

# Road map for attractive, inclusive, and safe mining work



## Project leader

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## Partners

LTU, Boliden, LKAB, BDX

## Project duration

March 2022 – March 2025

# Goals of the project.

1

The overall goal is to develop a roadmap for **attractive, inclusive and safe mining work ...**

2

... through research on work environment, attractiveness, agile and learning organizations, skills, safety, gender equality, workplace culture, social sustainability, human-technology-organisation, socio-technology, organisational and workplace change.

3

The roadmap aims to support the development of **resilience, flexibility and sustainability in the mining sector** through **human-centred development of both technology and organisations.**

4

This is important tools when handling the challenges that come from **the green and digital transformation** of the Swedish mining sector and sustainable development in local communities around the mines.

# The project in brief (1).

The project runs March 2022 – March 2025 (3 years).

The roadmap is developed by researchers (LTU) and company representatives (LKAB, Boliden, BDX).

We are doing this **together**.

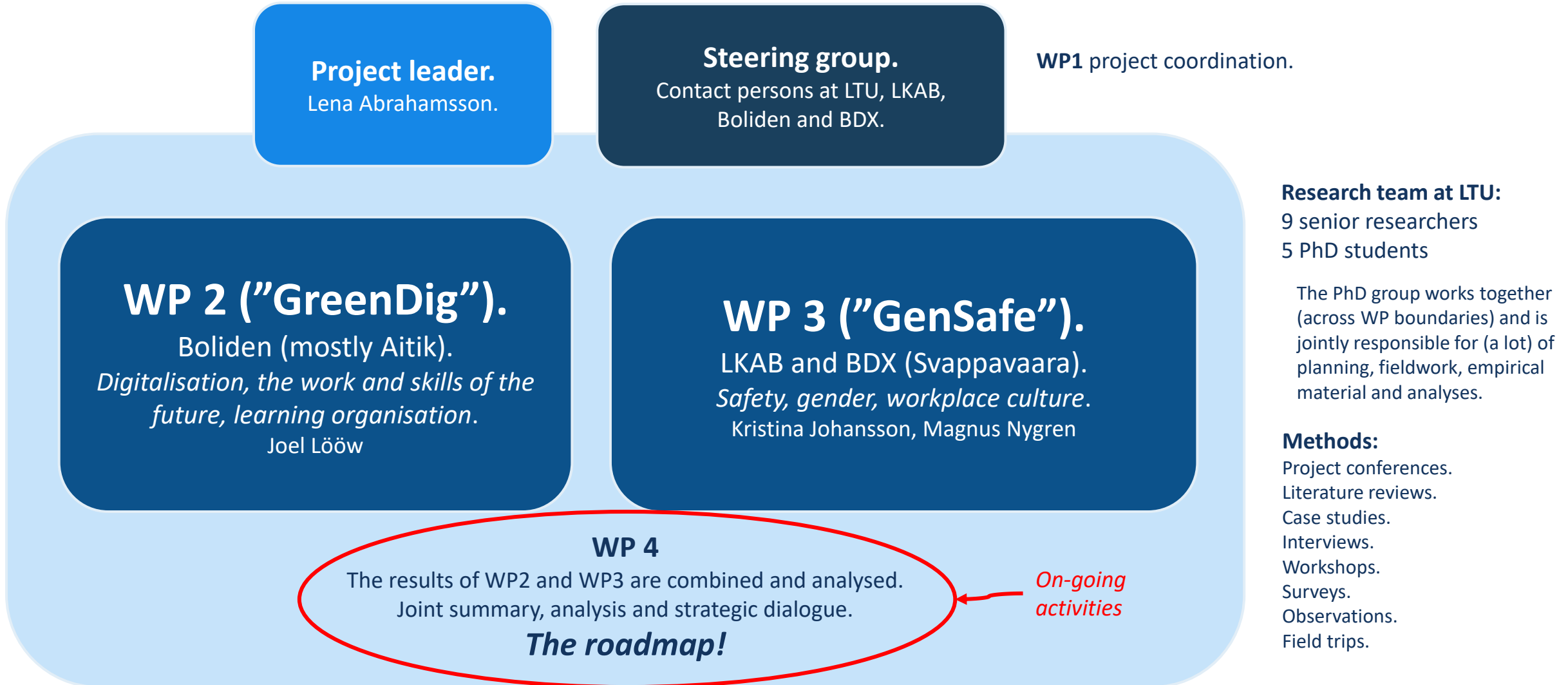
By combining:

- **theories and previous research**
- **practical industry experience**
- and
- **new empirical results.**

One important method: **the project conferences.**



# The project in brief (2).



# Researching the mining work of the future

## WP 2 “GreenDig”

A study of how **automation** changes **mining work** and **skills demands** and how a **learning organisation** in a green and digitalised mine could look like.

## WP 3 “GenSafe”

A study of the relationship between **gender equality** and **safety in the workplace culture** and look for methods that stimulate a safe and inclusive mining culture **throughout the supply chain**.

### Roadmap for attractive, inclusive and safe mining work (“Attract”).

A research project (2022–2025) at Human Work Science at Luleå University of Technology financed by the strategic innovation program *Swedish Mining Innovation* (a joint venture by the national research funds Vinnova, Formas and the Swedish Energy Agency).



# Results so far (1).

## **Automation (autonomous vehicles) changes the work of (some) operators.**

- Safer work, more varied work, more personal responsibility.
- Unpredictable (dependent on technology), increased bureaucratization and locked/inflexible work.
- Less social, fewer natural meetings for participation, joint problem solving and learning.

## **Industry 4.0 for maintenance work is a challenge.**

- Cyber security.

## **The new technology increases the need for learning organisation (for mining workers).**

- The old structure of groups, positions, professions, hierarchical levels hinders workplace learning.
- Need for better and more cooperation over organisational borders.

## **Collaboration between contracting companies (suppliers) and mining companies (clients) is a challenge.**

- Unequal power relations – client-supplier – difficult to develop joint solutions.
- Green and digital transition not prioritized in the sales order.
- Gender equality? Skills? Learning organization? Joint SAM? Safety culture?
- The contractors work in double systems (their own and the client's), perhaps several different industries.
- Lack of a strategy for digital collaboration.

# Results so far (2).

## **Safety first is well established and works, but there are exceptions.**

- When things malfunction. When it comes to the others. When there is no time.
- Resistance to “safety first” (checklists and rules) is about the fact that there are still many physical risks and work environmental problems that need to be addressed.
- The macho culture’s resistance to safety is not dominant today.
- It is about the conditions for the miners to work safely.
- Different terms and conditions for working safely in the contracting company and contracting companies.

## **Workplace culture and inclusion is about all professions, positions and companies at the workplace.**

- There are inclusion processes that exclude others. The opportunity to fit in is about gender, interests and origins.
- The norms of the local workplace culture are about being a man and a woman in the "right way".
- To be included, various forms of adaptations are required (e.g. tolerating "jokes") that risk counteracting safety and inclusion.
- It is different for different occupational groups.
- Safety has been more clearly integrated into the ordinary production processes than gender equality – both within each company and in the collaboration between supplier and client.
- One way to promote a safer and inclusive mining culture can therefore be to strengthen the gender equality perspective in existing safety work.

# One important method: the project conferences.

At each project conference, participants from the four project partners (LTU, LKAB, Boliden, BDX) participate to discuss the results achieved so far.

- The first project conference (13 September 2022) focused on **existing company experiences and previous scientific theories** – *the needs and challenges*.
- The second project conference (19-20 September 2023) focused on **empirical results from the case studies** of Boliden (mostly Aitik) and LKAB (Svappavaara) – *validation, synchronisation, inter-company learning*.
- The third project conference (3-4 October 2024) focused on **research results** – and *starting of our work with the roadmap*.

The aim with the project conferences is to jointly develop an understanding of how existing and new knowledge and methods can be used in companies (both mining companies and contracting companies) to promote attractive, inclusive and safe mining workplaces.

2022 Aitik



2023 Svappavaara



2024 Luleå



# Mining innovation for a sustainable future