Elkem ASA

Opportunities in automotive

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Elkem

More than 110 years of history as a technology provider

Founded in 1904 by Sam Eyde

Listed on **Oslo stock exchange** since March 2018

Total operating income

NOK 25.9 bn.

EBITDA

NOK 5.8 bn.

EBITDA margin

22%

Head office in Norway

29 plants worldwide

Employees worldwide

~ 6,200

R&D centres in Norway, France and China

>400 R&D people

Four strong business areas
all with attractive positions towards automotive

Silicones

End-markets

- Paper & Film Release
- Automotive
- Silicone Rubber
- Chemical Formulators
- Personal Care
- Textile
- Oil Field
- Construction

Silicon Materials

End-markets

- Chemicals
- Aluminium
- Electronics
- Solar
- Construction
- Refractories
- Oil & Gas

Foundry Products

End-markets

- Automotive
- Engineering
- Pipe and fittings
- Specialty Steel

Carbon

End-markets

- Ferroalloys
- Silicon
- Aluminium
- Iron Foundries

Strong position based on competitive strengths

- Broad product portfolio with strong positions
  - Silicones to airbags, gaskets, cables and battery insulation
  - Silicon metal to aluminium used in body structure and other parts
  - Specialty foundry alloys used in engine blocks, brake discs gear boxes etc.
- Well positioned to benefit from growth in EV – both in China, US and Europe
- R&D capabilities to meet technological development and demands
- Silicon and ferrosilicon production with low CO2 footprint
- Elkem's share of revenue from the automotive sector is approx. 25%

Ceramic brake discs to high-end segments

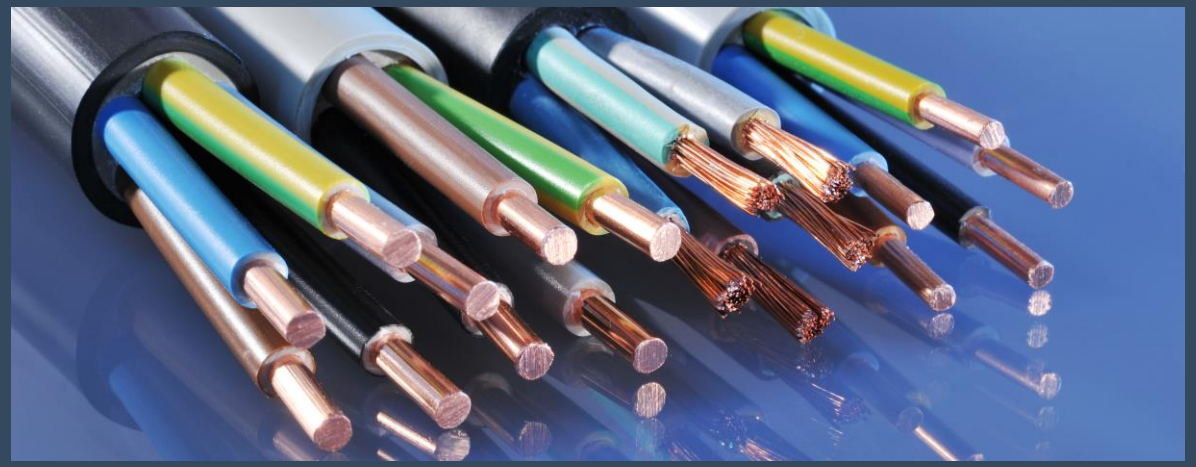
- High quality product with higher performance
  - Lower weight
  - Higher thermal stability
  - Higher friction coefficient stability
  - Reduced brake dust

- Use by luxury brands such as Porsche, Ferrari, Bentley etc.

Silgrain used for production of ceramic discs due to excellent properties

Well positioned to benefit from market trends

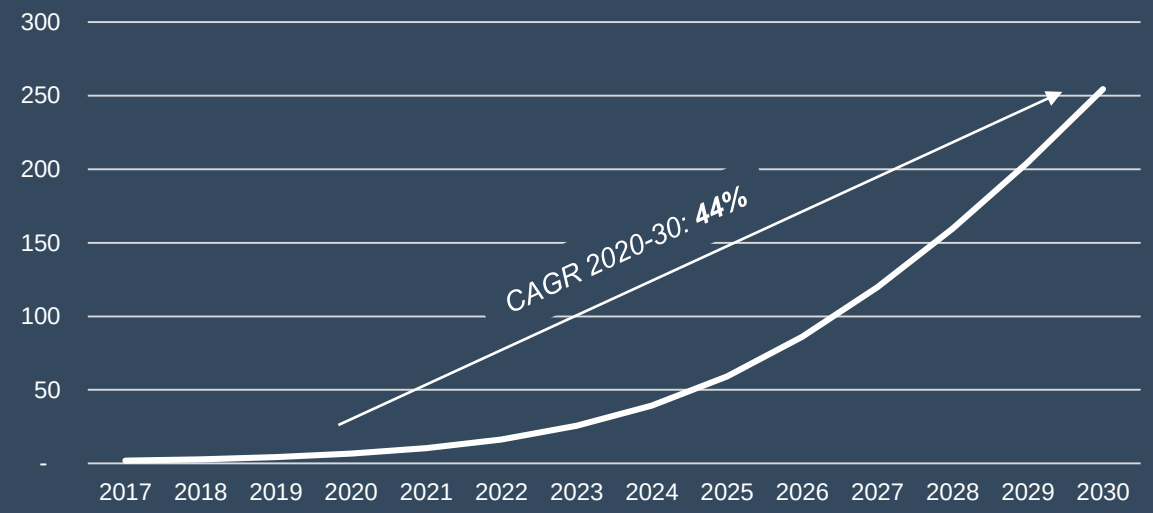
- Growth in EV market
  - Increased demand for batteries and components for electrical powertrains
- Light weighting
  - Demand for light weight materials and composites to improve fuel efficiency
- Sensor and electronics
  - Vehicle guidance/support systems (sensors) and interior electronics (screens, connectivity)
- Sustainability throughout the automotive value chain
  - Life cycle assessments (LCA) increasingly important for major OEMs



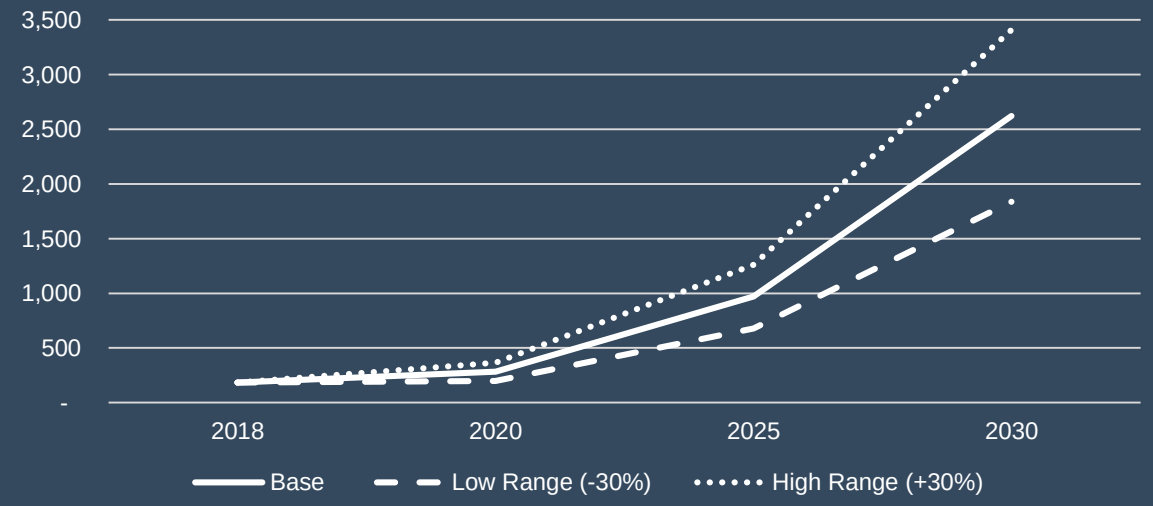
Growth in EV driving demand for Elkem's products

- Elkem is well positioned to benefit from growth in EVs
- Silicone solutions to thermal management for battery packs and cables
  - Insulating foams to dissipate heat in high voltage and power electronics such as batteries and battery-packs
  - Cables with fire resistance and ability to manage thermal flows
  - Foam gaskets and potting materials to protect battery packs from moisture and dust - key to preserving durability and efficiency
- Ferrosilicon to electrical steel
  - Electrical steel used to produce magnetic cores for electric motors
  - Improves the motor efficiency, reducing the need for battery capacity and thus increasing range
- Growth in EVs beneficial to Elkem
  - An EV contains on average four times more silicone than a traditional fossil fuel car

Projected global production of electric vehicles (passenger and commercial, in millions)[1]



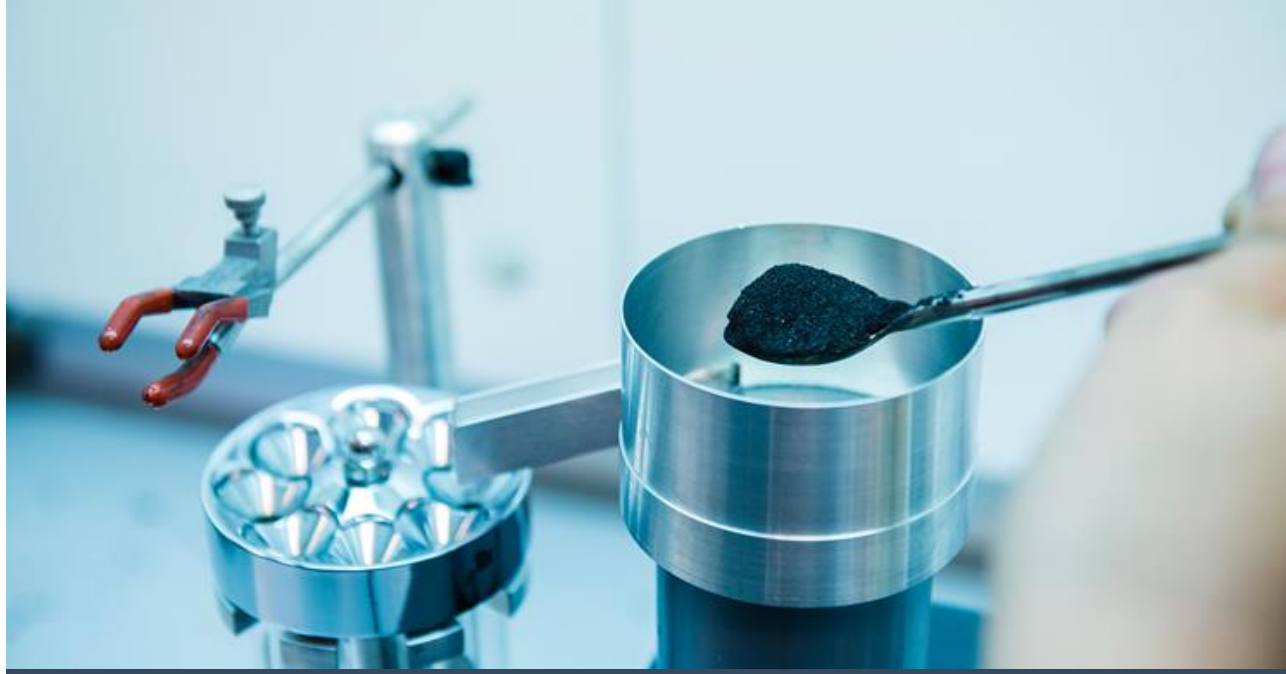
Global Battery Demand (in GWh)[2]



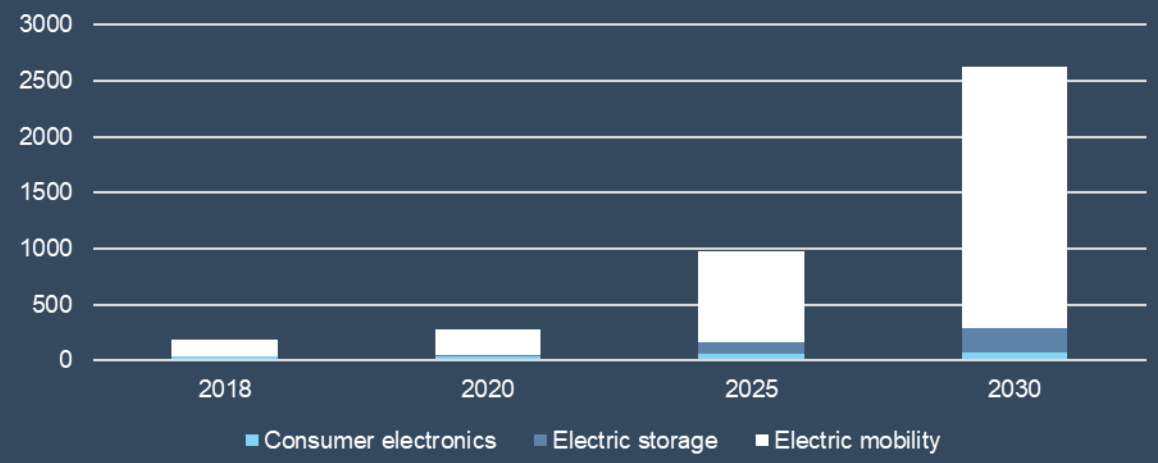
Sources:
1) World Economic Forum - A Vision for a Sustainable Battery Value Chain in 2030
2) DNVGL – Energy Transition Outlook 2019

Growing battery demand gives attractive opportunities

- Exploring market opportunities for graphite and silicon materials in battery cells
  - Graphite is the dominating anode material today
  - Silicon-graphite composite could be the next generation anode materials
- Pilot plant in Kristiansand to develop high-end synthetic anode graphite for lithium-ion battery cells
  - Tailor-made for EV applications
  - The pilot line will be in full operation in Q4 2020
  - Industrial production of anode graphite from 2023
- Development of silicon graphite composites increasing energy density further
  - Silicon has around 10x higher theoretical storage capacity than graphite
  - R&D is needed to overcome challenges related to expansion/disintegration during charging/discharging



Global Battery Demand – by application (in GWh)



Source: World Economic Forum - A Vision for a Sustainable Battery Value Chain in 2030

Light weighting increases demand for silicon and ferrosilicon

- Silicon to aluminium alloys
  - Aluminium replacing steel in chassis, engine blocks, drivetrain components, lowering the total vehicle weight
  - Strong relationships to key producers

- Ferrosilicon-based alloys enable use of light cast iron alloys
  - Elkem can deliver products that reduce vehicle weight through improving component design, enabling the use of lighter cast iron alloys

Sensors and electronics

- Increased use of sensors and electronics as OEMs respond to consumer demands for a connected and digital experience

- Silicones used as protective materials
  - Elkem offers a full range of silicone HCR rubber compounds and elastomers
  - Protection of electrical wires and cables
  - Encapsulate and seal electronic components to protect against mechanical and environmental contamination

- Silicon for use in computer chips, sensors and associated electronics
  - Elkem is a significant supplier of Si-based materials for the semiconductor industry, enabling the automotive industry to introduce new technologies requiring advanced electronics, such as autonomous vehicle features

Sustainability
low carbon footprint and life cycle assessment

- Increased focus from automobile industry on greenhouse gas emissions throughout the value chain, from production, to use and recycling of vehicles
  - Driven by consumer demands for sustainable products
- Elkem's production of ferrosilicon and silicon used in alloy materials for automotive products is among the most environmentally friendly in the world
- EcoVadis has given Elkem the Gold performance rating for the 2019 CSR assessment, ranking Elkem in the top 10 per cent
  - EcoVadis is a recognised provider of business sustainability ratings. The assessment is based on 21 main CSR criteria

Summary

- Elkem has a strong position towards automotive
- Well positioned to benefit from growth in EV market
- Promising opportunities for battery solutions
- Strong R&D capabilities to take part in technology development
- Sustainability in production becoming increasingly more important