



An initiative of the European Union

CLUSTERS MEET REGIONS

KITILÄ | 25 · 27

FINLAND | APRIL 2023

A SUSTAINABLE APPROACH
TO RAW MATERIALS

EUCLUSTERS MATCHMAKING EVENTS



MATCHMAKING
EVENTS

#SingleMarket30





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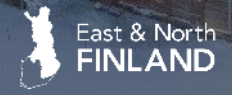
European Cluster Collaboration Platform

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WELCOME



Agenda

08:30-08:45	Introduction by the organisers	
08:45 – 09:00	Keynote speech	Importance of raw materials for the economy in East and North Finland
09:00 – 09:15	Setting the scene	ECCP Input Paper for East and North Finland
09:15 – 10:15	Session I: Round table I:	East and North Finland in Industrial Transition Modern Digital Solutions and High Technology
10:05 – 10:30	Coffee Break	
10:30 – 11:20	Round Table II:	Industrial Circular Economy in East and North Finland
11:20 – 11:50	Round Table III:	Arctic Water Excellence - showcasing interregional cluster collaboration
11:50 – 12:00	Reflections and Concluding remarks	
12:00 – 13:00	Networking Lunch	

Round Table III: Arctic Water Excellence – showcasing Interregional Clusters Collaboration

Moderator: Antonio Novo, President of the European Cluster Alliance

- **Eero Antikainen**, Cluster coordinator, Kuopio Water Cluster
- **Jarkko Rätty**, Research Manager, Kajaani University Consortium, University of Oulu
- **Lasse Moilanen**, CEO BioSO4 Oy [h](#)and CEO MINING FINLAND



Round Table III: Arctic Water Excellence – showcasing Interregional Clusters Collaboration

Eero Antikainen

Cluster Coordinator, Kuopio Water Cluster





KUOPIO WATER CLUSTER



Eero Antikainen, MSc (Tech.)

Cluster coordinator
Head of Research, Environmental Engineering
Savonia University of Applied Sciences

Contact:

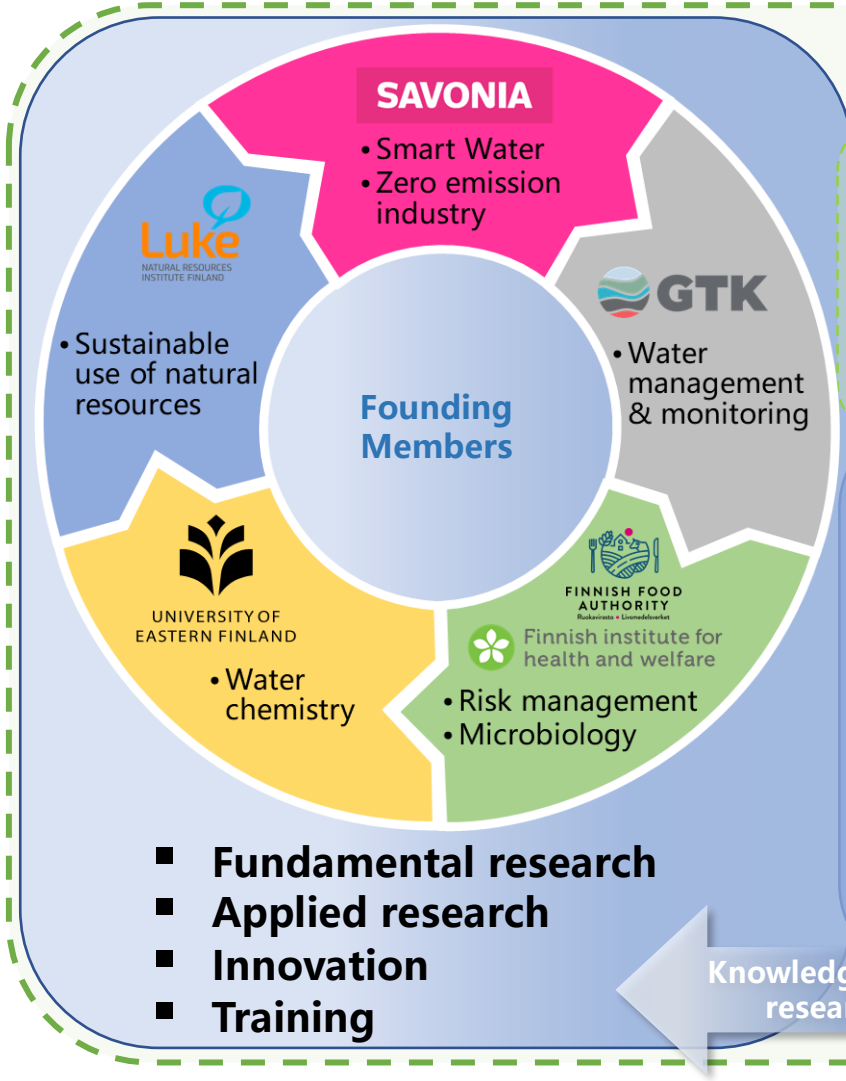
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Eero Antikainen
Research and Development Manager



April 2023



Supporting Members



DiGiCENTERNS

THE DIGITAL INNOVATION HUB OF NORTHERN SAVO REGION

- Digitalization competence centre
- R&D in digitalisation
- Solve business problems together with customers by using means of digitalization

- Cross-pollinates RDI & business
- Clusters & ecosystems from 8 key sectors

BUSINESS CENTER

POHJOIS-SAVO • NORTH SAVO

- Business services
- Startup accelerator
- Business development
- Commercialisation

KUOPIO WATER CLUSTER

- Testing and product development
- Piloting and product demonstration
- Proof of Concept
- Development space and hardware resources
- Coordination of business cooperation



LEADERSHIP IN WATER SECTOR



Technology Readiness Levels:

University	TRL1	TRL2	TRL3	TRL4	TRL5	TRL6	TRL7	TRL8	TRL9	Industry
	Observed & Reported	Application Formulated	Proof of Concept	Lab	Piloting			Product		
	Research			Development			Commercialisation			

MAIN TECHNOLOGIES IN FOCUS:



Zero Emission Industry:

Circular economy applications for water treatment/recovery/reuse and closed water cycles



Environment: Prevention of pollution of water and groundwater, management of agricultural water and industrial water



Smart Water Solutions:

Digitalisation in water sector

MAIN SECTORS IN FOCUS:

MAIN TECHNOLOGIES IN FOCUS:



Zero Emission Industry:

Circular economy applications for water treatment/recovery/reuse and closed water cycles



Environment: Prevention of pollution of water and groundwater, management of agricultural water and industrial water



Smart Water Solutions:

Digitalisation in water sector



Kuopio Water Cluster - solutions for water challenges -

**ALL YOU NEED FROM LABORATORY SCALE TO
ON-SITE PILOTING OF NEW INNOVATIONS IN
WATER SECTOR**



Water Smart Territories Finland



KUOPIO WATER CLUSTER

Digitalisation in water processes

- IoT
- Wireless Data Solutions
- Data Analytics and Mining
- Artificial Intelligence
- Modelling
- Cyber Security

CEMIS

Centre for Measurement and Information Systems

- Mining waters
- Process measurements and automation and ICT
- Sensor and measurement technology manufacturing + R&D
- Water treatment technology

SMART SPECIALISATION IN NORTH AND EAST FINLAND IN WATER EXCELLENCE



- Industrial water treatment
- Water safety:
 - Microbiological applications
 - Water chemistry and analytics
- Mining and agricultural emissions and water management
 - Monitoring
 - Modelling
 - Hydrogeology
- Mobile pilot test-rigs
- Smart water solutions (applied ICT)



- Municipal wastewater test site
- Drinking water test-rigs (filtration technologies etc.)
- Separation technologies

TOPICAL WATER RELATED CHALLENGES IN NORTH AND EAST FINLAND

Examples of the topical challenges/needs identified with industries and water companies:

- Utilisation of digitalisation in practice for smart monitoring and water management in large industrial sites and water utilities
- Advanced sulphate and nitrogen removal processes for cold climates
- Selective metal recovery processes for industrial applications
- Rapid monitoring and control methods for water analytics in on site conditions
- Robust and cost effective filtration methods for old mine sites



Arctic Water Excellence;

- a comprehensive approach to develop innovative solutions for the topical challenges in cooperation with regional research organisations and businesses -

AWE-project consortium combines together wide expertise of water excellence from North and East Finland to solve topical challenges identified together with industry and water utilities

Aim of the joint project is to:

- Develop and implement in practice new innovative and cost effective solutions for the topical water challenges by testing and piloting those solutions on site
- Identify the most potential new innovations and related company consortiums to boost further development of those innovations towards market ready solutions in international markets
- Catalyse creation of spin off projects for further product and business development lead by private companies

AWE-project has applied ERDF-funds from the regional councils of the North and East Finland

AWE-project is divided in to five work packages as followed:

WP 1: Management and coordination

WP 2: Smart Water Management Methodes for water intensive industries

WP 3: Circular Economy Applications for Water Utilities

WP 4: Sensoring and Monitoring Technologies

WP 5: Catalysing new businesses and international activities of the most potential solutions

Arctic Water Excellence – public-private partnership -



Kaakkois-Suomen ammattikorkeakoulu



VTT



SAVONIA



WATER ECOSYSTEM



KUOPIO WATER CLUSTER

CEMIS

Centre for Measurement and Information Systems



Terrafame

Knowledge grows

Meoline

OPERON GROUP



3Awater

NordFuel



Table III: Water solution to the world – Clusters in Arctic Water Excellence collaboration in East and North Finland

Dr. Jarkko Rätty

Research manager, University of Oulu,
Measurement technology unit, Kajaani



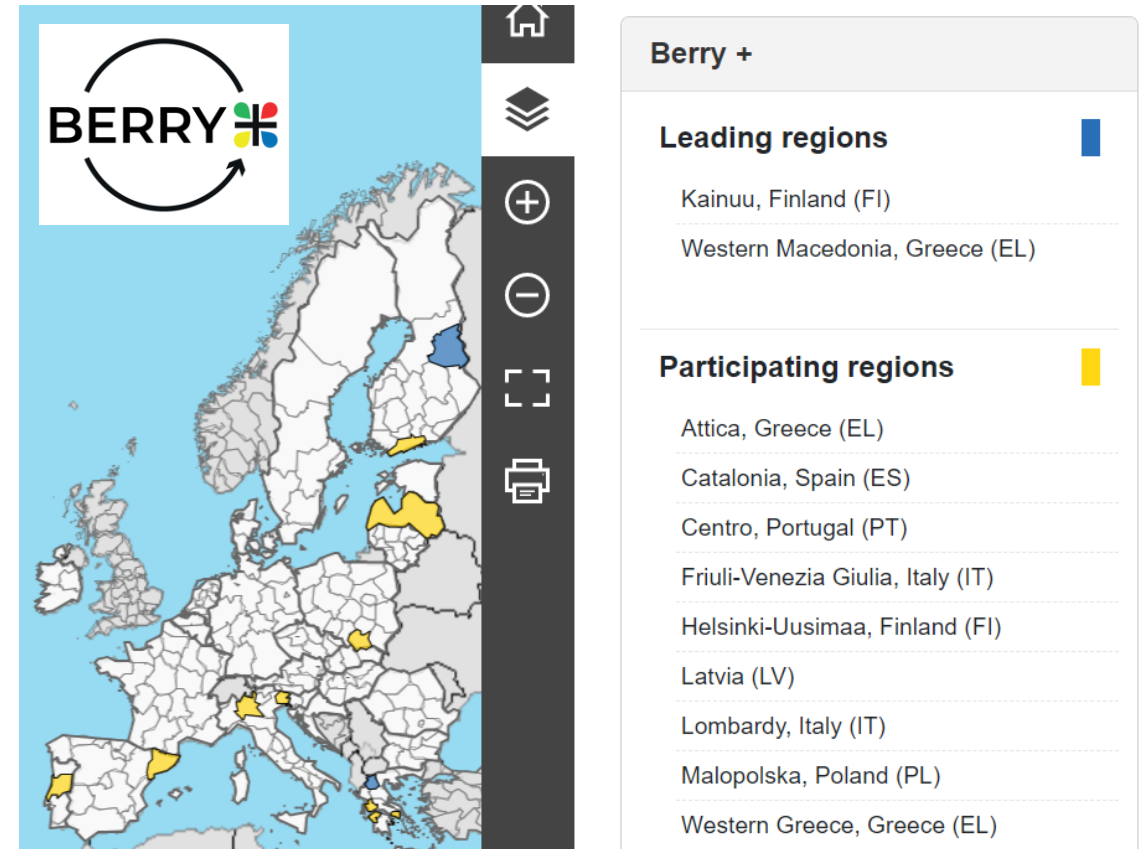


Kajaanin Yliopistokeskus
Kajaani University Consortium

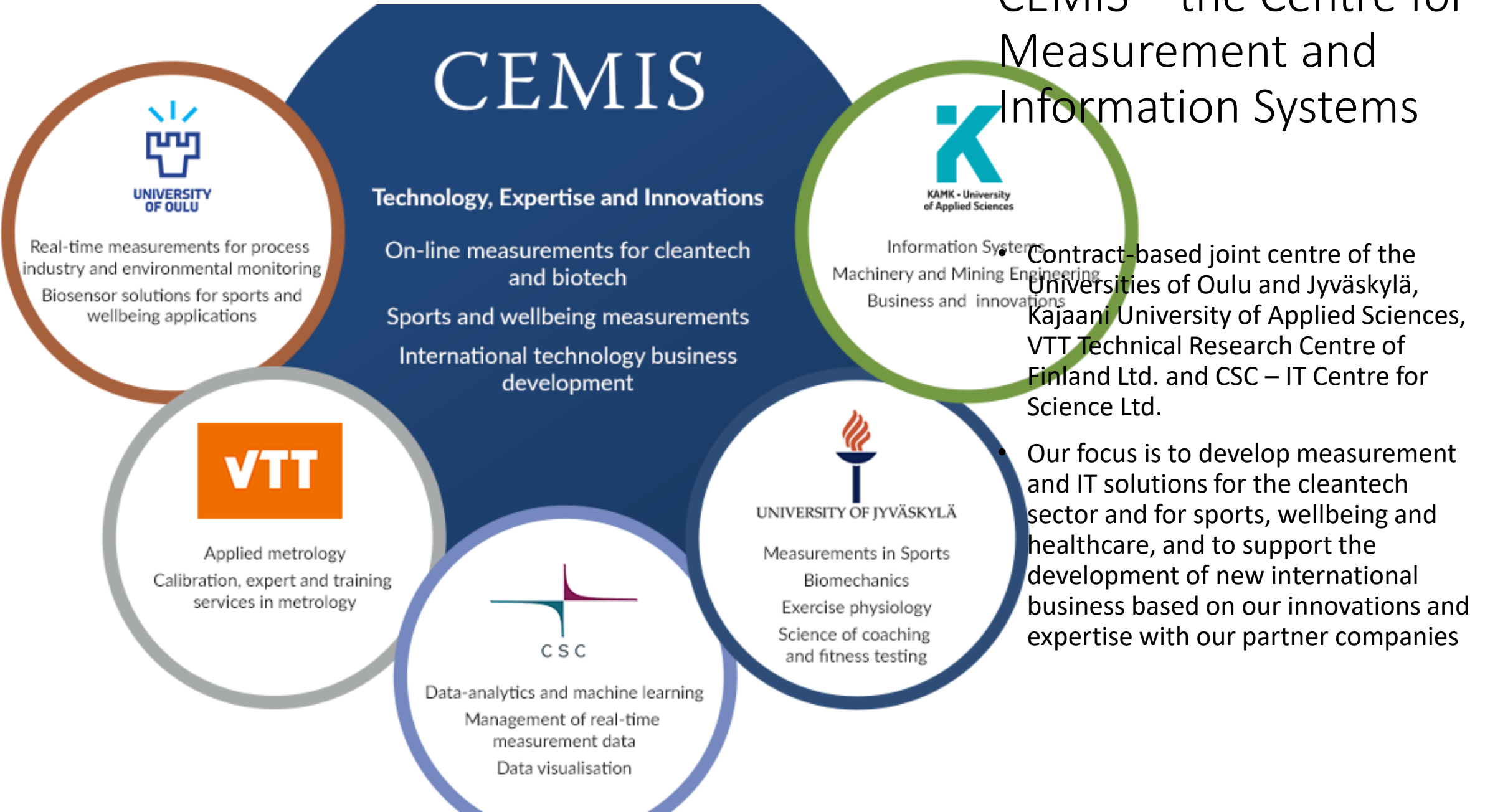


BERRY+

- BERRY+ is an S3 industrial modernization partnership
- Establish an interregional cluster among the partner regions, emphasizing excellence-based processing of renewable natural resources & their side streams for high added value applications and ensuring access to market, through value chain collaborations
- Kainuu is the one of the leading regions



CEMIS – the Centre for Measurement and Information Systems



The Kajaani University Consortium

- KUC is a networked academic community focused on scientific research, university teaching and community relations.
- The objective is to intensify cooperation between the universities and to develop collaboration with regional universities of applied sciences, business and commerce.
- The Kajaani University Consortium consists of four networked universities (Eastern Finland, Lapland, Jyväskylä and Oulu) that have units in Kajaani and Sotkamo. The Consortium is coordinated by University of Oulu.



Measurement technology unit MITY

- The University of Oulu's Unit of Measurement Technology (MITY) is a unit focused on measurement technology that operates in following areas of application: bioeconomy, ICT, cleantech and health and wellness.
- Approximately 40 highly qualified researchers and measurement engineering and analytics professionals operate in the Measurement Technology Unit.
- Cleantech research aims to develop new applications of measurement technology for real-time environmental monitoring, extractive industries, forestry, and the challenges and opportunities generated by renewable bioeconomy.



AWE - Arctic Water Excellence

MITY focuses developing new measurement technology

- Real time sulfate measurements
- New innovations to rapid bacteria detection for industrial processes
- New heavy metal measurements to industrial applications





Kainuu

Four seasons – four faces

Nature

State-of-the-art technology & ICT

Wood industry and mining

Well-being

Table III: Water solution to the world – Clusters in Arctic Water Excellence collaboration in East and North Finland

Lasse Moilanen

CEO BioSO4 Oy and CEO MINING
FINLAND





Mining Finland

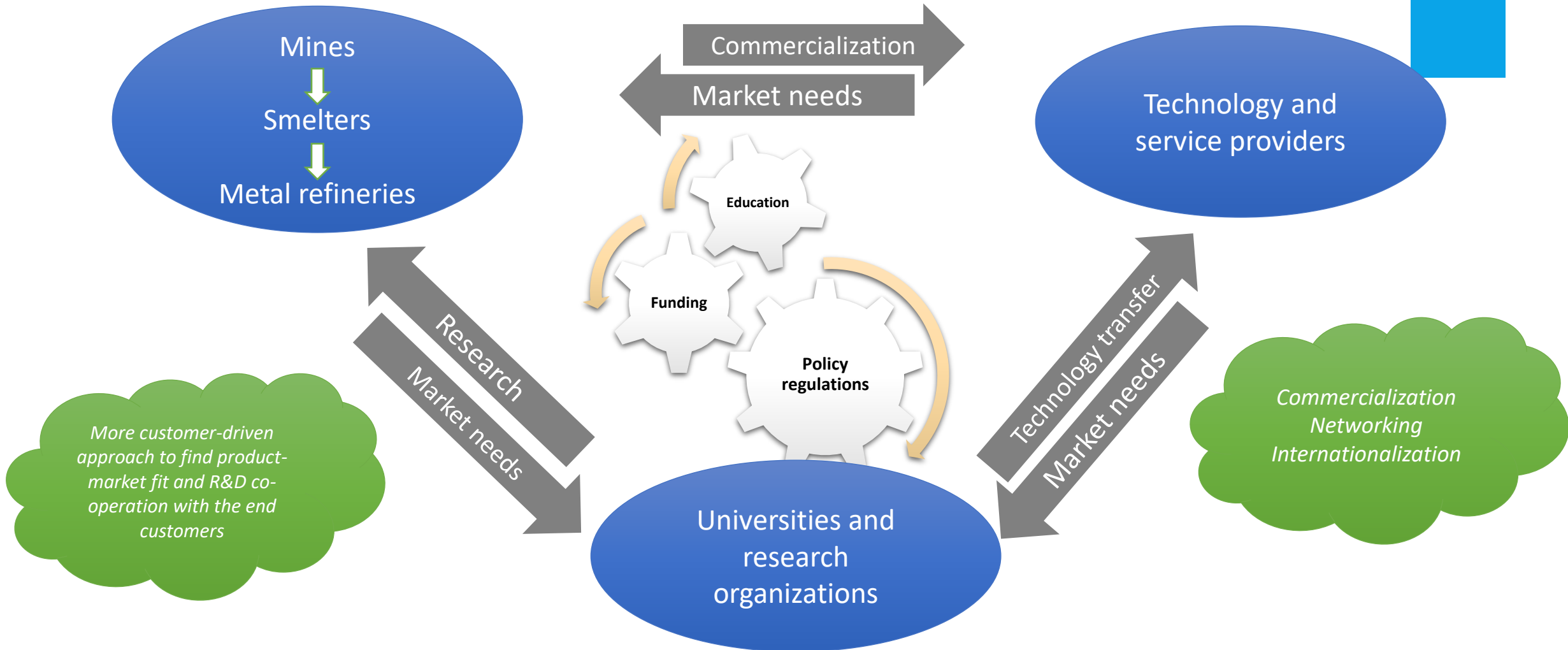


Who we are?

- Mining Finland is a non-profit and membership fee funded association
- Established first as part of Green Mining programme in 2015, registered association in 2019
- Promotes export of Finnish mining technology and services
- Promotes foreign investments to the Finnish mining cluster
- Facilitates R&D and education collaboration among mining sector actors working in Finland or in cooperation with Finnish companies abroad



Finland has a strong mining ecosystem





Why Finland

#1 Finland, Europe's most **digitally advanced** nation
(European Commission 2019)

#1 Most attractive country in the EU for **global mining investments**, #13 in the whole world
(Fraser institute's Annual Survey of Mining Companies 2021)

#3 in Europe in **Battery Supply Chain Ranking** *(BloombergNEF)*

#20 among 190 economies in the **ease of doing business**
(Trading Economics 2019)

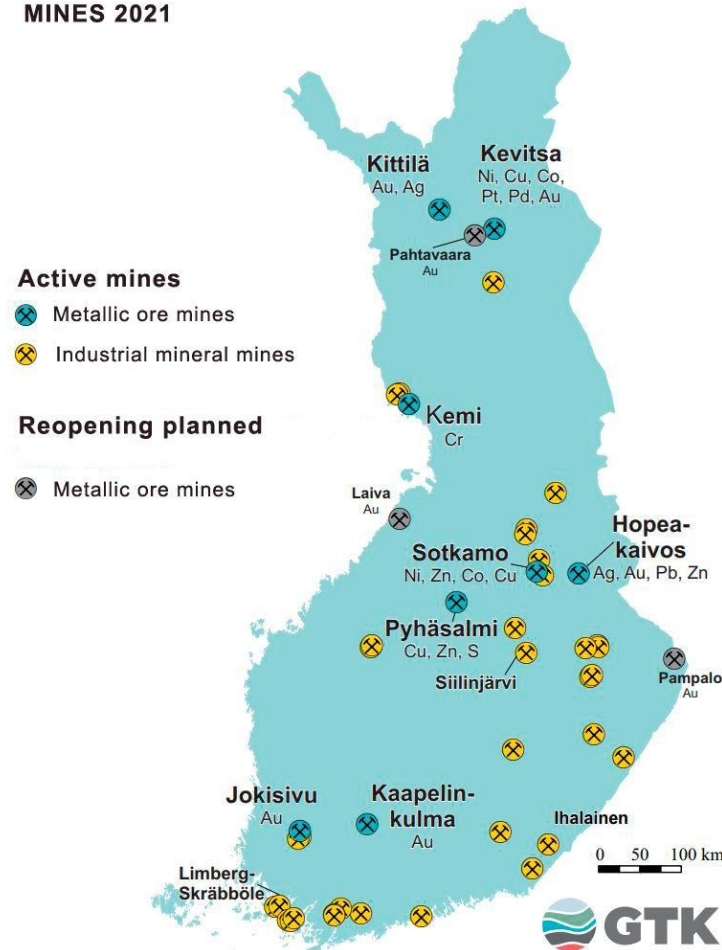




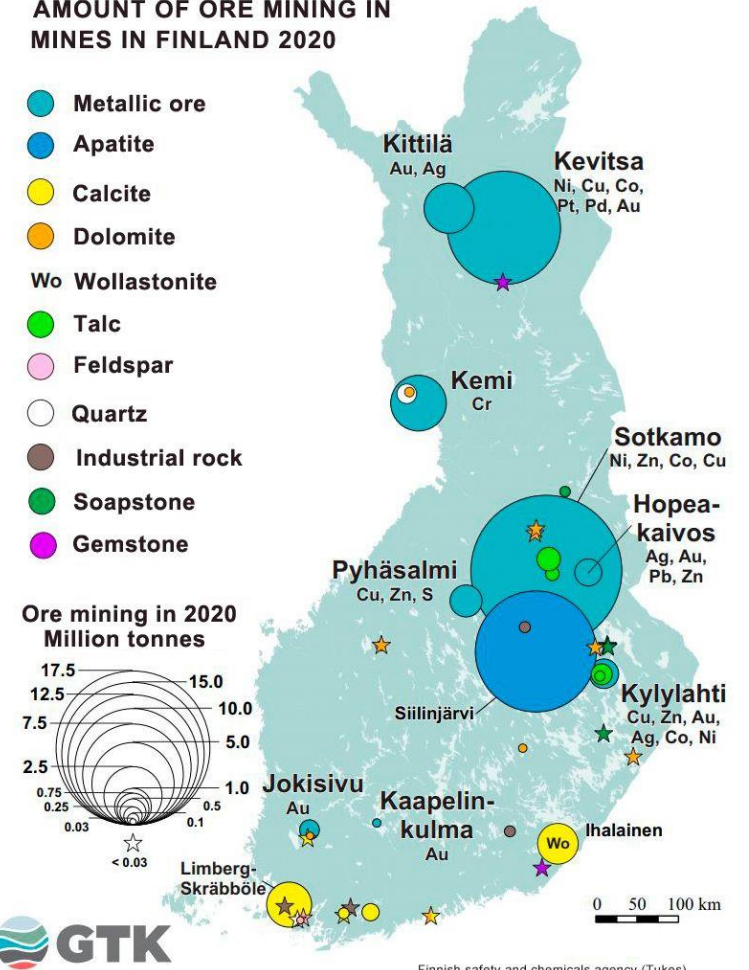
Mines and exploration projects

- In 2021 there were 10 metallic and 34 industrial mineral mines in Finland
- Same year 50 mineral exploration companies drilled altogether 280 kilometres (growth 28 % from previous year) (Tukes)

MINES 2021



AMOUNT OF ORE MINING IN MINES IN FINLAND 2020



Finnish safety and chemicals agency (Tukes)
National Land Survey of Finland Topographic Database NLS, 2020

Battery minerals

- Strong development in the battery value chain
 - Raw materials (lithium, cobalt, nickel)
 - Production of chemicals
 - Processed materials, such as precursors, cathode active materials, cathodes
 - Battery cells and packs
- Recycling and reuse of batteries

www.terrafame.com/news





Environmental, Social and Governance policies

- Good environmental, social and governance policies are essential for exploration and mining companies operating in Finland
- Maintaining the social licence to operate (SLO)
 - The SLO cannot be applied from any authority, but it is gained from the local community companies operate in
- Standard of Sustainable Exploration and the Finnish Mining Standard, agreed by the Finnish Network for Sustainable Mining (www.kaivosvastuu.fi)

Mining technology and service providers



Mining Finland member companies: <https://miningfinland.com/member-companies>

Membership fee

€ 7000

Large Organisations

Large companies/organizations with more than 250 employees and an annual turnover higher than 50 million euros.

€ 5000

Universities and other education organizations

€ 2500

Support membership

€ 1000

Registered associations

€ 500

Other associations and legal entities

€ 2500

Small size organisations

Small size companies/organizations between 10 and 50 employees and an annual turnover between 1 and 10 million euros.

€ 1000

Micro organisations

Micro companies/organizations with less than 10 employees and an annual turnover smaller than 1 million euros.

Membership fee is an annual fee. All fees VAT 0 %.



Planned events in 2022-23

- FinnMateria 25.-27.10., Jyväskylä, FI
- Mining Indaba, 6.-9.2.23, Cape Town, SA
- PDAC, 4.-8.3.23, Toronto, CA
- Expomin, 24.-27.4.23, Santiago, Chile
- World Circular Economy Forum, 30.-31.5. Helsinki
- FEM Conference, 31.10.-2.11.23, Levi, FI



14th FENNOSCANDIAN
EXPLORATION AND MINING

31 October - 2 November 2023 • Levi • Lapland • Finland
Event Centre Levi Summit • femconference.fi

FINNMATERIA





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**Mining
Finland**

REFLECTIONS AND CONCLUSIONS

- **REFLECTIONS: Arianna Dellaca'**, Project Advisor, EISMEA
- **CONCLUDING REMARKS: Antonio Novo**, President of the European Cluster Alliance

