



BUSINESS FINLAND

Batteries from Finland

February 15.2.2019

An aerial night view of a city, likely Singapore, with a complex network of glowing white lines and nodes overlaid on the scene, symbolizing a global or digital network. The city lights are visible in the background, and the network lines form a web-like structure across the sky and buildings.

BUSINESS FINLAND

Combating the Climate Change

ENERGY STORAGE A MAJOR GROWTH AREA – BATTERIES ONE SOLUTION

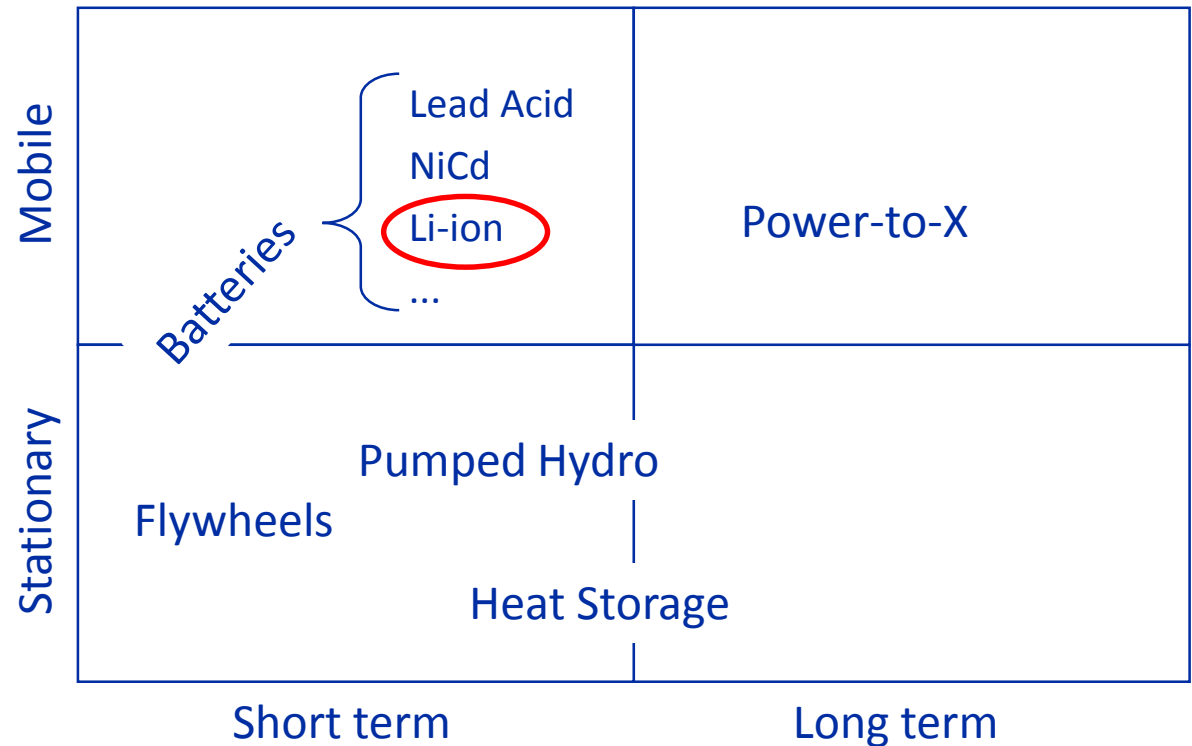
Drivers for energy storage growth

- Integration of renewable generation
- Electrification of transport
- Grid resiliency & security of supply
- Digitalization & cost
- Emerging business models

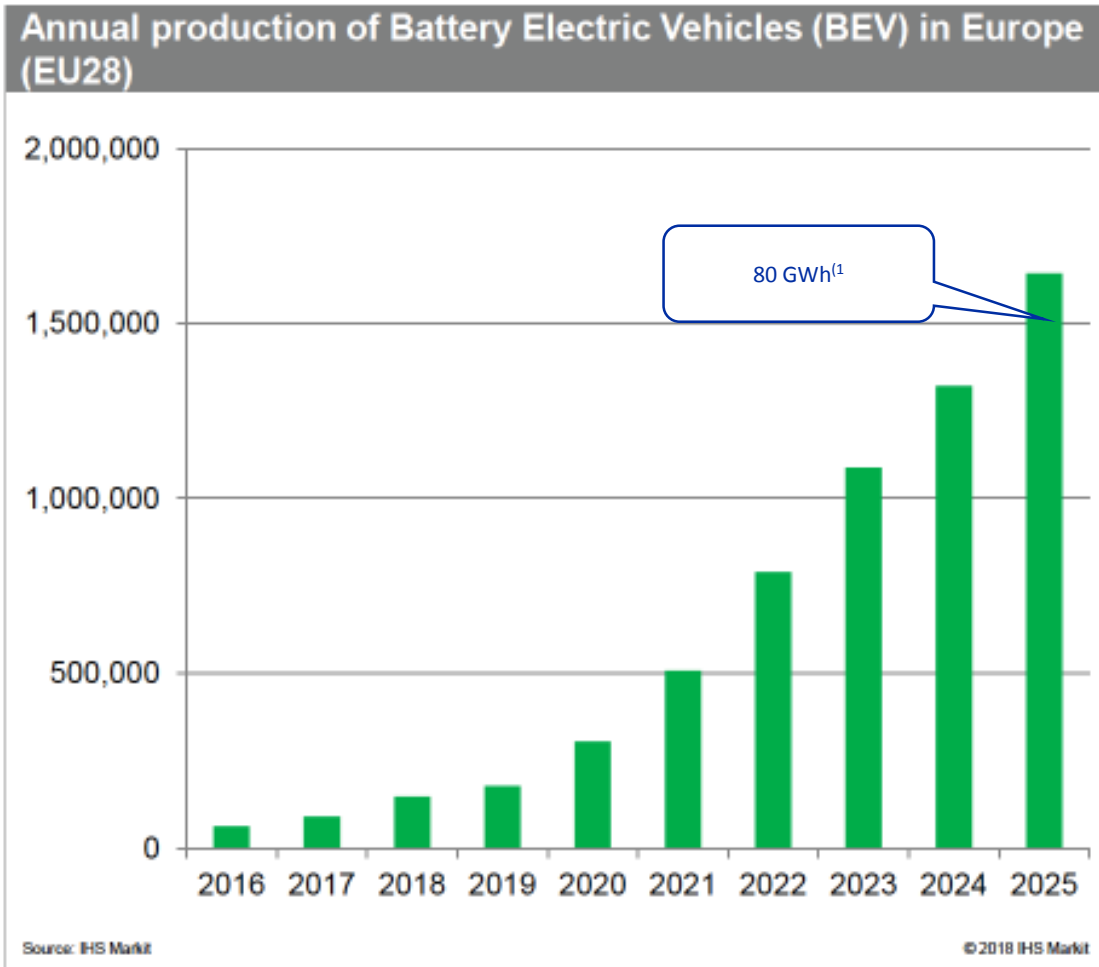


Energy & Climate Policies

Illustrative examples of storage technologies

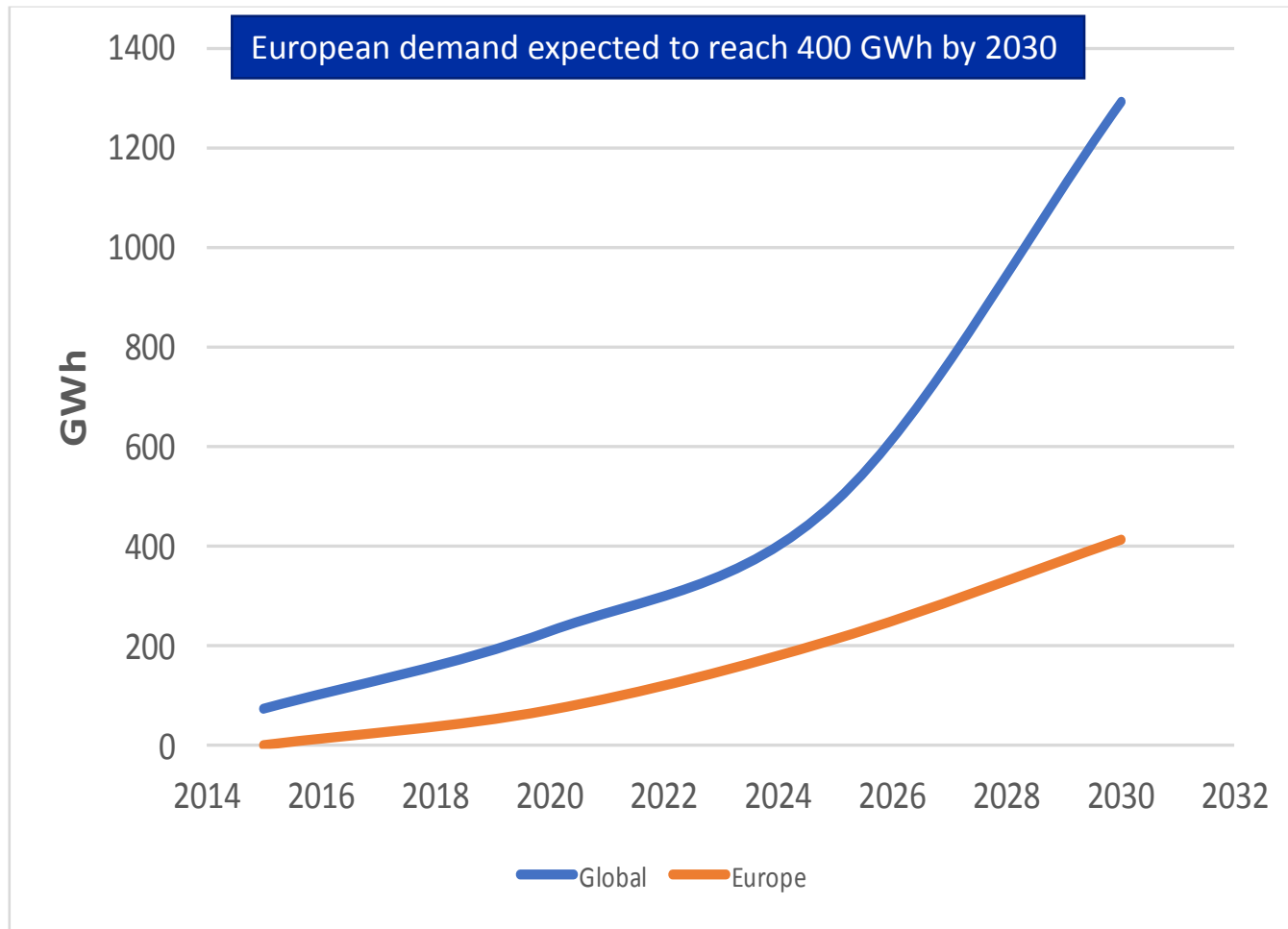


EUROPEAN ELECTRICAL VEHICLE MARKET



Source: IHS Markit, European Battery Storage 2018, Cologne Feb 1 2018

¹⁾ Estimating 50 kWh battery per BEV

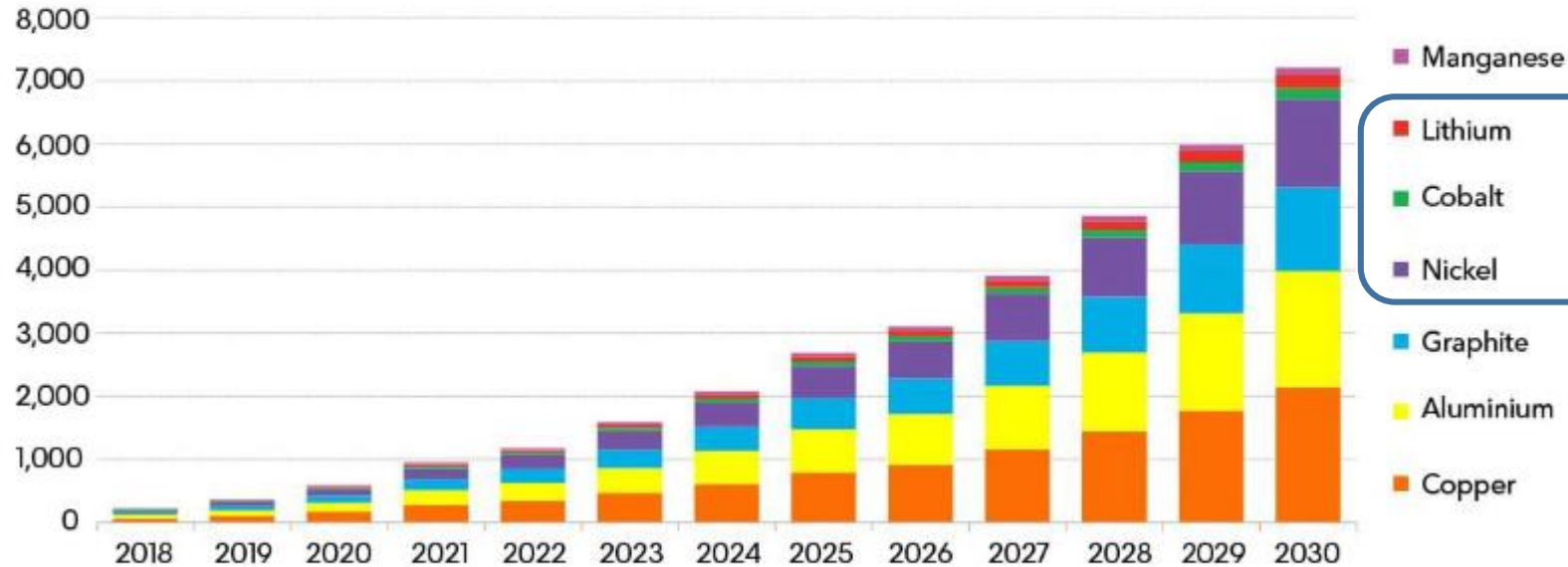


Sources incl: Bloomberg New Energy Finance, Avicenne, Kipost

- May 2018, **VW orders for \$48 billion worth of batteries.**
- June 2018, **BMW order several billion € worth of batteries**

METALS AND MATERIALS DEMAND FROM LITHIUM-ION BATTERY PACKS IN PASSENGER EVS

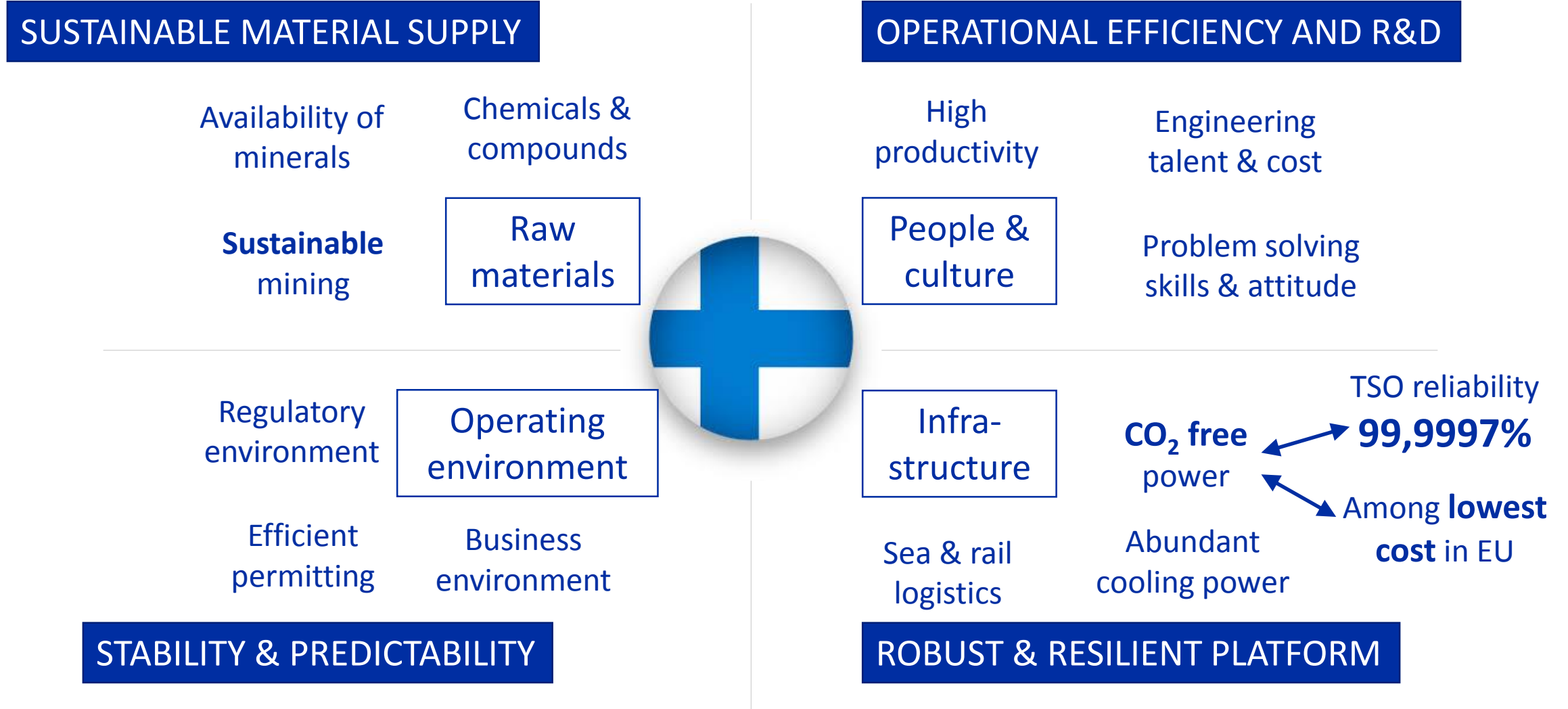
Thousand metric tons



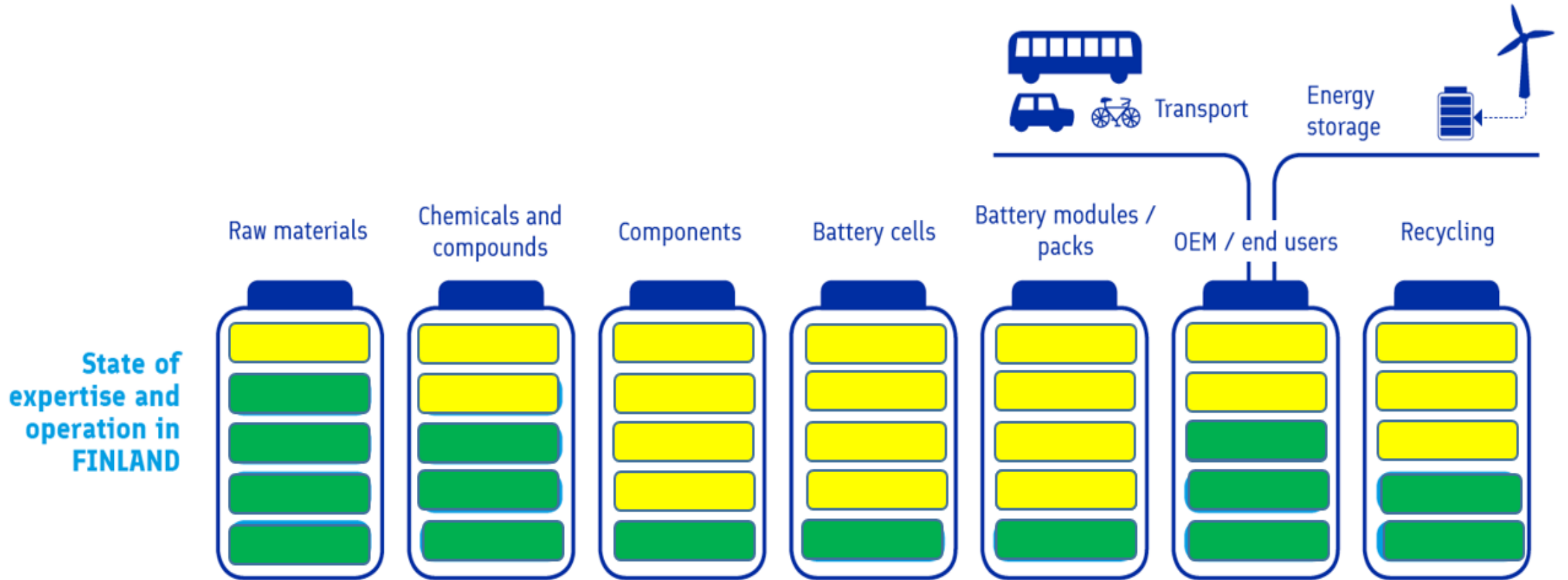
Finland, only country in Europe having all key minerals

Source: *Electric Vehicle Outlook 2018, Bloomberg New Energy Finance*. Note: Copper includes copper current collectors and pack wiring. Aluminium includes aluminium current collectors, cell and pack materials and aluminium in cathode active materials.

FINLAND OFFERS AN EXCELLENT PLATFORM FOR BATTERY INDUSTRY



SUMMARY - BATTERY VALUE CHAIN IN FINLAND



BATTERIES FROM FINLAND – MAIN FOCUS

Sub-segment	Materials	Cells and modules	Applications	Recycling
Objective	<p>Grow added value of the production in processing minerals</p>	<p>Attract leading Li-ion battery manufacturers to invest in Finland.</p>	<p>Identify and develop innovation of the Finnish material handling, transportation and energy sectors and enable international growth.</p>	<p>Support developing new business concepts and recycling solutions in Finland.</p>
Means	<p>Support collaboration between companies in mining and chemical industries to improve competitiveness and efficiency.</p>	<ol style="list-style-type: none"> 1. Describe well-defined business opportunities 2. Communicate actively in EU forums and directly to potential companies 	<p>Support developing expertise and solutions of applicable companies and their access to the EU networks and global markets</p>	<p>Support mutual RDI activities between companies and research facilities and strong networking in EU programs and international companies.</p>

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BATTERIES FROM FINLAND – STATUS

INVESTIGATION

- The objective is to **prepare for the cluster search**
- **Overview** of the current and pending ecosystem and cluster projects
- Defining the **need** for new platforms
- Activating **collaboration – domestic and Nordic level**

CLUSTER SEARCH

- Activate **networking** between companies and existing ecosystem and cluster projects
- Realize partially depending on detecting faults and needs in current action (**based on investigation**), and interest from companies
- **Collaboration - Nordic and EU** next steps

BUILDING A BILLION-CLASS ECOSYSTEM

- The objective is to be a part of the **billion-class** European ecosystem with a global scope
- Growth engine funding, international investments, RDI investments, investments from companies

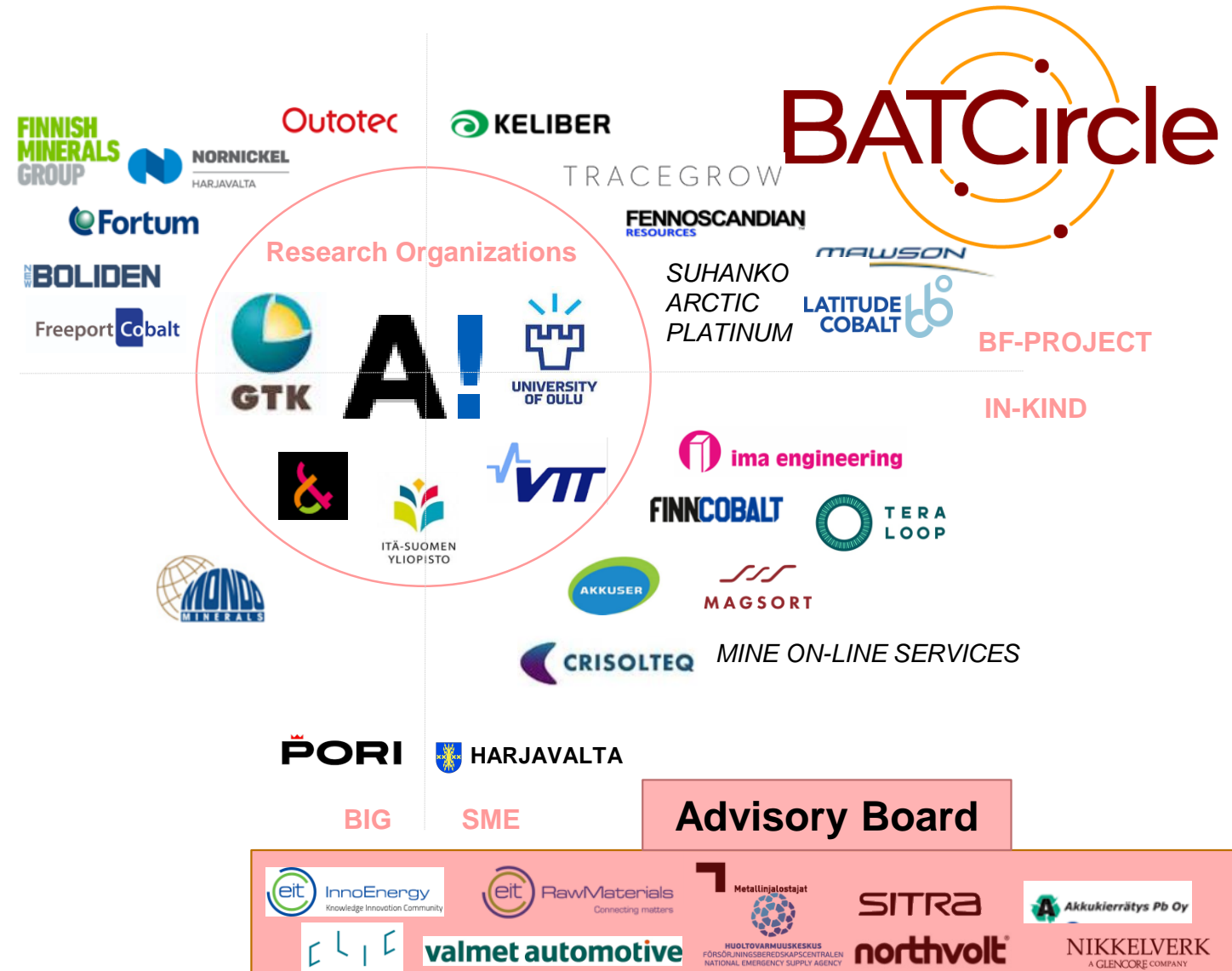
BATCIRCLE – CIRCULAR ECOSYSTEM OF BATTERY METALS (2019-2020)

Joint industry-academia project

- 8 large companies
- 14 SMEs
- 2 cities
- 4 universities
- 2 Research centers (GTK,VTT)
- 21 M€ budget

Key topics

- Sustainable primary resources
- Value addition in metal refining
- Battery recycling
- Precursors and active materials
- Circular business ecosystems



EU COLLABORATION



EU Battery Alliance

Company-led

Europe can capture a new market worth 250B€/year in 2025

10-20 gigafactories by year 2025

SET Plan Battery WG

France in charge

Finland joining in

Areas of focus:

- 1) Material/Chemistry/Design + Recycling
- 2) Manufacturing
- 3) Application and Integration



LETS WORK TOGETHER

- Combat the Climate Change
- International Collaboration Needed
- Further Research & Development is Essential –
 - Battery Technologies / Storage
 - Recycling
 - Smart Grids
 - Business Models
- We can do it !

Thank You!

