EUR -125 mio. (NRR0), EUR 74 mio. (CRR1) & EUR 173 mio. (ERR2)
- recoverable quantities of 2.7 mio. t (CRR1) & 7.1 mio. t (ERR2)
- main drivers: (a) environmental rehabilitation, (b) economic viability, & (c) long-term positive regional development
- main barriers: (d) metallurgical testing on tailings from upper part of the tailings deposit, (e) development of a solution for the disposal of the neutralised sludge from the Rammelsberg mine during & after project execution, (f) proposal of measures for the mitigation of environmental impacts, (g) conduction of a detailed stakeholder assessment, & (h) preparation of legal permit applications
- overall project rating for all 3 scenarios: E3.3F3G3 (cf., table 1)

Table 1. Excerpt of the categorisation matrix for the rating of the overall project (left-hand side) & subprojects for the recovery of individual raw materials (right-hand side). Each rating result is assigned an own colour ranging from purple (Category 3), including an intense red to pink (Subcategories 3.3 to 3.1), orange (Category 2), & green (Category 1). Adapted after reference [3].

aspects	overall project			subprojects for individual raw materials recovery (CRR1, ERR2)				
	NRR0	CRR1	ERR2	BaSO ₄	Cu	Ga	FeS ₂	inert material**
geological	G3	G3	G3	G3	G3	G3	G3	G3
technological	F3	F3	F3	F2	F2	F3	F1	F1
total rating	E3.3	E3.3	E3.1	E3.1	E3.3	E3.3	E3.2	E3.3
environmental	E3.3	E3.2	E3.2	E3.1	E3.1	-	-	E1
social	E3.3	E3.3	E3.3	N/A	N/A	N/A	N/A	N/A
legal	E3.3	E3.3	E3.3	N/A	N/A	N/A	N/A	N/A

Figure 1. Three steps for a systematic raw materials recovery project assessment and classification. Adapted after reference [3].

CONCLUSIONS

the developed approach helps to:

- identify sustainability aspects at local level
- provide a quick overview of project potentials & barriers to support decision-making for further project development
- create transparency for discussion with involved stakeholders to find an acceptable solution for how to proceed

REFERENCES

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*UNFC: United Nations Framework Classification for Resources



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