

Mining Ecosystem

Bergslagen & Mining@ORU

2025-10-01

Örebro University

Bergslagen – Sweden's Oldest Mining Region

- Bergslagen is an undefined region, historically one of Sweden's most important economic areas due to its mining industry.
(e.g. *Falun Copper Mine*, *Sala Silver Mine*)
- Mining activities documented since the Middle Ages – but likely much earlier.
(e.g. *Garpenberg*)
- One of the world's leading producers of iron for centuries (1200s–1800s).
(e.g. *Norberg*)
- Today, Bergslagen produces about half of Sweden's base metals.





Strengths Bergslagen – Geological potential and mineral occurrences

- Base metals
- Critical/strategic minerals (CRM/SRM)
- Carbonate rock
- Secondary resources



Strengths Bergslagen – Ecosystem and competence supply

- Technology providers and industrial sector
- Innovation system and research infrastructure
- Geographical location

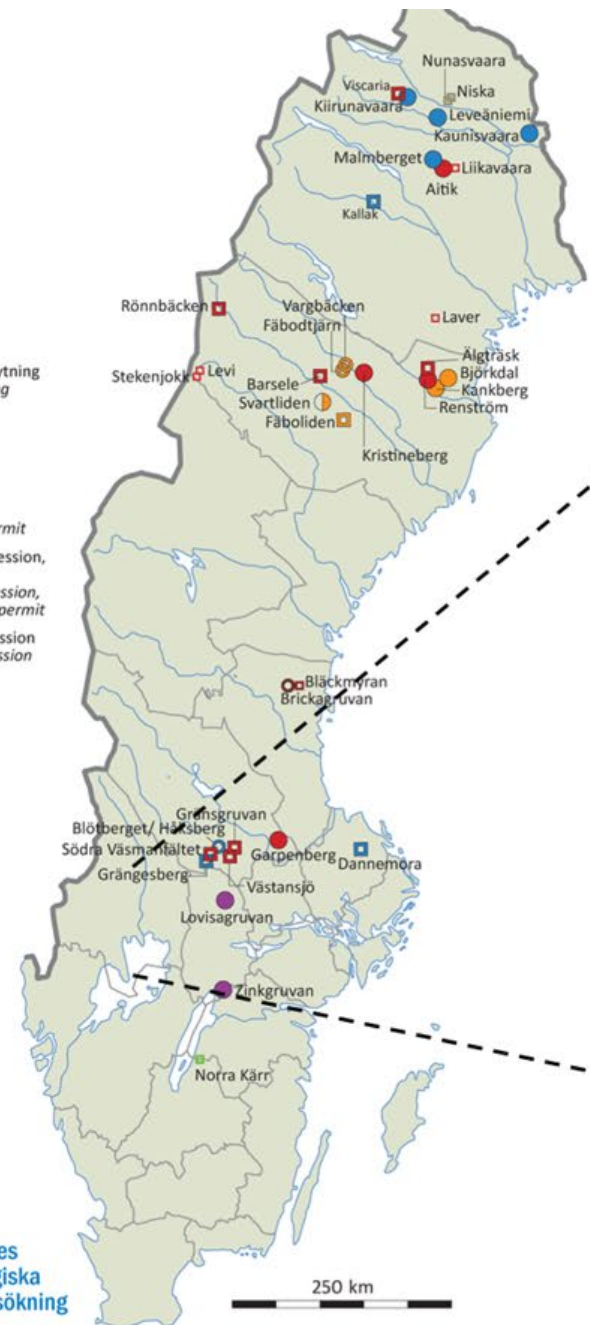
A diversified ecosystem of actors

The mining ecosystem in Bergslagen is broad and includes:

- **Education & research** – Örebro University with strong profiles in AI, sustainability, and industrial development.
- **Technology & innovation** – World-leading mining tech, automation, safety, and sustainable solutions.
- **Municipalities & civil society** – Active in combining industrial growth with sustainable community development.
- **Cultural heritage** – Mining deeply rooted in local culture, fostering understanding and engagement.

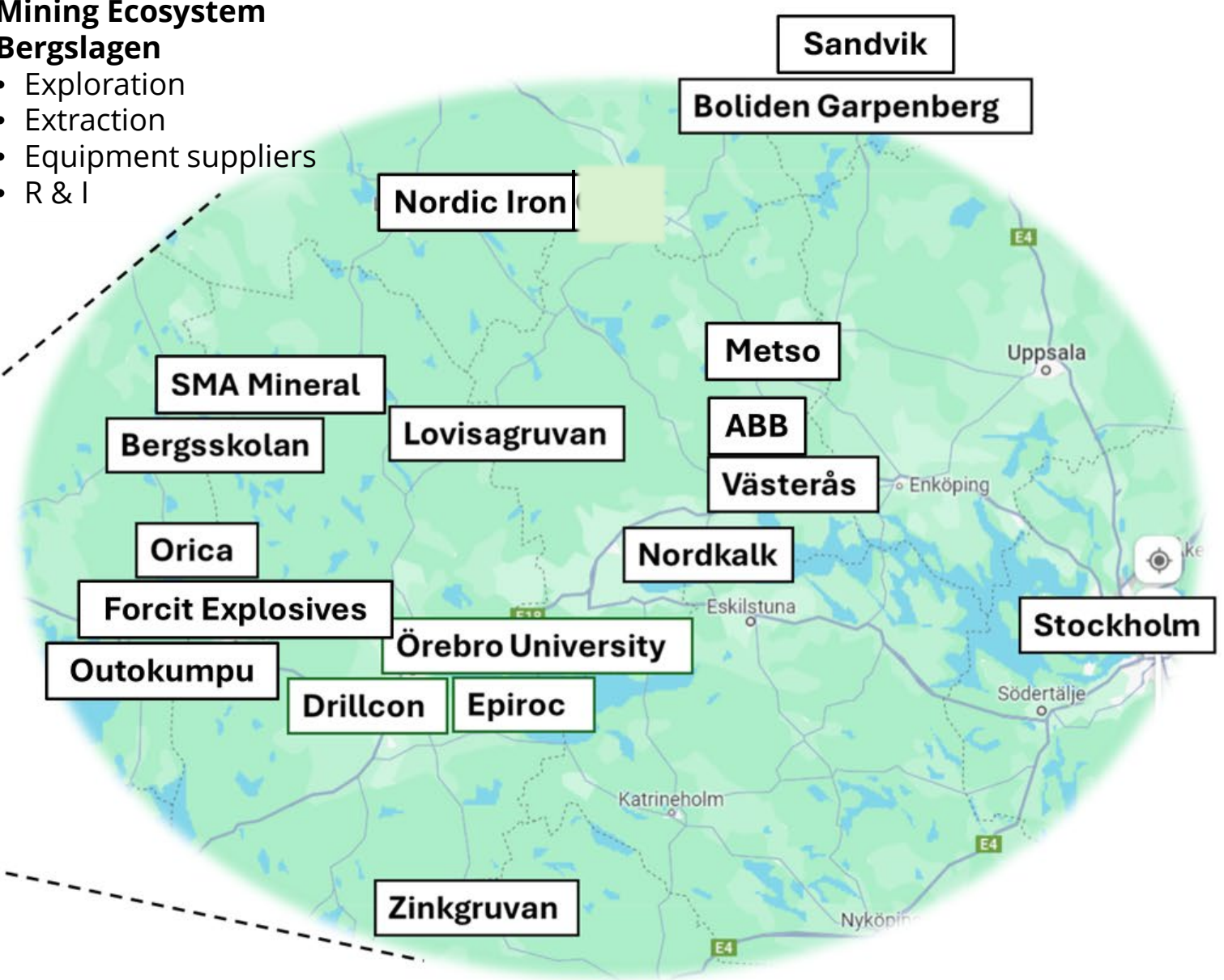


- Iron ore
- Järn och annan metall
Iron and other metal
- Basmetaller
Base metals
- Basmetaller och guld
Base metals and gold
- Guld
Gold
- REE
REE
- Industrimineral
Industrial mineral
- I produktion
In production
- Endast anrikning, ingen brytning
Only concentrate, no mining
- Kampanjproduktion
Campaign Production
- Ej i drift
Nonoperating mines
- Miljödom klar
Granted environmental permit
- Beviljad bearbetningskoncession, väntar på miljöprövning
Granted exploitation concession, waiting for environmental permit
- Ansökt bearbetningskoncession
Applied exploitation concession



Mining Ecosystem Bergslagen

- Exploration
- Extraction
- Equipment suppliers
- R & I



Regions/municipalities

KomTek, Trainstation
Ljusnarsbergs kommun
Luleå kommun
Örebro kommun
Region Dalarna
Region Örebro län
AB Samarkand2015
IUC Industrihubb
Business Region Örebro

Universities

Linköpings universitet
Luleå tekniska universitet
Mälardalens universitet
Uppsala universitet
University of Oulu
Örebro universitet
Chalmers

Consultants/SMEs

RockSigma
Sweco
Remedy by Sweden AB
Precise PLC
Norse Diamond Drilling
Nordic Mineral Exploration AB
Breathe Global Ltd
Calluna Gold Trail AB
Jokkmokk Iron Mines
Konsultfront AB
Orexplore Systems AB

Institutes/government/NGOs

Swedish Metals & Minerals
PiiA, Processindustrial IT & Automation
EIT RawMaterials
Energimyndigheten
Central Sweden European Office
RISE
SGU
LRF
SCB

Mining Ecosystem

Bergslagen

Exploration

Production

Element supply

SMA Mineral

Bergsskolan

Löve

Västerås

Uppsala

Örebro

Linköping

Skövde

Århus

Oslo

Stockholm

Gothenburg

Malmed

Luleå

Umeå

Umeå

Umeå

Umeå

Umeå

Umeå

Umeå

Umeå



ENHANCING EU REGIONAL MINING ECOSYSTEMS: OREBRO, SWEDEN

EU Technical Support Instrument Project: *Enhancing Regional Mining Ecosystems for the Green Transition
and a Reliable Mineral Raw Material Supply*



OECD

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 www.oecd.org/cfe



Funded by
the European Union



OECD

BETTER POLICIES FOR BETTER LIVES

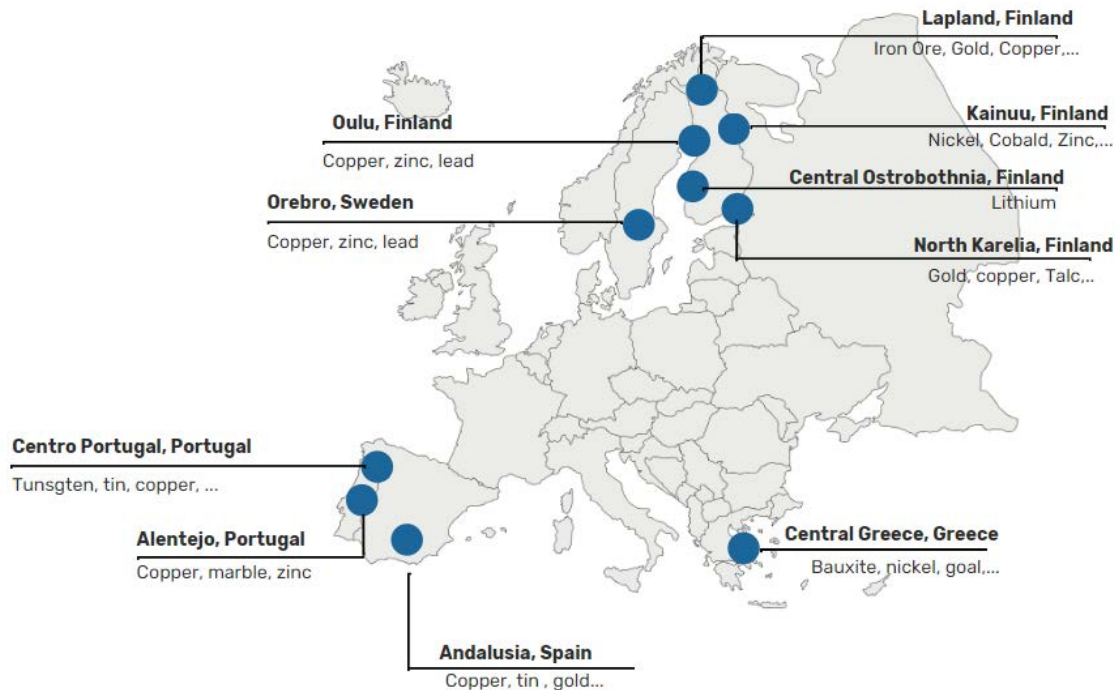


Regions involved and the field visits

Sep.2023- Jun. 2025

- ☐ 10 field missions:
 - ✓ + 450 stakeholders
 - ✓ 26 Municipalities
 - ✓ 12 Mines visited
 - ✓ 16 peer reviewers

- ☐ Inter-regional Workshops
- ☐ Regional profiles
- ☐ Synthesis report



Fact-finding missions to the ten regions





General Findings



Critical regions in the EU mineral value chain



Minerals' supply

- **Top EU suppliers:** Copper, Bauxite, Gold, Nickel, Strontium, Gypsum
- **Unique minerals:** Chrome, zinc or dimension stones
- **Important deposits:** Cobalt, Lithium, Platinum



Education & Innovation facilities

- **Top educational centers (prof. and tech.):** Oulu, North Karelia
- **Pilot plants/ research centers:** GTK Mintec, CCTV Centro
- **Innovation networks:** CEMIS Kainuu, Swedish Mining Innovation Örebro



Mining Governance

- Subnational **mining policies:** Andalusia, Kainuu, Sodankylä, Finland
- **Government coordinating structures:** Lapland (Mining Hub)
- **ESG partnerships:** Diversification fund (Örebro), Regreening (Central Greece)



Green infrastructure and projects

- **Integrated Projects** for mineral processing: Kainuu, Central Ostrobothnia
- **Green and Competitive Energy Supply.**



The study identifies four key challenge areas



Workforce and Skills availability

- **Skills mismatch**
- **Outreach to** youth, women
- **Lack of accessible** training in mining municipalities



Links with SMEs and universities

- **Information gaps** to access funds and join projects
- **Lack of business approach in innovation** projects led by universities
- Lack of **incentives for circular** economy projects



Community perception

- **Abandoned mines** and **low trust** in government capacity
- **Exploration projects** with deficiencies in communication
- Lack of communication of **benefits beyond economics**



Permitting/ regulation

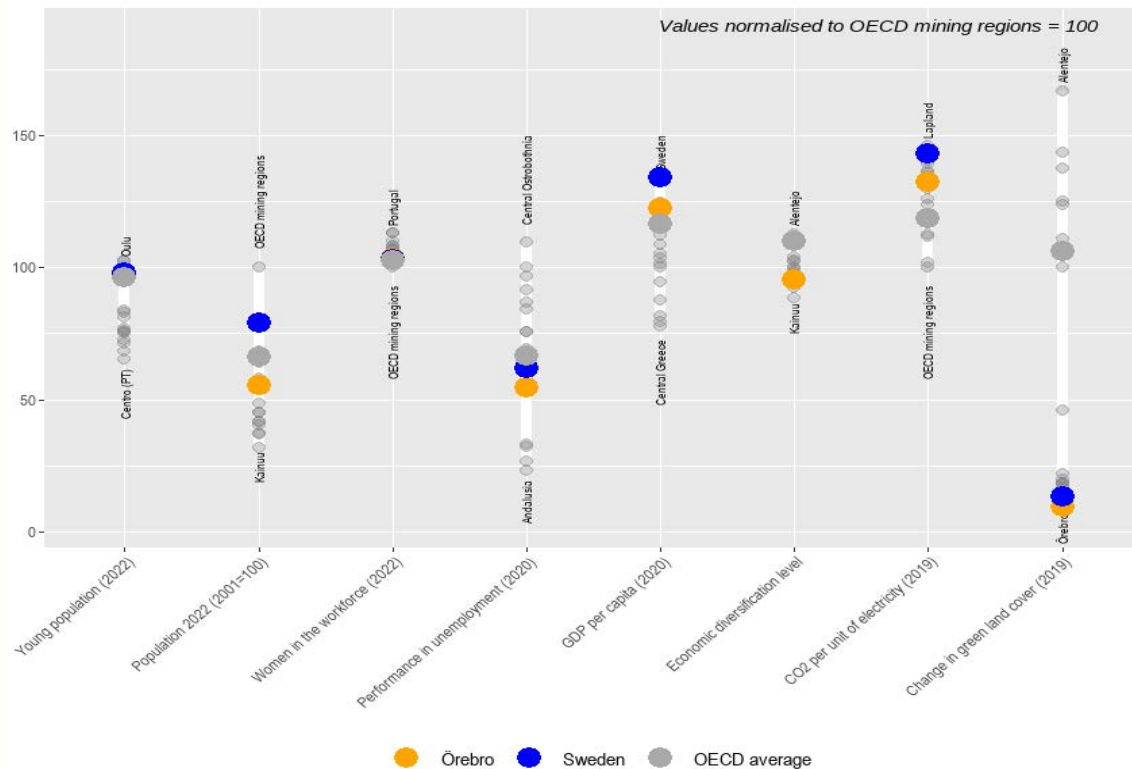
- **Lengthy/ uncertain** permitting for investment, innovation, efficient closure.
- **Lack of standardization** to address appeals and communicate changes
- **Classification of waste** affects valorization of mining waste



Örebro Focus



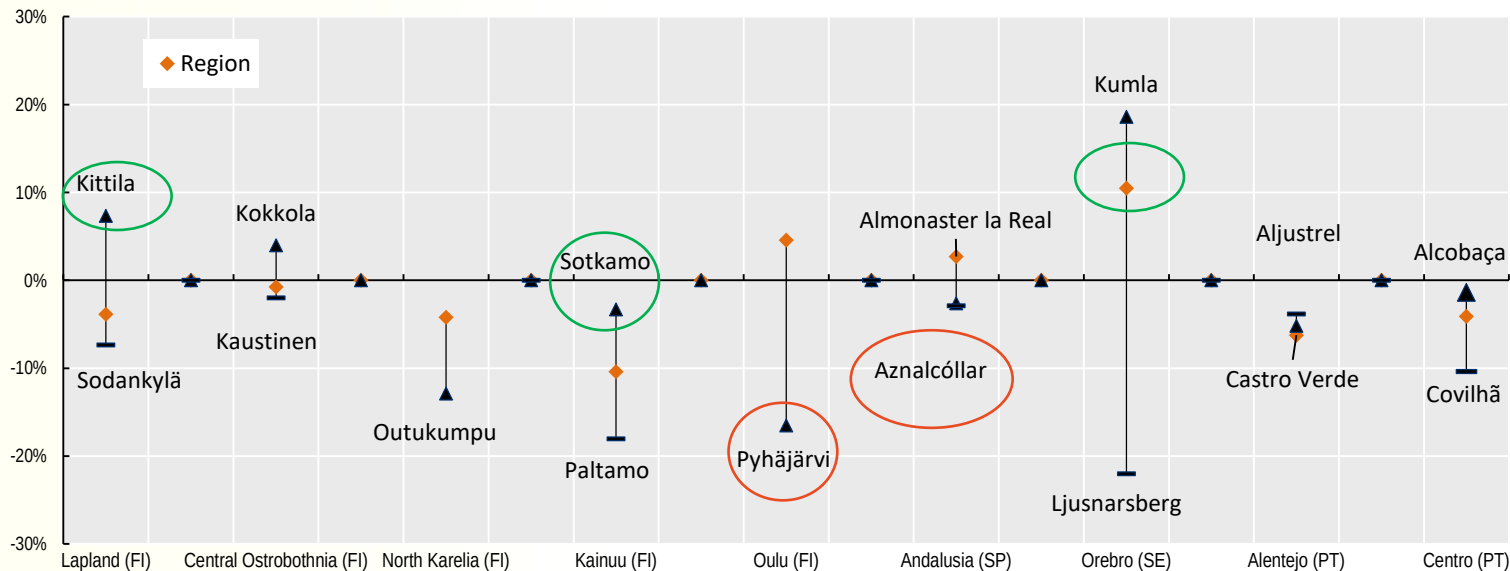
Well-being performance relative to OECD mining regions and cities benchmark





Mining accentuates population effects at the municipal level

Population growth (2010-2022)





Historic mining region with growing exploration projects

2 main active projects

Mine/plant	Company	Headquarters	Minerals	Municipality	Employees
Lovisa Mine	Lovisagruvan	Stråssa, Örebro	Lead, silver, zinc	Lindesberg	20
Zinkgruvan Mine	Zinkgruvan Mining	Zinkgruvan, Örebro	Lead, copper, silver, zinc	Askersund	800 (300 sub-contractors)

5 projects in the pipeline or under exploration

Mine/plant	Company	Headquarters	Minerals	Municipality
Archelon Natural Resources/ Archelon REE AB	Archelon	Sweden	Iron ore	Norberg, Nora (north of Örebro)
Gyttorp REE Project	Bastion Minerals	Australia	Rare earth elements	Nora (north of Örebro)
Nybergsfältet old iron mines	Big Rock Exploration AB	United States	Gold	Nora (north of Örebro)
NewPeak Metals in the Bergslagen area	NewPeak Metals	Australia	Tungsten	Multiple
Blötberget Iron Ore Project	Nordic Iron Ore AB	Sweden	Iron ore and rare earth elements	Ludvika, Dalarna County



Örebro assets and challenges

Opportunities

**Mine site with positive links
with community (Zinkgruvan)**

Innovation ecosystem: Swedish
Mining Innovation and EPIROC

**Regional response to
Sweden's Minerals Strategy**

Infrastructure projects

Challenges

Permitting process

Infrastructure and energy costs

Strategy to reuse old mine sites

Workforce for mining



Good practices identified in Örebro

Community engagement

Metals4U= project provides education on origins and uses of metal and mineral

Zinkgruvan Mining re:think programme provides development support to local SMEs

Innovation & circular economy

REEDEAM project creates courses for advanced professionals to support the green transition

IUC Industrihubb supports companies carrying out industrial development projects

Employment & skills

Samarkand2015 provides assistance to help workers transition to new jobs

Bergsskolan technical school provides practical learning, skilling individuals for the mining sector



Regional level: 15 recommendations in 5 pillars

Policy frameworks

Update Sweden's Minerals Strategy

Create a regional mining strategy or strategic actions

Participation of municipalities in exploration decision-making

Mining governance

Create clear environmental management guidelines for companies

Clarify the municipal benefits linked to mining

Enhance env. Related information

Employment + skills

Industry hub to improve skills supply mining

Pathways for students to tailor competencies

Mining-related educational programmes

Innovation + circularity

Leverage innovation ecosystems for circularity in mining

Re-establish innovation centre to upskill local SME

Facilitate the use of EU funds for reuse of old mines

Infrastructure

Utilise Northern Europe EU funds to improve transport infrastructure for industry

Thank you



andres.sanabria@oecd.org

www.oecd.org/fr/regional/mining-regions-cities.htm

Twitter: @OECD_local

LinkedIn: www.linkedin.com/company/oecd-local

Website: www.oecd.org/cfe

Blog: oecdcoito.blog



*Find more about the OECD Mining
Regions and Cities Initiative*



Interreg
Europe



Co-funded by
the European Union

EMRIE

EMRIE

**European Mining Regions
Innovation Ecosystems**



Background

1. CRMA: Regional responsibility

- EU's Critical Raw Materials Act sets ambitious targets: 10% of EU's annual consumption from domestic extraction, 25% from recycling/reuse.
- Meeting these goals requires stronger regional policy tools and active engagement from resource-rich regions.

2. Circular and efficient resource use

- Smarter use of land, natural resources, and mining waste reduces dependency on imports.
- Integrating circular economy principles into planning strengthens supply security and lowers environmental impact.

3. Strengthening regional capacity

- EMRIE supports the green transition through new policy instruments and governance models.
- Shared learning and exchange of practices build knowledge for robust regional innovation ecosystems.

What is EMRIE?

- An Interreg Europe project (2025–2029)
- Focus: Supporting the Critical Raw Materials Act through regional policy development
- Goal: Improve circular economy and resource efficiency in mining regions
- Portugal, Spain, Finland, Sweden, Poland, Ukraine, Greece
- Builds on experience from the OECD DG REFORM project, with broad regional support and engagement



Why is Örebro involved?

- Sweden's Bergslagen has a unique mining history and ecosystem
- Strong regional actors: mines, technology suppliers (Epiroc, Orica, Drillcon), research and education
- Mining not yet visible in the Regional Development Strategy (RUS 2022–2030) → opportunity to integrate

What will we do?

- Lead regional SWOT analysis and peer review
- Identify and share Good Practices from Bergslagen
- Host stakeholder meetings with industry, municipalities, civil society
- Organise the 5th interregional event in Örebro
- **Explore how mining and mineral issues could be reflected in the Regional Development Strategy – in line with CRMA, and considering regional opportunities and challenges**

Expected results

- A well-informed basis for possible updates of the regional strategy
- Better understanding of how mining and circular economy link to regional development
- Contribution to EU's secure and sustainable supply of raw materials
- Enhanced collaboration between academia, industry, and policymakers

Who is involved?

- **Örebro University (partner)** – research, coordination, stakeholder group
- **Region Örebro County (policy authority)** – strategy and implementation
- Stakeholders: Boliden Zinkgruvan, Lovisagruvan, Epiroc, Business Region Örebro, IUC Industrihubb, Bergskraft, the County Administrative Board

**Interreg
Europe**



Co-funded by
the European Union

EMRIE

The project EMRIE is implemented in the framework of the Interreg Europe programme and co-financed by the European Union.

www.interregeurope.eu/emrie



Community engagement in Geoscience

Comic Con – A Creative and Inclusive Space to Engage Young People in Geoscience

Magnus Johansson

Community engagement while playing

- Inclusion & transparency
- Raise curiosity, fuel interest
- Educate to support understanding
- Enable interaction, facilitate debate
- Inspiration & seeding



Gaming & playing



COMIC CON

SGU

SGU

Sveriges
geologiska
undersökning

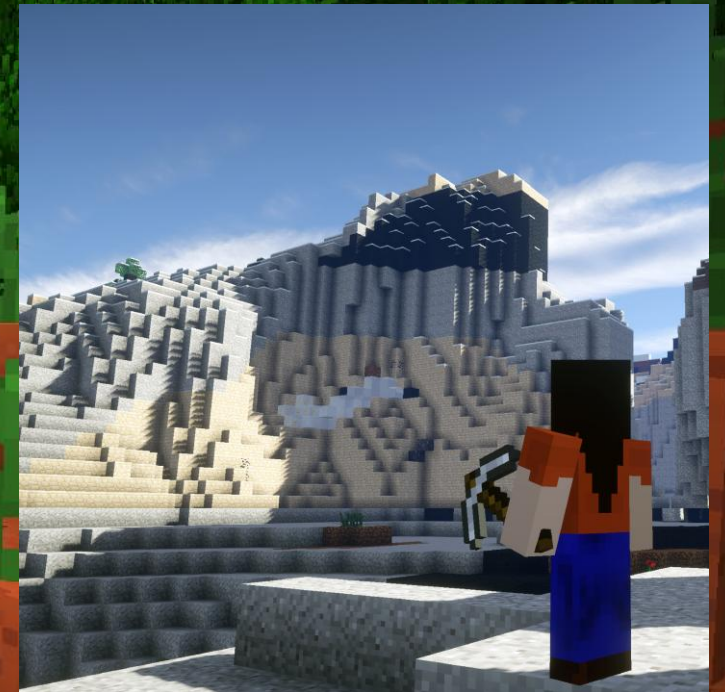
BETTERGED

Funko





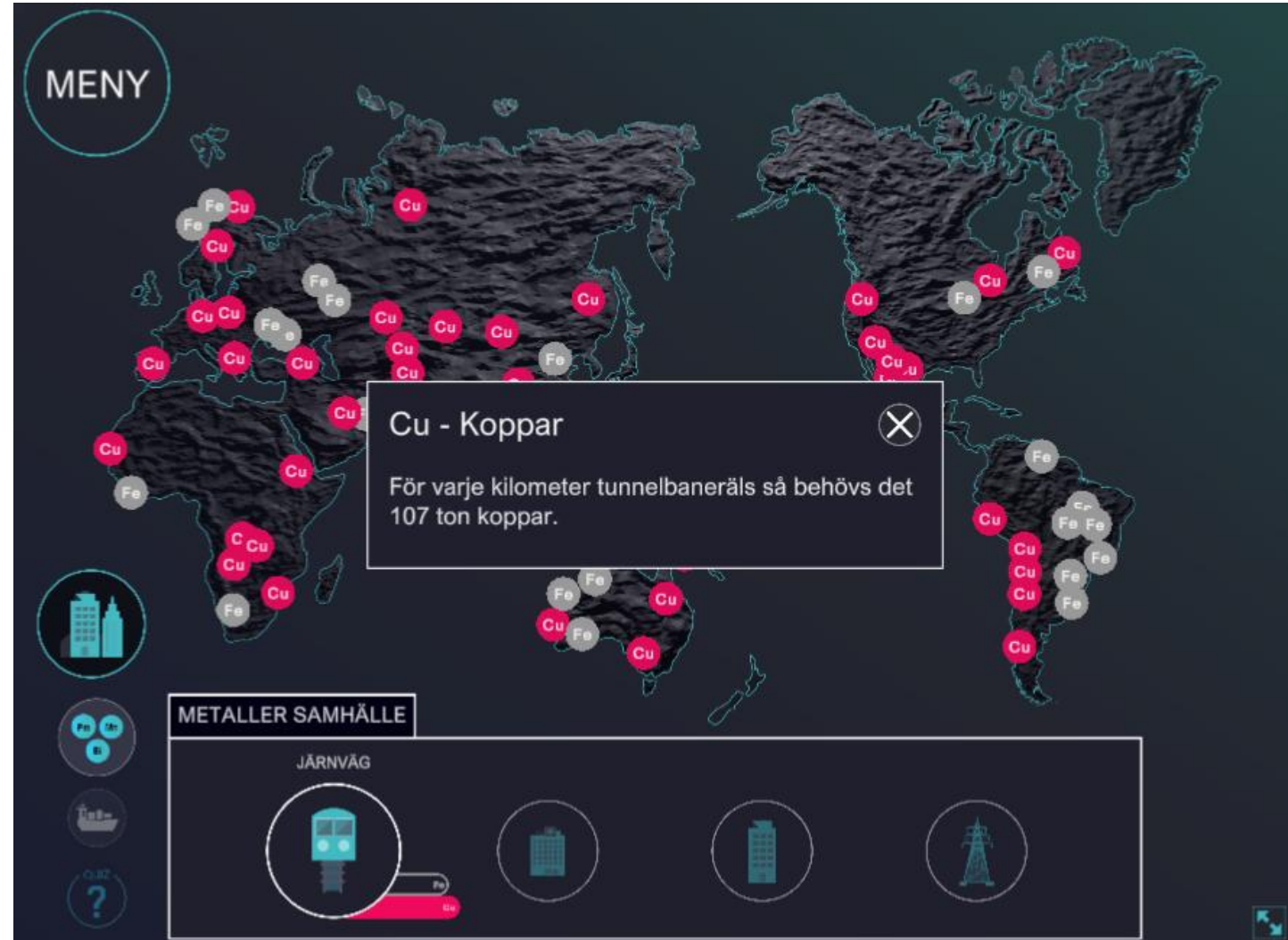
Minecraft



Metals4you – Interactive mining map



SwedishMiningInnovation
www.bergskraftmetals4u.rocks



Treasure hunting

SVERIGES GEOLOGISKA UNDERSÖKNING

MINERAL JAKTEN





MINERALJAKTEN



Crash course on mineral prospecting

- The Right of Public Access
- The Minerals Act
- Protected Areas
- Practical tips & tricks
- Basic equipment

Mineral finds

- Reporting to SGU
- Evaluation process





Peter Karlsson från Påskallavik, Oskarshamns kommun, är vinnare av Mineraljakten 2025.
Foto: SGU

Peters sällsynta fynd gav honom segern: volfram och koppar i skogarna i Gladhammar

UPPDATERAD 4 JUNI 2025 PUBLICERAD 4 JUNI 2025

Peter Karlsson från Påskallavik är årets vinnare av den nationella tävlingen Mineraljakten. Han har gjort sällsynta fynd av jordartsmetaller, volfram och koppar i ett område vid Gladhammar i Västerviks kommun.

– Det är roligt, det är ju mycket prispengar, 75 000 kronor, säger han.





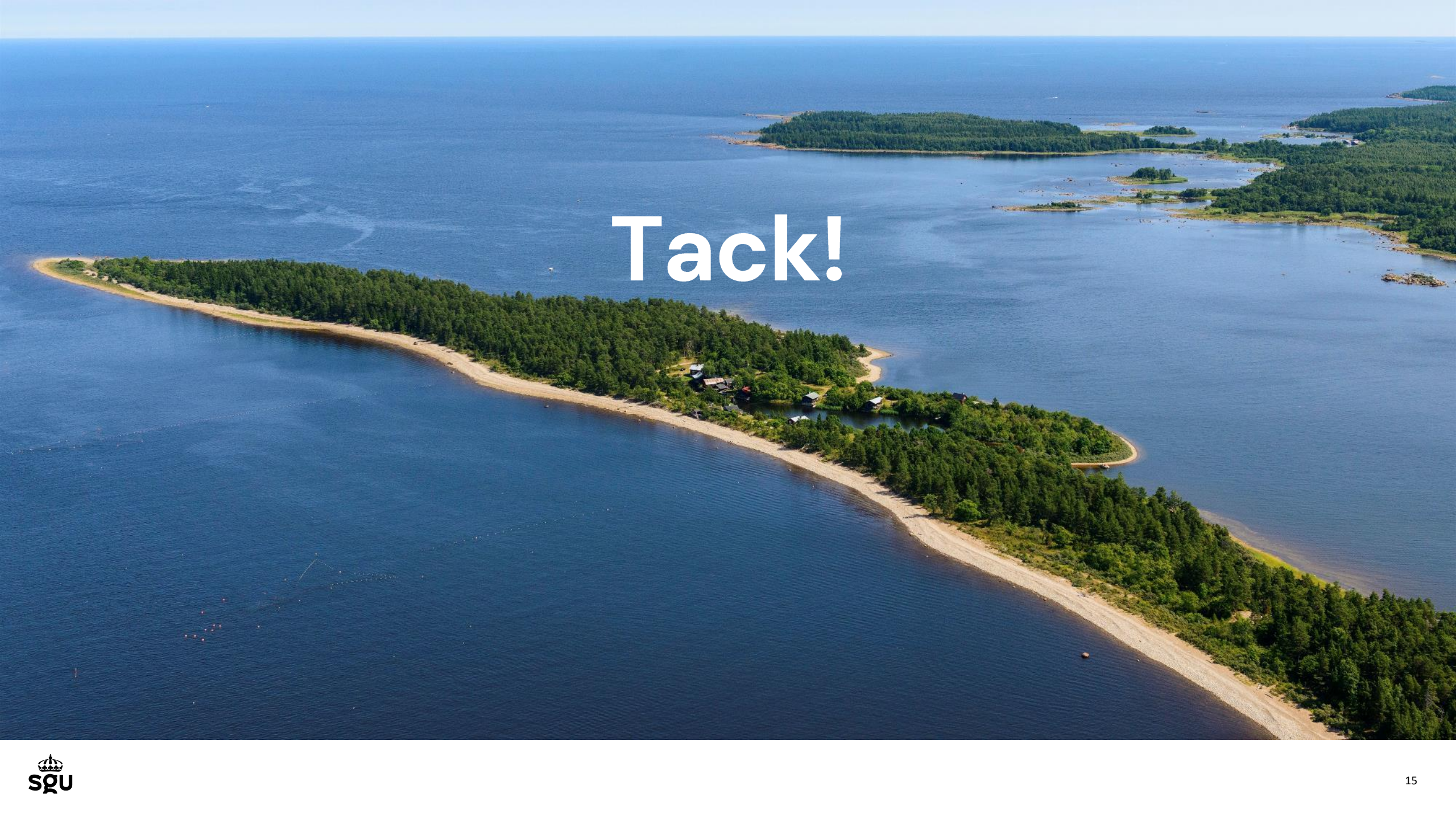
MINERALJAKTEN.SE

Två sätt att tävla:

1. Ladda ner appen Mineraljakt via butikerna Google eller Apple, eller:
2. Besök www.mineraljakten.se
3. Skapa ett konto och följ instruktionerna för hur en observation ska rapporteras ned bilder, koordinater och en beskrivning av fyndet.
4. Vänta på återkoppling från SGU. Om våra geologer tycker att fyndet verkar intressant så kommer vi be er att skicka in ett fysiskt prov.

Behöver du hjälp?

Använd kontaktformuläret på hemsidan eller mejla till tobias.blixt@sgu.se, alternativt ring på [018179099](tel:018179099)



Tack!

Community Engagement, Communication, and Trust in Green Industrial Projects

Elisabeth Gammelsæter

Author and senior advisor at Sweco Norge AS

Presentation given at Mining@ORU 1. October 2025, Örebro University

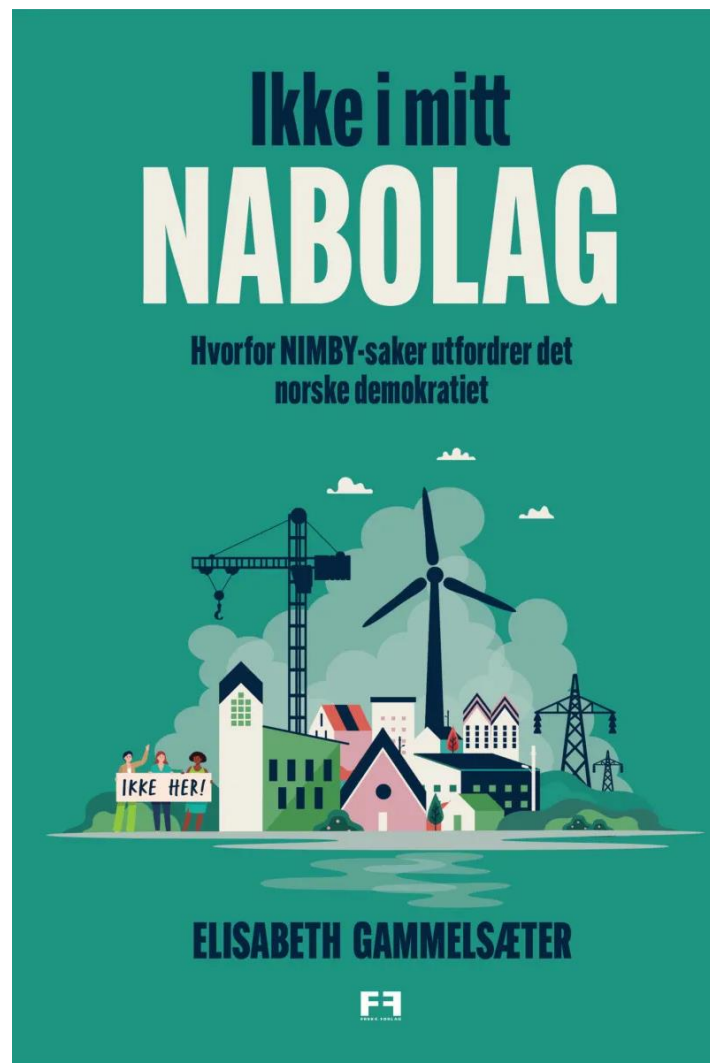




- Elisabeth Gammelsæter
- National Economist
- Background
 - Norwegian Ministry of Industry
 - Former Secretary General of Norsk Bergindustri, Norwegian Mineral Industry
- Senior Advisor for Sweco Industry Norway since 2019
 - Mineral Industry, new green industries, “challenging measures”
 - Part of Sweco Norway’s 2025 “Green Heads” campaign
- Author of “Ikke i mitt nabolag” 2022
 - First edition sold out
- “Not In My Neighborhood”
 - English edition launched in 2025
 - Available in Norwegian and international internet book stores

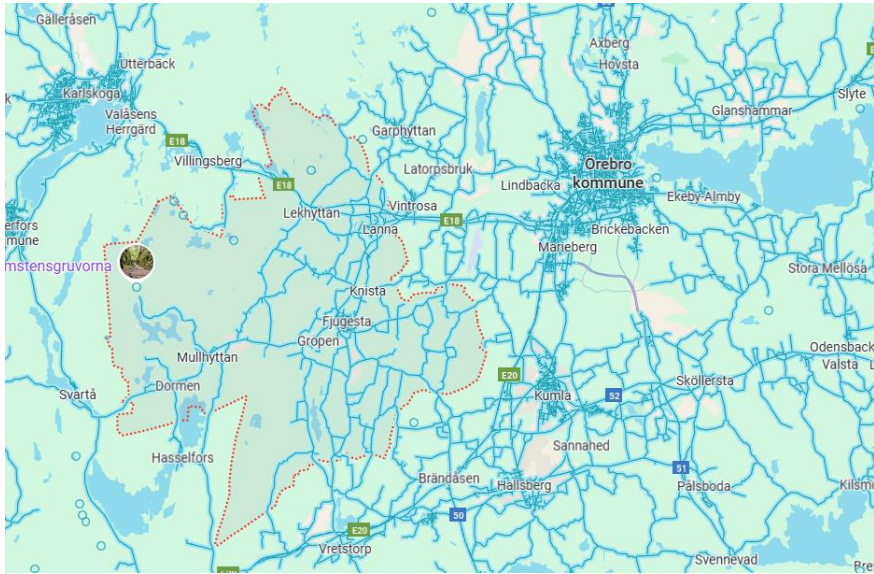
Who am I?

Elisabeth
Gammelsæter



AI about Lekeberg:

- Agriculture, forestry
- Crafts, industry
- Municipal services
- 8 500 inhabitants (+)



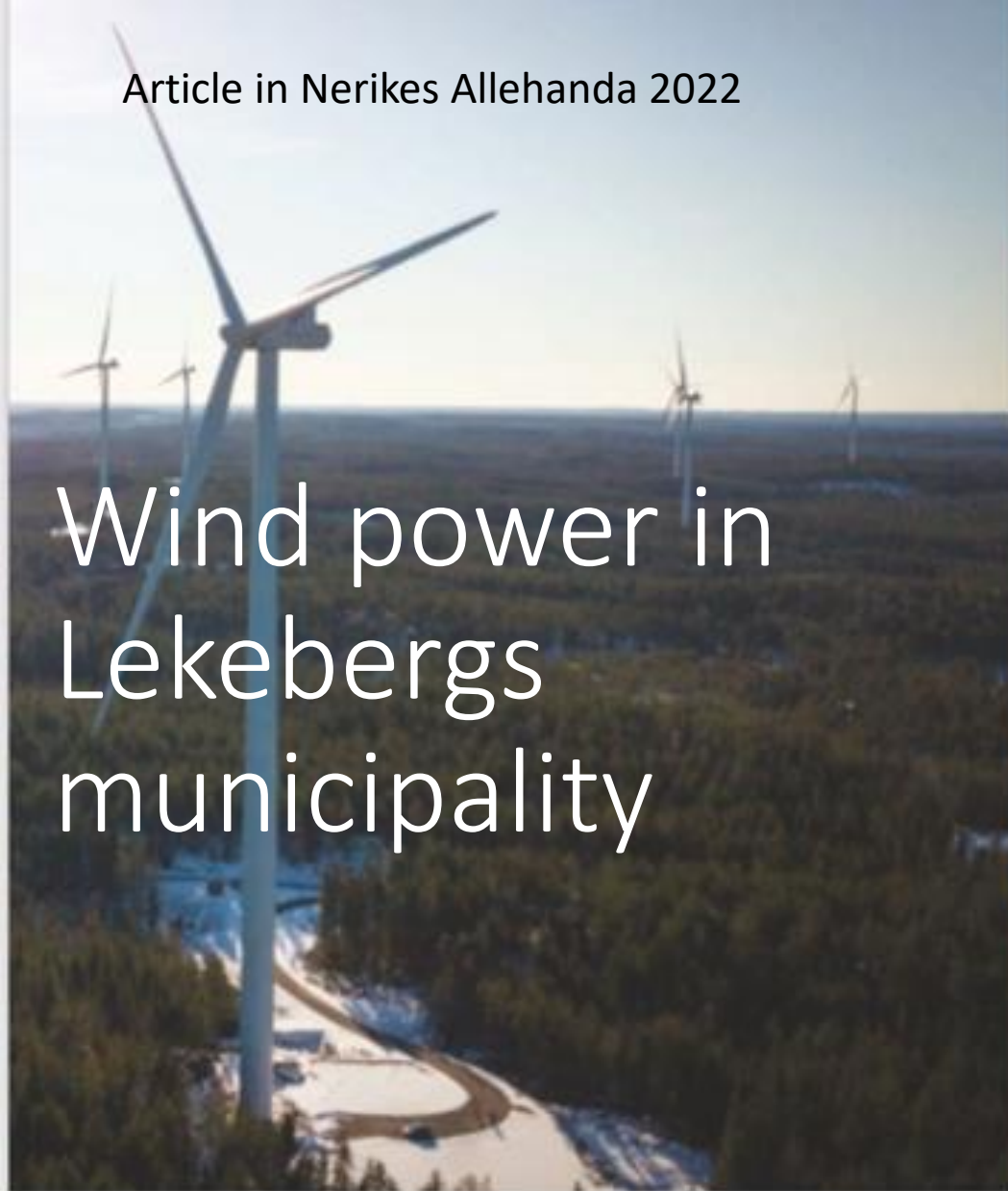
Lekeberg, east of Örebro

Let us start locally

Swedish examples

Article in Nerikes Allehanda 2022

Wind power in Lekebergs municipality



snurrar runt långsamt.

FOTO: ALEXANDER LINDBE



För Alexander Bjelke och Anne-Gro Egeberg är vindkraftverken med sina ljus och ljud en del av vardagen numera.

FOTO: JOE VÄGGE



För Alexander Bjelke är vindkraftverken vardag numera. Han flyttade hit under byggtiden. Det i bakgrunden ligger närmast hans hus.

FOTO: JOE VÄGGE



Enrico Lenzner i Vekhyttan störs mindre av rotorbladens swooshande än i början.

FOTO: JOE VÄGGE



Den här skylten sitter efter vägen mot Kronobergs vindkraftpark.

FOTO: ANNA BALOG



De 16 vindkraftverken står utpräglade i skogen och når långt över trädkropparna. Stora delar från dem hörs redan när det är svag vind och rotorbladen

Stormen har bedarrat

The storm has calmed down – wind power has become part of everyday life

– här är vindkraften vardag

Kronoberget

- 2010 lämnade Stena Renewable (som nu heter SR energy) in ansökan om att bygga en vindkraftspark.
- Såväl privatpersoner som föreningar, bland andra Naturskyddsföreningen och Kilsbergskanten, protesterade mot planerna. De beförde buller, skuggning och ville behålla naturen i området orörd. Över 2 000 personer skrev på en namninsamling mot planerna.
- I juni 2012, efter att ha skjutit upp beslutet flera gånger, säger Lekebergs kommunfullmäktige ja till vindkraftsparken med 19 ja-röster och 16 nej-röster.
- I januari 2013 säger länsstyrelsen också ja. Beslutet överklagas, men får inte prövningstillstånd i mark- och miljödomstolen.
- Våren 2017 kommer arbetat med att bygga vindkraftverken igång på allvar.
- Hösten 2019 är de 16 vindkraftverken klara och i full drift. Varje vindkraftverk kan producera 3,8 MW (megawatt). Totalt producerar de el till 40 000 hushåll, cirka 200 GWh (gigawatttimmar) el om året.

emot planerna. Ribbohytteborna hade olika åsikter i valet mellan att bevara naturen och tystnaden och satsningen på klimatvänlig, förnybar el, men behöll respekten för varandra berättar hon.

We kept the respect for each other

Nu, när vindkraftsparken är i gång, har stormvägarna lagt sig upplever Anne-Gro Egeberg. Själv har hon har accepterat att de står där de står.

I have accepted that they are there

–

Förut var det helt mörkt och tyst här, det är borta. Vi störs inte så mycket av dem, även om de syns och hörs nästan hela tiden. Vi hade fruktat att det skulle bli värre, men det blev inte så farligt.

Alexander Bjelke har ock-

The darkness and the quiet has gone. But it didn't go so bad.

2025: new plans

Sammanfattningsvis anser vi att Lekebergs kommun redan tar ett betydande ansvar för elproduktionen och att det saknas brett stöd bland invånarna för ytterligare etableringar. Därför bör vi inom politiken använda vårt veto mot nya vindkraftverk så tidigt som möjligt i processen, och vi kommer att verka för att så sker.

Vi står fast vid vår linje och kommer därav ge ett löfte om att vi alltid kommer vara en tydlig röst emot ny etablering av vindkraft i Lekebergs kommun.

**Kristdemokraterna:
Veto – a clear voice against windpower**

Uttalande kristdemokraternas årsmöte: De flesta i kommunen har nog uppmärksammat att det finns bolag som vill bygga fler vindkraftverk i Lekebergs kommun, framför allt planerna på vindkraftparker utanför Mullhyttan. Detta är en aktuell och känsloladdad fråga, vilket gör att vi inom Kristdemokraterna i Lekeberg har valt att ta en tydlig ställning. Vi kommer vid varje tillfälle att vara en stark röst mot nya vindkraftverk i kommunen.

We have done our part
Det finns flera skäl att säga nej till dessa planer. För det första anser vi att Lekebergs kommun redan har tagit sitt ansvar. Statistik från SCB visar att kommunen år 2022 förbrukade totalt 59 862 MWh. Den befintliga vindkraftparken på Kronoberget producerar cirka 159 163 MWh per år, baserat på en kapacitetsfaktor på 30 procent. Det innebär att vi producerar långt mer el än vi själva förbrukar. Därför anser vi att nya etableringar bör ske i kommuner där behovet är större.

Only a few locals are positive
För det andra måste det finnas ett lokalt stöd för ny vindkraft. Vid samtal med invånare under kampanjer i kommunens tätorter har vi märkt att endast ett fåtal är positiva, medan ett stort antal är starkt emot planerna. Som förtroendevalda måste vi ta detta på allvar.

Wind power depends on the weather – not robust enough
För det tredje krävs en stabil och tillförlitlig elforsörjning. Vindkraft är väderberoende, vilket innebär att produktionen varierar beroende på vindförhållanden. För att säkerställa ett robust energisystem krävs en kombination av olika kraftslag, där baskraft såsom kärnkraft och vattenkraft utgör stommen. Om en stor andel av Sveriges energimix består av väderberoende kraftslag ökar risken för kraftiga prisvariationer och energibrist under perioder med låg vind.

Gotland – limestone
quarry for cement
production



LEDARE

«Removal of quarry licence will hamper building sector in Sweden»

Så hindrar regeringen nödvändiga klimatåtgärder

chefredaktör
berg
4

ionen
berg
ehanda.se
nds
opparviks-
1284 Visby,

LEDARE

Målkonflikter finns
i alla politikområ-
den, även i miljö-
frågor

The government is hampering necessary climate measures

driver regeringens politik
åt olika håll. Nyligen neka-
des Cementa (6/7) att fort-

sätta bryta kalksten i Slite
på Gotland. Ett beslut som
kommer få enorma konse-
kvenser för svensk ekonomi
då cementproduktionen i
Slite står för uppskattnings-
vis 75 procent av all cement
som används i Sverige.

Eftersom cement är ett
grundläggande byggma-
terial riskerar Sverige att
drabbas av ett akut bygg-
stopp (Tidningen Närings-
livet 14/7). Branschorgani-
sationen Byggföretagens vd
Catharina Elmsäter-Svärd
betonar särskilt effekterna
på infrastruktur.

Inte minst kommer detta
påverka regeringens plane-
rade miljöåtgärder. Utan
cement lär det exempelvis
bli svårt att bygga nya vind-
kraftverk, vilka behöver en
stabil grund, och ny järnväg
såsom den planerade hög-
hastighetsbanan mellan
Stockholm och Göteborg.



Leserinnelegg i Gotlands Allehanda 17 juli 2021

Cementa at Gotland

- Lost their permit to quarry limestone at Slite on Gotland in July 2021
- Due to elevated chloride content in water samples
- The mining threatens the groundwater on the island
- Cementa planned a CO2 neutral cement plant
- Cement = 7% of the world's greenhouse gas emissions
- Construction in Sweden was threatened
- Due to other standards, imports was not a solution
- LKAB's mines need cement for further development
- Extension of time-limited permit
- **May 2025: renewal of permit, lasts for 30 years**
- Important difference between Sweden and Norway: whether it is the judiciary or the government that makes decisions about permits

Långsiktigt tillstånd för kalkbrytning på Gotland beviljat – byggbranschen lättad



Marlén Eskilsson Publicerad 7 maj 2025 · [10 kommentarer](#)

Efter år av oro för byggstopp kom beskedet som får byggbranschen att andas ut. Heidelberg Materials får fortsätta bryta kalk på Gotland i hela 30 år till. Beslutet banar dessutom väg för en av Sveriges största klimatåtgärder. Samtidigt finns bekymmer om Gotlands framtida vattenförsörjning.



Foto: Cementa

Mark- och miljödomstolen har beslutat att Heidelberg Materials får fortsätta bryta kalk- och mörgelsten i ytterligare 30 år vid Filehajdar och Västra brottet utanför Slite på Gotland, [rapporterar SVT dag](#). Cementen som produceras från denna brytning täcker omkring 75 % av Sveriges behov vilket gör fabriken i Slite till en av landets viktigaste för byggsektorn.



NIMBY

Not in My Back Yard

Not where it bothers me

What is most
unpopular –
the Saint
index (USA)

Type og facility	Share of respondents who would be negative to local establishment 2015
Landfill – deposition plant	81.9%
Casino	73,5%
Power plant/utility	65,9%
Aggregates quarry	59,6%
Shopping mall	37,5%
Apartment buildings	34,9%
Single homes	10,2%

What is NIMBY?

Demanding facilities that society needs but that no one wants to live near

Three main variants

- Not here

- It's unfair that I carry the burden on behalf of the whole of society

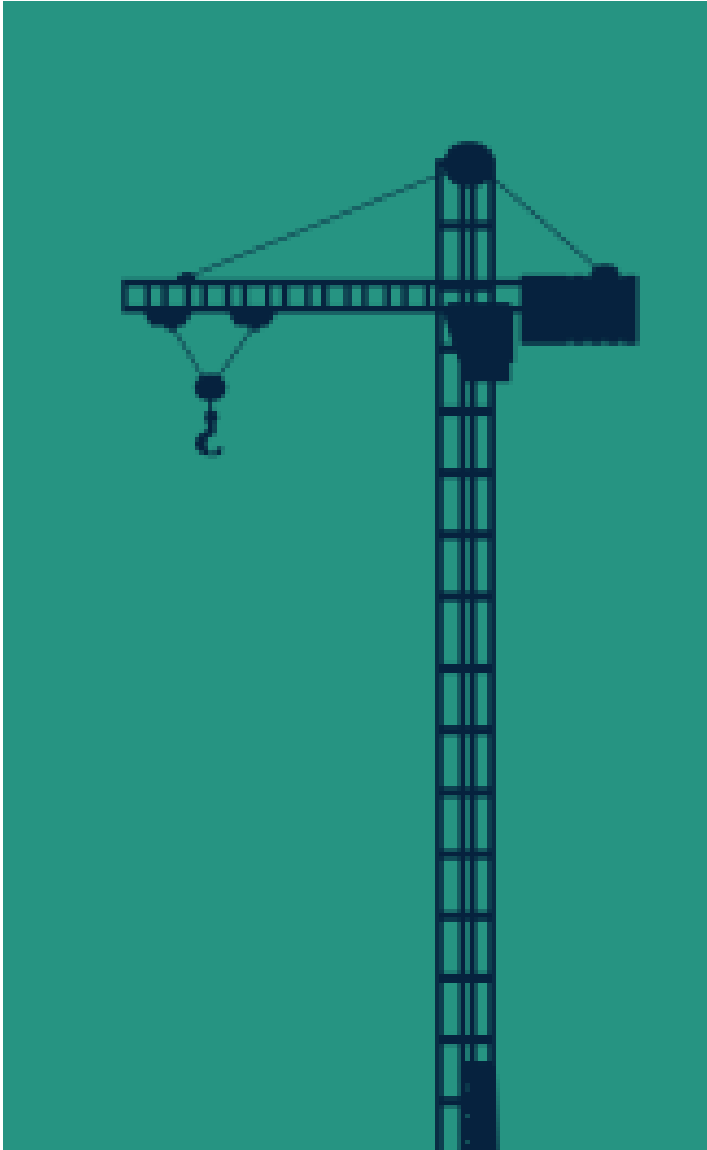
- Not anywhere in the world

- Below the limit of what is considered acceptable

- The opposite

- "Yes in My Back Yard"

Not in My Back Yard (NIMBY)	Locally Unwanted Land Use (LULU)	Not In Anybody's Yard (NIABY)	Not On Planet Earth (NOPE)	Build Absolutely Nothing Anywhere Near Anything [or Anyone] (BANANA)
Not On Our Street (NOOS)	Citizens Against Virtually Everything (CAVE)	Not Against My Business or Industry (NAMBI)	Place In Blacks' Back Yard (PIBBY)	Some Other Bugger's Back Yard (SOBBY)
Somebody Else's Problem (SEP)	Yes In My Back Yard (YIMBY)	Not My Generation	Ikke i min fjord	Ikke i mitt land

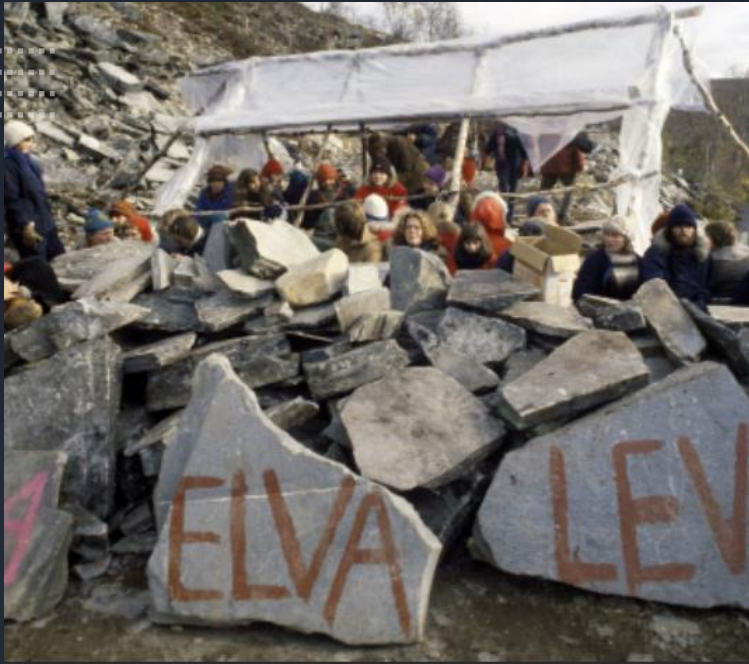


Approach

- Drawing experience from people who have been involved
- Emphasize listening to people who have been on both sides
- What can we learn from what has happened in the past
- "Solastalgia"
 - The longing for the landscape as it was
 - Change is uncertain and "scary"



Norwegian examples



The early cases - 1970s

(Mardøla, Alta, Rio Tinto Zink)

- Resulted in a greater appreciation of nature in regulations
- Norway got the world's first Ministry of the Environment
- Protection plans were adopted
- Informants highlight The good conversation, respect for the opponent
- Involvement leads to good processes
- Sámi rights were strengthened

Monstermasts in Hardanger 2011

- Overhead electrical powerlines vs. sea cables
- Hardanger as a national symbol
- Advice
 - Establish communication and build trust across the board
 - Agreement on factual basis
 - Experience of imbalance
 - The battle over concepts



Moving on to mining examples

- While Sweden is more of a «heavy metal» country, Norway has less than a handful of metal mines
- Global leader in Industry minerals
- Europe's largest REE deposit
- Natural stone
- The only country in Europe which exports aggregates with any success





New mines in Norway

- You can't move the mine, the minerals are where they are
- Very long processes
- Two projects that have been in the process of being established since 2006/2009
 - Nordic Mining in Western Norway, rutile/titanium dioxide- opened in 2025
 - Nussir in Finnmark, copper, new financing recently in place
- Controversial projects
 - Sámi areas
 - Pressure on nature
 - Minerals that contribute to the green transition, electrification

the Fosen case –
Wind power plant in
reindeer herding area
- Høyesterett (high
court decided that the
plant was against the
herders' human rights
- a new threshold for
cultural expression



UNGDOM: Representanter fra Norske Samers Riksforbunds ungdomsorganisasjon står bak aksjonen i Olje- og energidepartementet
FOTO: EMRAH SENEL / NRK

Torsdag 23. Februar –
fredag 3. mars 2023
Fosen – den nye «Alta-saken»



– Nå har jeg behov for å skjerme mine medaksjonister som sitter her på femte døgnet. Vi er utslitte, og jeg tåler ikke at du sitter her og prater den samme tompratene over oss som dere har holdt på med i 505 dager. Det tar slutt nå, sa aksjonist og artist Ella Marie Hætta Isaksen til Aasland.

a «wet blanket» on industrial development in sami areas



AOT SIN VILJE: En demonstrant blir plukket opp og fjernet fra Finansdepartementet. Foto: Ditlev Eldamo / TV 2

Blokkerer enda et departement

Blir fjernet med makt: – I dag
stenger vi staten



On indigenous peoples' rights

- **Historical backdrop**
- **The Norwegianization policy**
- **The rights of the Sámi**
- **Strengthened after Alta**
- **Norway the first country in the world to ratify ILO 169 on indigenous peoples rights**
- **The Sámi Parliament did not accept the Minerals Act**
- **The Fosen case**
- **New threshold for how to safeguard cultural expression**
- **Future?**

Deposition of surplus minerals

My claim: this is the mining industry's most important challenge

You are looking for a certain, marketable share of
what you are excavating

The rest is side rock/surplus materials

This is a cost – no one wants to deposit waste

Strong political focus on circularity

Proximity to market, transport costs

What to do

Sell as much as possible, deposit as little as possible

Take the best possible care of nature, the environment

Make as much as possible available for later use

Breaking news Norwegian Broadcasting

1. October 2025:

Norway is the country in Norway which destroys most nature per inhabitant in Europe

Sweden is number 9

25% of the area which is being built in Norway goes to cottages

Sammen med journalister fra ti land har NRK avdekket hvordan europeere bygger ned grøntområder i oppsiktsvekkende fart.

Og det er faktisk vi nordmenn som bygger mest per innbygger.

Europa fra grønt til grått

Nedbygd natur og matjord per innbygger 2018–2023

1. Norge: 38 m²
2. Estland: 34 m²
3. Irland: 33 m²
4. Finland: 32 m²
5. Litauen: 30 m²
6. Polen: 27 m²
7. Romania: 23 m²
8. Kroatia: 22 m²
9. Sverige: 21 m²
10. Tyrkia: 21 m²
11. Island: 20 m²
12. Latvia: 19 m²
13. Bulgaria: 17 m²
14. Danmark: 17 m²
15. Ungarn: 16 m²
16. Østerrike: 15 m²
17. Slovakia: 15 m²
18. Portugal: 14 m²
19. Frankrike: 14 m²

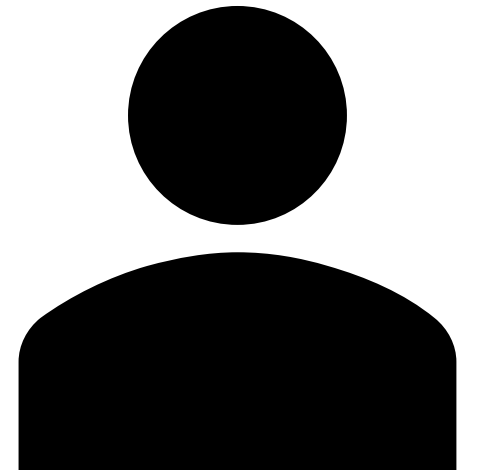
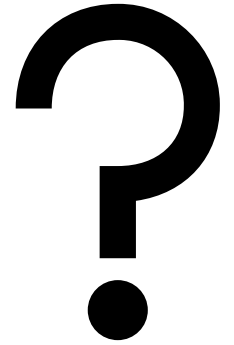
Urban development

Examples that are relevant
to most people

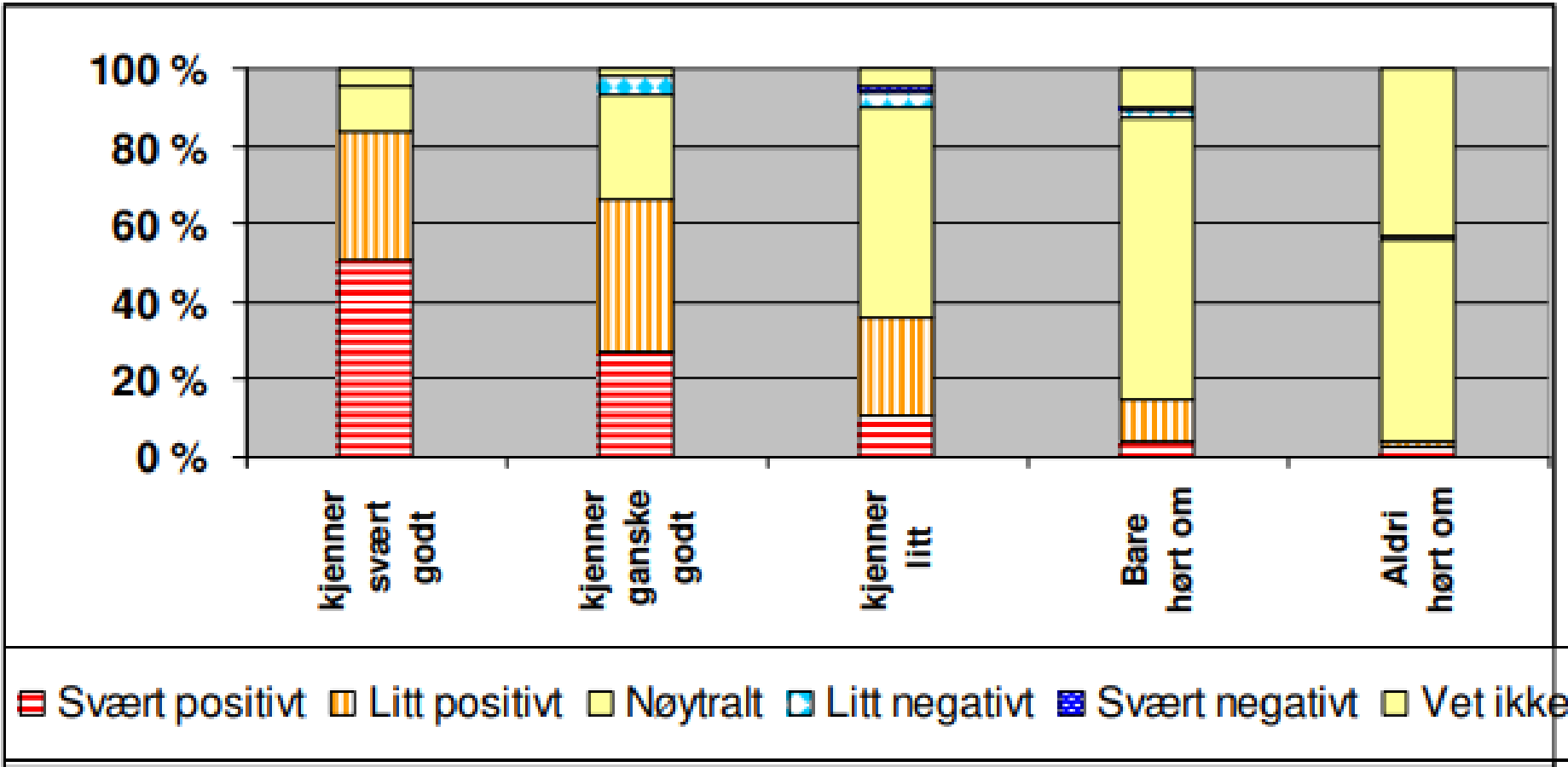


The chapter which was never published

- Premise of the book: all informants should "own their own story"
 - Very exciting chapter on urban development that was written, but in the end we chose not to publish
 - Opponent of the initiative who was the informant was generally sceptical about my book project
-
- suddenly decided not to have anything to do with the book project anymore
 - "Not what the book was supposed to be known for"



Correlation between knowledge and attitude towards the aggregates industry in Norway



Figur 7.
Sammenheng
mellom kjennskap
til pukk- og
grusbransjen
(x-aksen) og
holdning til den
samme bransjen.
Kilde PGL/Norsl
Statistikk.

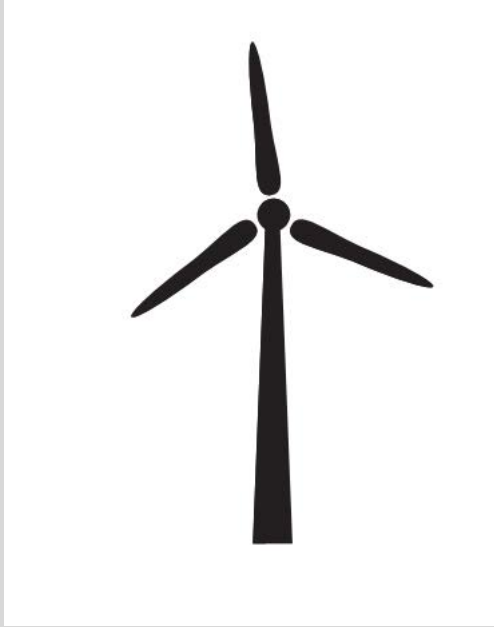
So what?

- What does this mean?
- For us as individuals?
- For our societies?



What can we learn?





Key learning points

- Early involvement
- Clear communication
- Respect for decisions that have been made
- Non-violence is non-negotiable
- Good guidance from the authorities
- Transparency
- Robust, knowledge-based impact assessments
- Respect the views of others
- Be careful how you phrase yourself
- Input from opponents can make projects better

Consequences for our democracy

- Who wants to be re-elected if one is declared an idiot?
- Who dares to front unpopular projects?
- What is the consequence of saying no?
- Imports from countries we don't like to compare ourselves with
- Electricity crisis and other crises
- Value chains breaking down?
- What is the consequence of saying yes?
- Pressure on nature
- Our consumption – is it sustainable?

12 Lørdag 9. juli 2022

NYHETER

KLASSEKAMPEN

■ Ny bok utfordrer den norske dobbeltmoralen om miljø- og

En utfordring for demokratiet

UTFORDRER: Vi vil ha billig, rein kraft, men ønsker ikke kraftverk. Grønt skifte, men ikke vindmøller og gruver. «Ikke i mitt nabolag»-holdningen utfordrer demokratiet, mener forfatter.

KLIMA

Av Ole Magnus Rapp

Etter en årrekke som generalsekretær i bransjeforeningen Norsk Bergindustri vil ikke Elisabeth Gammelsæter hevde at hun er helt objektiv. Men hun mener at hennes nye bok «Ikke i mitt nabolag» kaster lys over en utfordring som er økende.

Hun arbeidet først i Næringsdepartementet, der inntrappende søknader gjørte endte opp etter anke – så for bergindustrien, der utfordringene står tett.

Nå er hun i konsulentbransjen og bistår i prosessene med å få på plass infrastruktur og grønn industri. Det handler om vindmøller, vannkraft, gruver, by-fortetting, søppeleponier og mye annet som vi trenger, men som folk ofte ikke ønsker å ha som nabo.

For flere enn meg er det et paradoks at vi ønsker et grønt skifte, men vi vil ikke ta i bruk de metaller og mineraler som behøves og som finnes i Norge, sier hun.

Kina og Kongo, ikke her

Gammelsæter synes det er leit at nødvendige metaller for framtidens teknologi heller skal hentes fra Kina, som har monopol på viktige råstoffer, eller fra Kongo, der usunne arbeidsforhold og barnarbeid florerer.

Nå er det ikke slik at vi i Norge skal godkjenne alle typer naturinngrep og etableringer. Det finne mange prosjekter myndighetene bør og skal si nei til. Det er viktig at dette nei-et kommer så tidlig at det ikke er lagt ned masse forarbeid, slik at prosessen ikke kan stanses, sier hun.

Forfatteren har i boka intervjuet blant annet nøkkelpersoner i offentlige etater, kommuner, i politikken og i miljøbevegelsen. Hun har snakket med folk som har stått steilt imot hverandre i konflikter helt fra Alta og Mardøla på 1970-tallet, til dagens debatt om sjødeponi, monsternaster, giftdeponi, hydrogenproduksjon og motorveier.

Boktittelen spiller på be-

flere i politikken spør seg om det er verdt å fortsette, sier hun.

Dette igjen mener forfatteren utfordrer og kanskje svekker demokratiet og systemet med folkevalgte ombudskvinner og menn.

Torke ikke stille opp i boka

Flere hun intervjuet i arbeidet med boka, har seirene trukket sine uttalelser, og de er ikke publisert, av frykt for at de skal bli konfrontert med mer hets og uønsket oppmerksomhet. Dette gjelder både politikere på flere nivå og industriledere.

Gammelsæter understreker at lokal motstand og krav ofte er sunt, og at det dreier

FAKTA

Ikke i min bakgård:

NIMBY er et akronym for «Not in My Backyard». Uttrykket brukes i en nedsettende sammenheng overfor de som motsatt seg endringskapende tiltak i sitt nærområde, men som ikke nødvendigvis er motstander av at tiltakene gjennomføres i andre områder.

■ Brukes ofte i situasjoner der en lokal opinion reagerer negativt på tiltak som på et nasjonalt nivå anses som positivt, men som likevel reduserer kvaliteten i nærmiljøet.

■ Slike situasjoner kan oppstå som følge av kraftutbygging, vindkraftverk, infrastruktur som vei og jernbane, industri som forurenser og offentlige institusjoner for mennesker med en uønsket sosial atferd.

seg om saker som bør belyses fra alle sider.

«Vi må ikke sitte igjen med beslutningstakere som mister nattesøvn av frykt for at avgjørelsen de tar, er upopulær.

I 2003 gjorde hun en undersøkelse om folks forhold til pukkverk for forløperen til beslutningstakere som mister nattesøvn av frykt for at avgjørelsen de tar, er upopulær.

Hun viser til at det er mye oppriktig bekymring blant befolkningen for ting som skjer i deres nabolag. Om fakta og skillede opplysninger uteblir, øker bekymringene til reell motstand.

«Det er en naturlig reaksjon å protestere.

Undersøkelsen viste at der naboen til pukkverket eller grustaket ble lyttet til, og det pågikk en dialog, var forholdene jevnt over gode. Man tilpasset seg hverandre, avtalte dristastene når det var nødvendig og lyttet til hverandre.

«Å involvere sine naboer er viktig, og de som er ansvarlig for utbyggingsprosjekter, er nødt til å ta folk og sine omgivelser på alvor.

Hun viser til at det er mye oppriktig bekymring blant befolkningen for ting som skjer i deres nabolag. Om fakta og skillede opplysninger uteblir, øker bekymringene til reell motstand.

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Må skape relasjoner

Gammelsæter sier Norge som samfunn må ta tak i NIMBY-problematikken og mener det er et samfunnsansvar å skape relasjoner. Også utbyggere har ansvar, og det er viktig at diskusjonen er faktabasert.

Også de som organiserer motstand, har ansvar, for også her er det viktig at diskusjonen er faktabasert, sier hun.

Forfatteren viser til at norsk lovverk kommer høyt opp når de ulike lands regelverk for naturinngrep blir vurdert. Plan- og bygningsloven står sterkt og gir kommunene reell beslutningsmakt i de fleste saker.

«Bergverk blir i mange sammenhenger sett på som en versting, uten at vi samtidig er like kritiske til hva vi importerer, sier hun og viser til at mange norske lokalsamfunn har vokst opp rundt en mineralforekomst.

Gammelsæter mener alle kjenner fortida til gruvebyer som Røros, Mo i Rana, Kongsberg, Sulitjelma og Kirkenes og metallforekomstene som skapte lokalsamfunnene. Men også områder som Bærum og Arendal ble i begynnelsen basert på det berget ga og på foredling av mineralressurser.

«I enkelte medier kan man få inntrykk av at Norge kun har to gruver, i Repparfjord og Furdafjord, to prosjekter som ikke har kommet i gang og som det demonstreres mot. Faktum er at Norge har en stor bergverksanæring, som gir mer enn 5000 helttidige arbeidsplasser, sier hun.

Hun viser til at bergverksindustrien omsetter for over 12 milliarder kroner i året, og av dette eksporteres det for 5,4 milliarder.

Flere stemmer

Maren Esmark i Naturvernforbundet er blant kildene i boka, og hun mener at de negative konsekvensene av et prosjekt først kommer fram når den lokale motstanden blir stor.

«Lokal- og regionalmediene har tendens til å tro at ethvert utbyggingsprosjekt gir masse arbeidsplasser, redder klimaet og vil gi store skatteinnsluttninger, sier hun.

UTFORDRER: Vi vil ha billig, rein kraft, men ønsker ikke kraftverk. Grønt skifte, men ikke vindmøller og gruver. «Ikke i mitt nabolag»-holdningen utfordrer demokratiet, mener forfatter.





Elisabeth Gammelsæter



NOT IN MY NEIGHBORHOOD

How Norwegian NIMBYism Threatens European Sovereignty
and Norwegian Democracy



elisabeth.gammelsater@sweco.no

Phone 00 47 90965929

Book available at:

Adlibris.se

*Projektet genomförs inom ramen för Impact
Innovation-programmet Swedish Metals & Minerals,
en gemensam satsning av Energimyndigheten,
Formas, Vinnova och industrin.*

Swedish Metals & Minerals
impact innovation

Future STEM Identity

Local Collaboration for Sustainable Skills
Supply (STEM-3S)

Emelie Fälton
Linköping University



Short Project Overview

- Collaboration: universities, schools, science centers, and industry
- Develop and test locally anchored narratives and outreach formats to increase participation in STEM
- Goal: create a validated model for cross-sectoral collaboration that supports regional talent development and responds to recruitment challenges in the industry

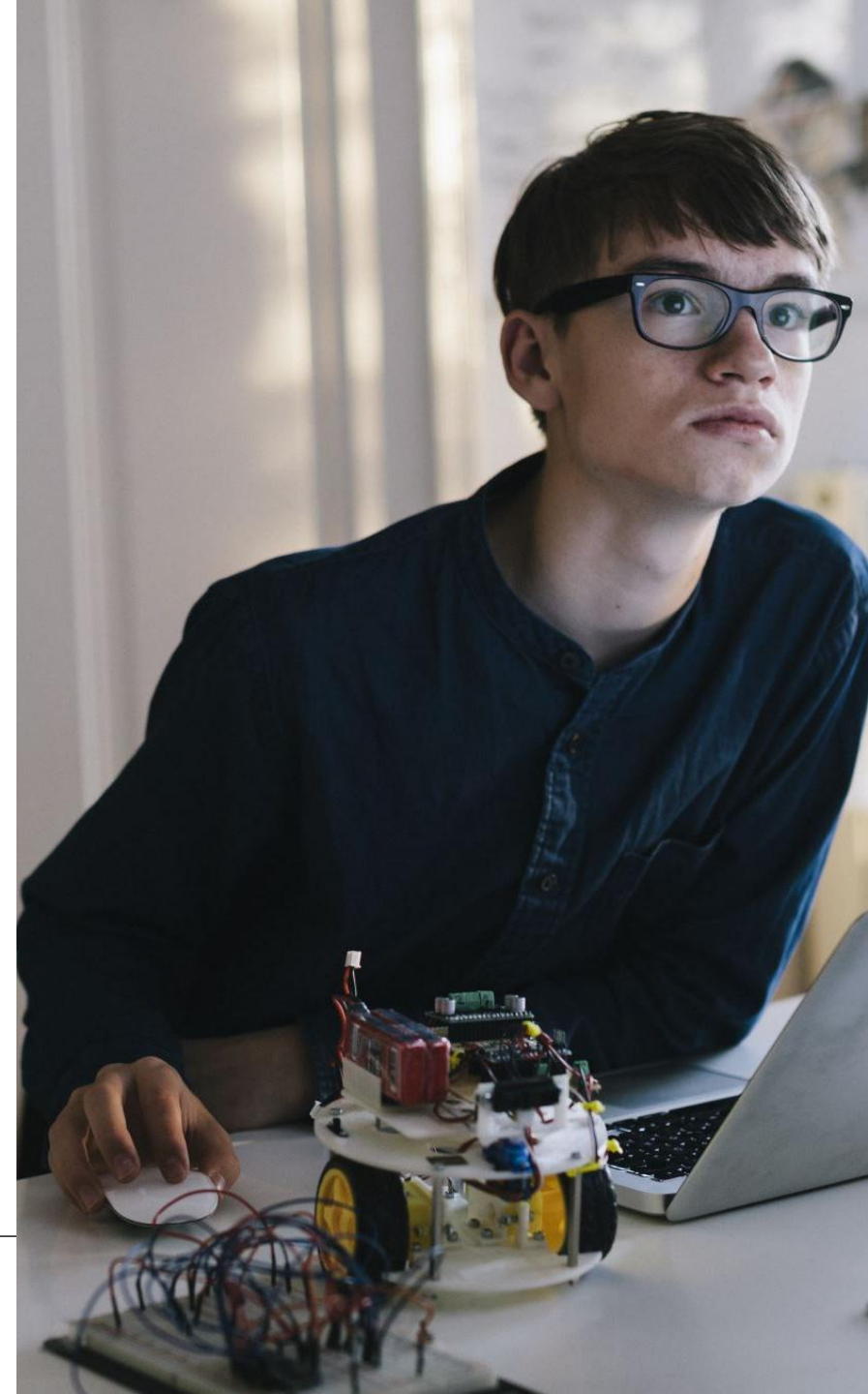


Jernkontoret



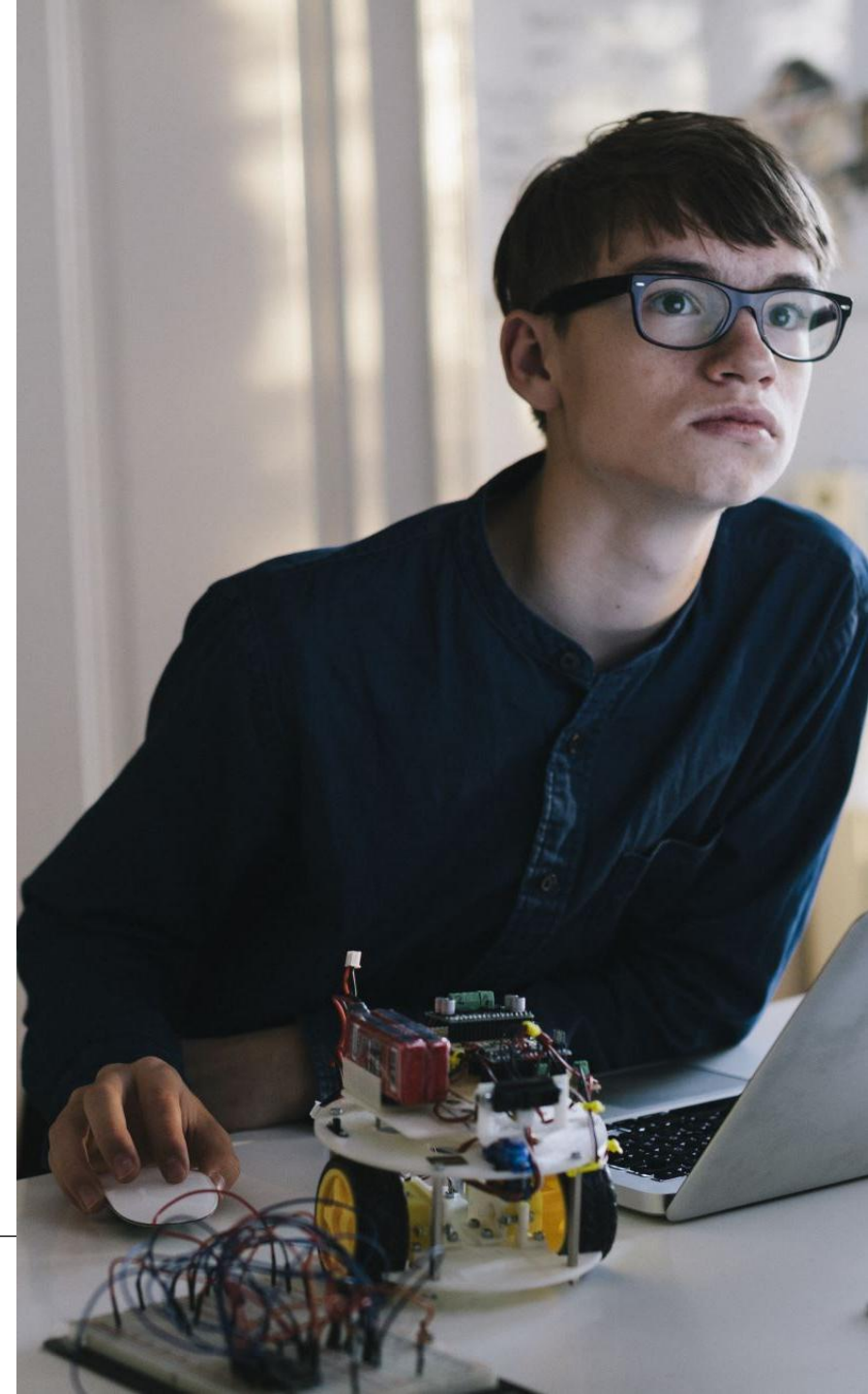
Research Questions

- RQ1: How are students' STEM identity and choices influenced by background, social media, and place identity?
- RQ2: How can schools, industry, and science centres collaborate to enhance STEM engagement?



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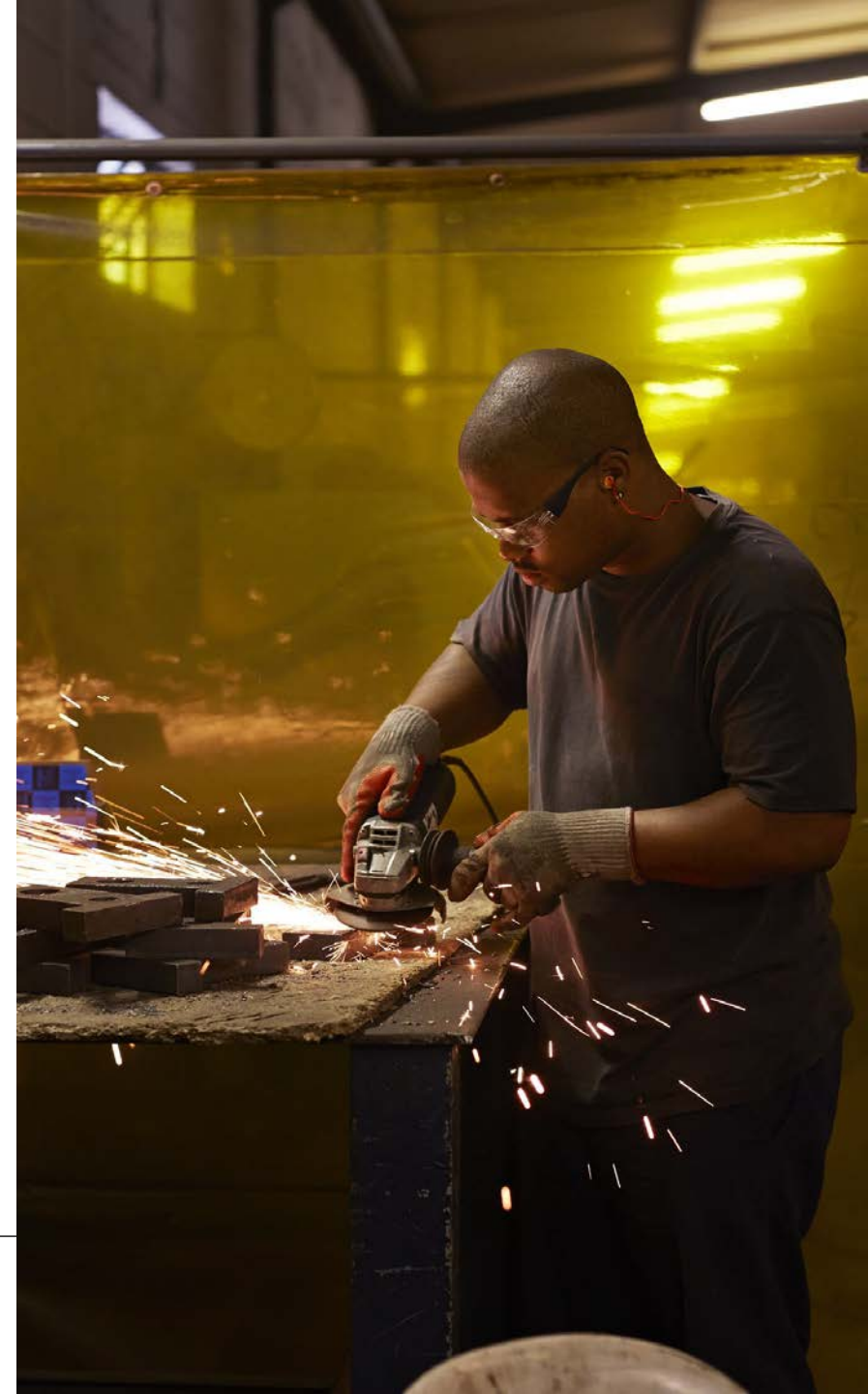
Hidden Resource: Vocational Students

- Often overlooked in STEM policy
- Rich in applied STEM learning
- Key to industrial transformation
- Challenge the STEM/non-STEM divide



A Visual Cultural Lens

- Visual culture = visual dimensions of our cultural and social lives
- Imaginaries of STEM futures and industrial careers are constructed visually
- Representation shapes who feels they belong in STEM
- Important to listen to and involve young people in constructing the visual narratives of STEM



First Step: Photo Elicitation

- Focus group discussions around images
- Students bring their own or found images of STEM, industry, and the future
- Images as discussion support = help articulate thoughts difficult to express verbally
- Researchers and students discuss and analyze images together
- Opens up for inclusive reflection



Next Step: Exploring...

- Visual and narrative tools that reflect diverse STEM futures grounded in insights from photo elicitation study
- Outreach formats in both formal and informal learning environments
- Inclusive representation in communication on STEM to broaden participation and sense of belonging





Thank you!

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PI – Andreas Larsson

Linköping University
andreas.b.larsson@liu.se



Swedish Metals & Minerals

impact innovation

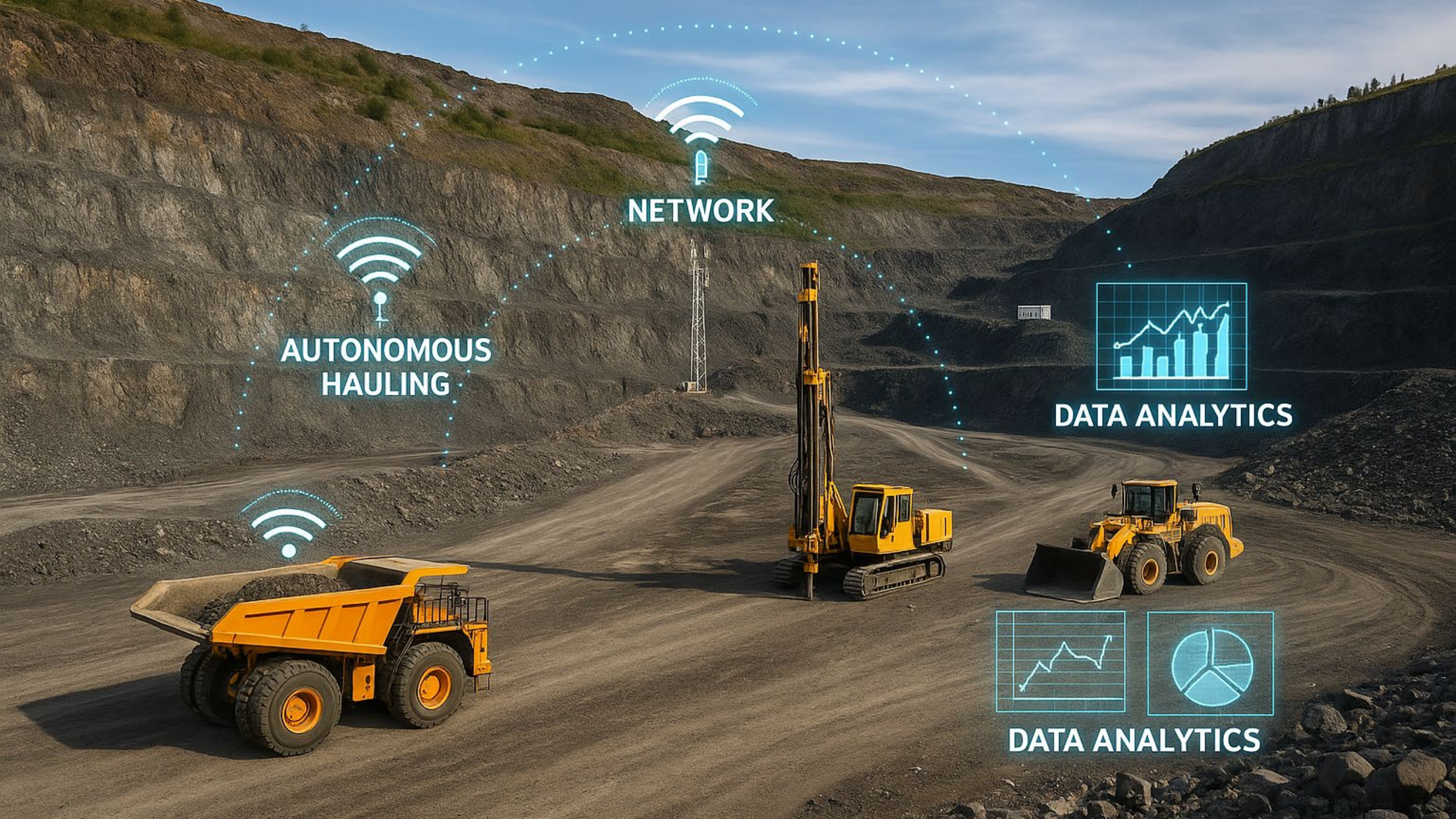
SMART-MINE:

Swedish Metals & Minerals – Social Innovation

1 Oct 2025

Agenda

- 1 What is SMART-MINE
- 2 What will we do?
- 3 How will we get it done?
- 4 What to expect
- 5 Next steps



NETWORK

AUTONOMOUS
HAULING

DATA ANALYTICS

DATA ANALYTICS

What is SMART-MINE?

Smart Mining with Augmented Reality for Training and Maintenance

Implementation and New-tech Enablement

Collaboration
LTU, Epiroc, Boliden



What will SMART-MINE do?

SMART-MINE will integrate advanced AR technology with change management and user-centred UX work to ensure successful implementation and adoption.



Key challenges of SMART-MINE

- AR technology
- Usability
- Change management
- Training
- Implementation



Usability

**Change
management**



Training



Implementation

SMART-MINE's strengths

- Epiroc organisation
 - UX development
 - Augmented-Reality framework
- Boliden Garpenberg
 - Leading in technology
 - Openness to test new solutions
- Human Work Sciences
 - Usability Research
 - Change Management Research
 - Training Research



How will SMART-MINE get it done?

- **SMART-MINE** is a three-year collaboration project
- between LTU, Epiroc, and Boliden
- to develop an Augmented Reality (AR) solution
- for safer and more efficient training
- in the operation and maintenance of underground drill rigs.



Work packages

- WP1: (Months 1–6) – LTU Needs Analysis
- WP2: (Months 6–30) – Epiroc AR Solution Development
- WP3: (Months 12–30) – LTU Usability & Acceptance
- WP4: (Months 24–36) – Epiroc Field Tests & Validation
- WP5: (Months 6–36) – LTU Change Management & Implementation Support



WP1:
Needs
Analysis



AR Solution
Development



Usability &
Acceptance



Field Testing
& Validation



Change
Management
& Implementation
Support



What results do we expect from SMART-MINE?

- Two core training modules:
 - Operators
 - Maintenance support module
- High level of usability for the AR solution
- Better understanding of technology acceptance
- Better understanding of Change Management
- Goal: increased safety, reduced resource waste, and an improved work environment for the green transition.

Deliverables

- **AR/VR Training Prototype:** A fully developed training module that enables simulation of high-risk scenarios, such as blind spots and hydraulic leaks, in a safe and controlled environment.
- **AR-Based Maintenance Guide, POC:** A field-optimized solution that provides real-time instructions to mechanics via AR headsets.
- **Field Report and Impact Assessment:** Documentation of tests conducted in Boliden's mines, including measurements of improved safety, reduced errors, and more efficient work processes.

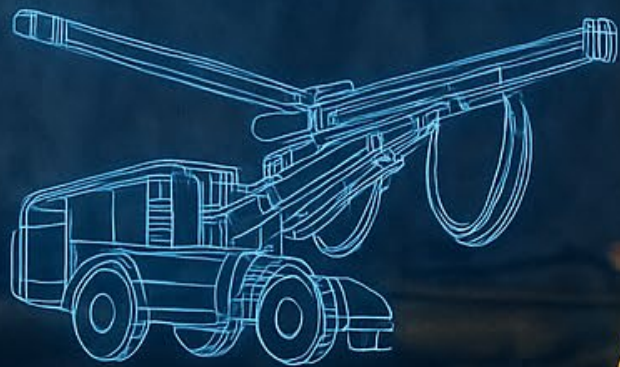
Deliverables

- **Scientific Publications and Acceptance Analysis:**
- **Implementation Guidelines:**
A practical guide for other industrial partners on how AR solutions can be introduced with high user acceptance.
- **Training Materials and Change Support:**
Includes manuals, communication packages, and training support to enable broad deployment in operational environments.

Will SMART-MINE lead to this?



AUGMENTED REALITY TRAINING MODULE



TASKS

- ✓ STARTUP
- ✓ OPERATION



SAFETY
WARNING



SAFETY
WARNING



Phillip Tretten¹⁶
Phillip.tretten@ltu.se

Acoustic and Haptic Feedback for Remote Drilling Operations

Örjan Johansson

Luleå University of technology, Epiroc Rock Drills AB,
Björkdalsgruvan AB

Projektet genomförs inom ramen för Impact Innovation-programmet Swedish Metals & Minerals, en gemensam satsning av Energimyndigheten, Formas, Vinnova och industrin.

Swedish Metals & Minerals

impact innovation

LULEÅ
TEKNISKA
UNIVERSITET

LULEÅ
TEKNISKA
UNIVERSITET

Acoustic and Haptic Feedback for Remote Drilling Operations

Project funded by Vinnova:

Impact innovation: Samspelet Mäniska och
Teknik – Swedish Metals and Minerals

Duration: 2025-08-18 → 2028-08-18

Coordinator: Luleå University of Technology

Background & Motivation

Mining is rapidly transitioning to remote operation and automation

Traditional sensory feedback (sound, vibration, haptics) is reduced

Risk of lower operator awareness and engagement

Need for new multimodal operator support systems

Purpose & Goals



STRENGTHEN HUMAN–
MACHINE INTERACTION IN
REMOTE DRILLING



DEVELOP MULTIMODAL
FEEDBACK (SOUND,
VIBRATION, HAPTICS)



ENHANCE SAFETY,
ERGONOMICS, PRODUCTIVITY,
AND ENERGY EFFICIENCY



DELIVER VALIDATED
PROTOTYPES, METHODS, AND
GUIDELINES

Research Questions

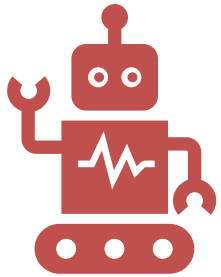
How can added sound and vibration feedback substitute loss of real physical signals?

Can sonification provide a more efficient information handling?

How to design operator interfaces that reduce workload and maintain awareness?

How do gender and individual differences affect perception?

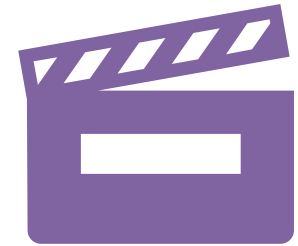
Project Concept



Continuous & event-based
acoustic and haptic cues
integrated into remote rigs



Data sources:
Drilling sound, vibration,
pressure, force, etc



Feedback to operators:
seat/joystick vibrations,
real-time audio cues, visual
indicators



Methodology

- Agile, user-centered design sprints
- Iterative prototyping in high-fidelity simulators
- Participatory design with professional operators
- Validation through lab and mine-site testing

Work Packages

WP
1

Management & coordination

WP
2a

Data collection: drilling sound, vibration, machine data

WP
2b

Participatory design sessions

WP
2c

Prototype development & refinement

WP
2d

Performance evaluation (simulator + field)

WP
3

Dissemination & communication

Expected Results

Increased productivity (drilling meters/hour)

Safer work environment

Improved energy efficiency

Reduced cognitive workload

Inclusive, gender-aware operator interfaces

New scientific knowledge on multimodal feedback

Long-Term Effects

More attractive and sustainable mining jobs

Safer, ergonomically optimized control rooms

Reduced environmental impact via efficient drilling

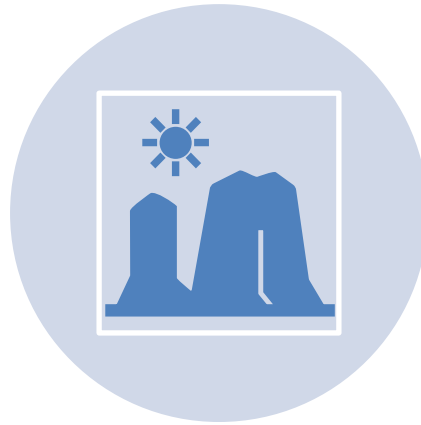
Contribution to Sweden's green mining transition

Project Team & Roles



LTU:

Coordination, Sound, Vibration
& HMI research



EPIROC ROCK DRILLS AB:

Machine technology and data,
Remote station development



BJÖRKDALSGRUVAN AB:

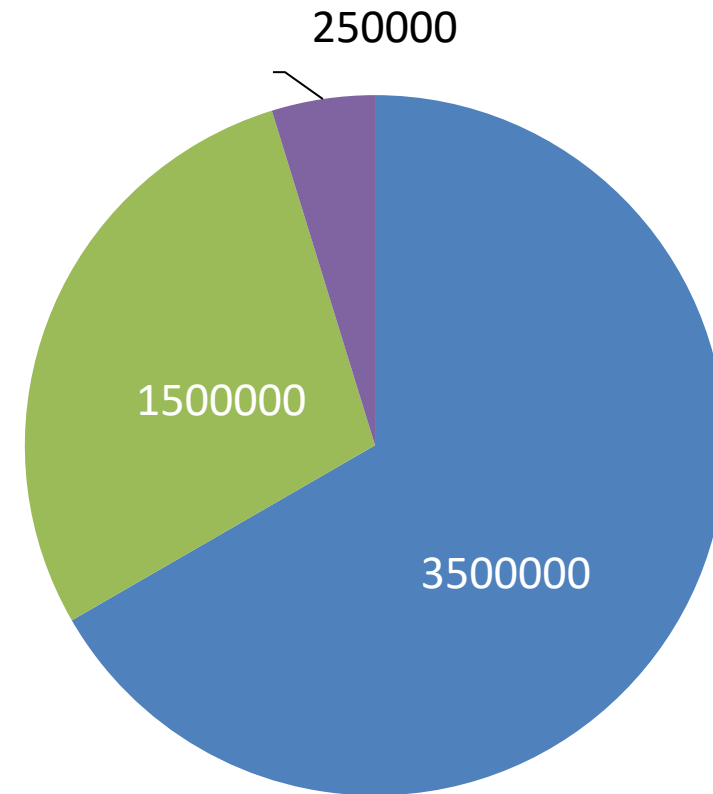
Test site, operator access,
field validation

Budget & Funding

Total: 5.25 MSEK

Vinnova funding: 3.5 MSEK (66.7%)

LTU 3.5 MSEK, Epiroc 1.5 MSEK,
Björkdalsgruvan 0.25 MSEK



Summary & Outlook

AHFeRDO will deliver
validated multimodal
interfaces for remote
drilling

Provides scientific
contributions and
practical guidelines

Positions Sweden at
the forefront of safe,
sustainable, and
attractive mining



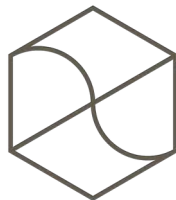
orjan.johansson@ltu.se

Undersökning av tredimensionella strukturer och texturer i sten genom medborgarforskning

U3SM

Mikael Bergqvist

Mining@ORU 2025-10-01



OREXPLORE



Vetenskap & Allmänhet

PUBLIC & SCIENCE SWEDEN

Swedish Metals & Minerals

impact innovation

Projektet genomförs inom ramen för
Impact Innovation-programmet Swedish
Metals & Minerals, en gemensam satsning
av Energimyndigheten, Formas, Vinnova
och industrin.

VINNOVA FORMAS



Energimyndigheten

Medborgarforskning – hur kan det se ut?

Galaxy Zoo – ett mycket framgångsrikt medborgarforskningsprojekt





TASK

TUTORIAL

Is the **central galaxy** simply smooth and rounded, with no sign of a disk?

 Smooth

 Features or Disk

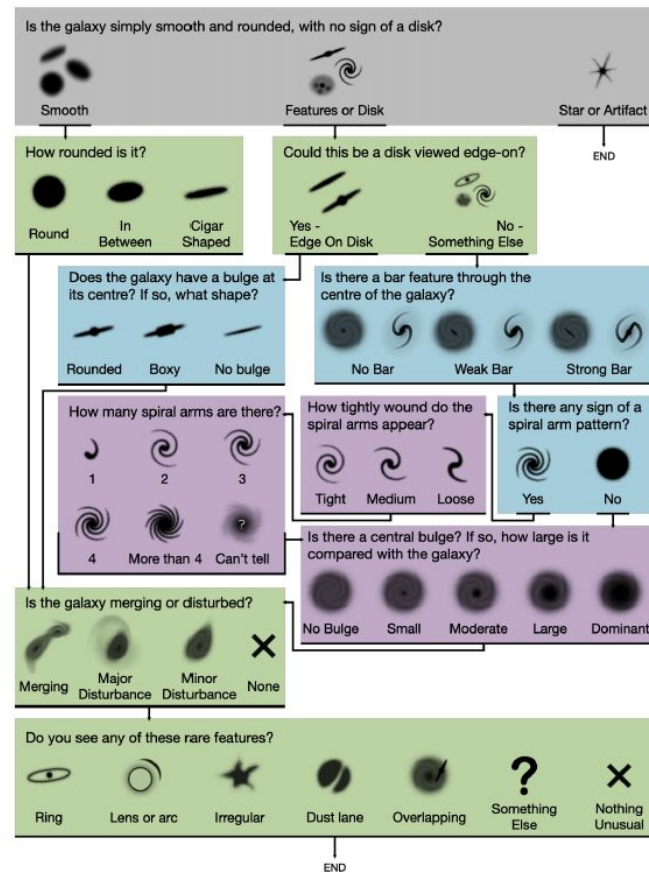
 Star, Artifact, or Bad Zoom

NEED SOME HELP WITH THIS TASK?

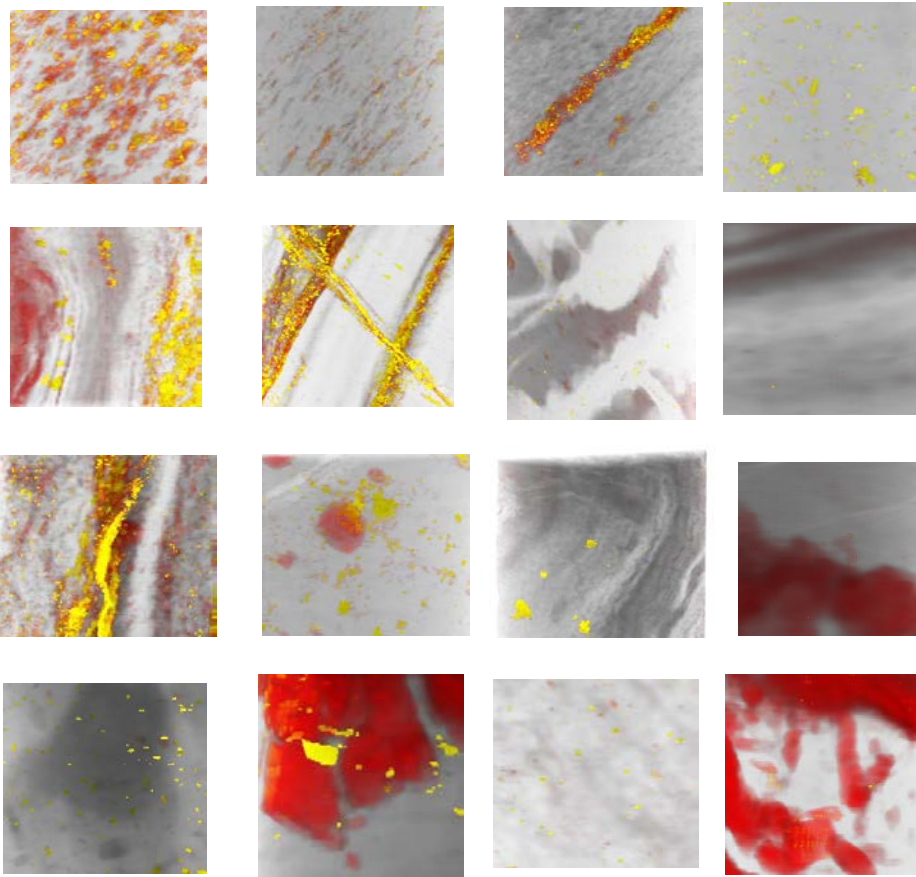
Done & Talk

Done

  You should sign in!



Projektidé: Galaxy Zoo – fast för sten!



Exempel på data från
borrkärnor uppmätta med
Orexplores teknik.

Förutbestämda klasser
bestäms inom projektet.

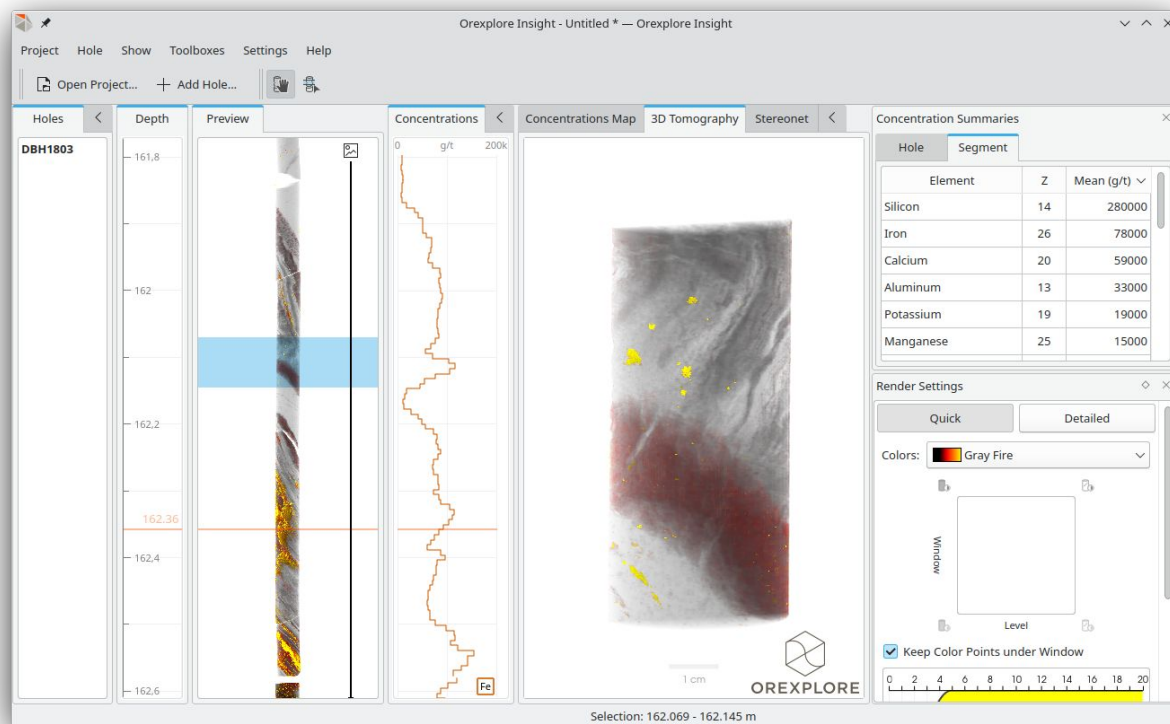
Klassificering görs genom
medborgarforskning.

Orexplores produkter - basen för indata i projektet



Borrkärneanalysatorn GeoCore X10

Skannar borrhärlor med röntgentomografi och röntgenfluorescens.



Mjukvaran Orexplore Insight®

Verkt g f r visualisering och vidare arbete med data fr n GeoCore X10.

Ett steg tillbaka! Vi behövde fler i projektet!
Här, på Mind Detonator i Jörn, hittade vi Creative
Crowd!
Väl förankrade i Skellefteås spelutvecklingskluster och
i Skelleftefältets gruvdistrikt





Tidigare arbetat med Bergskraft i Bergslagen

Säte i Kopparberg, mitt i Sveriges äldsta gruvområde, Bergslagen, med 10500 kända gruvor.

- Lång erfarenhet av information och tjänster inom geologi, gruva, miljö



Erfarenhet av medborgarforskning?



Vetenskap & Allmänhet

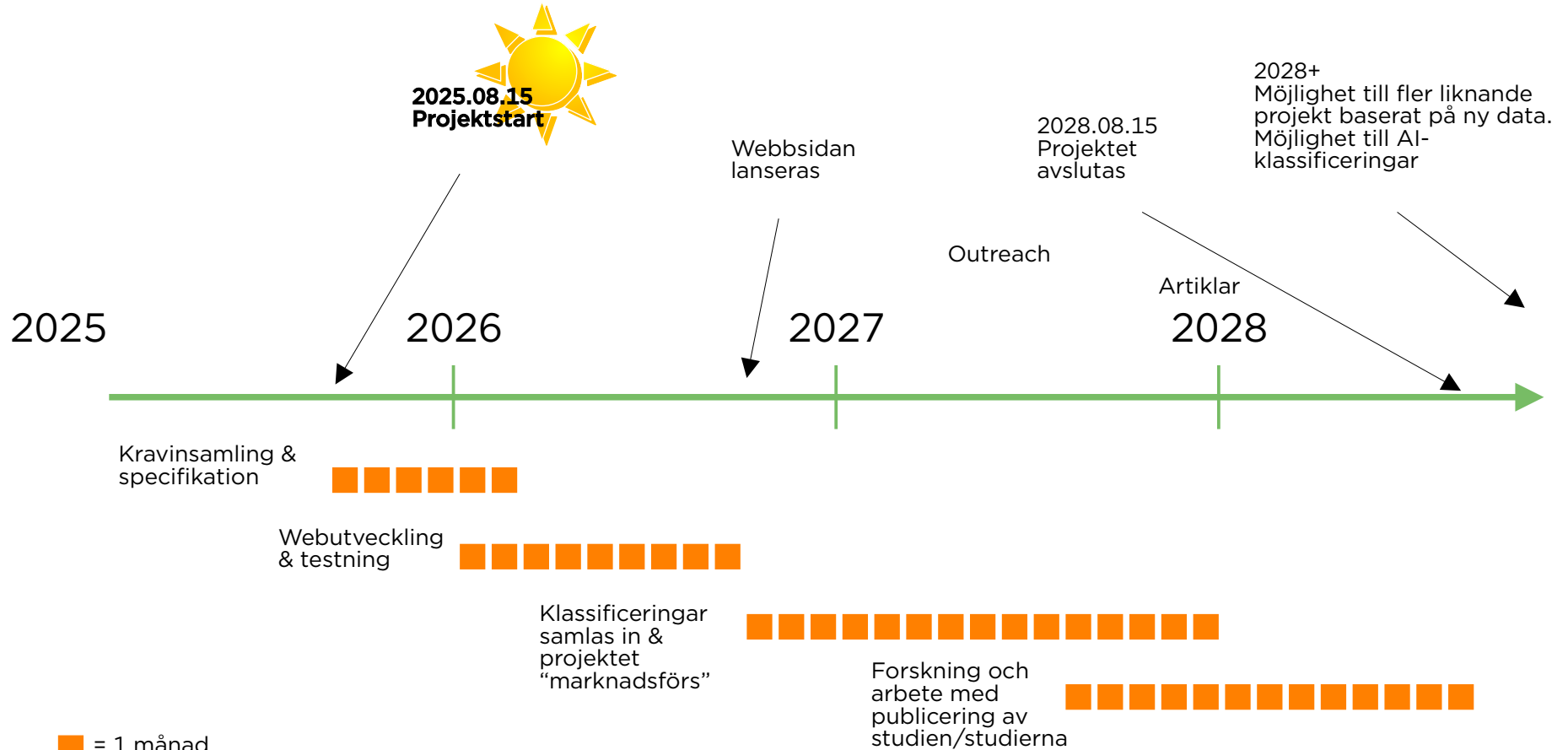
PUBLIC & SCIENCE SWEDEN

Ideell förening som främjar dialog och öppenhet mellan allmänhet och forskare.

- Det behövs mer kommunikation och samverkan kring forskning för att finna hållbara lösningar på samhällets utmaningar.
- Lång erfarenhet av medborgarprojekt



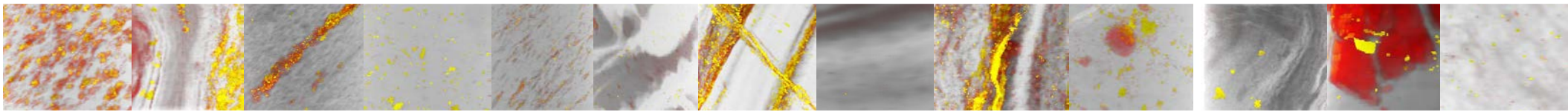
Tidsplan



Syfte

- Att lyfta allmänhetens kunskap och engagemang inom gruvnäringen.
 - Öka förståelsen för gruvrelaterade verksamheter, trygga kompetensförsörjningen till sektorn.
- Medborgarforskning kan ses som ett medel att nå ut till en bred allmänhet och samtidigt öka kunskapen och intresset.
 - CT-data visuellt tilltalande, potential att bidra till att göra arbete inom metaller och minerals mer attraktivt.
- Människor är väldigt bra på att tolka och klassificera information i bilder, vilket kan ge värdefulla insikter för prospekterings- och gruvbolag.
- Genom att extrahera mer information från borrhärdar kan förståelsen för den lokala geologin öka.
 - Mer träffsäker prospektering och effektiviserad energianvändningen vid brytning då förhoppningsvis mindre gräberg bryts
- Genom att i en forskningskontext belysa nyttan av CT-data ligger projektet väl i linje med Orexlore Systems ABs verksamhet.
 - Efterfrågan på CT-skanningar i branschen förväntas öka, liksom värdet av sådana skanningar för gruv- och prospekteringsbolag.
- Projektet kan bidra till EUs mål om ökad självförsörjning av kritiska råmaterial inom unionen, ökad kunskap och ge ett ökat intresse från allmänheten.
- Leda till kommersiella framgångar för företagen i projektet.

Mål



Projektets mål:

- Ta fram ett lämpligt schema för oberoende klassificeringar av strukturer i sten som endast baseras på CT-data.
- Webbsida för medborgarforskning om strukturer i CT-data av sten.
- Nå ut och engagera en bred allmänhet i projektet.
- Främja samarbete mellan projektets parter.
- Publicera data från klassificeringarna.
- Publicera resultatet av studien i en eller flera vetenskapliga tidskrifter.

Tack!

Frågor?

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Projektet genomförs inom ramen för Impact Innovation-programmet Swedish Metals & Minerals, en gemensam satsning av Energimyndigheten, Formas, Vinnova och industrin.

Swedish Metals & Minerals

impact innovation

VINNOVA FORMAS

 **Energimyndigheten**



Culture and Community Fund

Projektet genomförs inom ramen för Impact Innovation-programmet Swedish Metals & Minerals en gemensam satsning av Energimyndigheten, Formas, Vinnova och industrin.

Swedish Metals
& Minerals

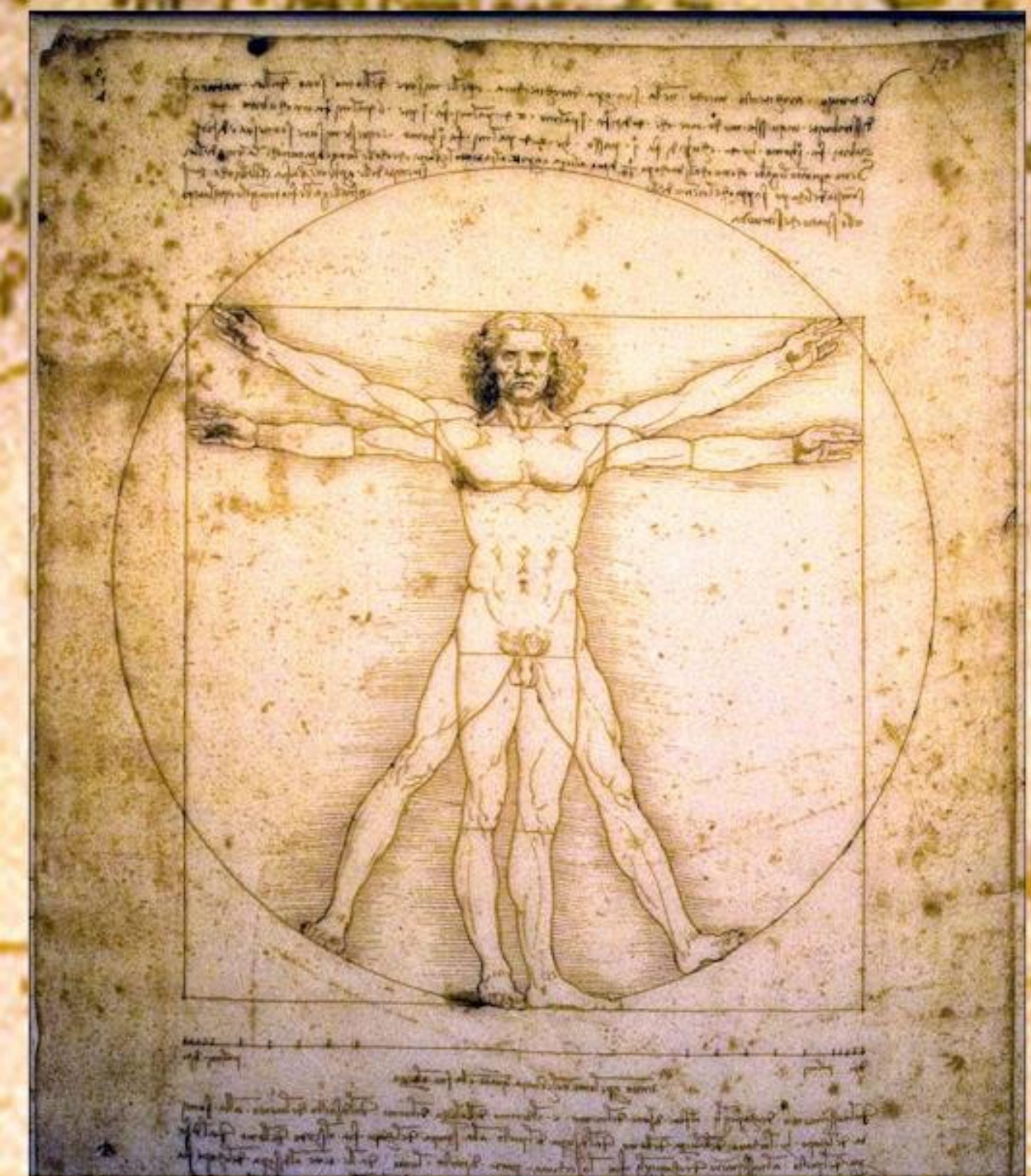
impact innovation



Culture

- Drives our development
- Creates humanity and empathy
- Defines who we are

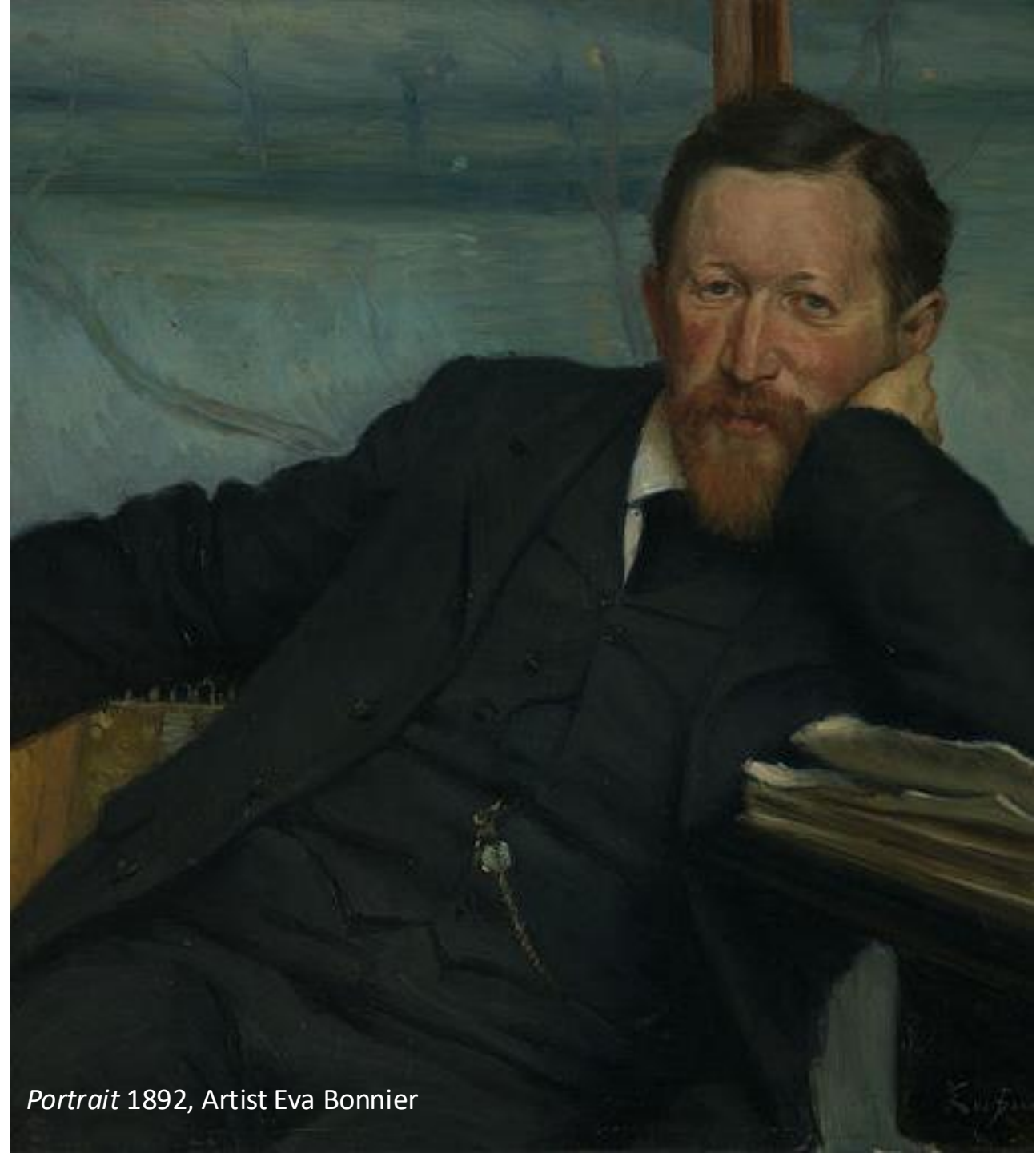
The Vitruvian Man, a drawing by Leonardo da Vinci, is a typical example of the union of art and science that characterized the Renaissance.





Hjalmar Lundbom

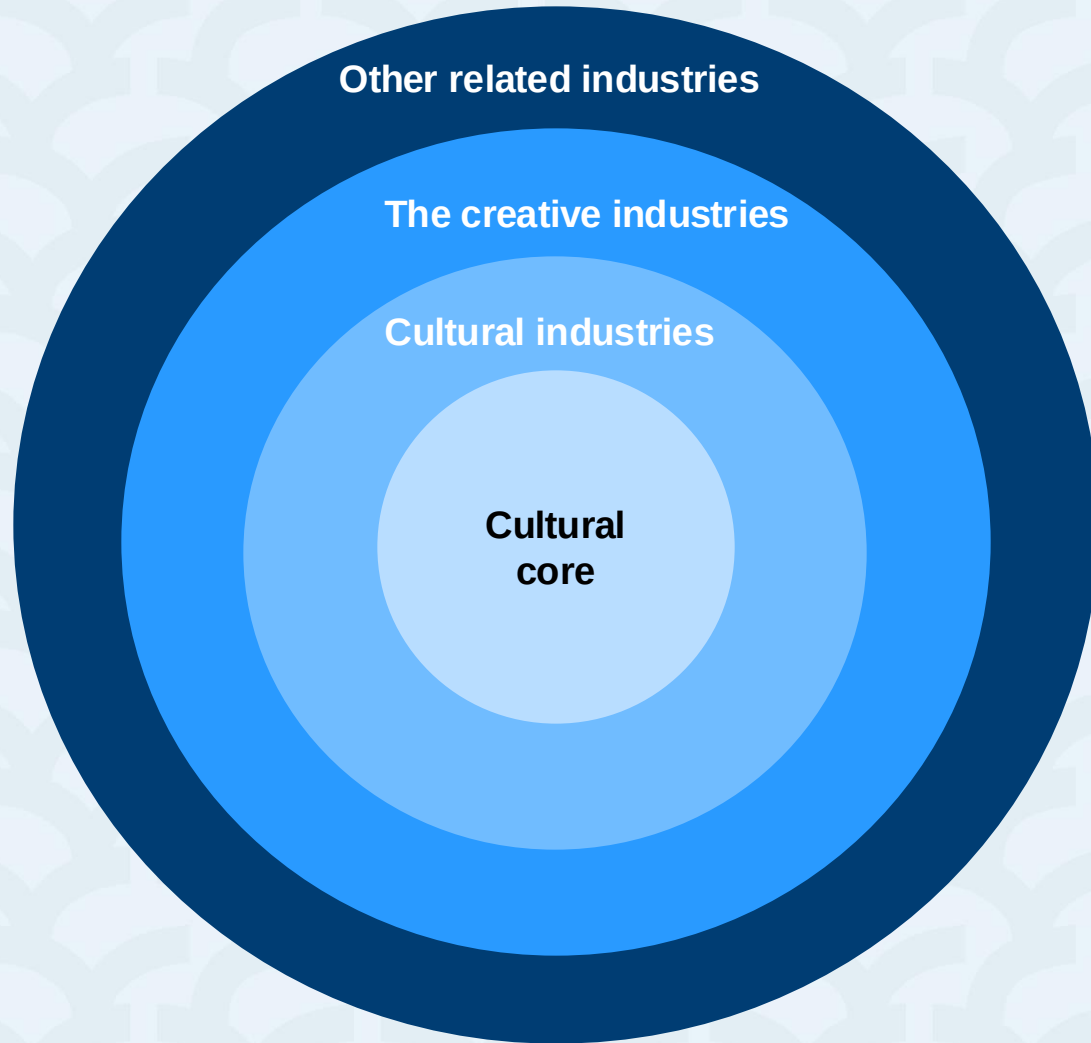
- LKAB's first managing director and the founder of Kiruna
- Humanist
- Patron of the arts
- Involved artists in community building
- Benefactor



Portrait 1892, Artist Eva Bonnier



What is culture?



Cultural core

The visual arts, arts and crafts, music, performing arts and literature.

Cultural industries

The film industry, museums, galleries, art galleries and libraries.

The creative industries

Cultural heritage, newspapers, radio, TV and other media and the computer game industry.

Other related industries

The fashion industry, the design industry, architecture and the advertising industry



The Artists

- The core of culture
- Visualizes contemporary trends
- Challenges norms
- Inspires new thinking
- Part of the democratic process



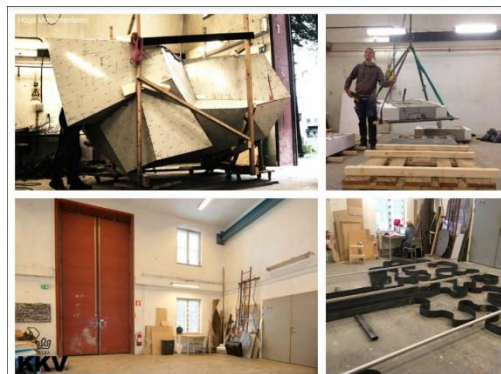
The Opposite Sphere, Artists Eva Gun Jensen, Jan-Erik Falk, Dan Lestander & Ricky Sandberg



KULTURCENTRUM
EBENESER



LULEÅ
KKV



Galleri Syster





How can culture contribute
to a more attractive society?

How can business sector
contribute to culture in the
Green Transition?



**Aesthetic and
cultural values**

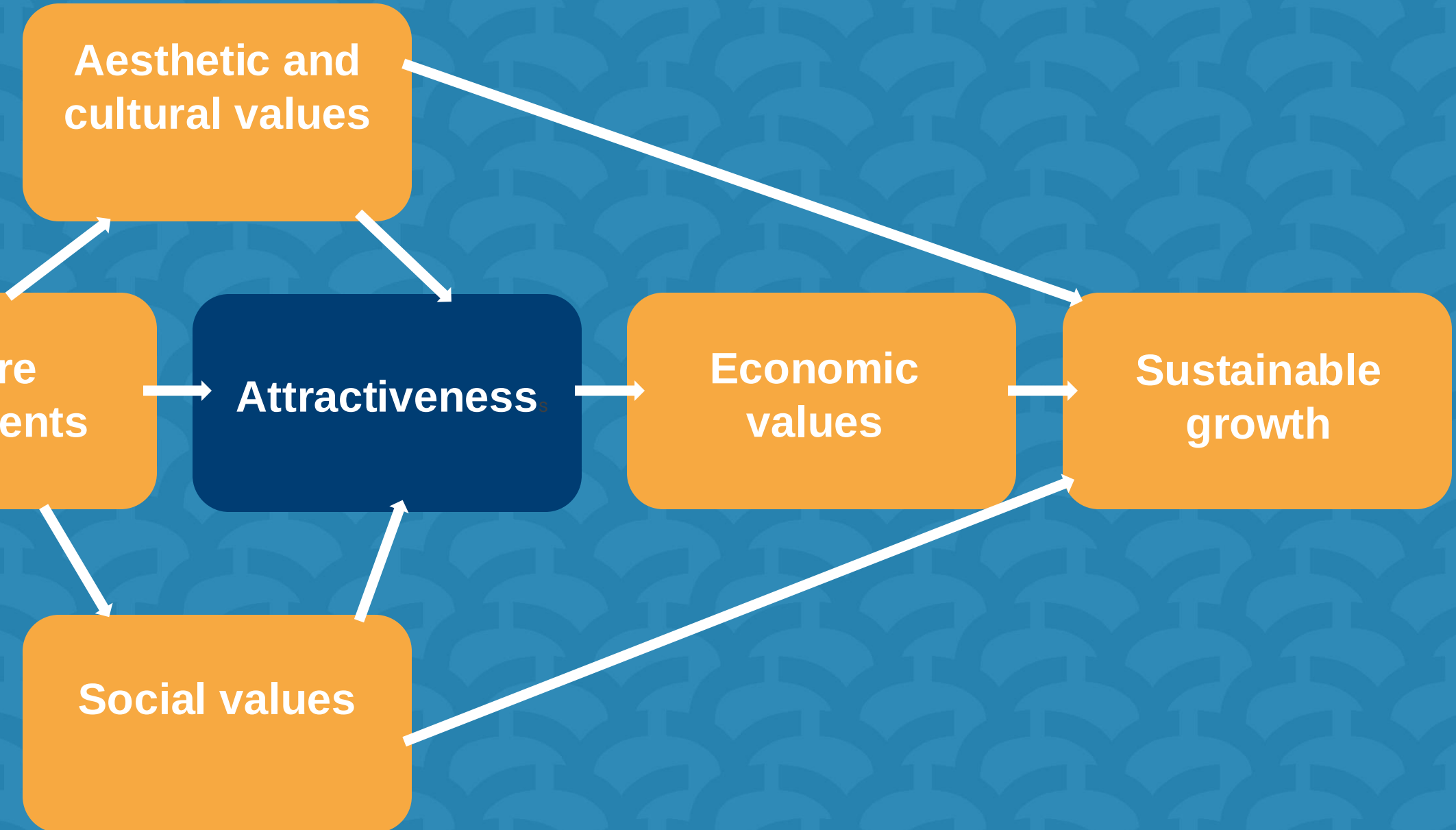
**Culture
investments**

Attractiveness

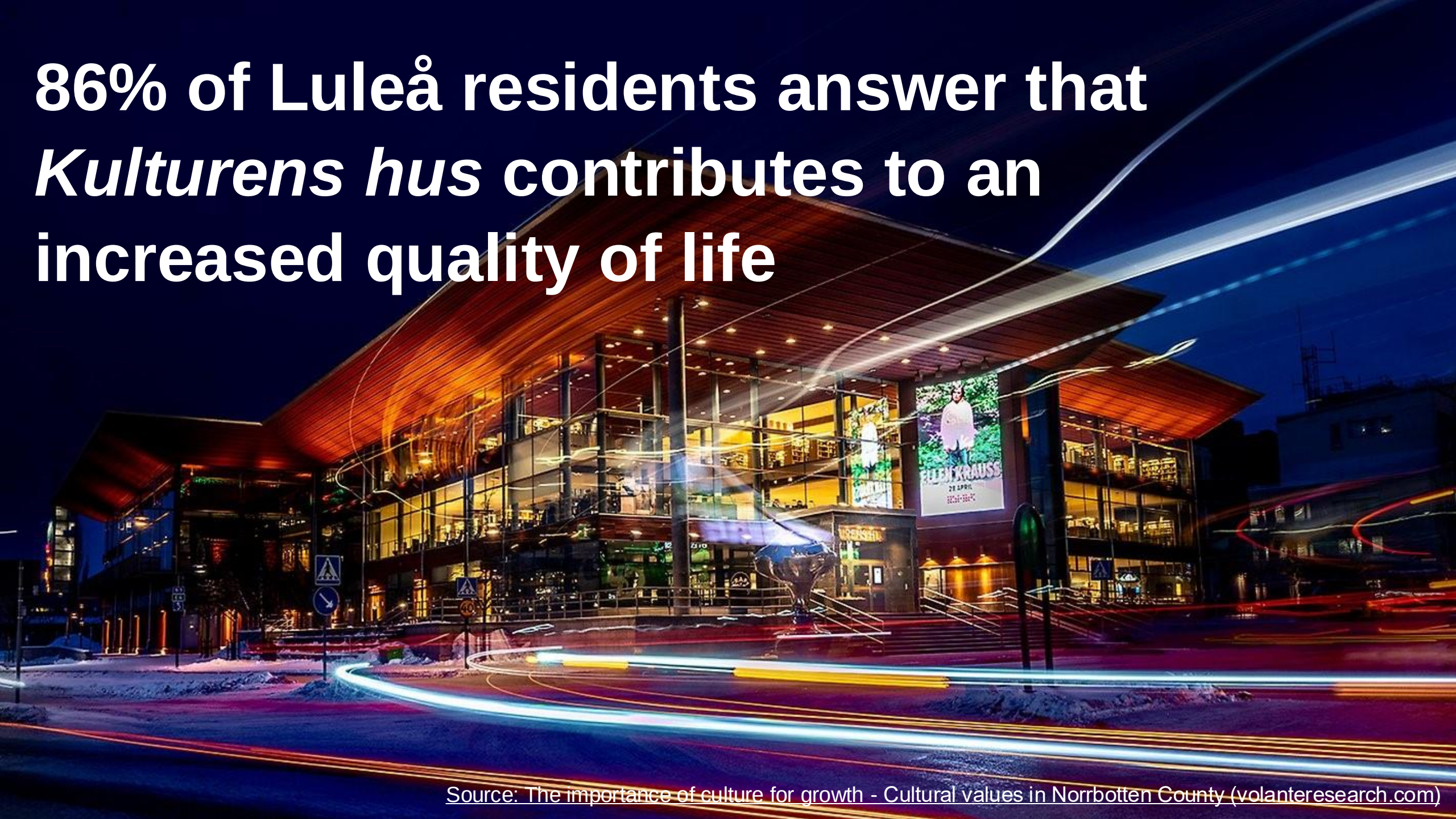
**Economic
values**

**Sustainable
growth**

Social values



86% of Luleå residents answer that *Kulturens hus* contributes to an increased quality of life



A photograph of a large orchestra performing on a stage at night. The stage is illuminated with warm yellow lights, and the musicians are visible. Above the stage, a massive, curved, blue-lit structure, resembling a large pipe or tunnel, arches over the performance area. The background is dark, suggesting an outdoor or semi-outdoor venue. The overall atmosphere is dramatic and modern.

**Cultural tourists usually spend
more money than other tourists**

A large, diverse audience is seated in a theater, looking towards the stage. The audience is composed of people of various ages and ethnicities, all focused on the front of the room. The theater has red seats and a dark stage area. The text "Culture and Community Fund" is overlaid in large white letters across the center of the image.

Culture and Community Fund

How does it work in practice?



Collaboration partners

Industry

SSAB
LKAB
Talga
Snells Entreprenad

Universities

Luleå Tekniska Universitet

Industry organizations/Companies

Tromb
Företagarna Norrbotten/Luleå
Fastighetsägarna Mitt/Nord
Norrbottens Byggmästarförening
Luleå Näringsliv
Lulebo
Luleå Energi
Swedavia - Luleå Airport

Culture Organizations

Kilen Art Group
Dansinitiativet
BD POP
Filmpool Nord
Ebeneser
Konstnärernas Riksorganisation

Specialists Grantmaking

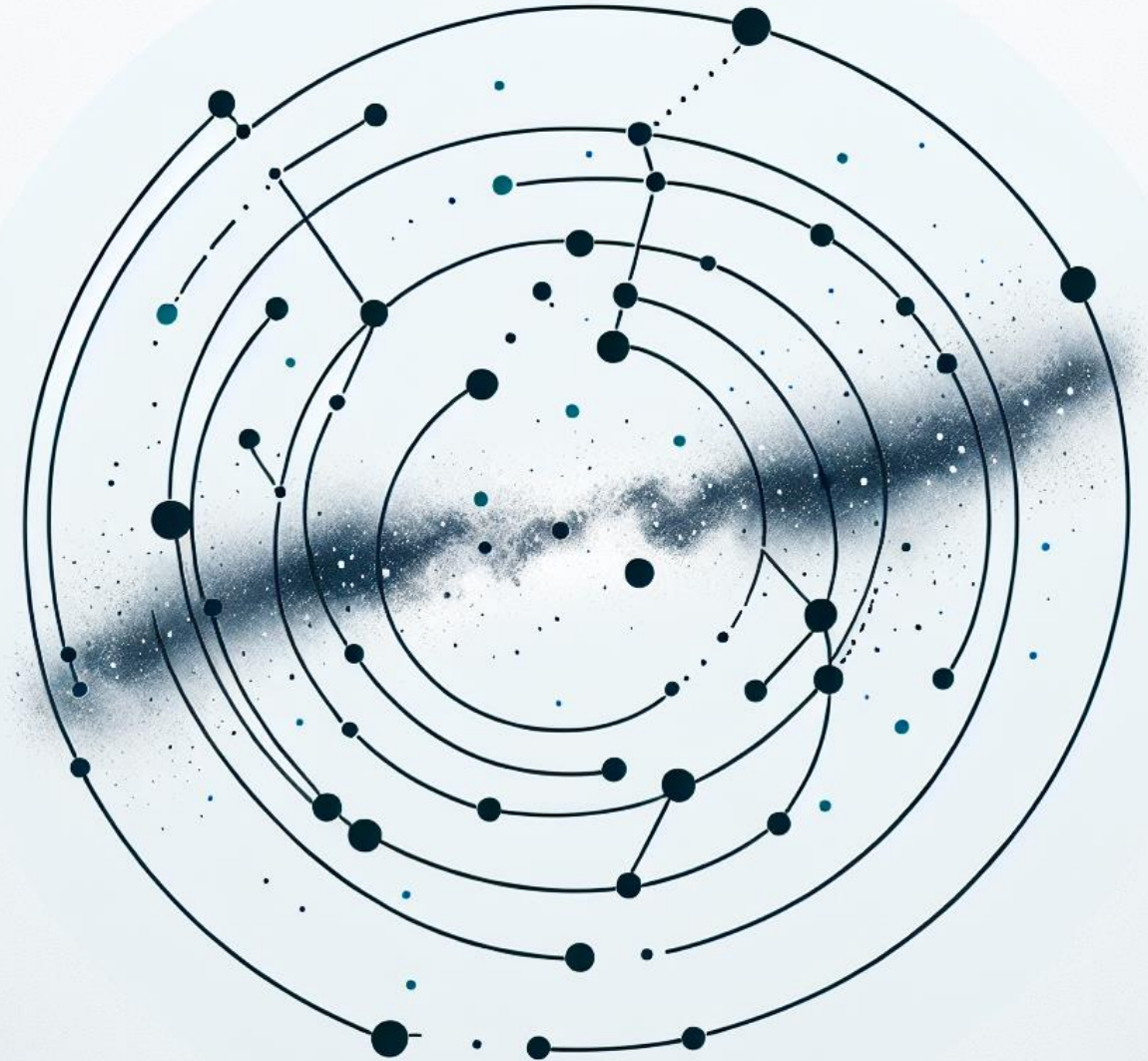
Kulturbyggan
Sparbanken Nord

Consultants

Brakeley Nordic
Brightnest
LTU Business

Public sector

Luleå Kommun
Kiruna Kommun
Länsstyrelsen
Region Norrbotten





Within the project

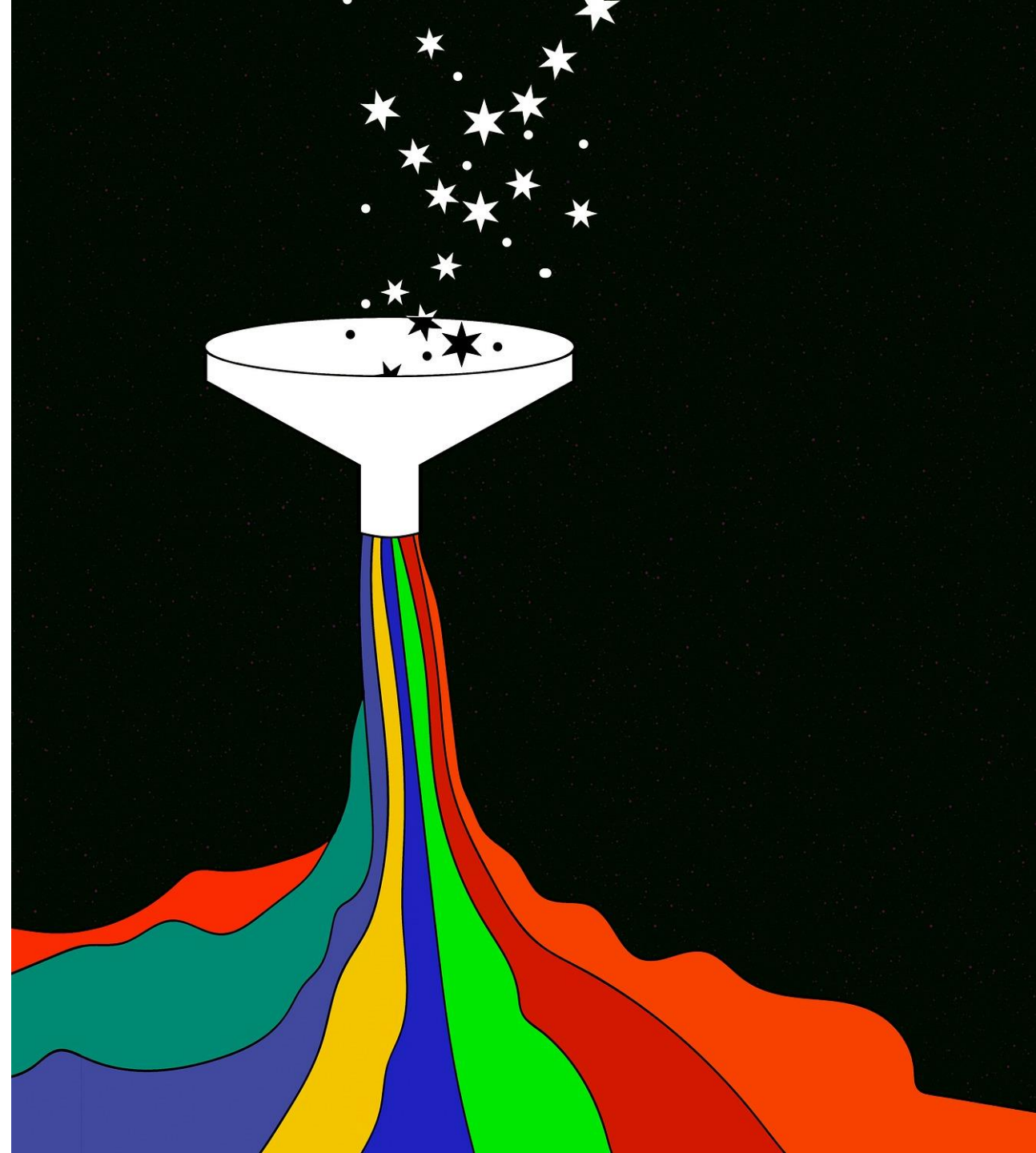
- **Culture and Community Fund Light**
Two calls for proposals. Currently 600,000 SEK from SSAB and LKAB jointly.
- Five larger **Cases** with project partners
- Two **Collaborations** between companies and the cultural industries with in-kind.





Collect all ideas in one place

- Coordination of reinvestment in society
- Less personnel resources
- Clarity towards those who want to apply for funds
- Better control
- Easy to communicate





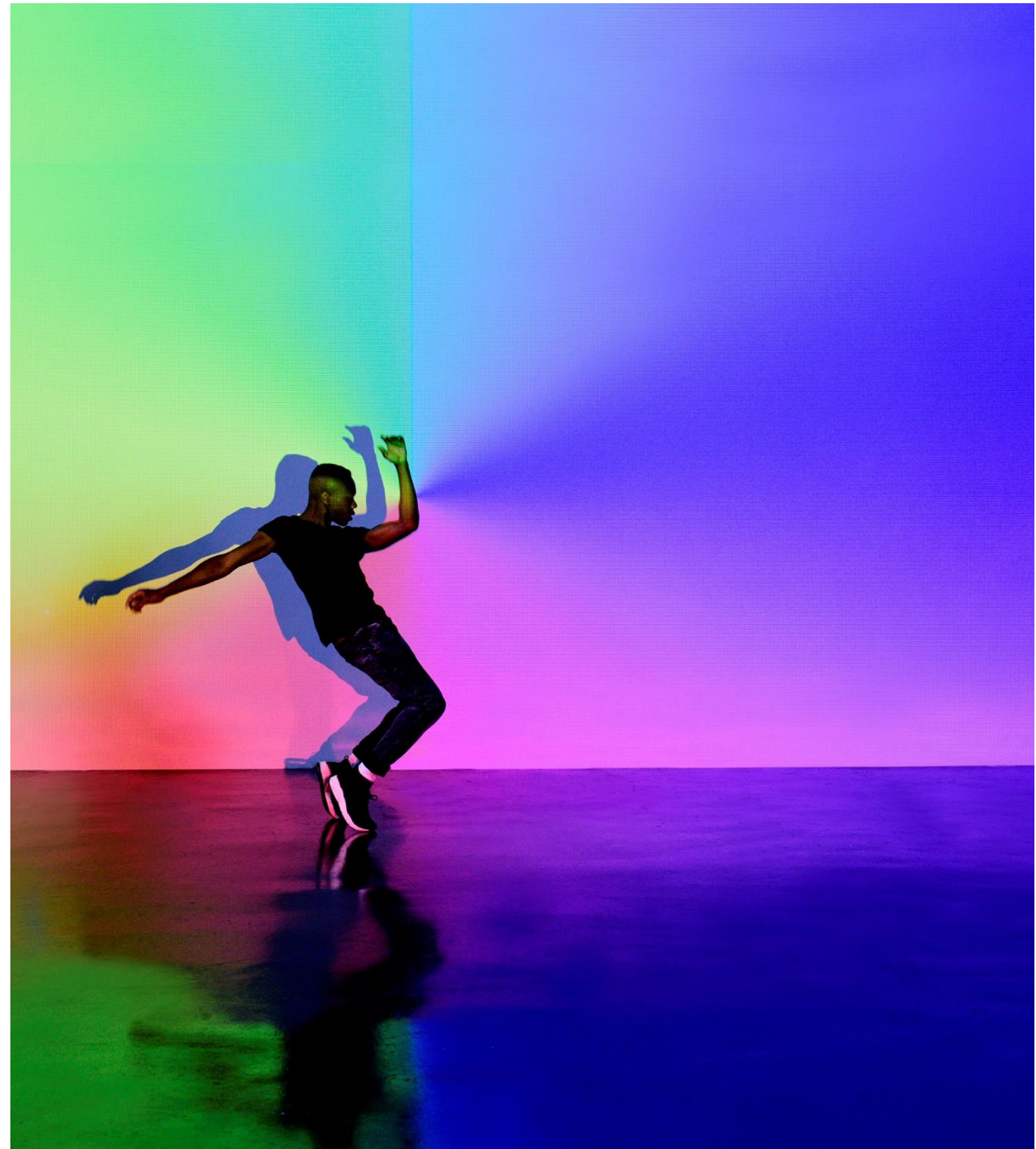
Arm's length distance between company and applicant





Cooperation Business - Culture

- Culture as employee development
- Companies that strengthen skills for cultural events and cultural workers
- Art Residencies at Companies
- Culture and art as the company's image
- Cultural performances at company events
- etc





Project delivery

When the project is complete we want to have achieved:

- A permanent consortium with the Culture and Society Fund.
- 10 letters of intent with companies that want to invest in the fund.
- A communication plan. A website and newsletter.
- Calls for proposals.
- Dissemination of results.
- A final report with analysis of the project and presentation of the project's knowledge support.



A photograph of a community event. In the foreground, a young girl with dark hair, wearing a pink dress with a white seashell pattern and a bright green headband, is being carried on the shoulders of an adult wearing a grey hoodie. To the left, another person is seen from behind, wearing a white t-shirt, a tan baseball cap, and a brown leather backpack. The background features a large wooden wall with a prominent rainbow-colored heart graphic. Other people are visible in the crowd, and a musician is partially visible in the background.

SATISFIED RESIDENTS

A photograph of a male worker in a blue polo shirt and an orange hard hat. He is focused on operating a piece of industrial machinery, which has a large, clear, spherical component. The setting appears to be a factory or a large-scale industrial facility with various pipes and structural elements visible in the background.

**SUPPLY OF
COMPETENCE**

An aerial photograph of a modern urban development. The image shows several tall, dark-colored apartment or office buildings situated next to a large body of water. The area is surrounded by lush green trees and parks. A road with a few cars is visible in the foreground. The sky is blue with scattered white clouds.

SUSTAINABILITY

Thank you for listening!

ricky.sandberg@lulea.se
hanna.isaksson@lulea.se



LULEÅ KOMMUN

**Swedish Metals
& Minerals**

impact innovation

