

FINNISH MINERALS GROUP

Adding value of raw materials with sustainability labeling covering the entire value chain

September 3, 2019

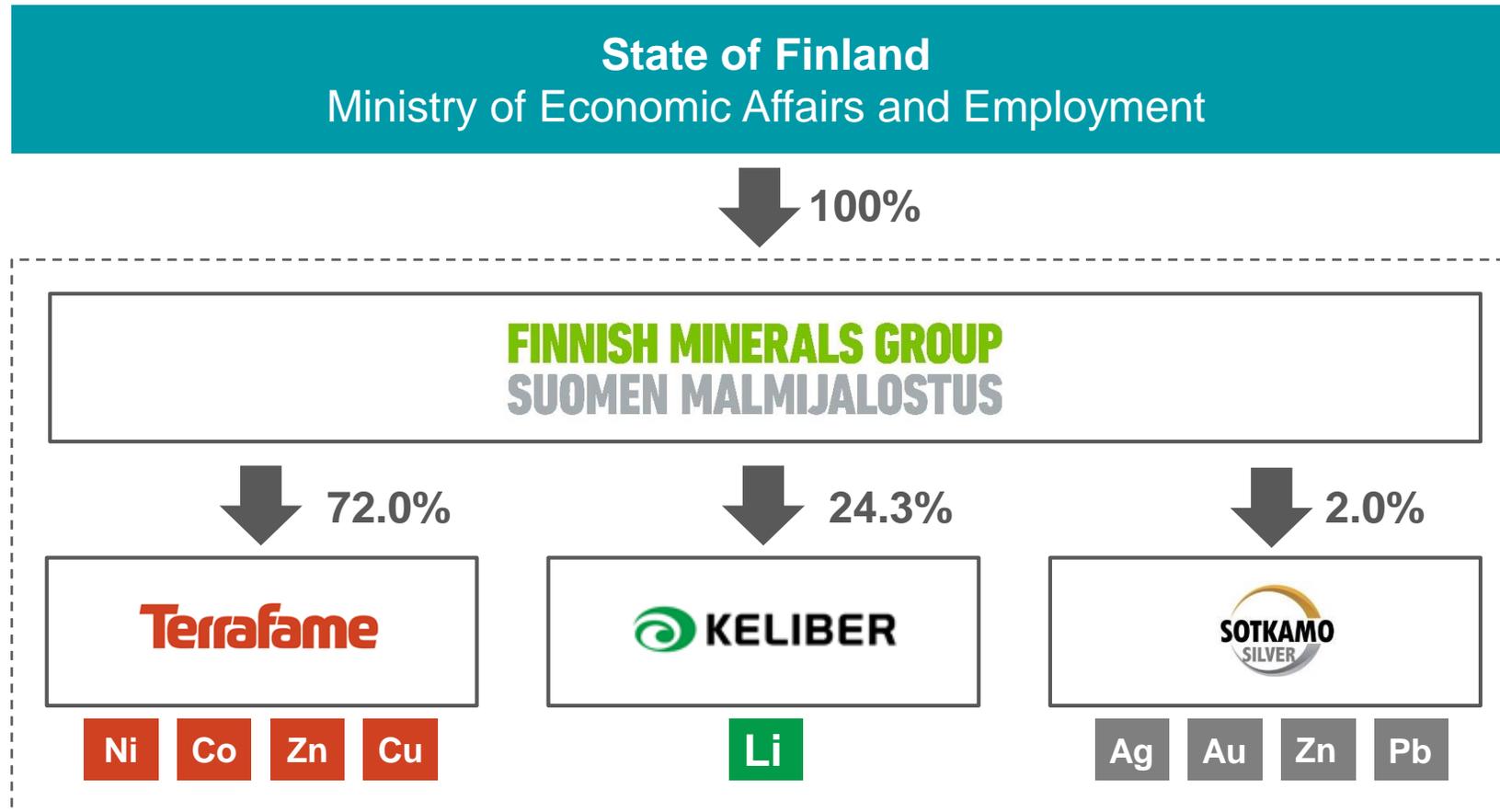
Jani Kiuru, Chief Research Officer



Outline

- + FMG in brief
- + E-mobility → Expectations vs reality?
- + How is this possible?
- + How does FMG fit in

+ Finnish Minerals Group is a special-purpose development company owned by the State of Finland



+ FMG's vision is to create an integrated battery value chain in Finland



Mission



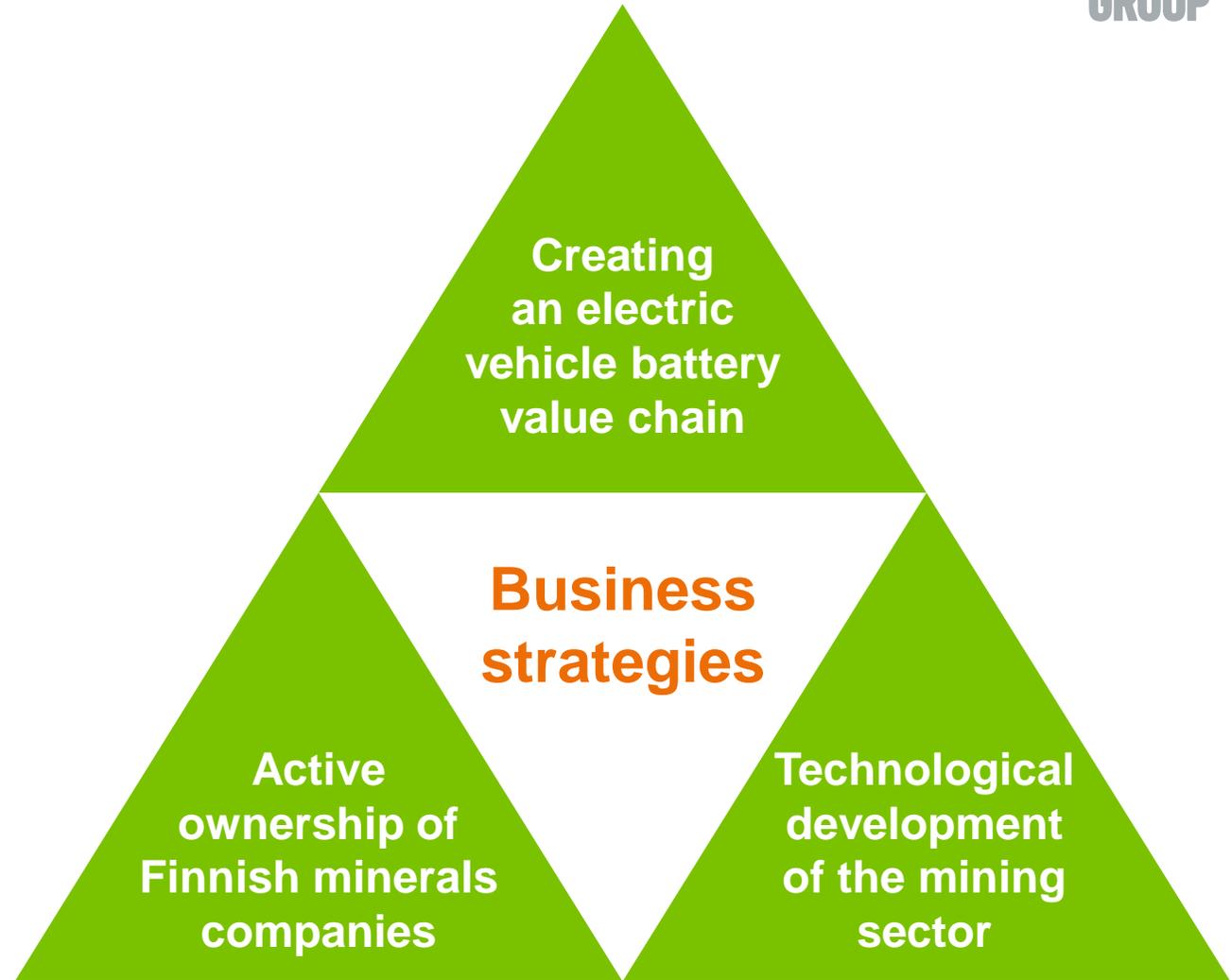
Responsibly maximizing the value of Finnish minerals

.....

Vision



We will bring active and competent capital to a technologically advanced mining industry. We will create an integrated electric vehicle battery value chain in Finland.





Problem 1: What is the real effect on environment?

+ E-mobility – Expectations vs reality?



<https://www.sustainability-times.com/sustainable-business/electric-vehicles-will-need-a-confidence-boost/>



<https://www.transportenvironment.org/press/electric-cars-emit-less-co2-over-their-lifetime-diesels-even-when-powered-dirtiest-electricity>

E-mobility, how **green** is it really?

WORLD NEWS JUNE 27, 2019 / 6:19 PM / 2 MONTHS AGO

Accident at Glencore mine kills at least 41 in Congo

Stanis Bujakera, Aaron Ross

4 MIN READ



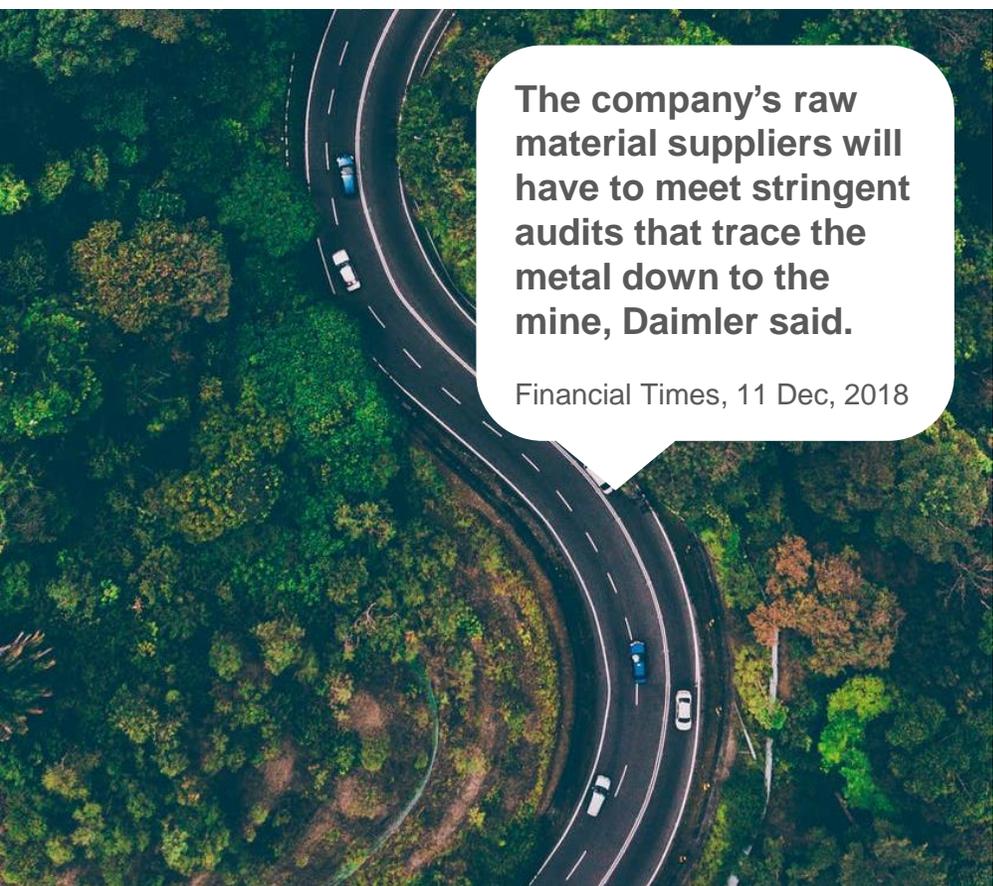
KINSHASA (Reuters) - At least 41 artisanal miners were killed on Thursday when part of a copper and cobalt mine owned by Glencore collapsed in southeast Congo, the provincial governor said.

Artisanal mining on the edge of commercial mine sites is a big problem across Africa. The rudimentary, outdated and unregulated practices miners employ can often compromise safety: mine disasters in Congo alone cost the lives of dozens a year.

Thousands of illegal miners operate in southern Congo, which produces more than half of the world's cobalt, a key component in electric car batteries.

+Conflicting realities recognized by the players in the EV market

Carbon neutrality and traceability demanded by OEMs...



The company's raw material suppliers will have to meet stringent audits that trace the metal down to the mine, Daimler said.

Financial Times, 11 Dec, 2018

An EU research group is creating a certification method for raw materials, to be completed by 2021. The project is part of a push to sustainably mine the metals needed for Europe's clean energy transition. But critics say certification is not the answer.

<https://www.euractiv.com/section/batteries/news/the-eu-is-creating-a-sustainability-label-for-raw-materials/>

"When we say that we are delivering a carbon-neutral vehicle, this naturally includes battery cell production."

Thomas Ulbrich, member of the VW Board of Management,
Süddeutsche Zeitung 28 Dec, 2018

DAIMLER

Press Information

August 2, 2018

Daimler intensifies activities for a sustainable raw material supply chain and joins further initiatives

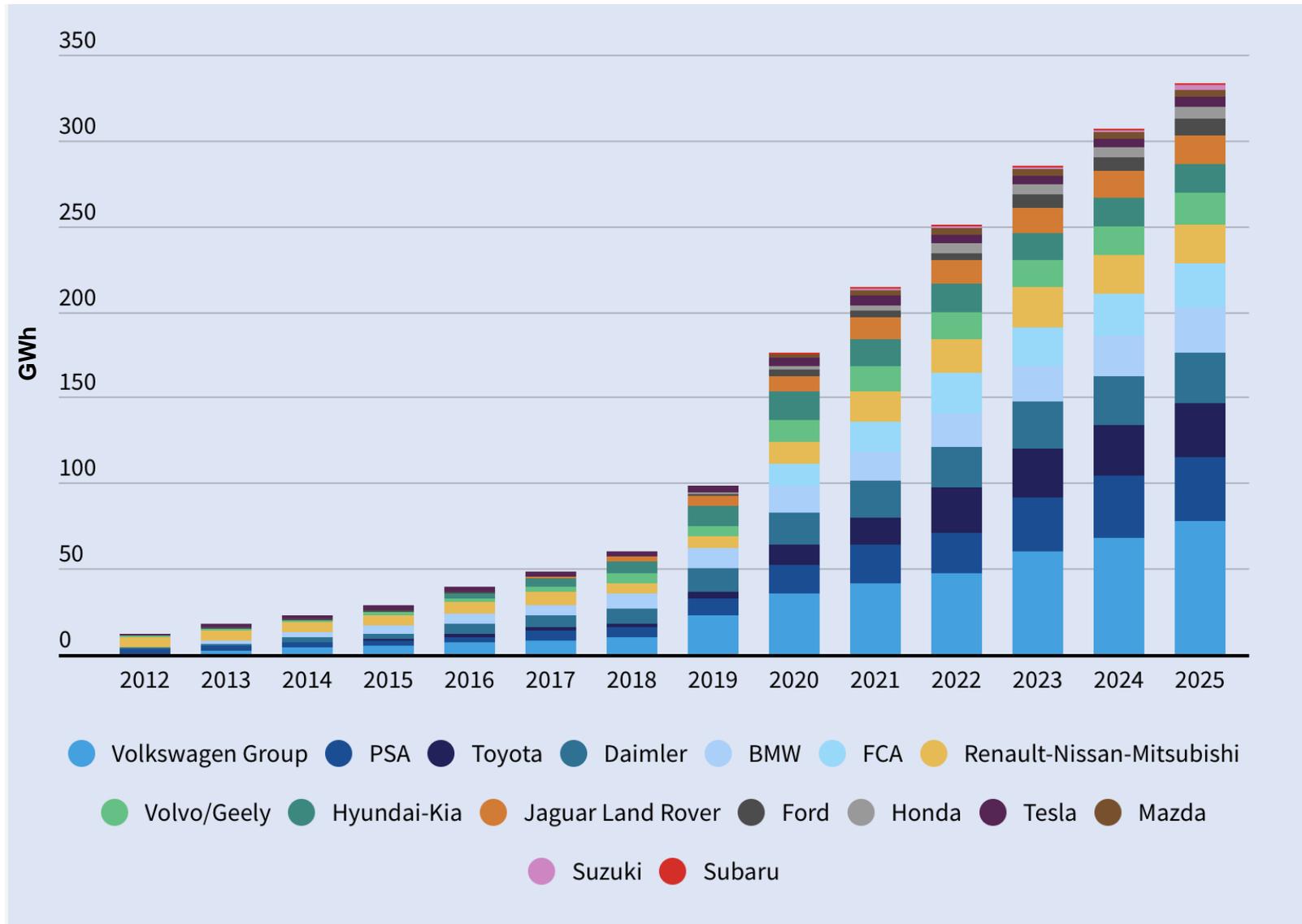
- Daimler increases transparency in the raw material supply chain by joining the Responsible Cobalt Initiative, the Responsible Mineral Initiative, the Responsible Steel Initiative and the Aluminium Stewardship Initiative.
- Renata Jungo Brüngger, Member of the Board of Management of Daimler AG for Integrity and Legal Affairs: "Joining initiatives is an important addition to our own activities such as the Human Rights Respect System."
- Sabine Angermann, Head of Purchasing and Supplier Quality for Raw Materials and Strategy at Mercedes-Benz Cars: "We are aware of our responsibility in the procurement of raw materials and are pooling our strengths in these initiatives through cooperation with other business enterprises."

Stuttgart – As part of the offensive for a sustainable raw material supply chain, Daimler AG joins forces with associations, organizations and competitors in a number of initiatives. The common goals are clear: certifiable standards, safe origins and transparency in the procurement of high-risk raw materials and a tangible improvement in the working and living conditions of people locally. By joining, Daimler AG is expanding its broad commitment to initiatives and is actively promoting greater transparency in global raw material supply chains. The company is thus taking another important step towards shaping sustainable mobility.



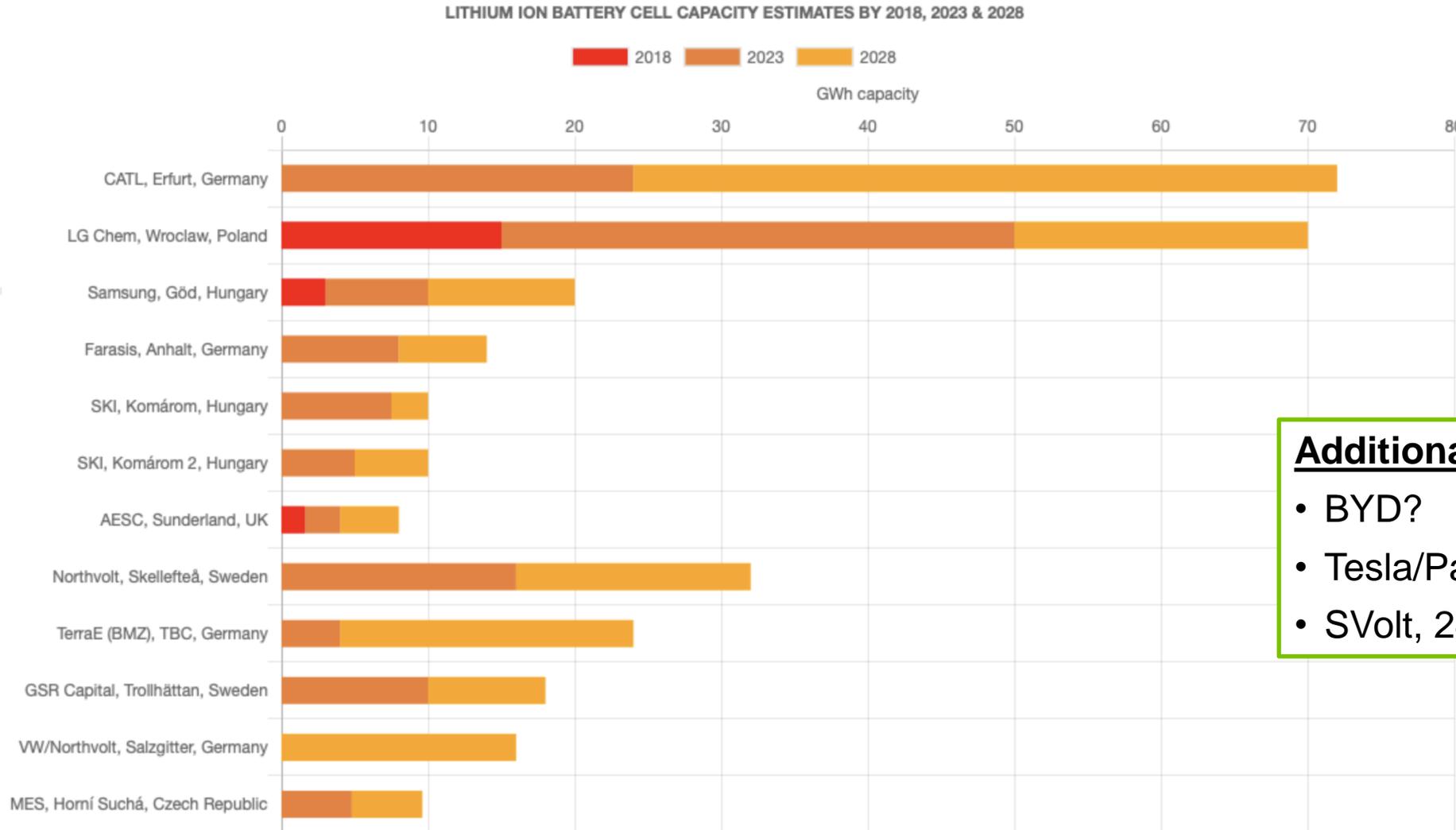
Problem 2: Where do we get the material?

+ Number of xEV models in Europe to explode



+ European cell capacity to follow in line...

Total Capacity Pipeline by 2028: 303.6 GWh

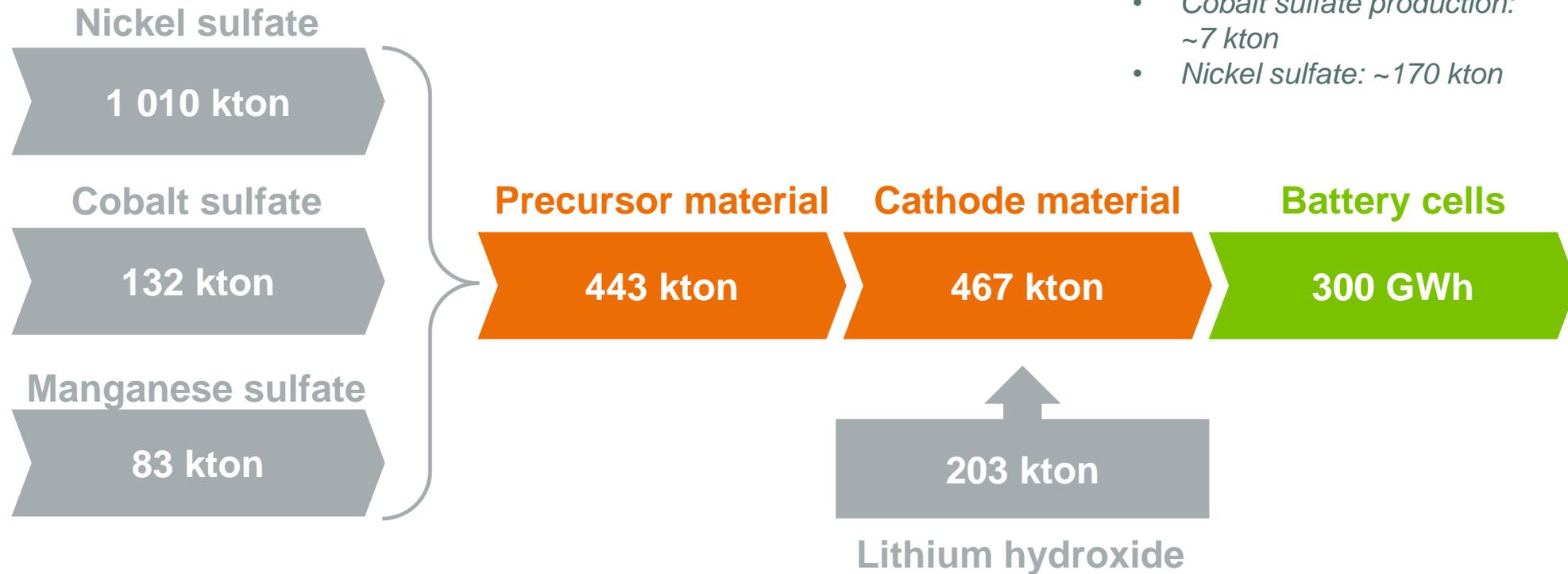


Additionally:

- BYD?
- Tesla/Panasonic?
- SVolt, 24 GWh?

+ What this means from the material side...

→ 450 000 tons of cathode material



For reference:

Terrafame future production:

- Cobalt sulfate production: ~7 kton
- Nickel sulfate: ~170 kton



The sides of the equations do not match



British climate targets alone will require the current annual global production of cobalt to double by 2050, in order to satisfy electric vehicle growth demands. A large increase in other raw materials will also be needed, according to UK scientists.

<https://www.euractiv.com/section/batteries/news/uk-scientists-warn-raw-material-output-must-surge-to-hit-ev-growth/>



EU's Sefcovic: Real risk that 'raw materials become the new oil'

Europeans have to be “very vigilant” that today's dependency on imported oil and gas is not replaced by dependency on lithium, cobalt, copper and other raw materials that industries need for the green transition, Maroš Šefčovič told EURACTIV.

<https://www.euractiv.com/section/circular-economy/interview/eus-sefcovic-raw-materials-could-become-the-new-oil/>

Is this possible? Are the costs too high?



How does FMG fit in?



Our aim is to gain competitive advantage from sustainable production

- + Tool for this would be a system for traceability adopted in the battery materials industry to ensure which materials are responsibly mined, processed and recycled
- + Possible business cases
 - Market/Demand driven
 - Regulation driven
- + Hypothesis:

Europe is an attractive business area for ethical sourcing of raw materials using clean energy systems. Introducing a traceability mechanism for sustainably produced batteries enhances attractiveness of and gives credit to batteries manufactured in Europe.



Traceability research and industrial deployment

STATE-OF-THE-ART

- + The main driver for the initiatives and deployment are **social and environmental** values to enhance sustainability and responsibility
- + No real focus on the **price premium**, although ensuring responsible sourcing is increasingly seen as a strategic business issue
- + The awareness of the need for traceability for metals and minerals is increasing within the EU Commission and Member States, but **no real push** (e.g. no request for requesting due diligence when financial support is given to companies)

BENEFITS

- + Possibility to **claim the sustainability of products** and answer customer demand for responsibly produced goods
- + **Increased resource efficiency** along the supply chain (e.g. advantages in recycling part of the value chain)
- + The demand for sustainable and responsible goods is obvious, even if the **willingness to pay for it is still a bit unclear**

CHALLENGES

- + Lack of/Incoherent regulation, standardization and certification
- + Monitoring of mine sites, engaging all parties in supply chain and reliable information transfer/processing
- + Real-time identification and marking of ore is still missing

Traceability is required, but industry practices and business case are still non-consolidated



Next

- + Traceability co-creation initiative by Business Finland
 - + International initiatives and projects
 - + FMG's Project Portfolio for IPCEI
- Target to bring relevant European companies together

Traceability - for sustainable metals and minerals	SveMin
Certification of raw materials (CERA)	EIT RawMaterials
Responsible Sourcing Blockchain Network	IBM
Responsible Minerals Initiative (RMI)	Responsible Business Alliance (RBA)
Responsible Cobalt Initiative (RCI)	China Chamber of Commerce (CCCCMC)
Initiative for Responsible Mining Assurance (IRMA)	IRMA Steering Committee
European Partnership for Responsible Minerals (EPRM)	EPRM Board
Towards Sustainable Mining Canada	Mining Association of Canada
Forcefield	London Metal Exchange

FINNISH MINERALS GROUP
SUOMEN MALMIJALOSTUS