

Futu

Future availability
of secondary
raw materials

RaM

Utilization of extractive waste and the FutuRaM case site in Finland

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Geological survey of Finland GTK



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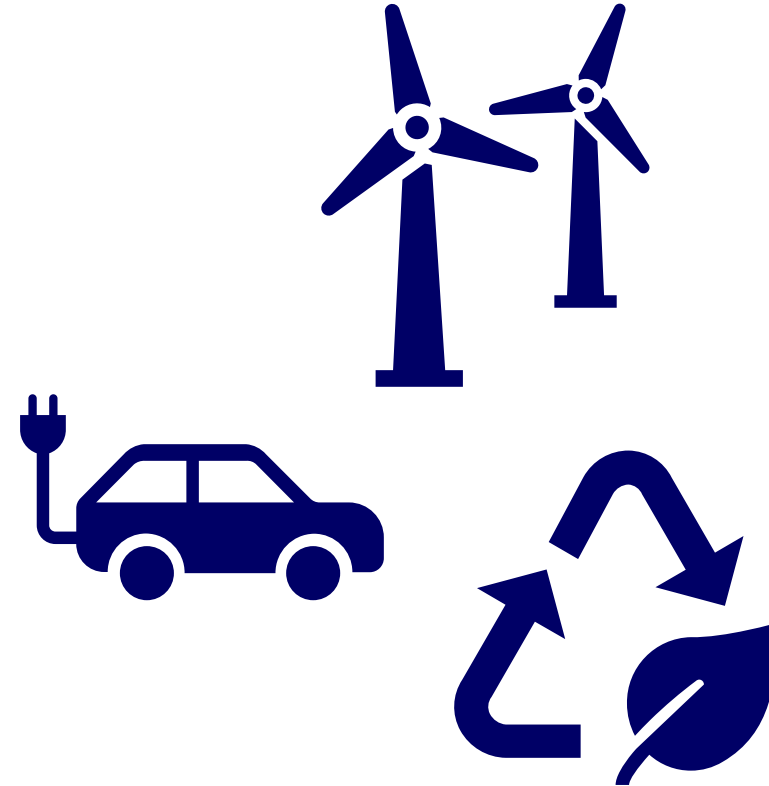


Extractive waste as secondary resources



Rising mineral & metal demand for clean energy

Focus on supply security & environmental impact
spurs interest in secondary resources from
extractive waste



Extractive waste in Finland



Finland's extractive waste: 100 Mt annually, 74% of total waste streams

1,113 Mt waste rock mined since 16th century, 96% from 1969-2021, half in last decade

Over 500 Mt tailings generated since flotation's introduction in 1911



Extractive waste as secondary resource in Finland



Low utilization of extractive waste as secondary resources, especially in metal mines

Mainly used for earth construction & cavity filling

Higher utilization in limestone quarries, e.g., Nordkalk utilized 95% of extracted material in 2021



Extractive waste as secondary resource in Finland



Lack of systematic national resource management hinders extractive waste utilization

Requires characterization considering resource quantities, technical viability, environmental & socio-economic issues

Existing data scattered (deposit data, risk assessments, compliance monitoring by authorities)

Secondary raw materials to be included in GTK's Mineral Database → FutuRaM database

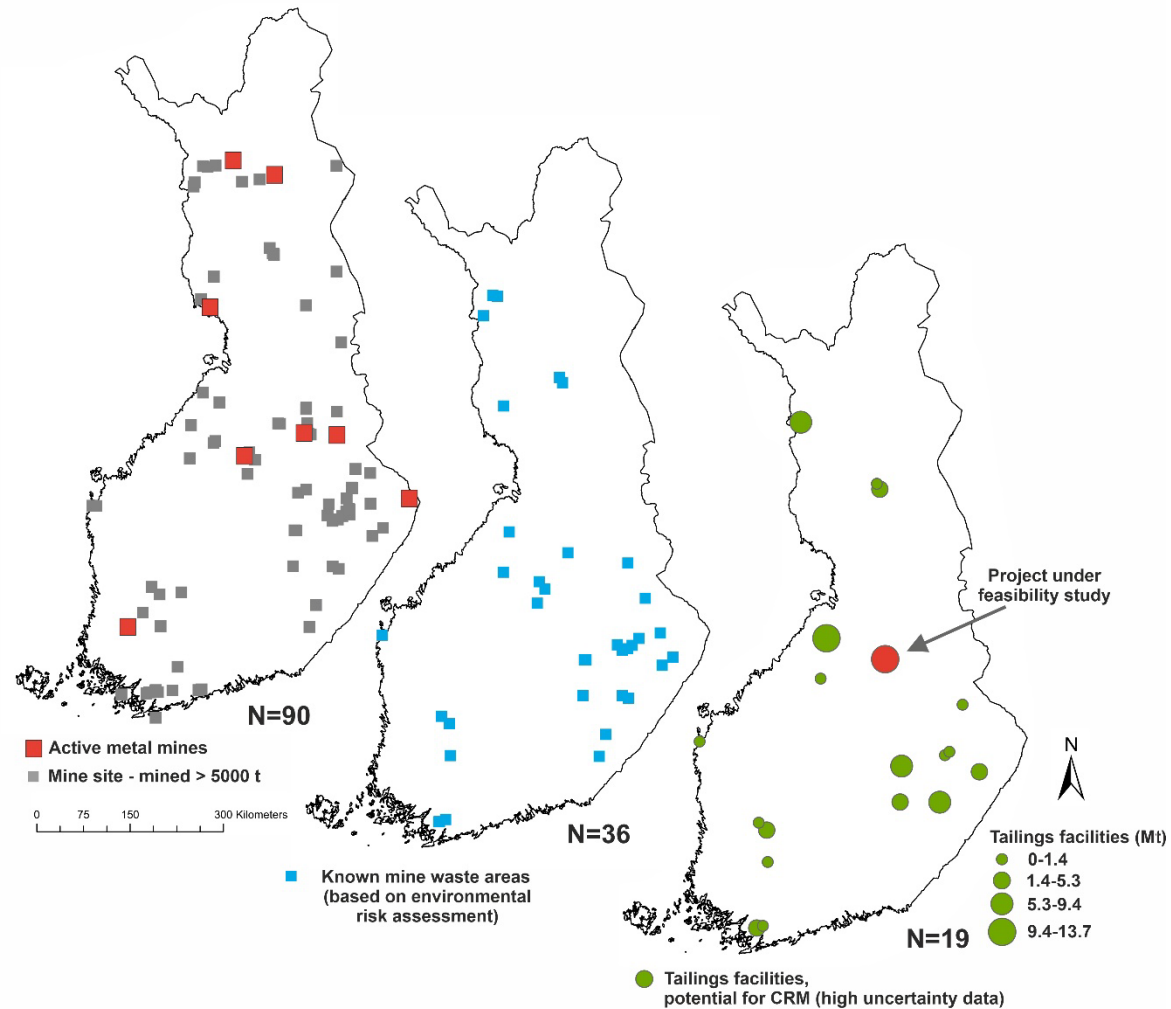


Extractive waste as secondary resource in Finland



Resource potential of closed extractive waste sites understudied

Only Otanmäki tailings area thoroughly investigated for remaining potential



The Otanmäki mine



Fe-V mine owned first by Otanmäki Oy and later by Rautaruukki Oy

Active 1953-1985, during which 33.1 Mt of rock material was extracted

25.5 Mt of ore, 11.8 Mt of tailings (includes also some slags)

Current plans to utilize tailings and re-open the mine by Otanmäki Mine Oy



Photo: Valokuvausliike Hynninen

The Otanmäki ilmenite project



100% owned by Otanmäki Mine Oy,
see: <https://www.otanmaki.fi/ilmeniittihanke/>

The Otanmäki Mine Oy started the investigations at
the Otanmäki tailings site in 2017

The current interim resource estimate indicate 9.8
Mt @ 7.9 % TiO₂ (16 % FeTiO₃)

The company is currently completing its
Prefeasibility Study and the plan is to start
producing ilmenite by the year 2025

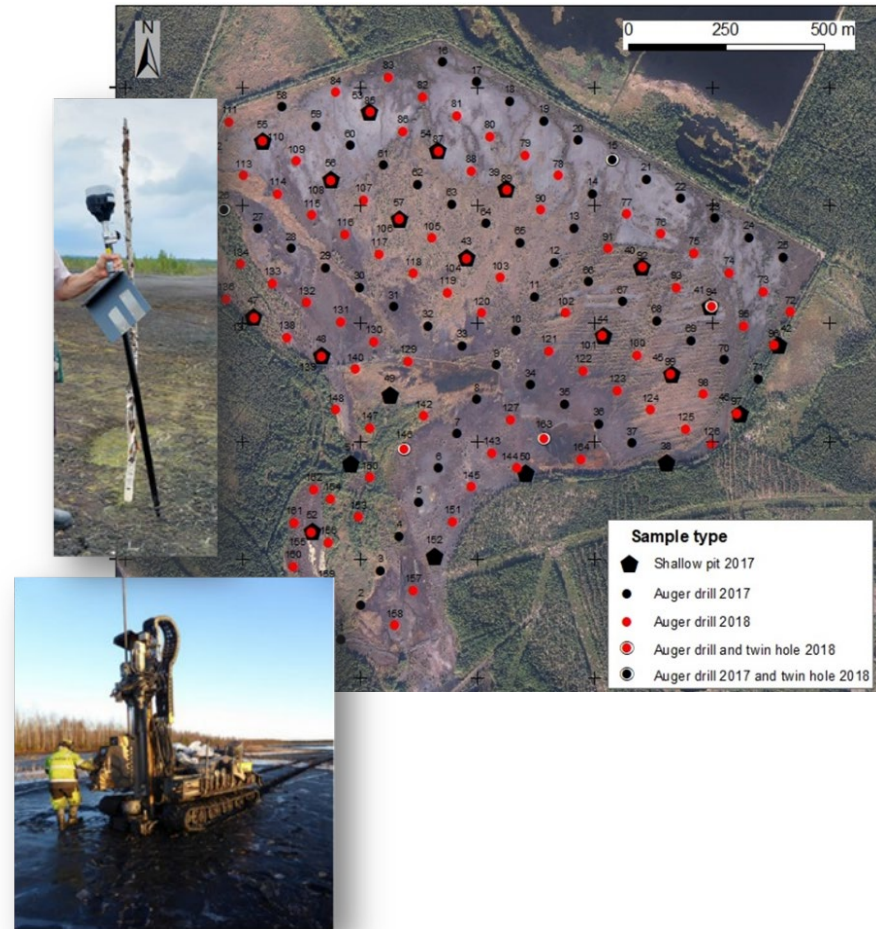


The Otanmäki ilmenite project



Investigations: systematic drilling & sampling,
resource modeling, pilot-scale beneficiation tests at
GTK Mintec

Otanmäki ilmenite resource classified as E2F2G2
(potentially viable) per the United Nations
Framework Classification for Resources (UNFC)



FutuRaM project and the resource management of extractive waste

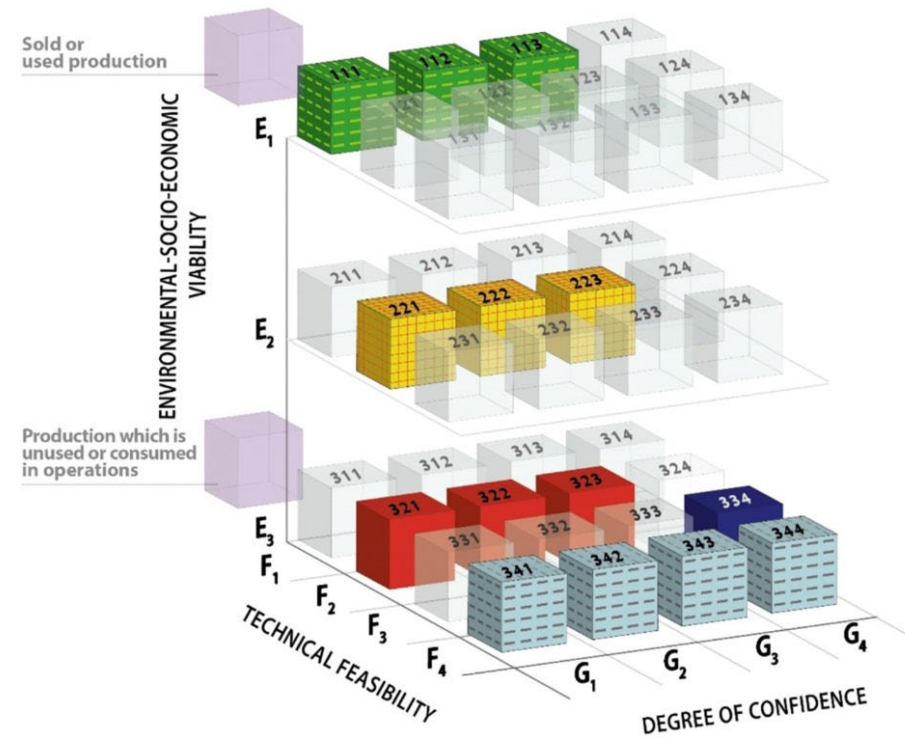


FutuRaM database: secondary resources classified via UNFC

Benefits of UNFC include comprehensive, harmonized, sustainable resource classification

Finland first in Europe to adopt UNFC for primary mineral resources

Otanmäki tailings facility as FutuRaM case site & future utilization example



FutuRaM project and the resource management of extractive waste



Concrete FutuRaM actions at Otanmäki:

- Testing and comparing 3 different drilling/sampling methods (auger, split & spoon, tube)
- Are there significant differences between the methods?
- What is the reliability of the sampling already done at the site?



FutuRaM project and the resource management of extractive waste



Concrete FutuRaM actions at Otanmäki:

- Investigate and model in detail a small part of the tailings area
 - 45-50 closely spaced drill cores
- Assessing the reliability of the resource estimation done based on more scattered drilling



FutuRaM project and the resource management of extractive waste



Concrete FutuRaM actions at Otanmäki:

- Document how the investigations and UNFC classification was made as an example for future projects



FutuRaM project and the resource management of extractive waste



Project web pages: <https://futuram.eu/>

Twitter: <https://twitter.com/FuturamProject> or
[@FutuRaMProject](https://twitter.com/FutuRaMProject)

LinkedIn:
<https://www.linkedin.com/company/86242549>



About FutuRaM

Securing the supply of secondary & critical raw materials in the EU.
A Horizon Europe funded project.

The Project Goal

FutuRaM will develop the Secondary Raw Materials knowledge base on the availability and recoverability of secondary raw materials (SRMs) within the European Union (EU), with a special focus on critical raw materials (CRMs). The project research will enable fact-based decision making for the recovery and use of SRMs within and outside the EU, and disseminate the data generated via an accessible knowledge base developed in the project.

The Project Scope

FutuRaM will establish a methodology, reporting structure, and guidance to improve the raw materials knowledge base up to 2050. It will integrate SRM and CRM data to model their current stocks and flows, and consider economic, technological, geopolitical, regulatory, social and environmental factors.

[READ MORE](#)



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Thank you!

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