

Agenda

- **Introduction**

- Robert Andrén, Director General, Swedish Energy Agency
- Jan Larsson, CEO Business Sweden
- Nina Kopola, CEO Business Finland
- Håkon Haugli, CEO Innovation Norway

- **Presentation of the report**

- **Next step and closing**

The Nordic Battery Value Chain

- Step 2: The feasibility of a joint Nordic value proposition to attract investments and partnerships

This report is a second step in the overall ambition to evaluate a joint Nordic approach to strengthen the emerging battery industry in the Nordic region

Background	<ul style="list-style-type: none"> ● Collaboration since December 2020: the Swedish Energy Agency and Business Sweden ● Goal: support the development of a sustainable, circular, profitable and competitive Nordic battery industry ● Focus: the Nordic countries who have set, or with ambitions to set, national strategies for a battery industry ● Report: this is the second report launched during 2021
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Objective of the report	<ul style="list-style-type: none"> ● To understand the gaps that need to be filled in order to build up a competitive battery industry in the Nordics ● To understand the feasibility of a joint Nordic value proposition for attracting foreign direct investments and partnerships
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Acknowledgements

**BUSINESS
FINLAND**

**Innovasjon
Norge**

Interviewees from Sweden, Finland and Norway*

VATTENFALL



A!
Aalto University

**RI
SE**

MORROW

Työ- ja elinkeinoministeriö
Arbets- och näringsministeriet

eit InnoEnergy

FREYR
Renewable energy storage

Hydro

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northvolt

EYDE CLUSTER
NCE EYDE
Norwegian Center of Expertise
Sustainable Process Industry

hydrovolt

NIKKELVERK
A GLENCORE COMPANY

HITACHI

**corvus
energy**

**STENA
RECYCLING**

fortum

ABB

CARGOTEC

BIL Sweden



Battery Norway

BatteriRetur

Graphmatech

Metso:Outotec

BEYONDER

dafo

*Excluding additional interviewees wishing to stay confidential

There is a great potential for the Nordic countries to develop a strong position in the rising European battery market – but the window of opportunity is narrowing

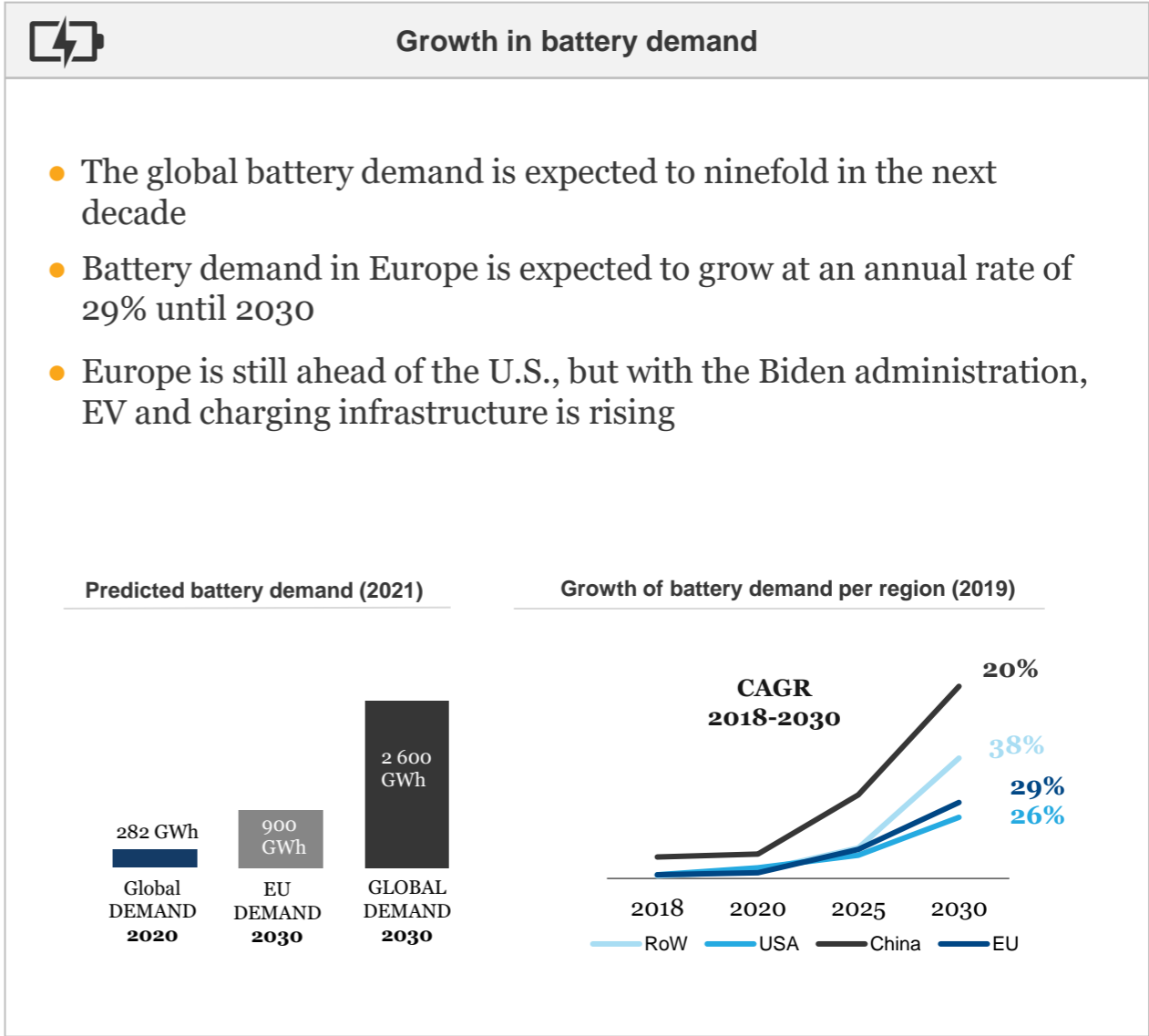
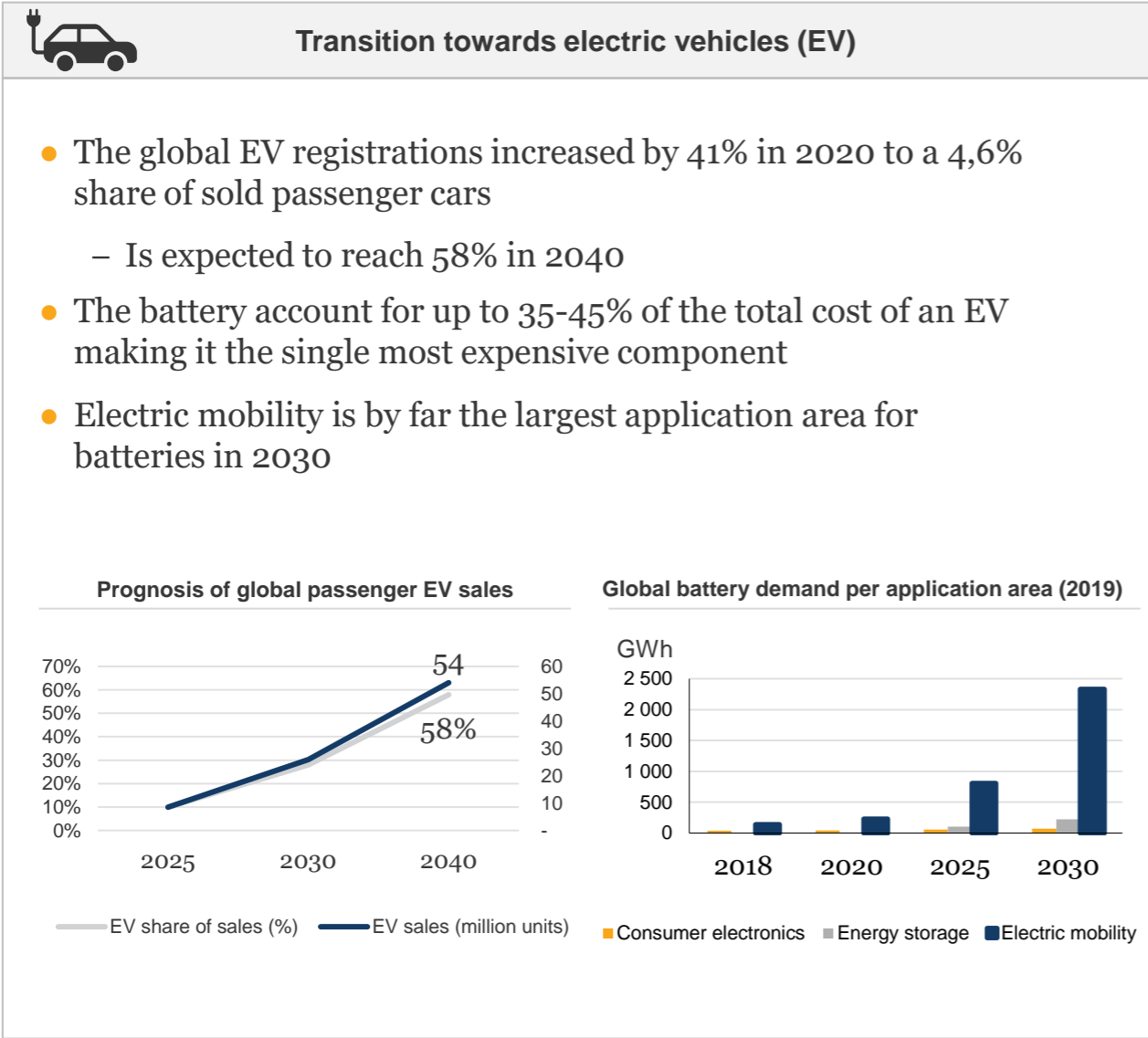
European battery industry is developing fast	<ul style="list-style-type: none">• Strong accelerating demand from electric vehicles and increased energy storage• Vast investments into Europe bring competence and capital• Ongoing race to secure investments• Heavy EU investments for an EU clean energy transition
The Nordic region has a favorable momentum	<ul style="list-style-type: none">• Strong battery industry development• Complementary strengths in every step of the battery value chain• Advantages in clean, affordable energy and a strong manufacturing industry
Some gaps need to be filled to build a competitive industry	<ul style="list-style-type: none">• Overall need to speed up the development and strengthen market position• Competence and critical components are required• Foreign direct investments are needed to fill the gaps
By joining forces, the region can take a strong position	<ul style="list-style-type: none">• The region needs to move fast in order to take a stronger position• Joint promotion activities to get attention is desired by the industry• A joint value proposition to improve attractiveness towards foreign investors

“ The value chain needs to become circular [...] and **batteries need to be obtained close by**. You do not want to be under China's restrictions. Covid has proved that the supply chain must be European. ”
[Finnish company]

“ Nordic batteries have **the chance to become the Rolls-Royce of batteries**. We have the preconditions for high quality sustainable batteries and integration with digital services. ”
[Norwegian company]

“ We need to take decisions and invest now **in order to take this position for sustainability at all**. It takes 3-4 years to establish a battery cell factory, and 10 years to set up mining. **We need to act NOW.** ”
[Swedish company]

The transition towards electrical vehicles will accelerate the demand for batteries in Europe in the next decade



Source: World Economic Forum - A Vision for a Sustainable Battery Value Chain in 2030, McKinsey analysis 2020, BloombergNEF Electric Vehicle Outlook 2020, European Battery Alliance

There is a wide gap between current production capacity and future demand

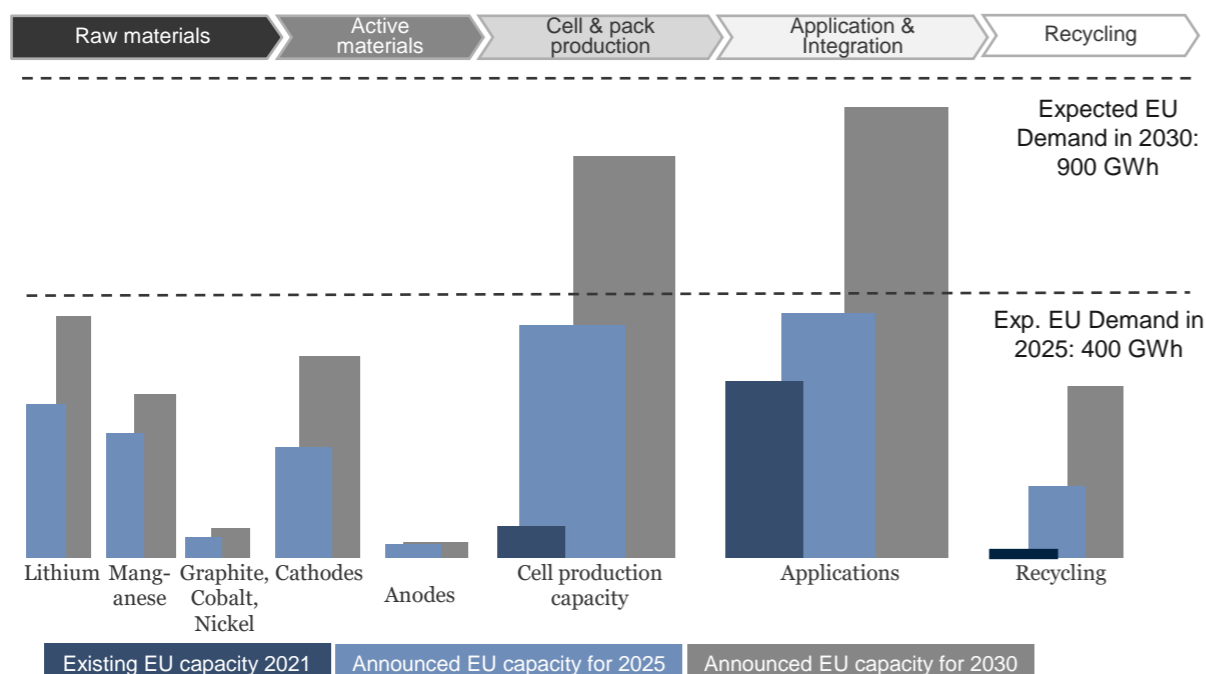
- EU regulations for a green battery life cycle are setting the market conditions



Wide gap between battery supply and demand in Europe

- Battery cell capacity is growing driven by the need to be close to OEM production sites
 - In all other parts of the value chain the gap is expected to be very wide in both 2025 and 2030

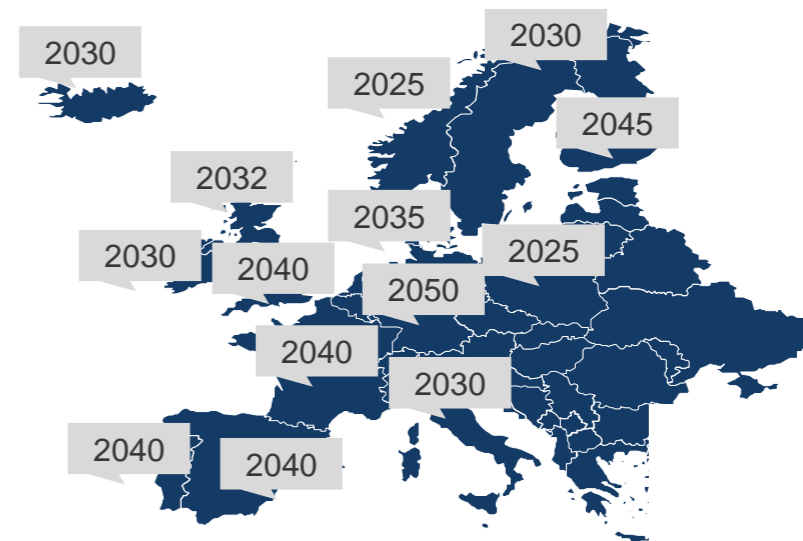
Predicted share of EU supply vs. expected EU demand until 2030 per value chain step



Sustainable battery agenda

- European policies for zero emission vehicles drives demand for sustainable batteries
 - European countries are approaching zero emission deadlines
 - Proposal in Dec. 2020 to modernize EU legislation on batteries
- The European Green Deal has actions for an EU clean energy transition

Deadlines for 100% Zero emission vehicles, or no new ICE* vehicles sold



Europe is mobilizing to build up competitive battery value chains – the arena is expected to be set within 3-4 years



European battery production build-up

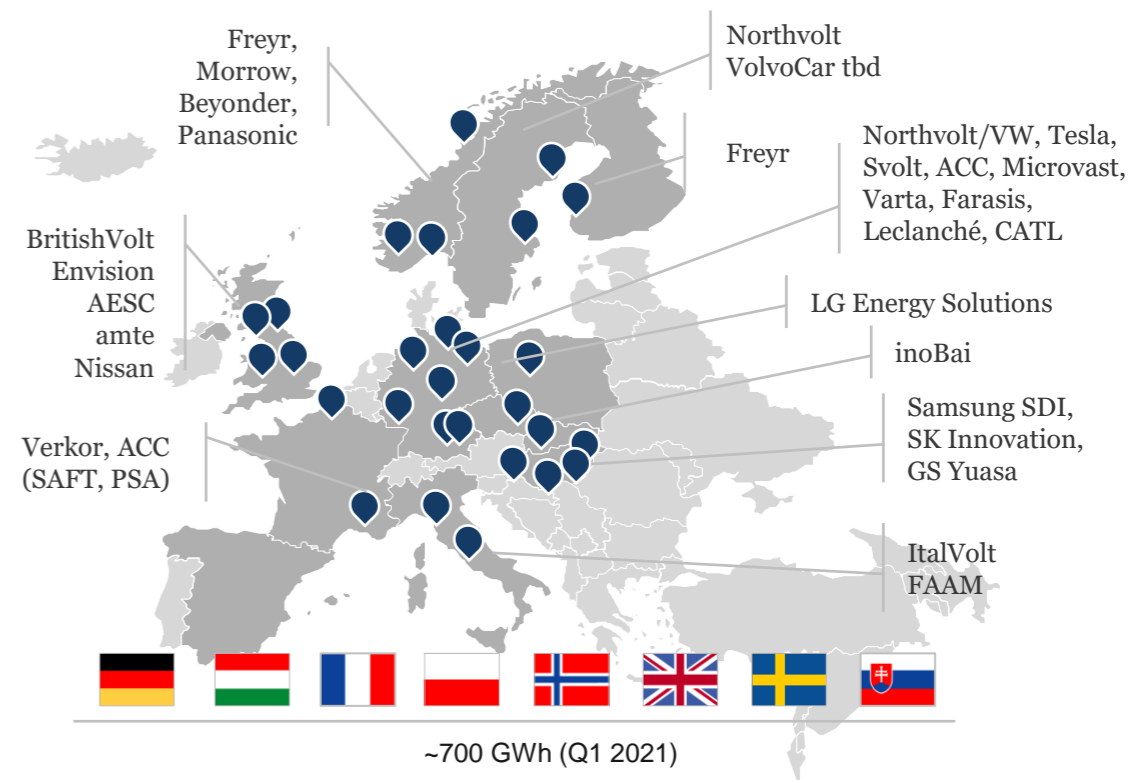
- Proximity of strategic components are crucial for European OEMs
 - Today, China, South Korea, Japan and Taiwan represent about 80-95% of the global battery production capacity
- The European share of the global battery production is expected to grow from 6% in 2020 to 16% in 2030
- Investments are happening at high speed – primarily by Asian and North American industry actors

Bloomberg NEF ranking (panned capacity)

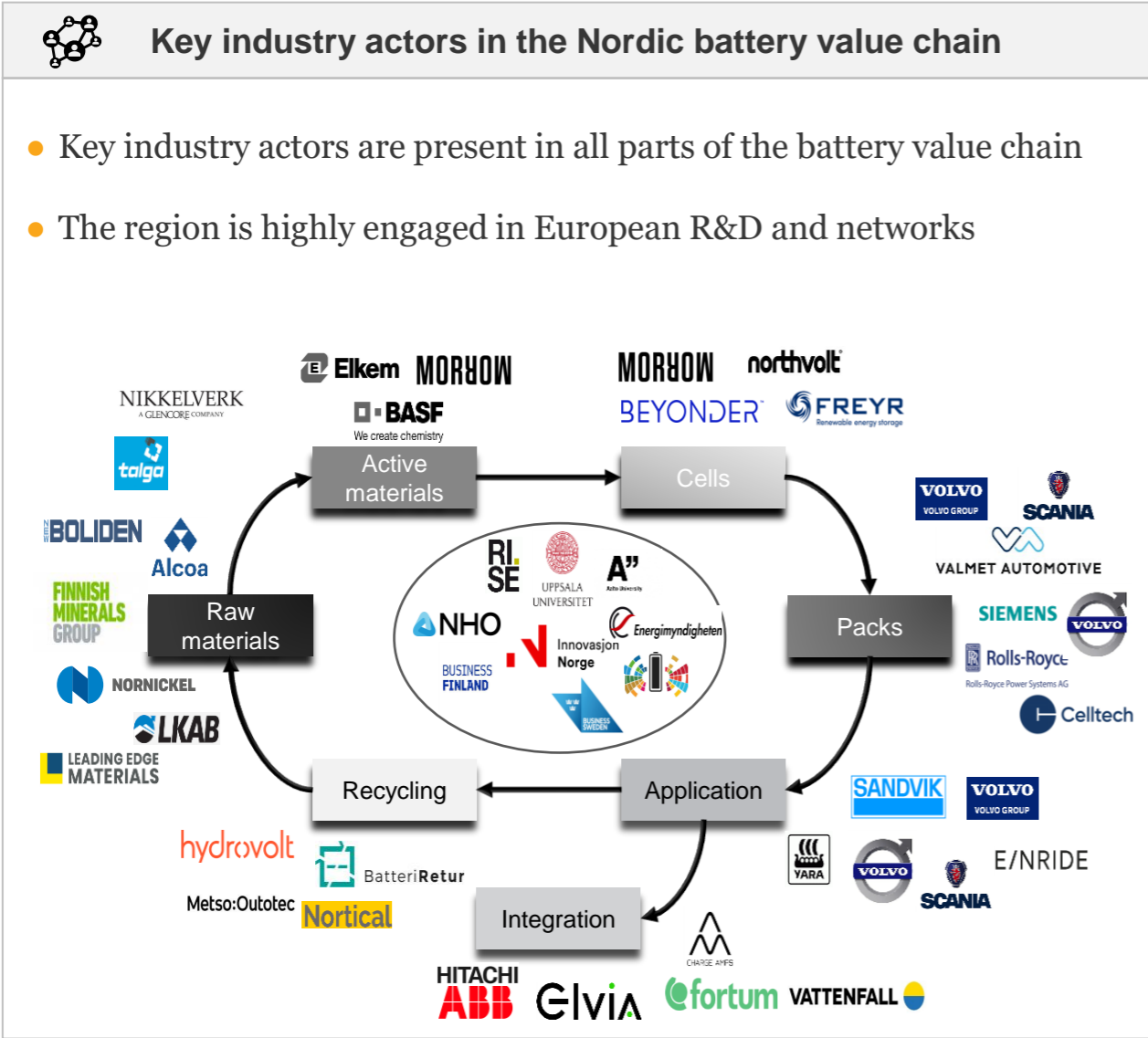
	Sweden	Finland	France	Germany	Hungary	Poland
BNEF ranking 2020	10	8	8	4	12	12
Raw mat.	22	11	17	17	22	22
Cell & component	13	13	13	6	6	5
Environment	3	5	1	12	8	11
Regulations	1	3	9	2	14	13
Demand	8	13	5	2	15	14

*Excl Norway, the index is based on activities in 2020 only

Examples of announced Gigafactory investments in Europe

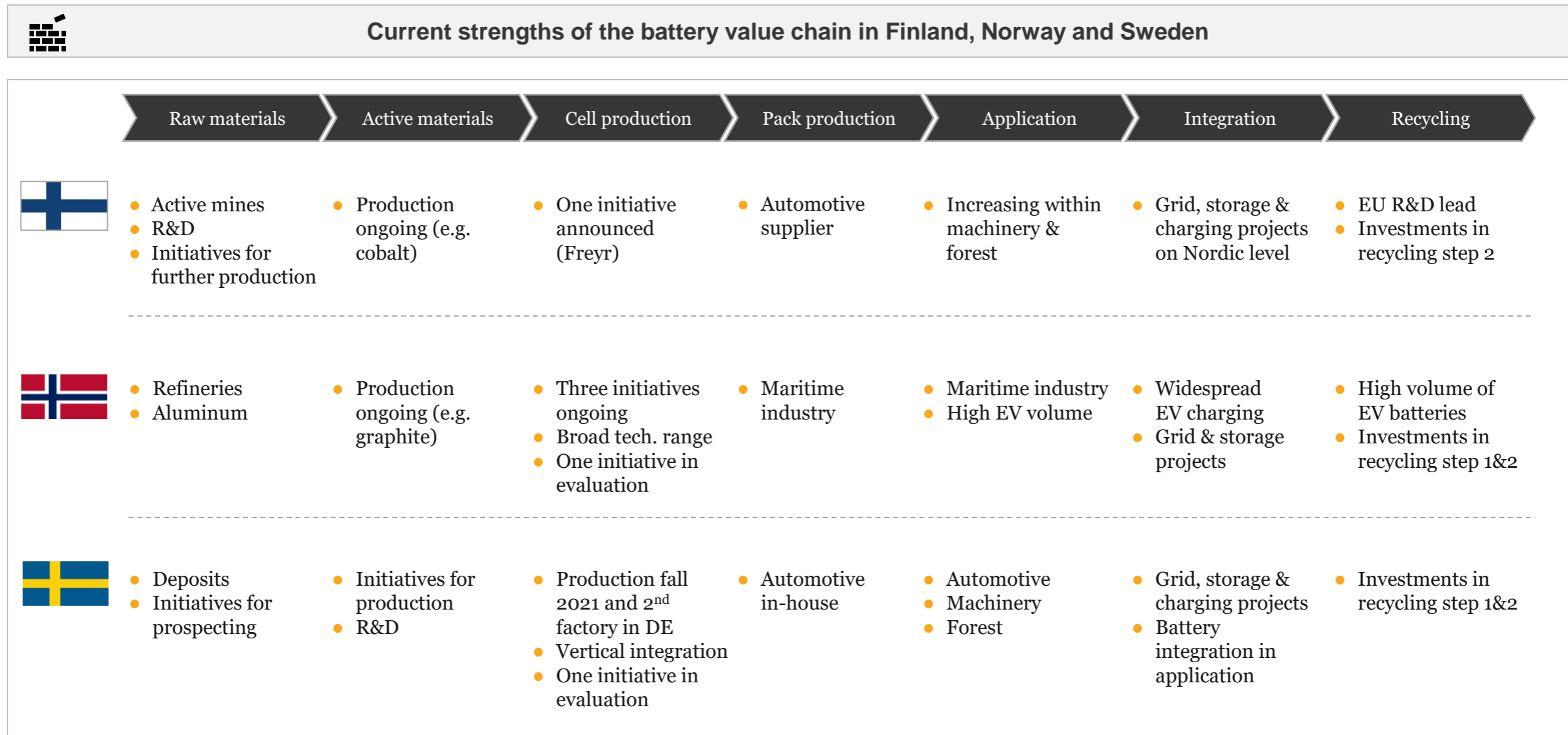


The Nordic region has a favorable momentum with key actors in all parts of the value chain and a continuous inflow of foreign investments



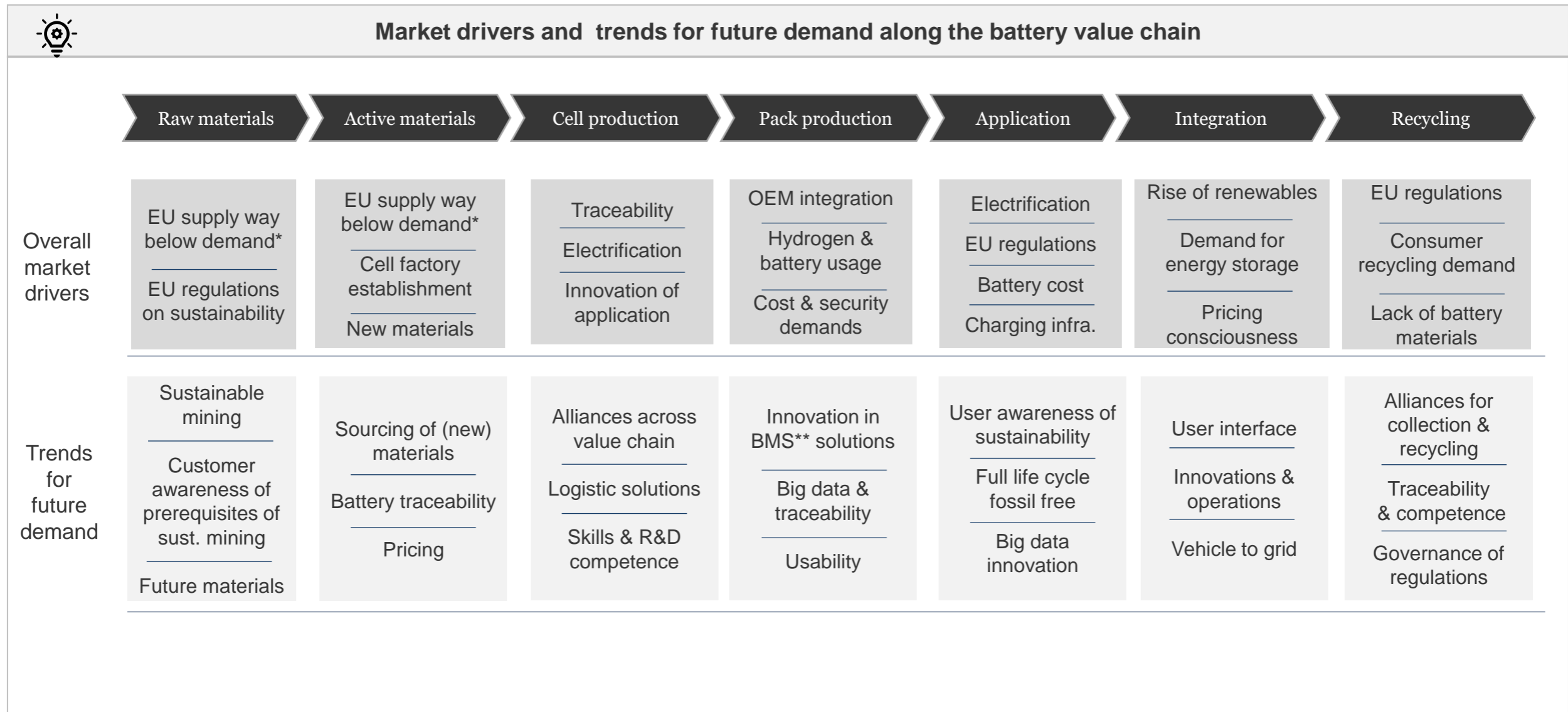
*Foreign and domestic investments
Source: Business Sweden interviews and analysis, Business Sweden report “the Nordic battery value chain” January 2021, company homepages

Finland, Norway and Sweden have complementary strengths in every step of the battery value chain



Source: Business Sweden interviews and analysis

Market drivers clarify future opportunities for digitalization, traceability & new materials driven by regulations & electrification

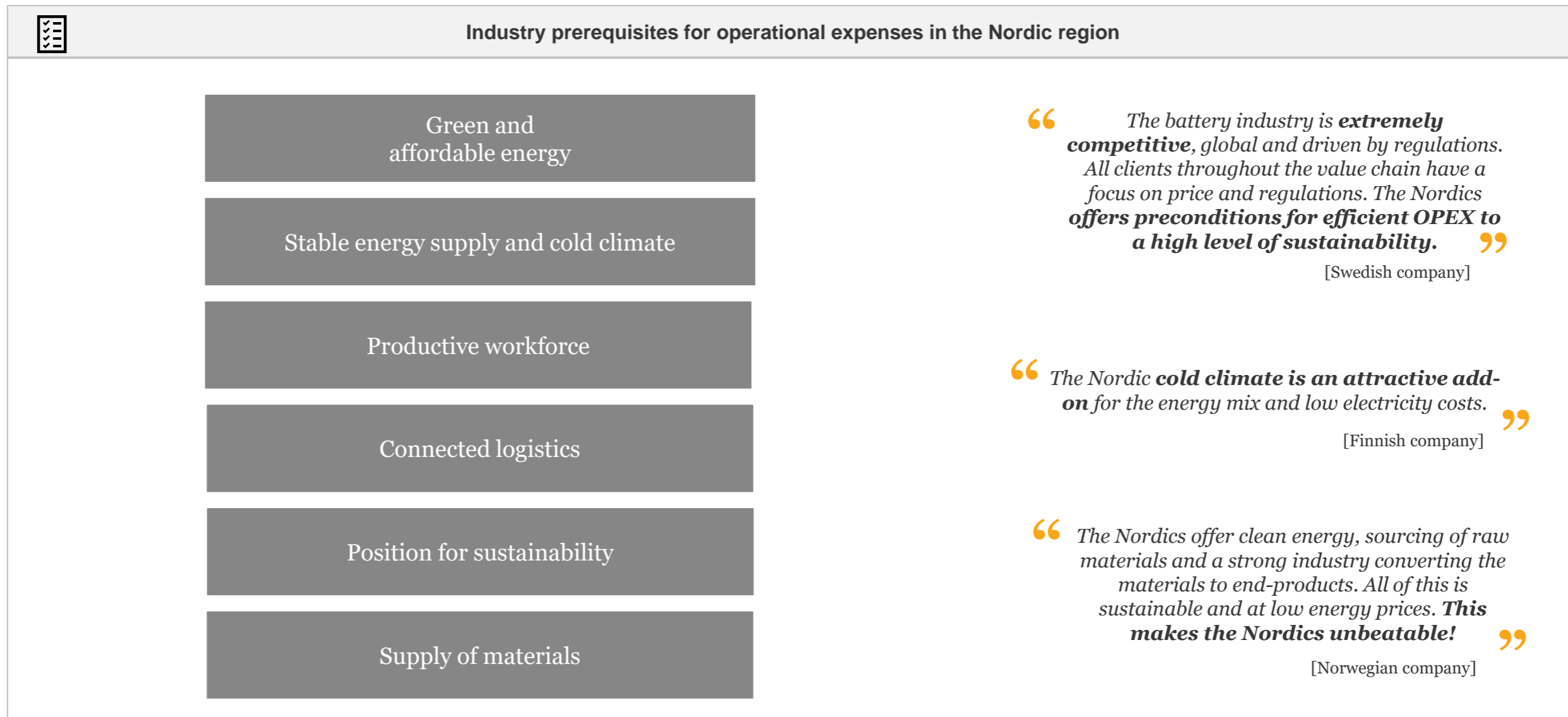


*Estimates from the European Battery Alliance comparing supply and demand 2025 and 2030

**BMS = Battery Management Systems

Source: Business Sweden interviews and analysis

The Nordic region has the basis for a cost efficient and sustainable battery industry



Source: Business Sweden interviews, initial analysis of statistics comparing markets in Europe

The industry highlight engagements in setting EU regulations, as well as to reduce risk and attract FDI to strengthen the value chain

Highlighted industry needs to successful build-up a strong battery industry				
Market prerequisites	Regulations for sustainability	Competence lift	Access to raw materials	Investments in infrastructure
	<ul style="list-style-type: none"> Supportive EU regulatory for batteries and battery waste demanding full life cycle sustainability 	<ul style="list-style-type: none"> Investments in R&D initiatives Education on all levels to reduce the competence gap long term 	<ul style="list-style-type: none"> Transparency and speed in national regulations and processes for mining Public debate on options for responsible mining 	<ul style="list-style-type: none"> Charging infrastructure Improvements in energy supply, storage and digital grids
Value chain supply & demand	Lowered first-mover risk	Connected ecosystem	Accelerated market position	Foreign direct investments
	<ul style="list-style-type: none"> Capital, grants and guarantees to reduce first mover risks Clear incentives for FDI 	<ul style="list-style-type: none"> Alliances with OEMs for orders and future innovations Collaboration between regional leaders and digital innovators 	<ul style="list-style-type: none"> Broad official and industry support A strong global brand with clear value proposition 	<ul style="list-style-type: none"> Speed and scale to develop the industry in the next couple of years FDI to bring experience, competence and networks
<div> <div> <p>“Regulations on EU level are crucial for the future market requirements. We can not miss such an opportunity, so we need to be engaged in the process.”</p> <p>[Finnish company]</p> </div> <div> <p>“We have a good storyline regarding a green battery value chain, but our voices have not been heard – marketing efforts are needed.”</p> <p>[Swedish company]</p> </div> <div> <p>“If the Nordic position for sustainability was more known, we might finally be able to get paid for all the investments we have done to have high quality along the full production line.”</p> <p>[Norwegian company]</p> </div> </div>				

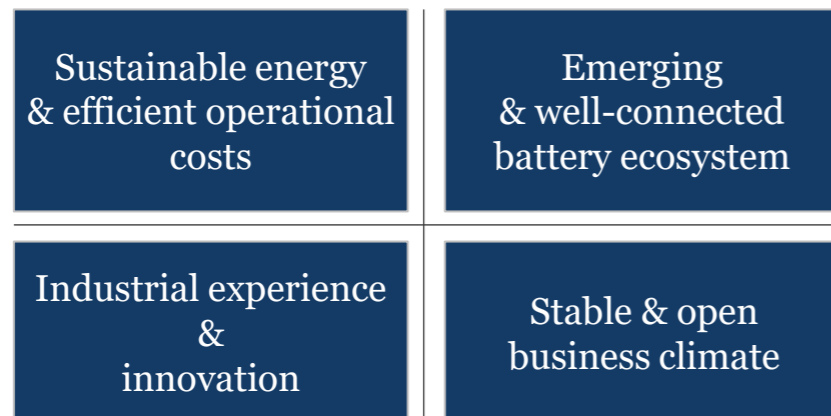
A jointly developed value proposition would improve the attractiveness towards foreign investors



A suggested Nordic value proposition...

- The Nordic countries share similarities and offer comparative strengths, so a combined narrative strengthen each country
- Aimed to attract foreign direct investments as well as strategic partnerships with OEMs and R&D centers

Suggested Nordic value proposition centers around four pillars



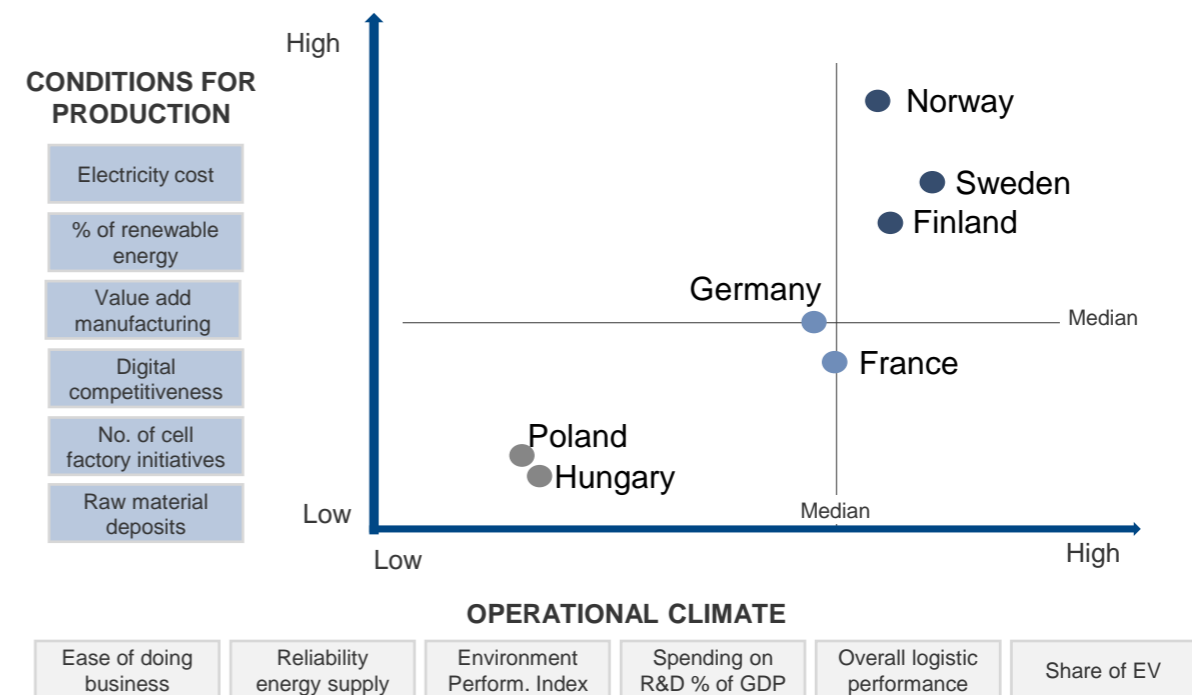
“We must have a **clear, to the point narrative** highlighting our strengths for sustainability, profitability and strong industry tradition”
[Norwegian company]



...compared to other European investment destinations


- An initial European comparison indicates a strong Nordic position*
 - Deeper analysis over time with future estimates needed

Business Sweden's Market Selection Analysis of the suggested value proposition



*Based on latest data available for one specific year. Parameters weighted. Comparison only among stated countries.
Source: Business Sweden interviews and analysis, Business Sweden Market Selection Analysis

By joining forces, the Nordics can accelerate the development of a strong position in the rising European battery market

	Recommended actions by the industry to accelerate the Nordic battery industry	
Develop a joint Nordic value proposition to attract FDI	<ul style="list-style-type: none"> • Develop a joint Nordic value proposition to attract foreign direct investments for experience, competence and competitiveness • Manage potential collaboration barriers by securing speed and efficiency, and focus on business value 	<p>“For example: recycling is still an open field, more so than other value chain steps, where the Nordic countries have preconditions for high value add. Regulations will set the conditions.”</p> <p>[Finnish company]</p> <p>“Together in the Nordics we could lift the level of R&D substantially. We need test centers like the ones in the UK and Germany.”</p> <p>[Norwegian company]</p> <p>“We need vast investments throughout the entire value chain. Foreign investments and competence are decisive as we accelerate our own capabilities and technology.”</p> <p>[Swedish company]</p>
Positioning and creation of global alliances	<ul style="list-style-type: none"> • Take a global position with a strong common sustainability and profitability narrative • Initiate joint marketing activities, e.g setting up alliances and strengthen networks 	
Extend Nordic collaboration	<ul style="list-style-type: none"> • Set up a communication platform for exchange of experiences and recruitment needs • Collaborate as joint Nordic R&D test centers • Develop a common agenda for long-term competency development at all levels 	
Acknowledge the impact of upcoming EU regulations	<ul style="list-style-type: none"> • Create awareness of the importance of the ongoing developments of the EU regulations on Nordic governmental level <ul style="list-style-type: none"> – Including regulations on the battery life cycle, battery waste and transportation of battery materials 	

Next steps during autumn 2021: Nordic webinar series Battery Thursdays!

In collaboration:

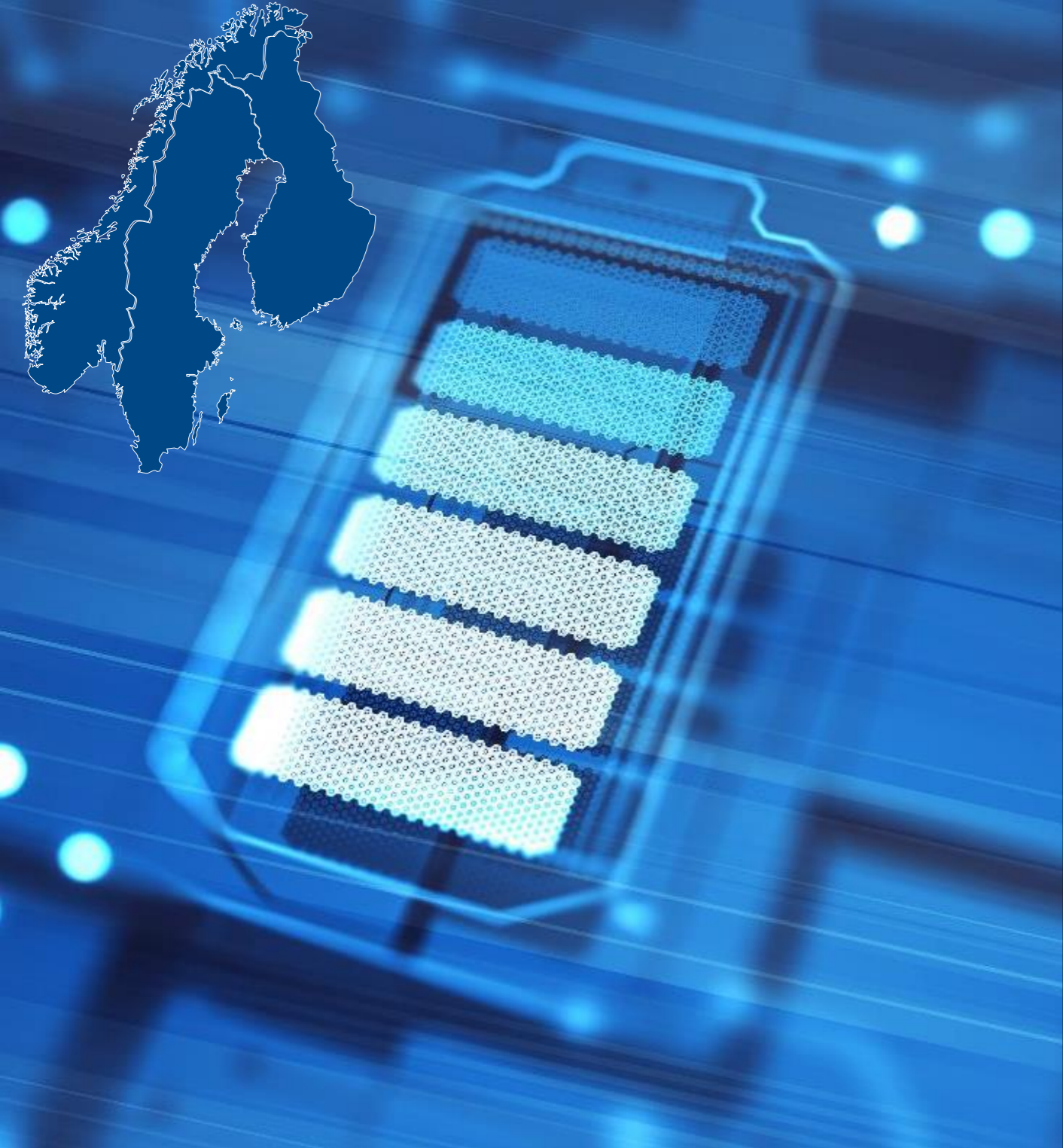
**EUROPEAN
BATTERY
ALLIANCE**

EBA250



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