

**BUSINESS
FINLAND**

**INVEST IN
FINLAND**

Welcome to Finland Growth for Finland - Ideas for Kasvuriihiryhmä, leader Risto Murto Saving The World is High Value Business

December 17, 2024

**Markku Kivistö
Head of Industry, Cleantech
Invest In
Business Finland**

FINLAND IS OPEN FOR BUSINESS

FINLAND

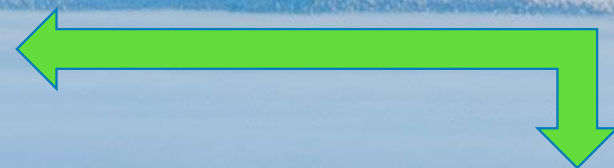
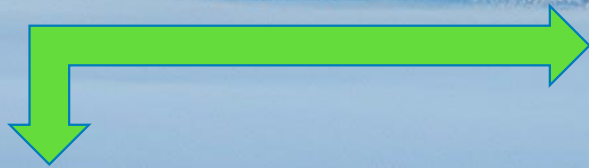
SAVING THE WORLD IS HIGH-VALUE BUSINESS

- 1) Save the World
- 2) Create Value
- 3) Growth for Finland

FINLAND – BUSINESS OPPORTUNITIES

COMBATING CLIMATE CHANGE WITH SUSTAINABLE SOLUTIONS

DECARBONIZING
INDUSTRIES /
SOCIETY



BATTERY VALUE CHAIN

DIGITALIZATION
DATA CENTERS

HYDROGEN - P2X ECONOMY
- EFUELS (+CO₂/ N₂, CCUS)



**CO₂ FREE
ENERGY**



CLEAN ENERGY PRODUCTION AT COMPETITIVE COST

Tämän esityksen tarkoituksena on tukea Teollisuuspoliittisen Strategian toteuttamista ja tämä on valmisteltu Risto Murrin johtamalle [kasvuriihiryhmälle](#)

Esityksen fokus on alla. Fokus valinta ja sisältö perustuu valmistelijan omaan pohdintaan ja työnkuvaan. Aiheet, jotka jo etenevät tai katetaan muualla, esim. luvitus, T&K rahoitus ja osaaminen / työvoima on jätetty pois.

Markku Kivistö

Head of Industry, Cleantech, In Invest

Business Finland

Toimialat:

- Puhtaan energian tuotanto
- Akkuarvoketju
- Vety talous / PtX / efuels / CO2 (esim. eSAF, emethanol, ammonia, lannoitteet)
- Vähähiilistävä teollisuus (esim. Blastr Green Steel, Arctial – Alumiini)

Fokus:

Strateginen Kysymys:

1. Miten saamme Suomeen enemmän investointeja vahvistamaan teollista perustaa

Tavoitteet:

1. Kehitämme toimintaympäristön kilpailukykyä investointien houkuttelemiseksi
5. Hyödynnämme puhtaan siirtymän sekä bio- ja kiertotalouden mahdollisuudet
6. Panostamme logistiikkaan, infrastruktuuriin ja teollisiin keskittyisiin



Proposals:

- 1) Convert growing cleantech project pipeline into Investment Decisions (FID)
- 2) Business Plan to Reindustrialize Finland based on Clean Energy potential
- 3) Industrial parks networks creation
- 4) Potential Funding Considerations
- 5) Attention to investors = Business Case

Mapping Proposals to Teollisuuspoliittinen Strategia:

Avainkysymykset

Investointien saaminen Suomeen

Vakiintuneiden teollisuudenalojen uudistuminen

Uusien kasvualojen vahvistaminen

Osaajien saatavuuden varmistaminen

Tavoitteet

Kehitämme toimintaympäristön kilpailukykyä investointien houkuttelemiseksi

Tehostamme julkista rahoitusta yksityisen rahoituksen vivuttamiseksi

Kasvatamme arvonlisää ja tuottavuutta panostamalla aineettomaan pääomaan

Luomme kasvua tutkimuksesta, innovaatioista ja kansainvälisistä verkostoista

Hyödynnämme puhtaan siirtymän sekä bio- ja kiertotalouden mahdollisuudet

Panostamme logistiikkaan, infrastruktuuriin ja teollisiin keskittymiin

Varmistamme osaavan työvoiman saatavuuden

1) Convert growing cleantech project pipeline into Investment Decisions (FID)
5) Attention to investors = Business Case

2) Business Plan to reindustrialize Finland based on Clean Energy potential

3) Industrial parks networks creation
4) Potential Funding Considerations

Proposal 1: Convert Growing Cleantech Pipeline into Investment Decisions

- The most important for short / medium term growth is to convert existing Cleantech Pipeline to Investments. Permitting / preparations on-going, investment decisions coming during next ½ – 3 years.
 - Current Cleantech Foreign Direct Investment Pipeline is approx **20 B€ and 10,000 direct jobs** with indirect impact 2-3 times.
 1. Battery Value chain projects – several on-going at various stages.
 2. Hydrogen and derivatives – approx 50 projects in Finland. Potential for 10% of EU H2 needs combining large potential for of CO2. Finland has potential to become one of the leading H2 countries in Europe.
 3. Large scale industrial plants – 1) Blastr Green Steel, Inkoo and 2) Arctial – Aluminium, Kokkola
- ➔ With positive decisions, will potentially kick-start wind power projects **10 B€ +**

Actions:

- Assure sufficient permitting resources and implement permitting reform
- Implement Investment Support and Tax Credit for maximum leverage with Tesi updated strategy
- Assure sufficient investments by Fingrid and Gasgrid. Drive forward industrial Park development
- Demand creation – work on EU regulation, technology agnostic approach, H2 and derivative regulation
- Keep onshore wind power property tax sceme, implement off-shore licensing timely.
- Evaluate ways of accelerating biogenic CO2 market creation (capture, logistics, CCUS)

Proposal 2: Business Plan to Reindustrialize Finland based on Clean Energy Potential

Reindustrialize Finland and create value based on competitive CO2 free electricity production and use.

- Create growth and value for Finland based on competitive CO2 free electricity potential.
- Supports Finland meeting 2035 CO2 neutrality target
- Long term plan, with systematic implementation with commitments

Business Plan:

Phase 1: 2025 – 2035 - Systematic plan to maximize value from doubling CO2 free electricity supply from 80 TWh to 160 TWh by 2035.

- 1) Enable supply and distribution
- 2) Create demand – Industrial Parks - networked
- 3) Define funding mechanism

Phase 2: 2035 and beyond (Finland 1100 ?)

- 1) Plan and target setting for even more ambitious energy production – 1000 TWh / 100% CO2 free

Proposal 2: Business Plan to Reindustrialize Finland based on Clean Energy Potential (1/2)

Reindustrialize Finland and create value based on competitive CO2 free electricity production and use.

Phase 1: 2025 – 2035 - Systematic plan maximizing value from doubling CO2 free electricity supply from 80 to 160 TWh by 2035.

1) Enable supply and distribution:

- Create plan for the most effective way for enabling value creation from electricity production growth:
 - Evaluate plan on how to develop electricity / energy system to produce 160 TWh by 2035 in Finland
 - Consider for production – e.g. main locations / areas, distribution network needs (TSO & DSO), base load needs / ways of implementing, etc.
 - Evaluate plan for logistics - ports, railroads, ports, other utilities, e.g. hydrogen, existing LNG networks, district heating, CO2 sources / logistics.
 - Evaluate funding and guarantee needs and possibilities.
 - Consider roadmap for implementation with milestones, responsibilities, including EU regulation milestones
- International co-operation:
 - Supporting EU competitiveness and resilience agenda – alignment with EU funding potential (e.g. IPCEIs).
 - Active EU regulation work towards technology agnostic energy systems
 - Proactive work on the current and next commission agenda.

Proposal 2: Business Plan to Reindustrialize Finland based on Clean Energy Potential (2/2)

Reindustrialize Finland and create value based on competitive CO2 free electricity production and use.

Phase 1: 2025 – 2035 - Systematic plan to maximize value from doubling CO2 free electricity supply from 80 TWh to 160 TWh by 2035.

2) Create demand – Industrial Parks – networked:

- (Re)develop network of connected industrial parks for electricity / energy consumption – e.g. 1GW, 3GW, 5GW power parks. Sample e.g .Super Sites / Fund in USA - <https://www.epa.gov/superfund>
- Industrial parks network connected to electricity, gas networks, logistics, utilities with development of competences
- Coordinated approach for industrial park development – e.g. focus industries, batteries, chemicals, hydrogen, steel, data etc.
- Keep ongoing investments by Fingrid and Gasgrid
- Park development considering permitting reform

3) Define funding mechanism:

- Consider RTD funding possibilities for supply and demand creation ecosystems
- Evaluate potential for infrastructure fund and various guarantee instruments for growth acceleration
- Evaluate and use of EU funding

Phase 2: 2035 and beyond - Finland 1100 - Plan and target setting for even more ambitious energy production

6. Panostamme logistiikkaan, infrastruktuuriin ja teollisiin keskittyymiin

- Edistämme logistiikan alatyöryhmän raportissa määriteltyjen tavoitteiden saavuttamista teollisuuden logistiikan kehittämistarpeisiin vastaamiseksi, liittyen mm. huoltovarmuuteen, kansainväliseen saavutettavuuteen ja logistiikan kilpailukykyyn.
- Kehitämme digitaalista infrastruktuuria ja huolehdimme riittävästä palvelin-, laskenta- ja tiedonsiirtokapasiteetista.
- Luomme pitkän aikavälin kehittämiskuvan teollisuuden tarpeita parhaiten palvelevasta energiainfrastruktuurista, mukaan lukien kansallisen vedyn siirtoverkon alueellisten teollisuuskeskittymien välillä.
- Laadimme teollisten keskittymien kehittämissuunnitelman, joka yhdistää puhtaan energian hyödyntämisen tehokkaaseen logistiikkaan, infrastruktuuriin ja materiaalivirtoihin sekä sektorirajat ylittäviin synergiaetuihin.

Työ- ja elinkeinoministeriön julkaisu • Yritykset • 2024:49

Teollisuuspoliittinen strategia Ohjausryhmän raportti



Työ- ja elinkeinoministeriö
Arbets- och näringsministeriet

Proposal 3: Develop Industrial Park Network

1. Aim to attract investments for energy consuming industries and boosting Economic Growth into network of industrial parks. Plan parks with e.g. electricity (X GW), zoning needs, logistics, utilities (e.g. H2, CO2), storages, base loads.

2. Enhancing Efficiency and Competitiveness – lowers investment risk, improve predictability, potential for faster go-to-market.

Creating platform for defined industries.

3. Supporting Sustainable Development – permitting, environmental considerations, industrial scale solution creation.

⇒ Implement TEM industrial policy, co-ordinated approach for industrial park network

⇒ Utilize the work done:

⇒ <https://www.kokkola.fi/tiedostot/teollisuuden-parhaat-kaytannot-raportti-verkkoluku/>

⇒ Teollisuuspuisto selvitys by TEM - upcoming

⇒ Local communities key role (public acceptance, zoning)

⇒ Permitting renewal – under way

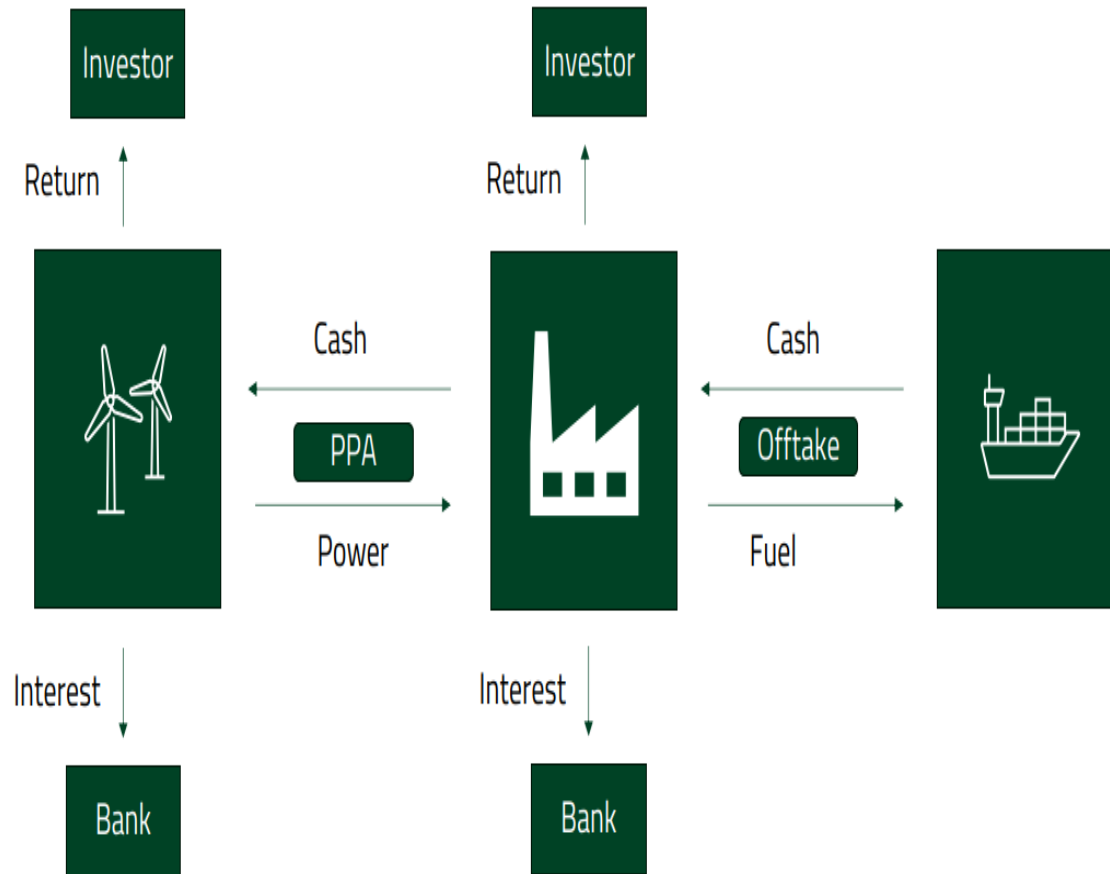


Proposal 4: Potential Funding Considerations

1. Evaluate Counter Party Guarantee mechanism – see next page
2. Evaluate potential to establish Infrastructure Fund
 1. Funding of infrastructure investments in industrial parks
 2. Returns from leases / service payments from industrial park
 3. Structured to appeal for long term domestic and international infrastructure investors
 4. Potential to accelerate industrial park development and upgrade / maintain existing ones
3. Evaluate use of EU funding promoting industrial renewal activities and EU competitiveness.
4. Continued Research, Development and Pilot funding by Business Finland for growth to meet government targets

EVALUATE COUNTER PARTY GUARANTEES - SAMPLE

Setup wind power trough PPA



Goal to catalyze investments – both for supply and demand of clean energy.

Possibility to give comfort that the bank will be secured if the PPA by the developer is not honored.

Guarantee to be priced market / competitively

Similar practices in use – sample:

Norway: <https://www.eksfin.no/en/products/counter/>

France: BPI - Banque Publique d'Investissement

Proposal 5: Attention to Investors = Business Case

1. Address Finland profile among investors – stability, competitiveness as investment location, predictability, advance information, etc.

=> Better go-to-market predictability, lower the risk and therefore improve the **business case**

2. Acknowledge Finland high dependency on international investors, significant role in:

- Clean energy production – e.g. wind power, PV and battery storage investments
- Battery value chain ownership and new project development
- Hydrogen value chain new project development
- Major industrial investment plans (e.g. green steel, aluminium)
- Cleantech technology know-how, e.g. in power electronics, automation, etc.
- Infrainvestors / consultants / construction companies increasingly interested into Finland

⇒ Comprehensive marketing / actions of Finland as international investment destination

⇒ Inclusion into national / regional / local messaging and activities

⇒ Tesi updated strategy implementation, increased network of international investors

3. Encourage domestic capital to investment into industrial scale-ups (VCs, CVC, family funds, foundations etc.)

⇒ Evaluate tax and other incentives for investments into and in Finland

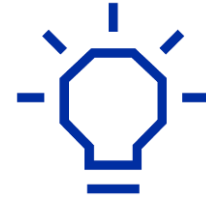
⇒ Pooling of funding – establishment of fund ?

VAIN 1% YRITYKSISTÄ SUOMESSA ON ULKOMAALAISOMISTEISIA, MUTTA POSITIIVISET VAIKUTUKSET MONINKERTAISET



5 306

YRITYSTÄ



27 % (1.2 mrd €)

T&K:STA (VIIMEISIN TIETO 2020)



23 % (130 mrd €)

LIKEVAIHTOA



43 % (35 mrd €)

TAVARAVIENNISTÄ (2022)



308 800

TYÖPAIKKAA



1 680 000 000 €

YHTEISÖVEROA



21 %

YKSITYISESTÄ TYÖVOIMASTA



19,4% (4,0 mrd €)

AINEELLISET JATKOINVESTOINNIT SUOMESSA (2022)

CLEAN TRANSITION BUSINESS OPPORTUNITIES

SUSTAINABLE MATERIAL SUPPLY

Availability critical minerals

Chemicals & compounds

Sustainable mining

Water

(Bio)CO2 availability EU market

Raw materials

Operating environment

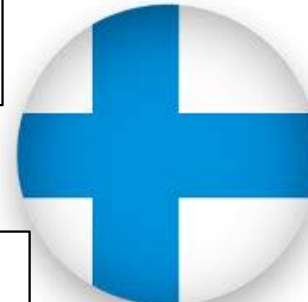
Business environment

CO2 Eurozone €

Neutrality 2035

Efficient permitting

Regulatory environment



OPERATIONAL EFFICIENCY AND R&D

Engineering talent & cost

Process Industry

Time-to-Market

People & culture

Infrastructure

Industrial Parks

Digitalization

Problem solving skills & attitude

Sea & rail logistics

CO2 free electricity

Cooling power

Ecosystems

World class companies

Grid reliability 99,99995%

Among lowest cost in EU

STABILITY & PREDICTABILITY

ROBUST & RESILIENT PLATFORM

THANK YOU !!!

**SAVING THE WORLD IS
HIGH VALUE BUSINESS –**

**LET'S DO IT TOGETHER
WELCOME TO FINLAND**





















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BACK - UP

SUSTAINABILITY – FINLAND #1

- 3RD YEAR IN A ROW


[Chapters](#)
[Rankings](#)
[Interactive Map](#)
[Country Profiles](#)
[Data Explorer](#)
[Downloads & Materials](#)

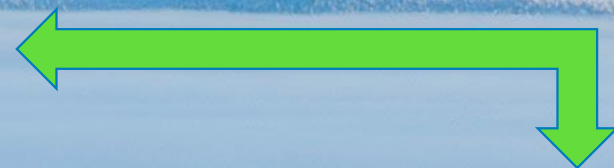
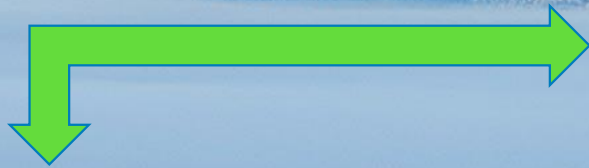
Rank	Country	Score	Performance by SDG
1	 Finland	86.76	
2	 Sweden	85.98	
3	 Denmark	85.68	
4	 Germany	83.36	
5	 Austria	82.28	
6	 France	82.05	
7	 Norway	82.00	
8	 Czechia	81.87	
9	 Poland	81.80	
10	 Estonia	81.68	

Sustainable Development Report 2023 by United Nations

FINLAND – FOCUS BUSINESS OPPORTUNITIES

COMBATING CLIMATE CHANGE WITH SUSTAINABLE SOLUTIONS

DECARBONIZING
INDUSTRIES /
SOCIETY



BATTERY VALUE CHAIN

DIGITALIZATION
DATA CENTERS

HYDROGEN - P2X ECONOMY
- EFUELS (+CO₂/ N₂, CCUS)

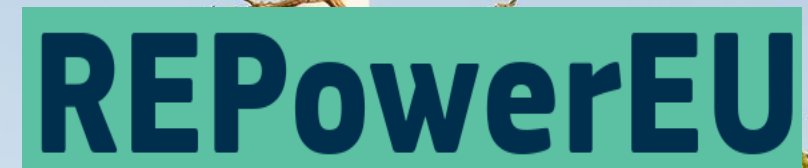
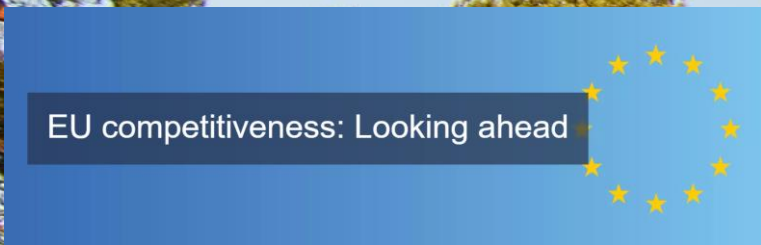


**CO₂ FREE
ENERGY**

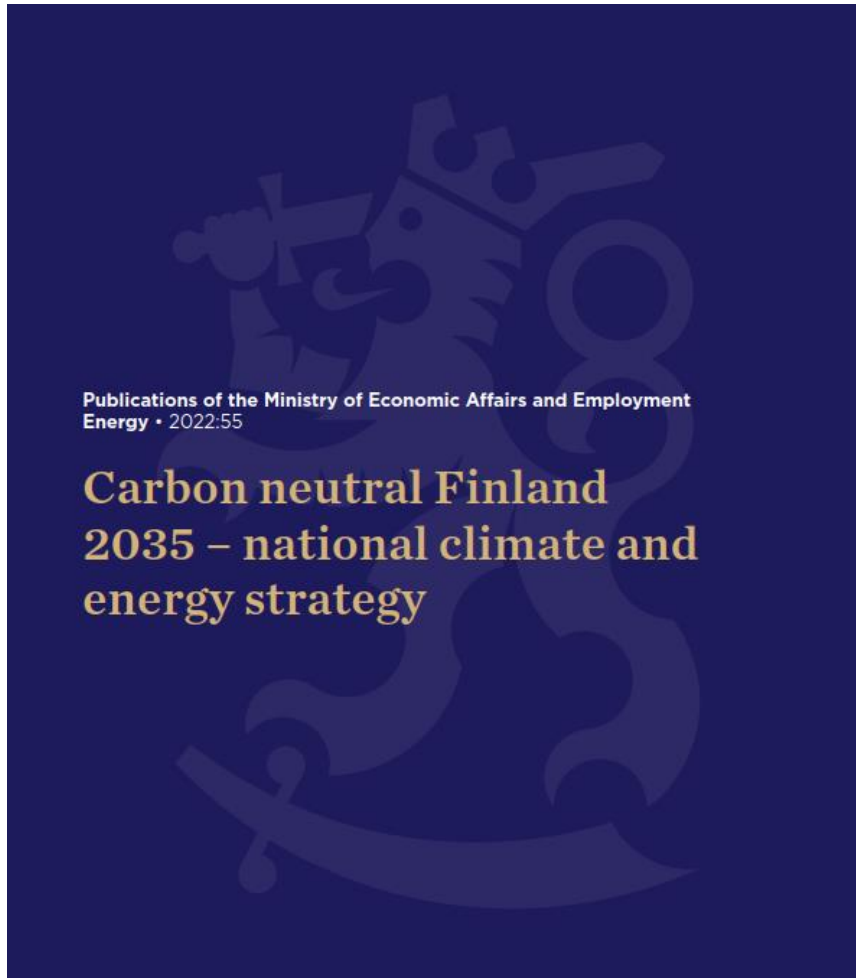


CLEAN ENERGY PRODUCTION AT COMPETITIVE COST

FINLAND BUILDING EUROPEAN AGENDA



FINLAND – CLIMATE AND ENERGY STRATEGY

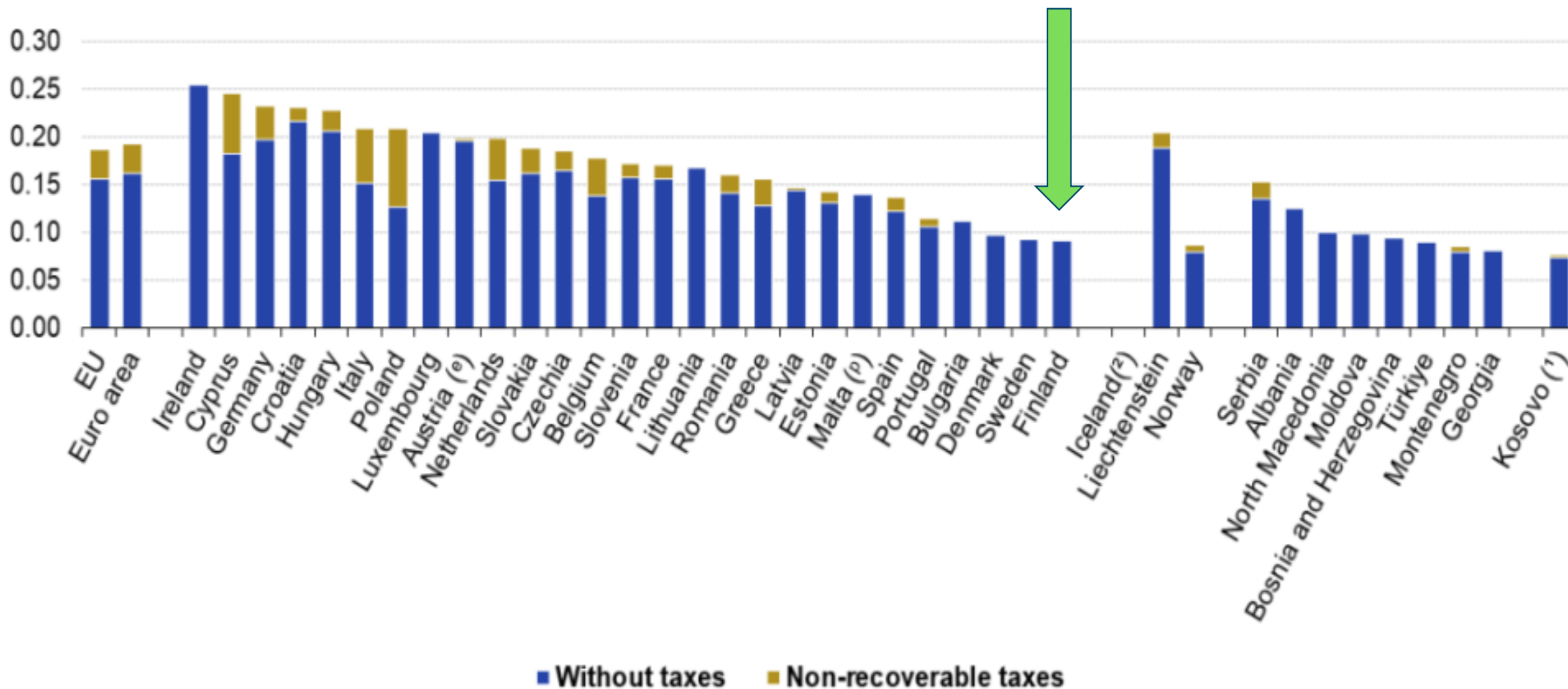


- CARBON NEUTRALITY BY 2035
- CLIMATE CHANGE AND BIODIVERSITY - SUSTAINABILITY
- TECHNOLOGY AGNOSTIC APPROACH – DRIVE THIS TO REST OF EUROPE – PROMOTES COMPETITIVENESS AND REDUCE REGULATION
- COMPLETE VALUE CHAIN APPROACH - CIRCULARITY
- INDUSTRY DRIVEN LOW CARBON ROADMAPS
- STRATEGY BEING UPDATED

COMPETITIVE CLEAN ENERGY IN FINLAND

- LOWEST COSTS IN EUROPE**
- CO2 FREE**
- WORLD CLASS GRID AVAILABILITY**

Electricity prices for non-household consumers, first half 2024 (€ per kWh)



FINLAND - RENEWABLE POWER GROWTH

Projected development of electricity generation (TWh)

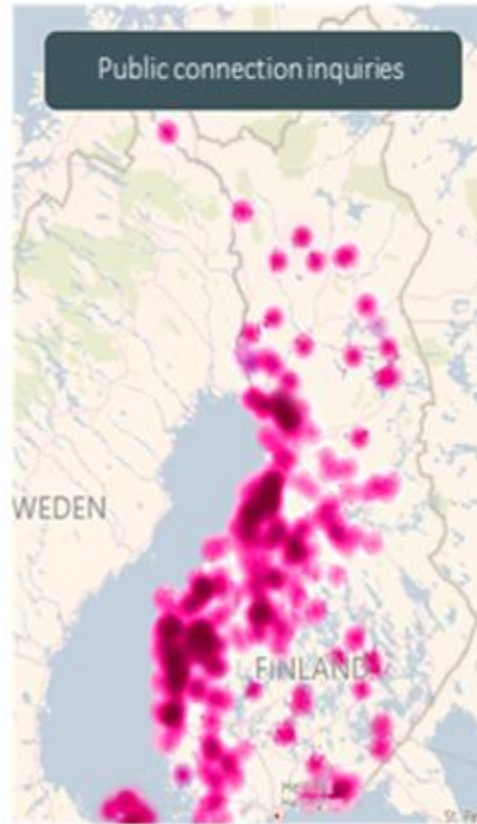
Fingrid estimate, January 2024

FINGRID



FIGURE 3 Projected development of electricity generation.

94% - CO2 Free Electricity in 2023
100%- 2030



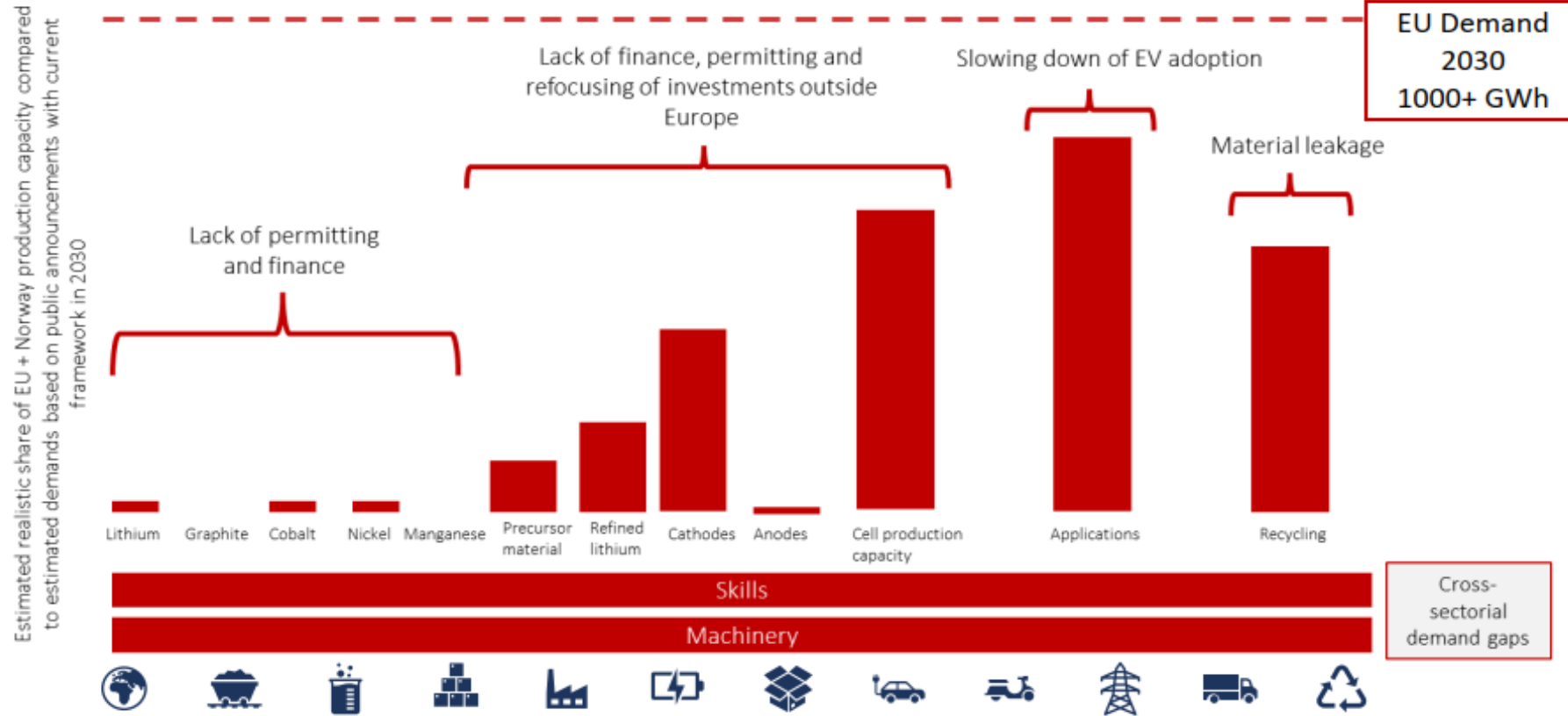
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BATTERIES



Global Battery Value Chain



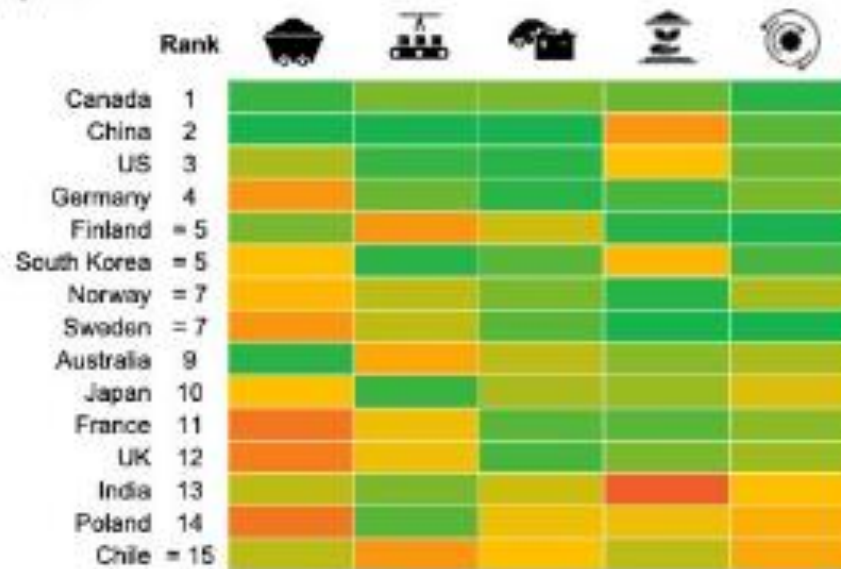
GLOBAL LITHIUM-ION BATTERY SUPPLY CHAIN RANKINGS

Overall results

Consistency across the supply chain is vital for maximizing potential

Top 15

Bottom 15

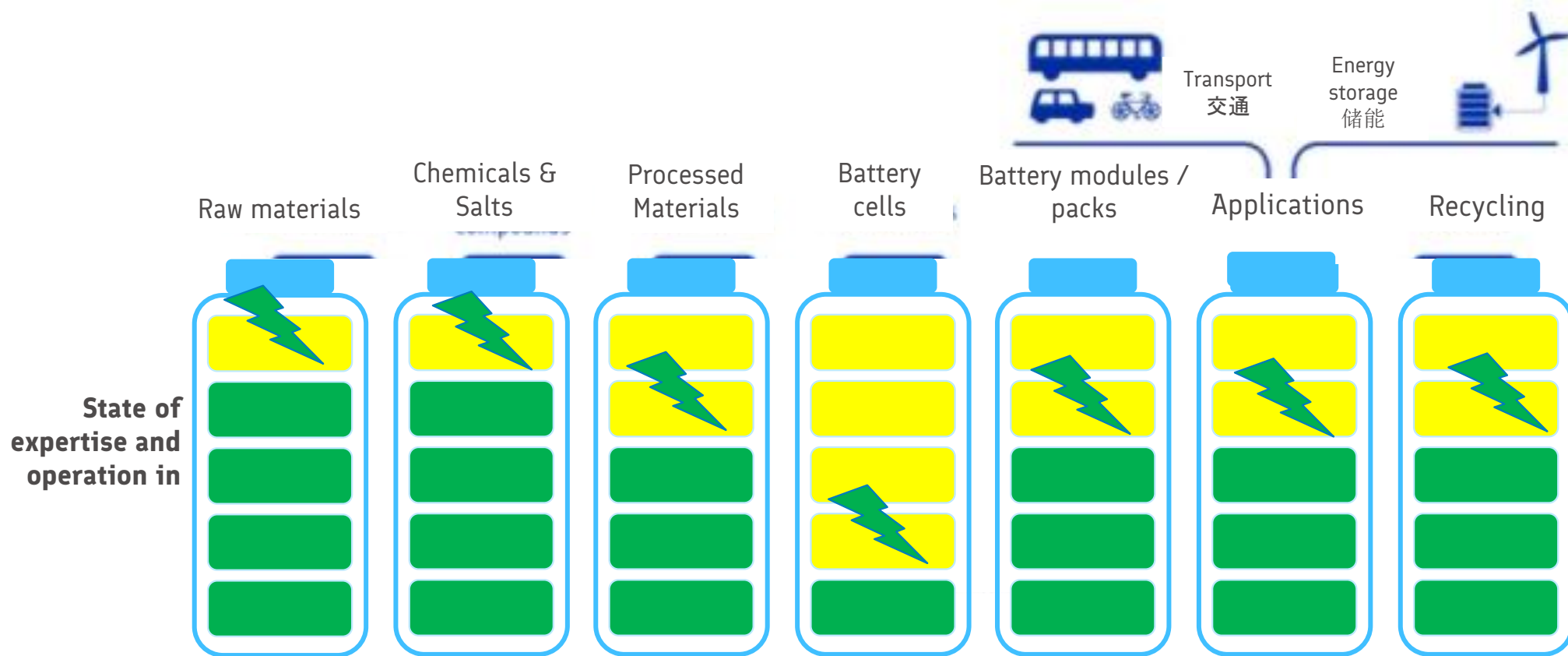


Source: BloombergNEF. Note: IRI is industry, infrastructure and innovation.

12 February 5, 2024

BloombergNEF

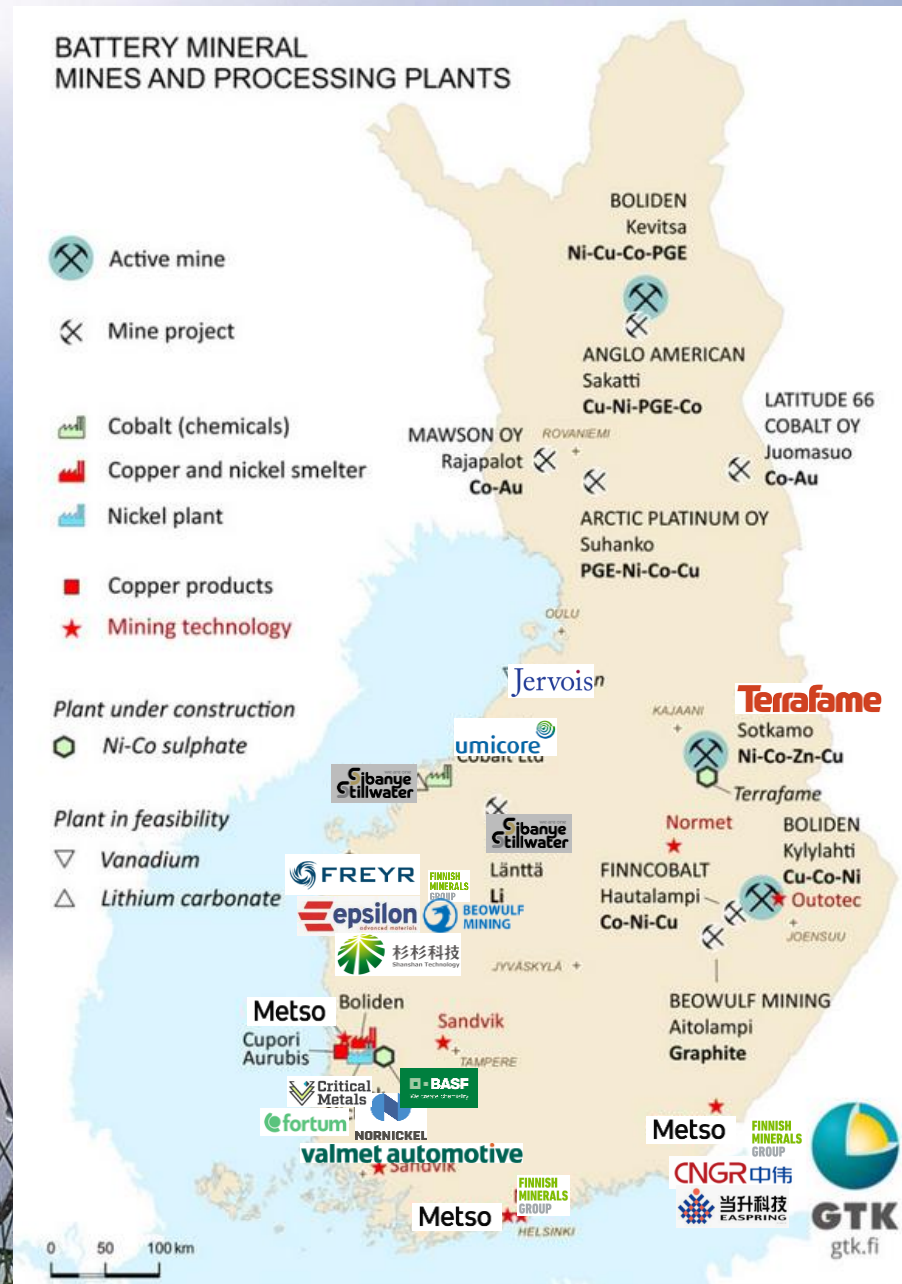
FINLAND - MATURITY OF BATTERY VALUE CHAIN



REGIONAL CO-OPERATION

ONLY EU COUNTRY WITH ALL KEY BATTERY MINERALS

SEVERAL INDUSTRIAL CLUSTERS / PARKS - SPACE, POWER, PEOPLE, LOGISTICS



BATTERY KNOW-HOW AND MATERIALS, ELECTRIFICATION, DIGITALIZATION

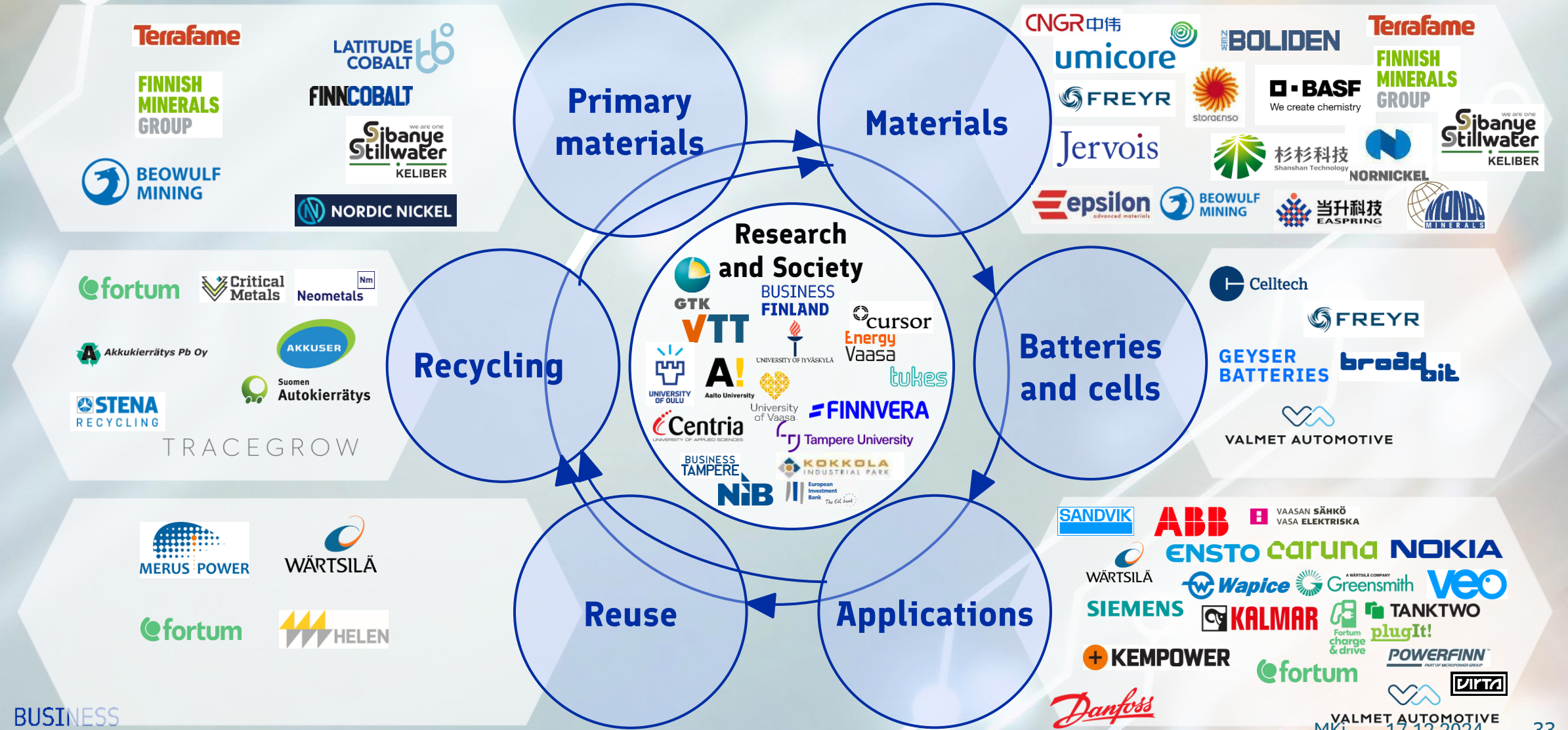
Publications of the Ministry of Economic Affairs and Employment Enterprises • 2021:6

National Battery Strategy 2025

SUSTAINABLE CIRCULAR BATTERY BUSINESS

FINLAND

SAMPLE OF COMPANIES



FINLAND ACTIVE IN BUILDING EU BATTERY VALUE CHAIN

IPCEI – IMPORTANT PROJECTS COMMON EUROPEAN INTEREST

Raw and advanced materials	Cells and modules	Battery systems	Repurposing, recycling and refining
BASF	ACC	BMW	BASF
Eneris	BMW	Endurance	Endurance
Keliber	Endurance	Enel X	Elemental
Nanocyl	Eneris	Eneris	Eneris
Solvay	FAAM	Kaitek	FAAM
Terrafame	SEEL	SEEL	Fortum
Umicore	VARTA		SEEL
			Umicore

Raw and advanced materials	Battery cells	Battery systems	Recycling and sustainability
ACIS	Alumina Systems	ACIS	Borealis
Arkema	BMW	Alumina Systems	Enel X
Borealis	Cellforce Group	AVL	Engitec
Ferroglobe	ElringKlinger	BMW	FIAMM
Fluorsid	FCA	Endurance	Fortum
Green Energy Storage	Green Energy Storage	Enel X	Hydrometal
Hydrometal	InoBat Auto	Energia Aqua	Italmatch Chemicals
Italmatch Chemicals	Manz	FCA	Keliber
Keliber	Midac	FIAMM	Liofit
Prayon	Northvolt	FPT Industrial	Little Electric Cars
SGL Carbon	SGL Carbon	Green Energy Storage	Midac
Solvay	Skeleton Technologies	InoBat Energy	SGL Carbon
Tokai Carbon Group	Sunlight Systems	Manz	Tesla
VARTA Micro Innovation	Tesla	Miba eMobility	Valmet Automotive
	VARTA Micro Innovation	Midac	ZTS VaV
		Rimac Automobili	
		Rosendahl Nextrom	
		Skeleton Technologies	
		Sunlight Systems	
		Tesla	
		Valmet Automotive	
		Voltlabor	

First pan-European research and innovation project, Dec. 9, 2019

Second pan-European research and innovation project, Jan 26, 2021

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HYDROGEN ECONOMY

FINNISH STRENGTHS IN HYDROGEN ECONOMY



A robust and **clean electricity system** as a basis for clean hydrogen expansion



Cheap renewable energy, biogenic CO2 and fresh water

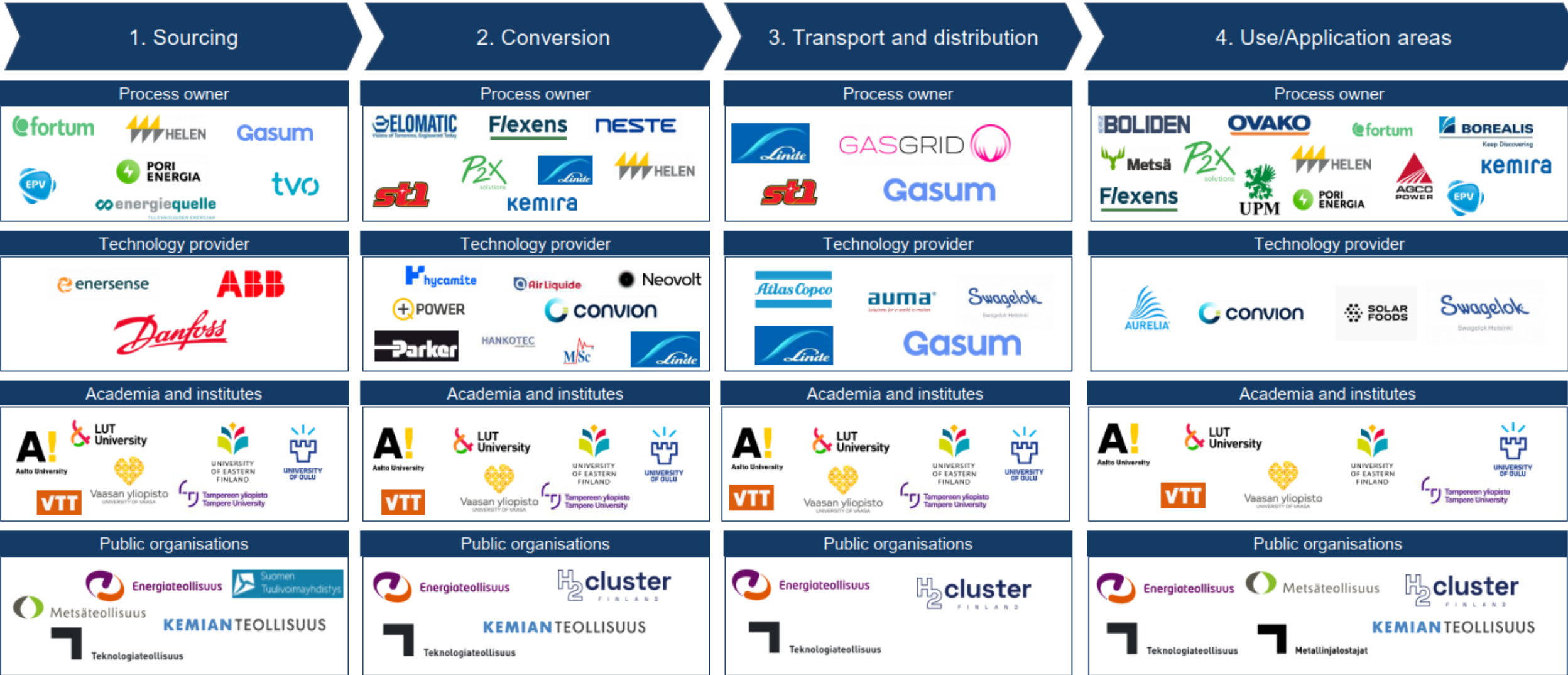


High-tech, stable society with unique competencies basis for **ecosystems**



Extensive **sector coupling opportunities** to integrate hydrogen across industries and energy sectors for **maximum value add**

Private and public Finnish ecosystem actors cover all parts of the value chain with potential for strong industrial use applications



FINLAND



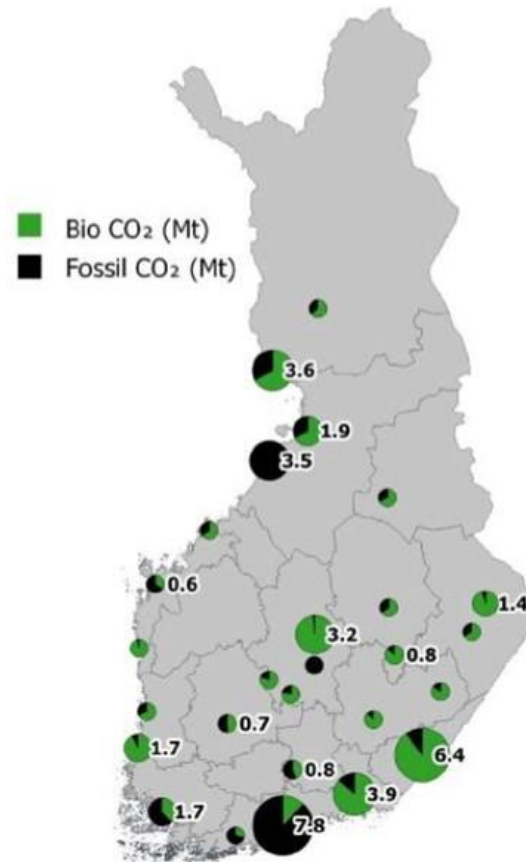
Clean hydrogen economy strategy for Finland

FINLAND – CO₂ SOURCES – BIOGENIC – 28 MT

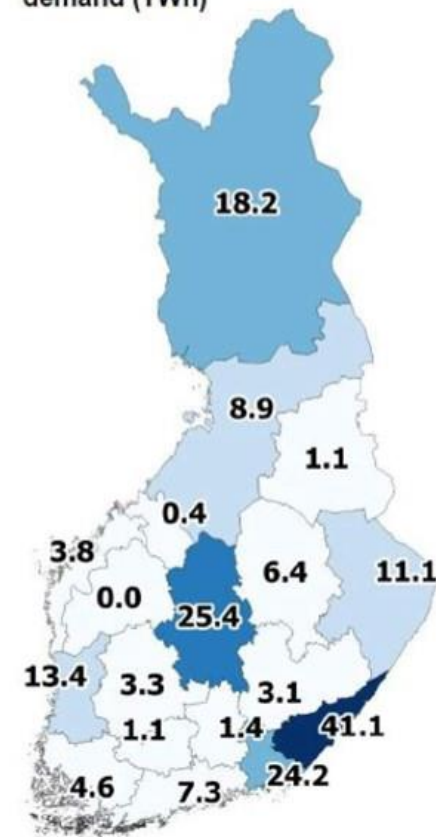
CARBON DIOXIDE AS A RESOURCE



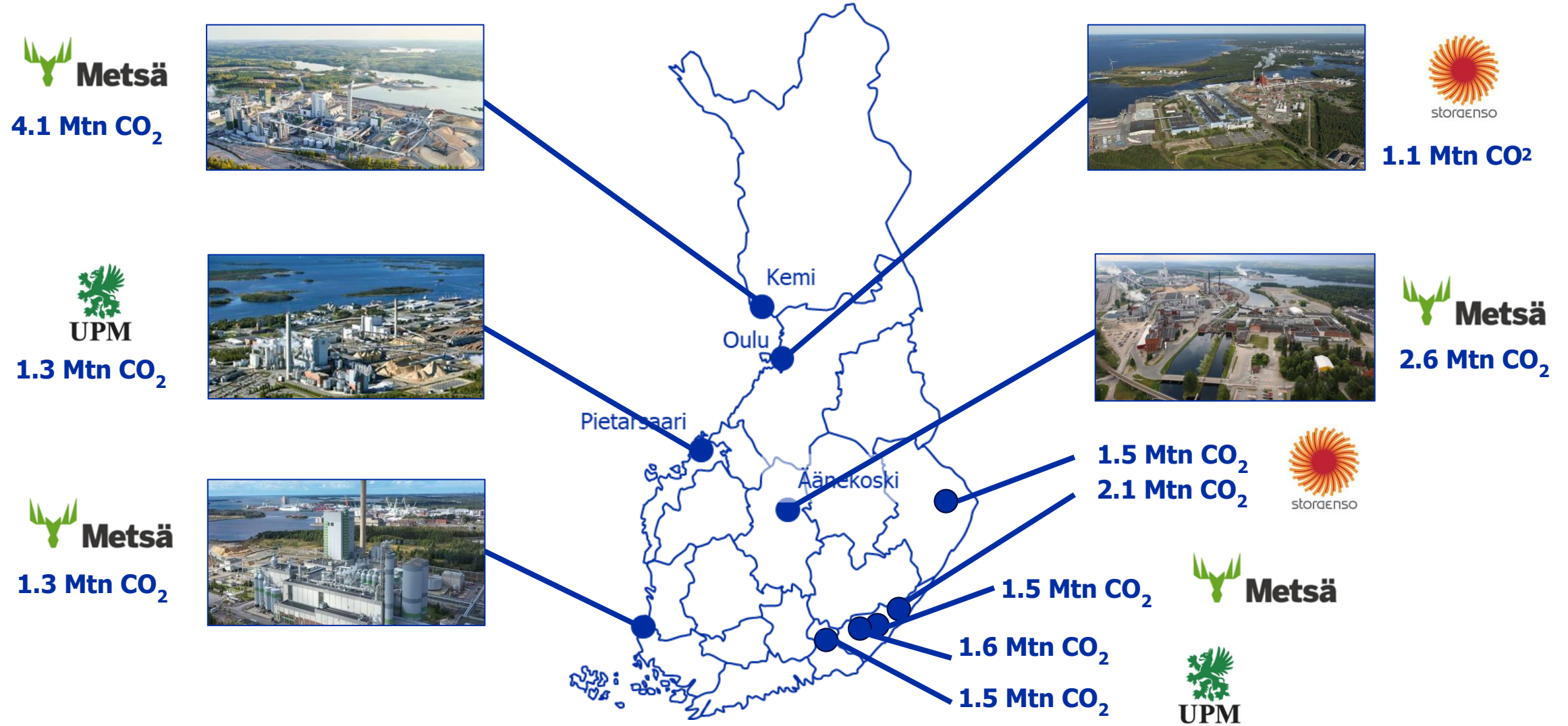
» Large point sources of CO₂ in Finland release over 41 Mt of CO₂ annually, of which over 50% originates from biomass



» BioCO₂ conversion electricity demand (TWh)



Finland – selected pulp mills and biogenic CO₂ (2021)



Commission approves up to €5.4 billion support by 15 Member States for an Important Project of Common European Interest (IPCEI) in the **Hydrogen Technology value chain** "IPCEI Hy2Tech"



*SME

Commission approves up to €5.2 billion support by 13 Member States for an Important Project of Common European Interest (IPCEI) in the **Hydrogen value chain** "IPCEI Hy2Use"



Competition

*SMEs

**BUSINESS
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DECARBONIZATION INDUSTRIES



DECARBONIZING STEEL (INKOO)

FINLAND



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