Elkem

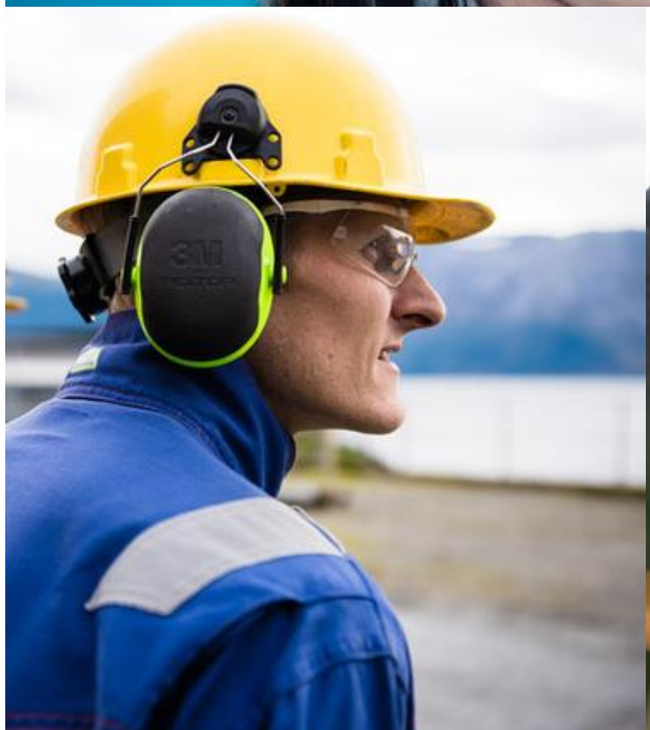
Silicon

Fundamental changes or normal cyclicality?

Inge Grubben-Strømnes

This is Elkem

One of the world’s leading providers of advanced material solutions



Who we are

- A global team of 7,000 people, with >500 in R&D
- 30 production sites, R&D centres and offices worldwide
- Headquartered in Norway, main hubs in France and China
- Listed at Oslo Stock Exchange, Bluestar 53% majority owner

What we do

- The company develops silicones, silicon products and carbon solutions
- We offer specialties and standards from fully-integrated value chains
- Our divisions: Silicones, Silicon Products and Carbon Solutions. 40% ownership in Vianode developing graphite for batteries

Our commitments

- Our purpose: Advanced material solutions shaping a better and more sustainable future
- Our strategy: Growth driven by operational excellence and increased specialization

Our performance

- Track record of continuous improvement since 1904
- Market cap NOK 26,5 billion
- 2021: NOK 33,7 billion in revenues
- 2022: Ecovadis “Platinum” rating, CDP “A-” on climate

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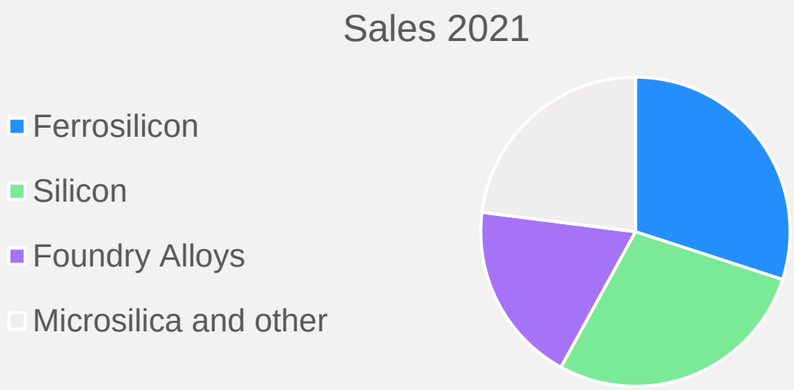
Elkem Silicon Products: Global leader in silicon based materials and solutions

In short

- Producer of silicon, ferrosilicon, foundry alloys and microsilica
- Strong positions based on scale, operational excellence, global footprint and sustainable hydro power
- Robust market positions based on high degree of customized products, deep application knowledge and close customer relationships
- Employees: >1900
- Revenues 2021: 14,8 NOK billion

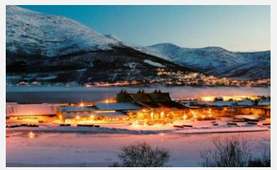
Business lines



Global footprint

Production plants

Norway	Salten, Thamshavn, Rana, Bremanger, Bjølvefossen
Iceland	Grundartangi
Canada	Chicoutimi
Paraguay	Limpio
China	Shizuishan
India	Nagpur



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Silicon value chain

Raw materials

Quartz

Coal and biocarbon

Electricity

Products

Total production capacity

205.000* mt in Norway and China
- 175.000* mt Silicon
- 20.000 mt Silgrain®
- 10.000 mt Silgrain® specialties

Properties

- Raw material in silicones and polysilicon optimizing selectivity
- Alloy strengthening aluminium
- Semi conductor insulating electronics
- Impurity management KSF

Industry players**

Silicones (50%)

Elkem, WACKER, DOW, MOMENTIVE, Shin-Etsu, EVONIK

Aluminium (30%)

Hydro, Alcoa, TRIMET, Allied Metal Company, STENA ALUMINIUM, RAFFMETAL

Polysilicon (10%)

TOKUYAMA, 协鑫 GCL, OCI, WACKER, HSC

Specialty niches (10%)

Air Liquide, SDGKW, SAINT-GOBAIN, brembo, Denka, ORICA, MATERION, LG Chem

End markets

Consumer goods

Construction

Automotive

Renewable energy

Electronics

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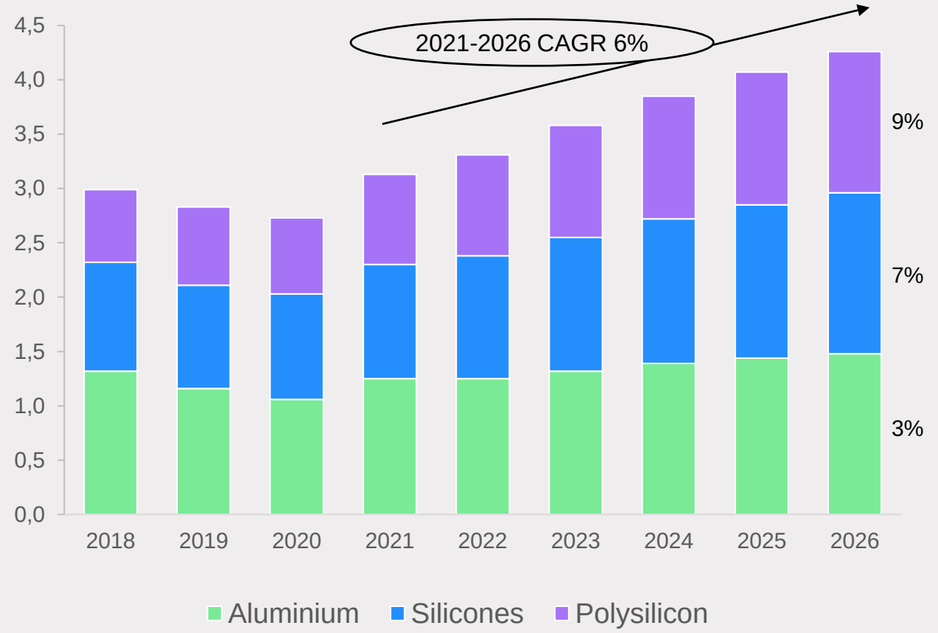
* Of which 50.000 mt at Yongdeng plant (internal supplier to Elkem Xinghuo) reported in Elkem Silicones
** Split of silicon revenues by segment. Companies not necessarily customers

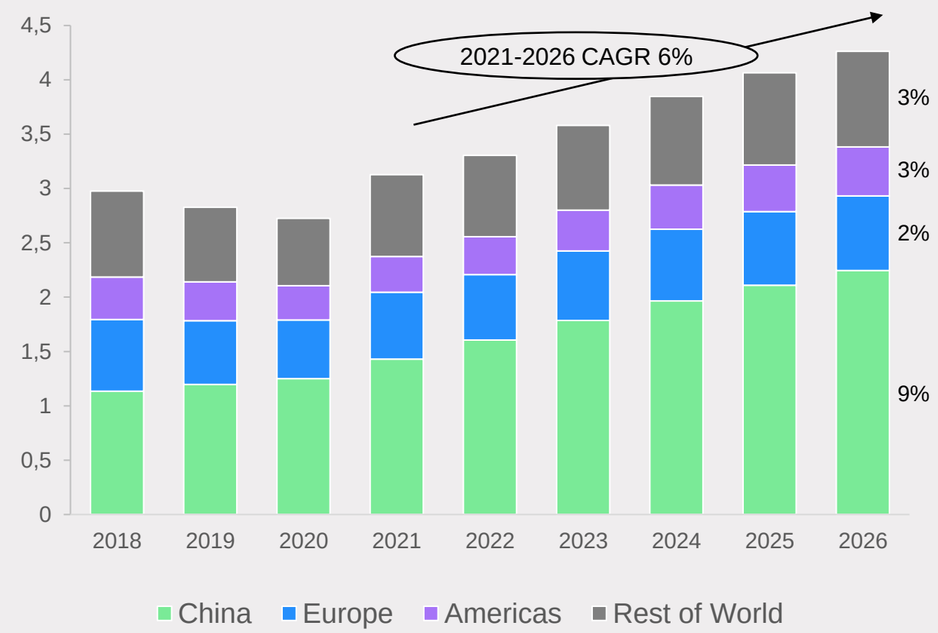
Strong growth in silicon driven mainly by silicones and polysilicon, especially in China

Silicon per end-use (million tons)



- Strong growth driven by silicones and solar
- Stable demand from aluminium
- Significant potential from batteries

Silicon per region (million tons)



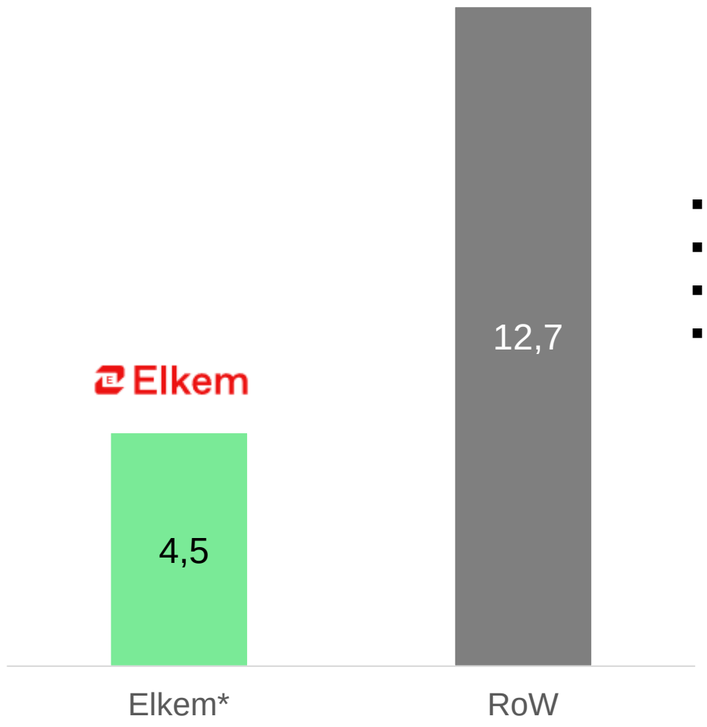
- Strong growth in China driven by large expansions in silicones and solar capacity

Sources: CRU Silicon Metal Market Outlook May 2022, Elkem analysis

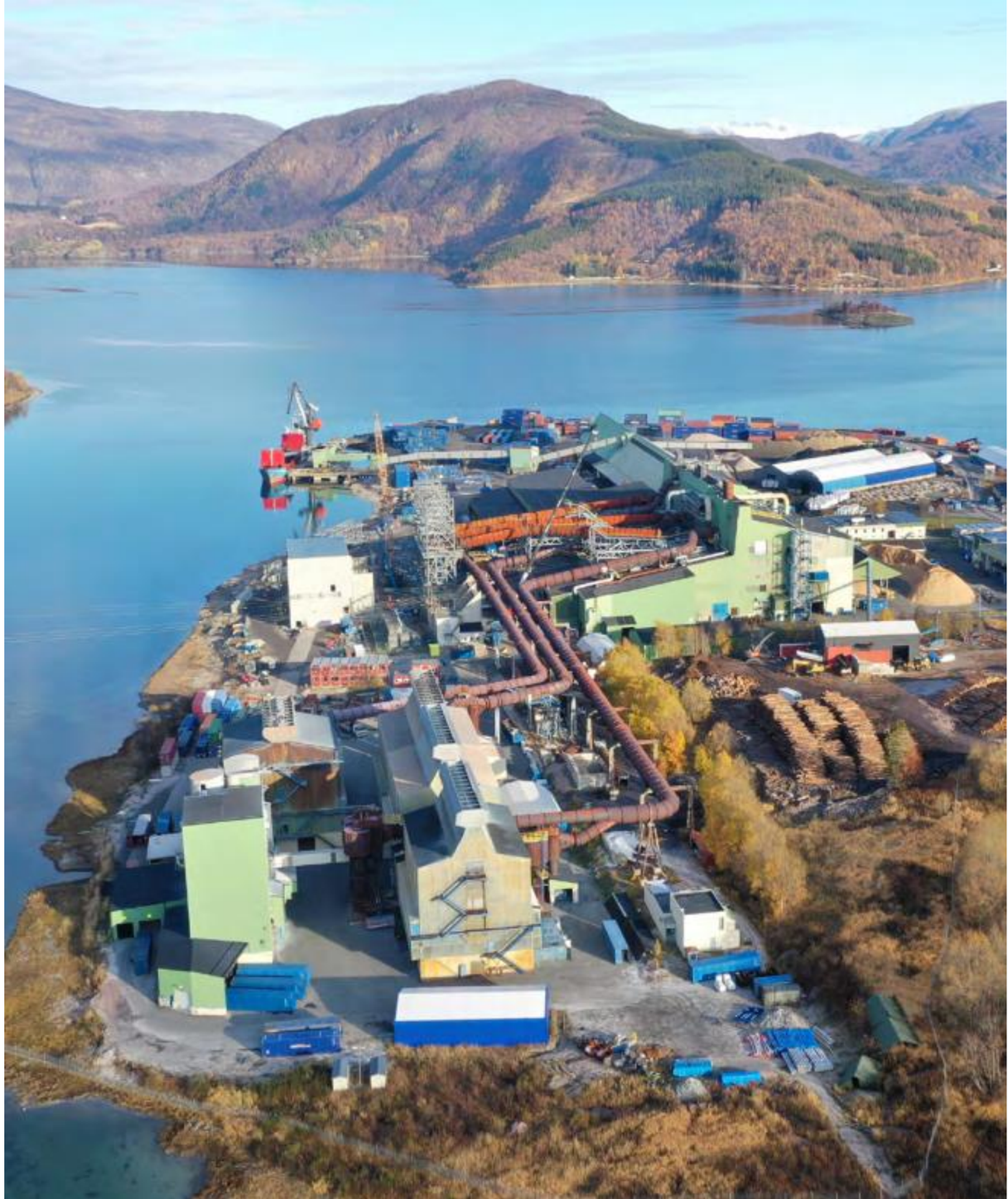
Silicon from Elkem has a low CO_2 footprint

Climate change (IPCC2013 GWP 100a v1.03)

Kg CO_2/kg silicon



- Hydro power
- Bio reductants
- Operational efficiency
- Energy recovery



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* Elkem LCA (reference period 2018, 2019) scope 1,2,3, cradle-to-gate, Norwegian plants
Source: Elkem LCA, RoW EcoInvent

Elkem’s strategic means to reduce fossil CO_2 from silicon production

Increase material and energy efficiency

- Stabilize and increase the furnace silicon yield
- Reduce silicon losses from tap hole to final product
- Install energy recovery from off gas

Reduce fossil CO_2 emissions

- Increase biocarbon share of CO_2 emissions from 20% in 2021 to 50% in 2031
- Develop technology for production and usage of biocarbon briquettes based on waste wood – pilot plant under construction in Quebec, Canada
- Build industrial biocarbon production plant in Quebec, Canada

Technology development of Si and FeSi production

- Facilitate for CCUS
- Develop furnace technology for silicon alloy production with no CO_2 through carbon looping

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Elkem is well positioned with access to key raw materials and attractive power positions

	Quartz	Coal	Bio	Electrodes	Power
					
Market challenge	▪ Limited supply of high quality quartz ▪ Weak supply chains globally	▪ Highly volatile markets ▪ Reduced demand for thermal coal, limiting access to metallurgical grade	▪ Limited access and high cost ▪ Immature technical performance ▪ Political risk	▪ Highly consolidated supply base	▪ High power prices globally ▪ Shift to renewables with variable output
Elkem position	▪ Captive quartz mines close to plants (Norway and Spain)	▪ Long term supply relationships and global sourcing team ▪ Agglomeration development	▪ Elkem with own bio carbon pilot plant ▪ Active with several potential partners	▪ In house supply and multi sourcing strategy	▪ All silicon smelters based on hydro power ▪ Energy Recovery reducing electricity consumption by 30%

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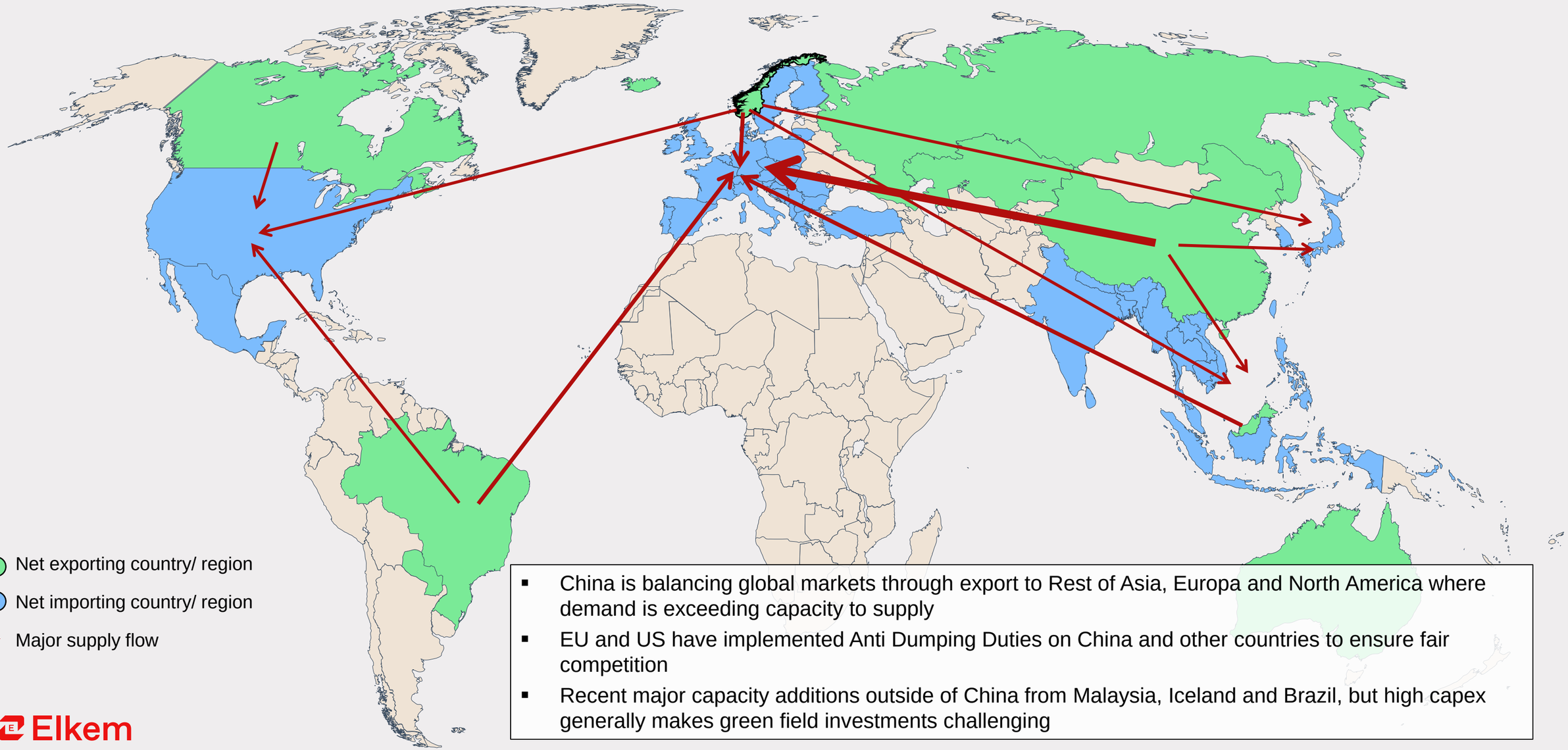
Silicon supply balanced by China



Net exporting country/ region

Net importing country/ region

Major supply flow

- China is balancing global markets through export to Rest of Asia, Europa and North America where demand is exceeding capacity to supply
- EU and US have implemented Anti Dumping Duties on China and other countries to ensure fair competition
- Recent major capacity additions outside of China from Malaysia, Iceland and Brazil, but high capex generally makes green field investments challenging

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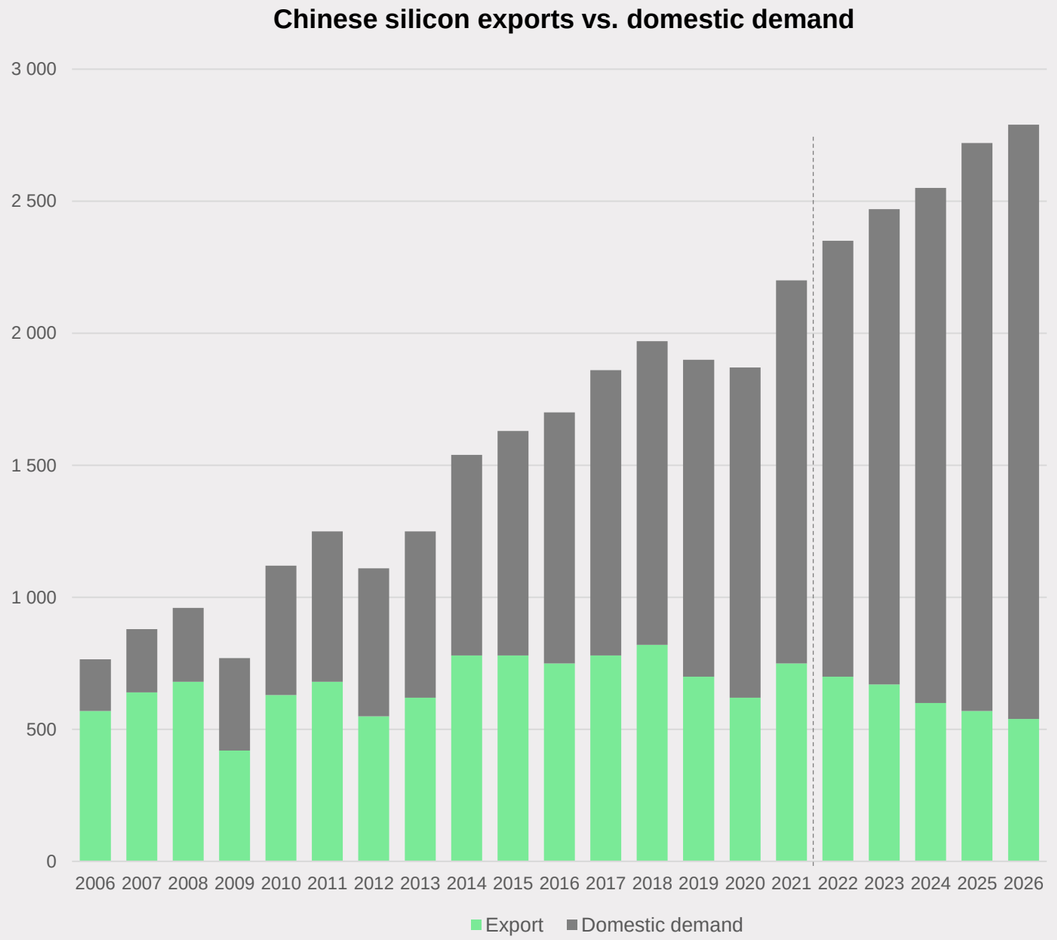
China’s role balancing silicon likely to weaken

- China established silicon and ferrosilicon production for exports based on strong incentives to expand capacity, low cost and low environmental standards
- Domestic demand has increased driven by solar, silicones and aluminium, supported by general economic development
- Production cost is increasing
  - Higher energy cost due to scarcity, strong demand and more imports
  - Stricter environmental regulations (local emissions and CO_2)
  - General cost level increasing due to higher standard of living
- Exports of silicon likely to decrease with price expected to increase



Sources: CRU Silicon Metal Market Outlook May 2022, Elkem analysis

Elkem has a resilient value proposition

Raw materials

- Captive quartz mines (70-80% of consumption) and in-house biocarbon development
- Renewable hydropower
- Long term relationships and broad supplier base
- Global sourcing team

Plants

- Operational excellence and economies of scale
- Energy recovery (up to 30% of electricity consumption where installed) and low carbon footprint
- Attractive product mix and high value microsilica
- Attractive locations/ logistics
- Market access/ proximity

Customers

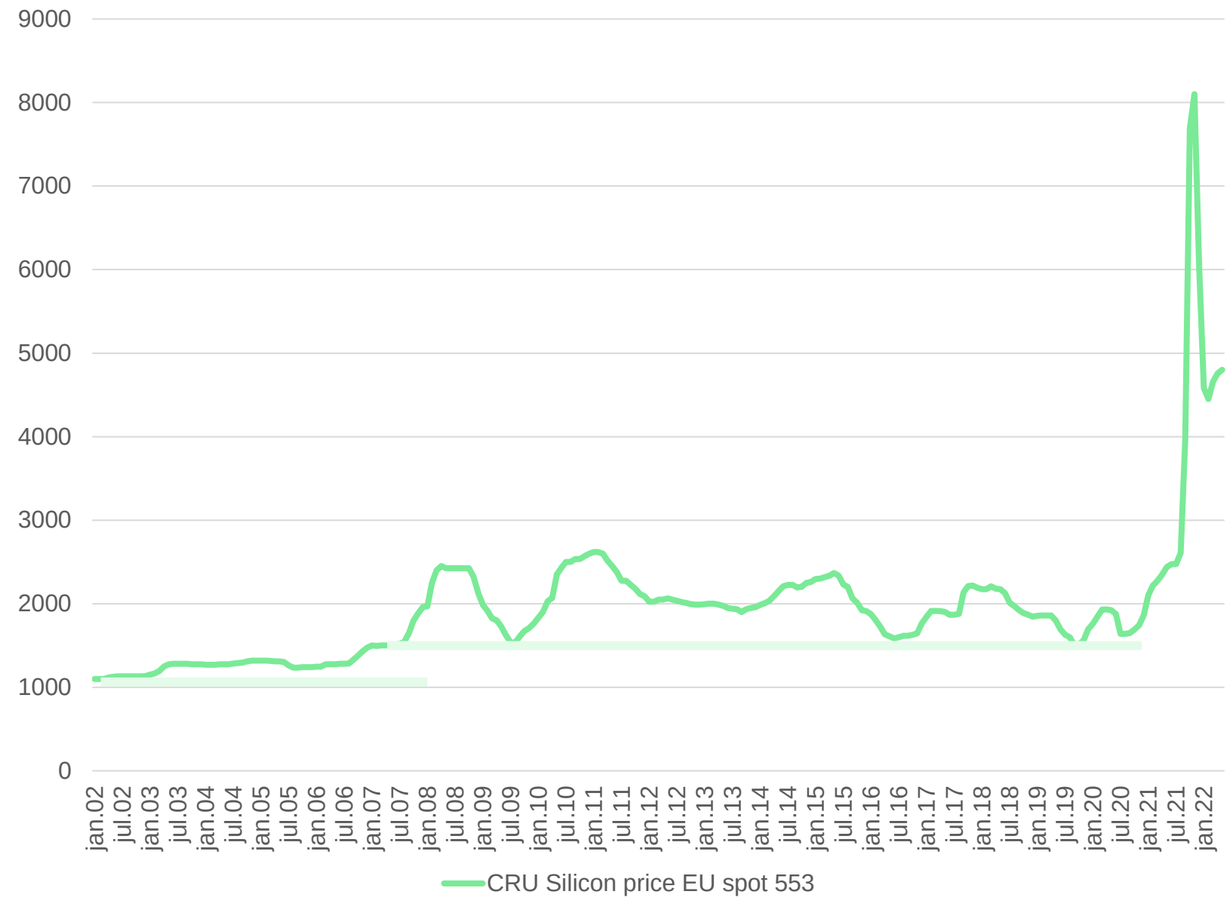
- Number one positions with strong brand and long-term relationships
- Deep application knowledge, patents and technical Customer Support
- Security of supply
- Ability to complement with external sourcing

End markets

- Sustainability
- Quality
- Reliability
- Relationships

What now? Market remains cyclical, but changing fundamentals are driving the levels up

CRU Si99 (553) EUR/mt



- Unprecedented price spikes, driven mainly by
  - Shortage of supply
  - High energy prices
- High volatility
  - Input factors such as coal and power
  - CO2 cost and regime
  - Tight market balance
  - Challenging logistics
- Underlying cost increase, especially in China
- Regionalization and security of supply
- Trade restrictions
- Sustainability and environmental footprint

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Source: CRU

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Delivering your potential