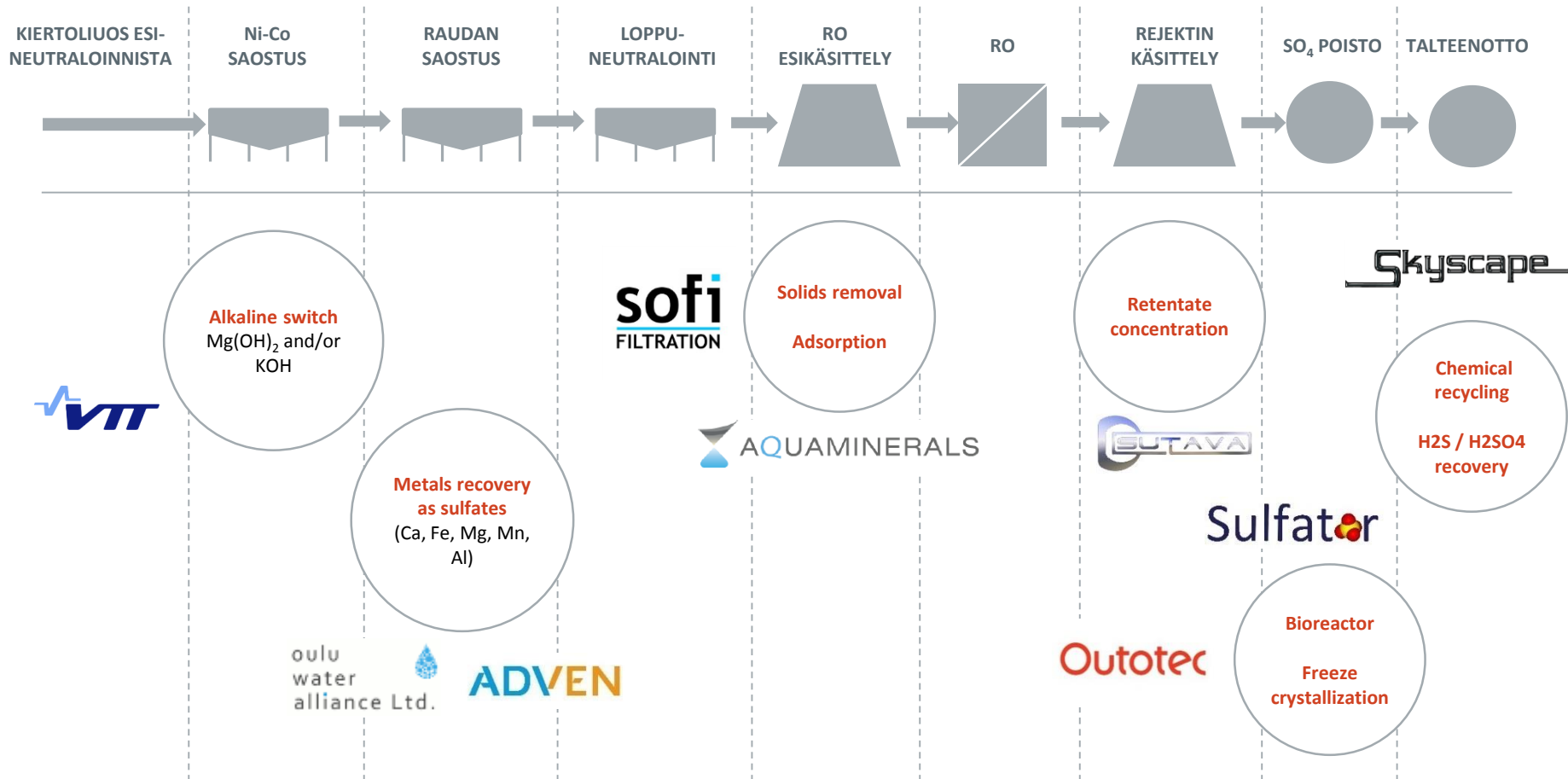


» Mine water
management R&D&I from
industrial perspective

>> Background

- High sulfate level of purified water is a process-related challenge at Terrafame mine.
- In fall 2015 we introduced a special water technology development project: “New technologies and ideas to purify water more efficiently. “
- We want to dig into the roots of the problem, instead of quick fixes.

>> Minidemonstration phase - spring 2016



The results were introduced in a seminar in June 2016. Several patents were applied.

>> Piloting phase ends in Summer 2017

Evaporation-
crystallization

Owatec Group (OWA) is piloting the recovery of additional metals as sulfates.

Solids
removal

Sofi filtration is piloting the filtering technology to separate solids from a few process locations.

NF

Skyscape is piloting possible modifications related to the capacity increase at the existing RO plant.

Bioreactor

Sulfator is piloting the anaerobic sulfate reduction in the RO retentate.

Alkaline
switch

VTT is piloting possibilities to modify to chemistry at metals recovery.

A few pre-feasibility studies will be produced for the selection of scale-up phase.

» The selection of the approach will be carried out and introduced in fall 2017

	2016				2017				2018			
Minidemos	■	■										
GATE 1	→											
Concept development (piloting)		■	■	■	■	■	■					
Pre-feasibility					■	■	■					
GATE 2			→									
Feasibility									■	■	■	
GATE 3									→			
Planning											■	■
Building												■

- Piloting phase was partly carried out with Tekes-funding.
- Funding for the feasibility has been applied from EIT Raw Materials.
- Funding for the demonstrations has been applied from EU H2020 Innovation Action instrument.

>> SMEs and R&D-companies involved

- More than 200 contacts
- More than 100 proposals
- More than 10 companies funded and participating the development
- Most of the funded companies are still involved in the development

>> Some benefits and challenges related to extensive involvement of SMEs

- Ideas are usually developable and out of the box
- People are dedicated and motivated
- In the beginning the costs seem competitive

- Level of technical understanding is inadequate
- Perspective and solution is based on false or insufficient information
- The approach is technically workable but not scalable
- The offering is not realistic and therefore the results do not meet with the expectations (delays, extra costs, etc.)
- The economical impacts are not understood
- The process impacts are not considered or understood
- Project management is poor which leads to poor information exchange, time management, budget management, etc.
- Reporting is not satisfactory (results are not scientifically proven, cause-effect relations are not considered, conclusions are missing, etc.)

Thank you!



Terrafame Group