sgl carbon

Investor Relations Presentation

December 2019

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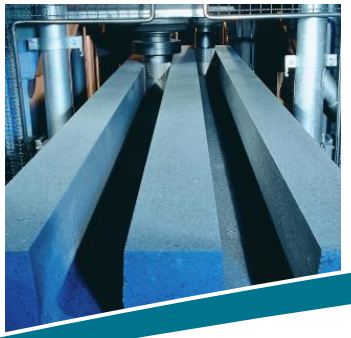
The Business Model

Successful transformation of SGL Carbon.

Carbon and graphite for Megatrends

Lighting › **Steel, Aluminum** › **Mobility, Energy, Digitization**



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SIGRI

SIEMENS PLANIA

SGL CARBON
Sigri Great Lakes Carbon Group

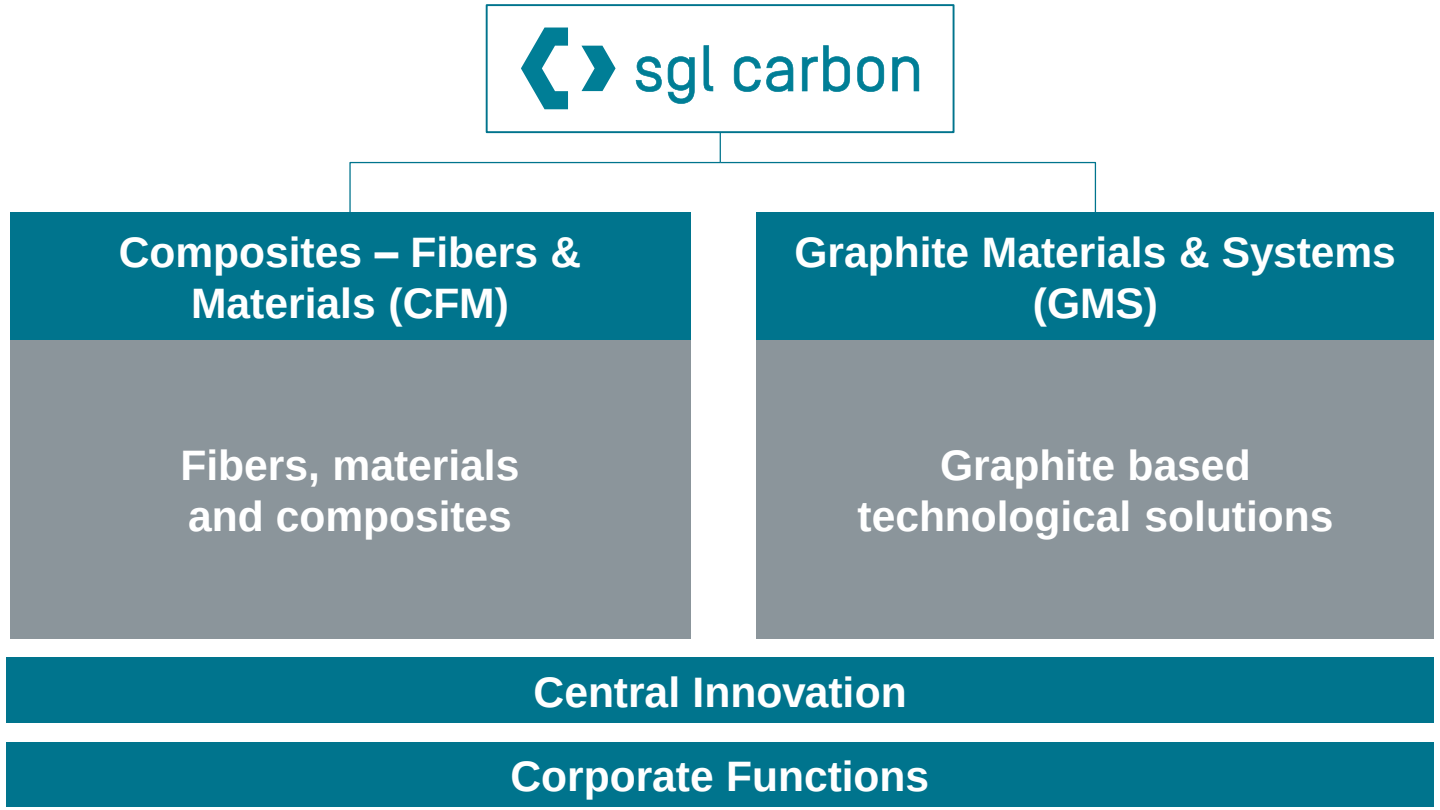
SGL CARBON GROUP

SGL GROUP
THE CARBON COMPANY

sgl carbon

New SGL Carbon.

Focus on two innovative businesses



Focus on CFM and GMS improves the balance between markets and industries, and thus **reduces volatility in our business**

New SGL Carbon.

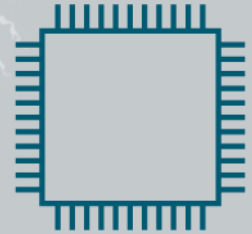
Specialized on carbon- and graphite-based solutions

30
Production sites

80+
Countries

Mobility

Energy



Digitization

Industrial Applications

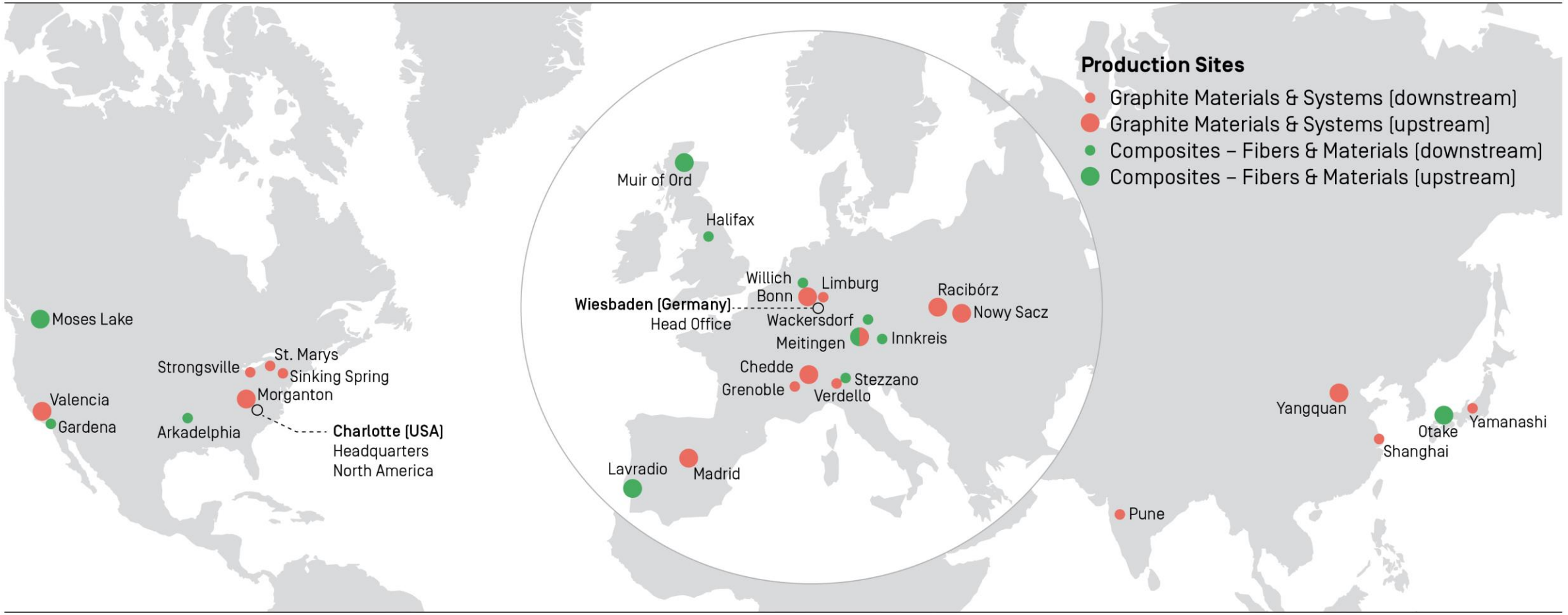
Chemical

Textile Fibers

~5,000
Employees

>€1bn
Revenue in 2018

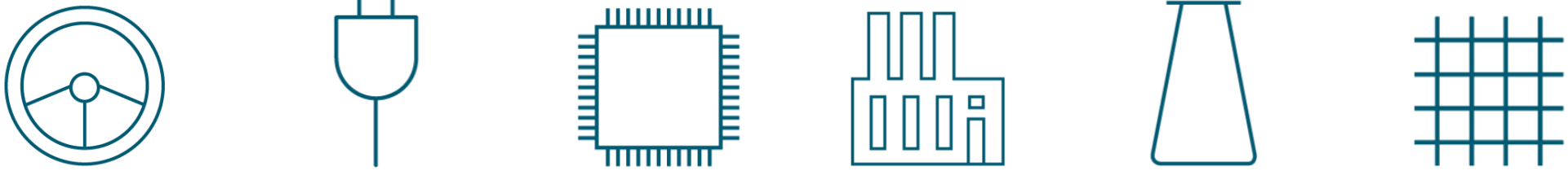
Global presence.
SGL Carbon worldwide sites



Group market segmentation.

Stronger orientation to customer and growth markets

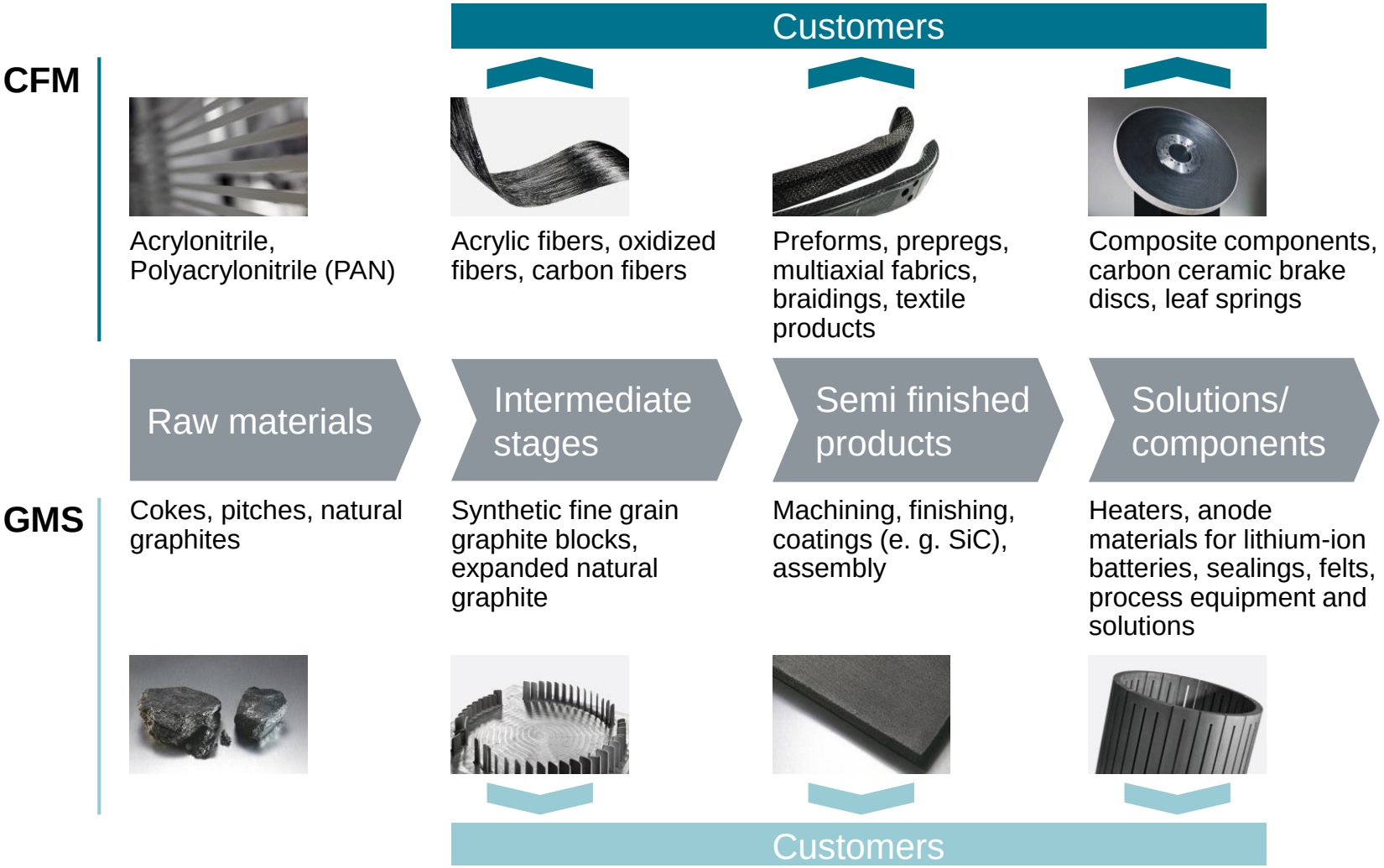
Market Segment



	Sales[1] € million	Mobility[2]	Energy[3]	Digitization[4]	Industrial Applications	Chemical	Textile Fibers
2018	**1048**	**29%**	**16%**	**7%**	**26%**	**13%**	**9%**
2017	860	19 %	22 %	5 %	29 %	14 %	11 %

[1] Figures in 2017 do not reflect full consolidation of SGL ACF and Benteler SGL as well as disposal of SGL Kümpers
[2] comprises automotive, aerospace and transport markets; [3] comprises battery, solar, wind and other energy markets; [4] comprises LED and semiconductor markets

Commanding entire value chain in carbon and graphite. Advantages in cost, quality and differentiation



Control over the entire **value chain** enables product customization to customer requirements

Customers receive **tailor made solutions** from every step of the value chain

Forward integration in finishing technologies (GMS) and CFRP-components (CFM) including application know how are essential for **differentiation**

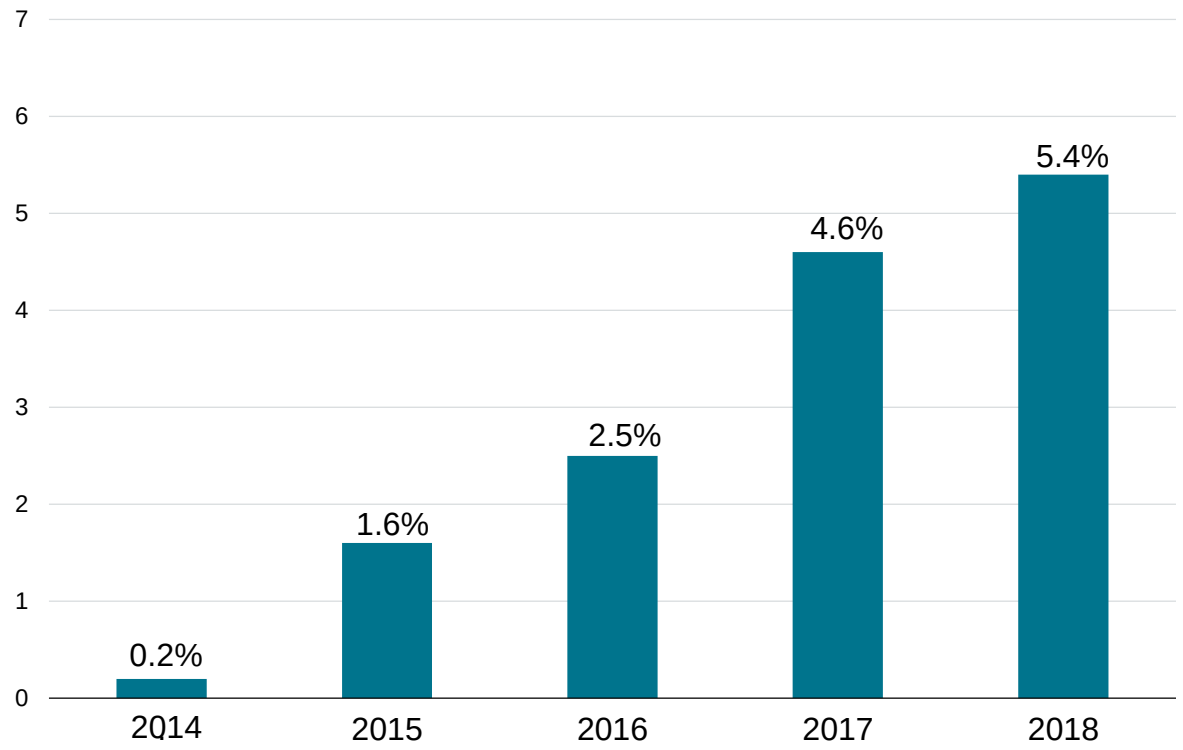
ROCE.
Remains key management principle for managing the business

In 2014, we, the new Board of Management, introduced ROCE as new **key management principle**, replacing ROS

As a result we implemented the ROCE target in all senior management layers, aligning their **incentive system** with ours

We started reporting ROCE on Group and BU levels on a **quarterly basis**, so that our progress can be tracked

ROCE[1] development



While we are not yet there, we have made substantial progress toward our targeted ROCE[1]

[1] ROCE defined as EBIT/Capital employed; historical data adjusted to reflect “new” Group structure

Levers to further profitability improvement.

Sales:

Focus on higher margin innovative **Megatrend markets** (digitization, energy, mobility)

Increase in share of **higher margin downstream businesses**

Increase utilization of existing capacities (CFM) and capacity extensions (GMS)

Commercial Excellence: margin and KPI steered sales organization with focus on price increases, improved product mix, high margin and high growth areas

Costs:

Automation

Digitization

Global **standardized** and **efficient processes**: e.g. Operations Management System

Fully utilize **Shared Service Center** and transfer further transactional tasks

Portfolio:

Lightweight and Application Center will support market penetration in automotive industry by closing the gap between materials and applications

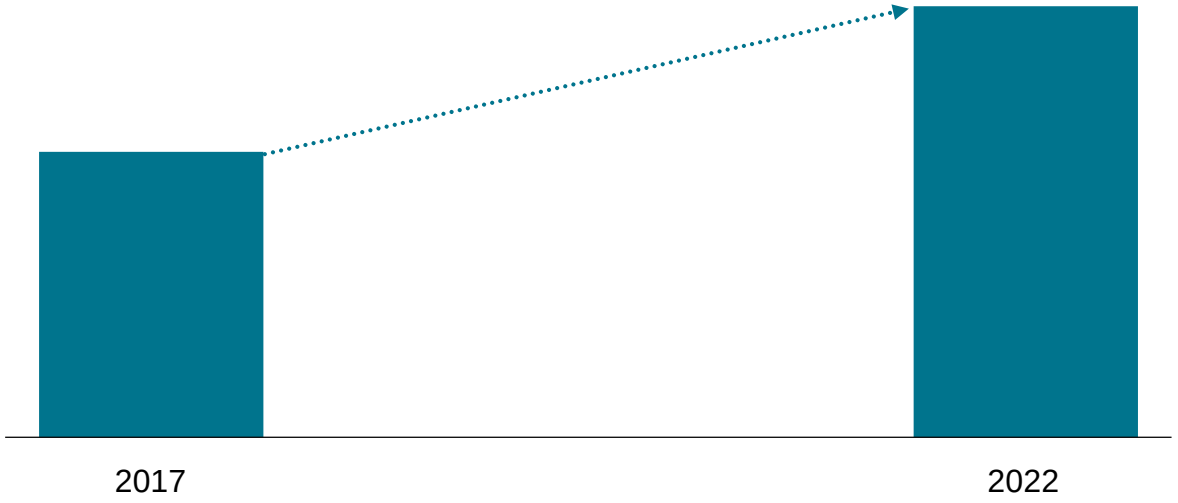
Battery laboratory: continuous build-up of own competencies to develop next generation material

Strategic and **KPI-driven CAPEX** planning and improved execution

SGL Carbon – our sales growth paths.

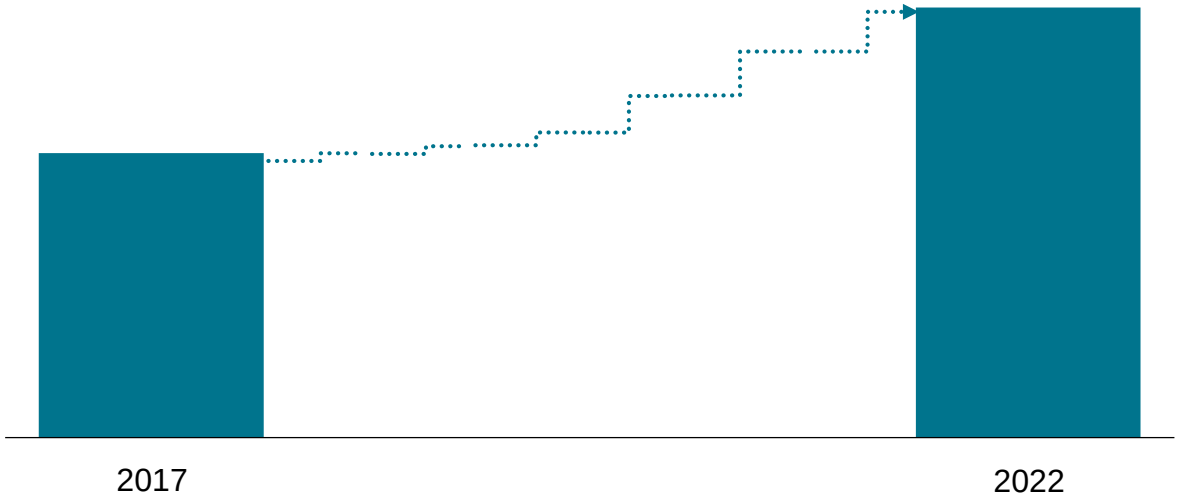
Different mid-term growth patterns expected in GMS and CFM

GMS



- Well developed material
- Well established markets and businesses
- **“Linear“ growth expected**

CFM



- Young material
- Breakthrough in composites today
- We have to develop our markets
- **Project-driven growth expected, back-end loaded**

Graphs for illustrative purposes; not to scale

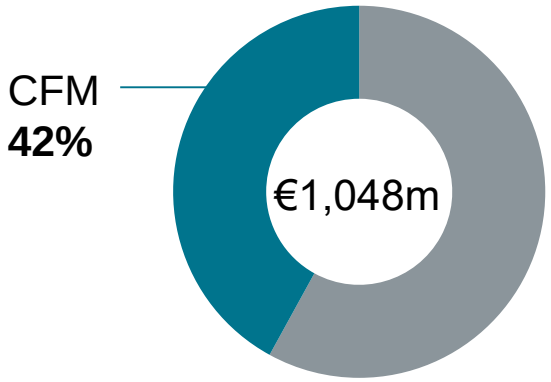
Business Unit
Composites- Fibers & Materials (CFM)

Reporting Segment.
Composites – Fibers & Materials (CFM)

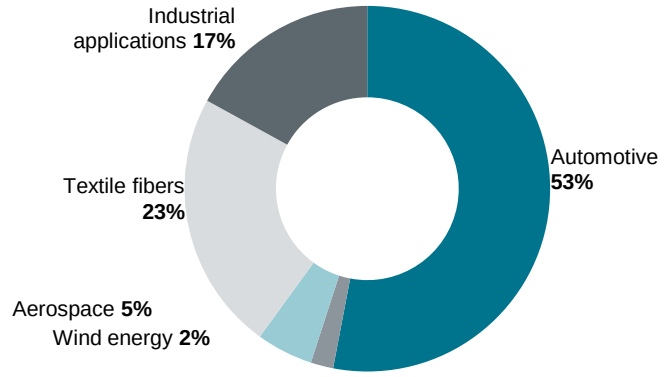
Activities

- Carbon Fibers
- Composite Materials
- Composite Components
- Ceramic Brake Discs (JV with Brembo)

Group sales 2018



CFM sales 2018



Key industries served

- Automotive
- Aerospace
- Energy
- Industrial Applications
- Textile fibers

Characteristics

- New applications in automotive, energy, industrial
- High earnings improvement potential
- Complete value chain in house

Strategic priorities

- Strengthen capabilities to safe-guard globally leading position
- Develop products and production technologies for innovative customer solutions
- Exploit synergies across the value chain

Carbon fiber composites industry still in its infancy.

Aluminum industry

1936	**Aerospace**	Douglas DC-3
1959	**Industrial Applications**	Introduction of aluminum cans
1961	**Automotive**	Land Rover V8 engine blocks
1994	**Automotive**	Audi Space Frame
2015	**Automotive**	Ford F-150

Carbon fiber industry

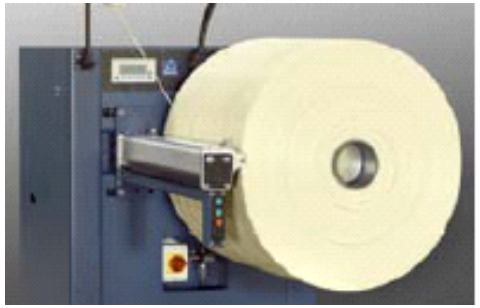
Late 1960s	**PAN-based carbon fibers**	First high-performance carbon fibers
1980s	**Aerospace**	US military aircraft
2009/13	**Aerospace**	Boeing 787, Airbus A350
2013/15	**Automotive**	BMW i3 and 7 series

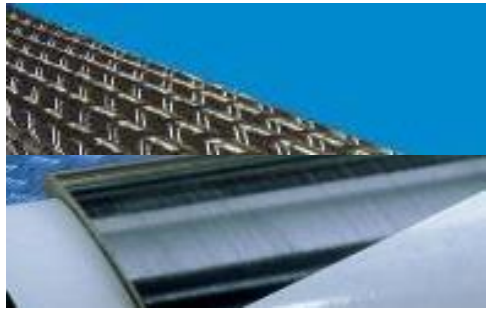
- It took the aluminum industry 40 to 50 years from selected use in aerospace to serial use in automotive
- Carbon fiber industry trails 30 years behind aluminum
- Driven by environmental legislation, serial use of carbon fibers and composites in general just begins

CFM growth strategy is based on commanding the entire value chain

Upstream Area | **Downstream Area**

Precursor → **Carbon fiber** → **Textile** (dry material) → **Prepreg** (impregnated material) → **Parts/ Components** → **OEM**






- Security of raw material supply
- Quality control (precursor)
- Cost competitive Panox and carbon fiber

- Certified/qualified materials
- Cost control of intermediate production stages
- Elimination of interfaces

- OEMs* request part/component solutions from their suppliers
- Provide “one-stop shopping”
- Customer value creation

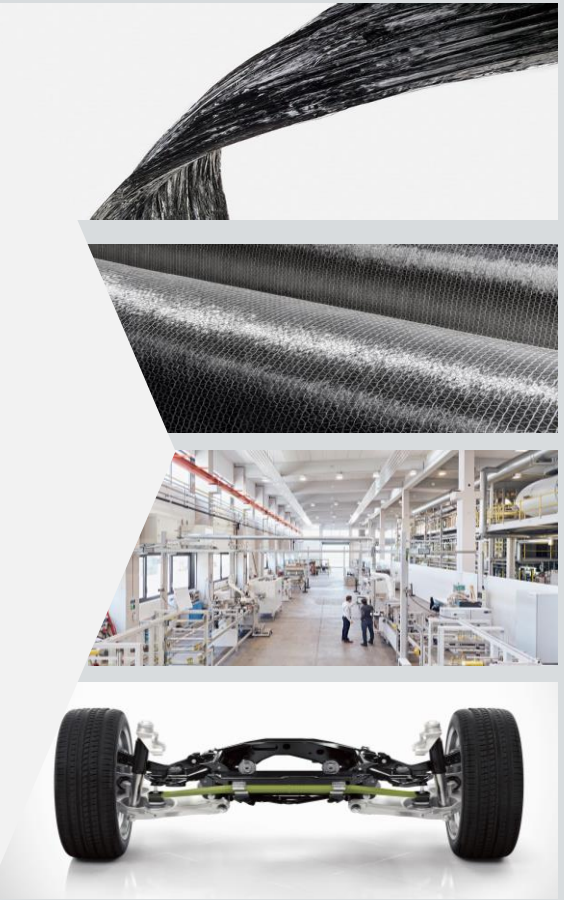
Demonstration of technology, development and series production competence along entire value chain is key

* In particular, the automotive industry, but also the aerospace sector

Our unique value chain and engineered solutions set us apart from competitors.

Our differentiators

- Engineered solutions
- Leading composites serial production
- Unique value chain from carbon fibers to components
- Industrial carbon fiber competence

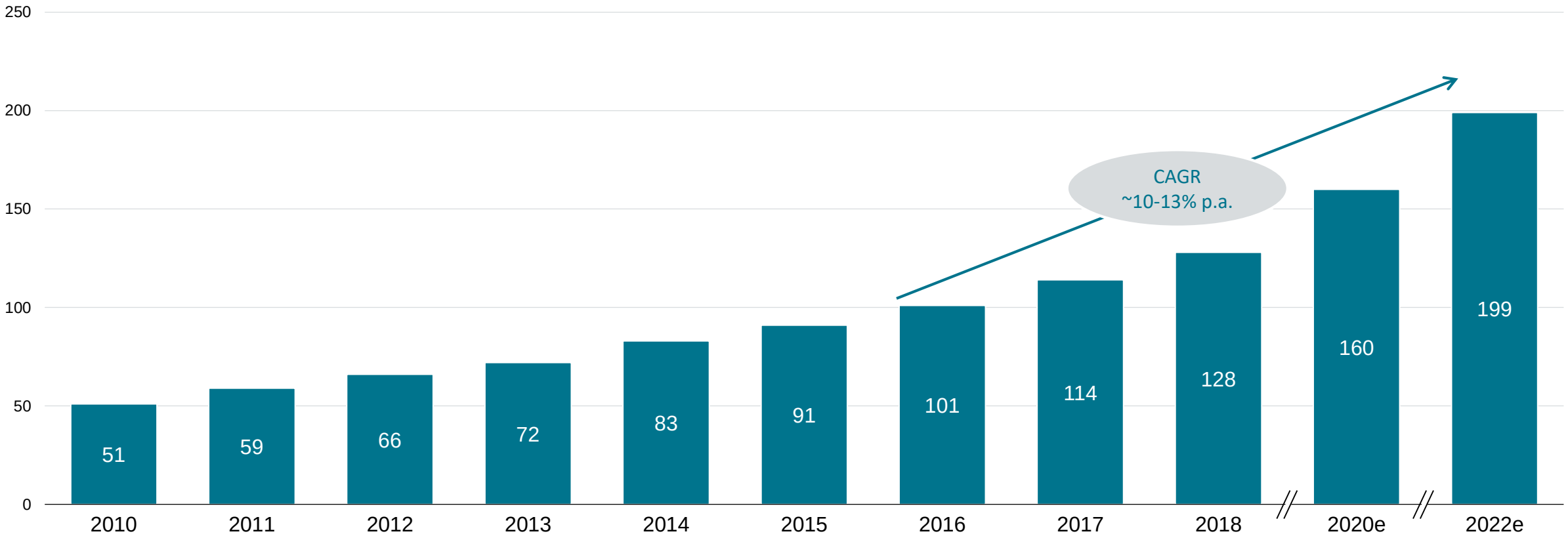


Competitors

- Carbon fiber producers focused on providing materials, not components
- Focused on expensive carbon fiber not suitable for automated production processes
- Component producers not backward integrated
- Geared to expensive, time consuming and not scalable hand lay-up

Carbon fibers and composite materials.
Strong demand growth anticipated

Global Carbon Fiber Reinforced Plastics (CFRP) Demand
[in thousand mt p.a.]



Source: CCeV (November 2018)

CFM expected to grow …

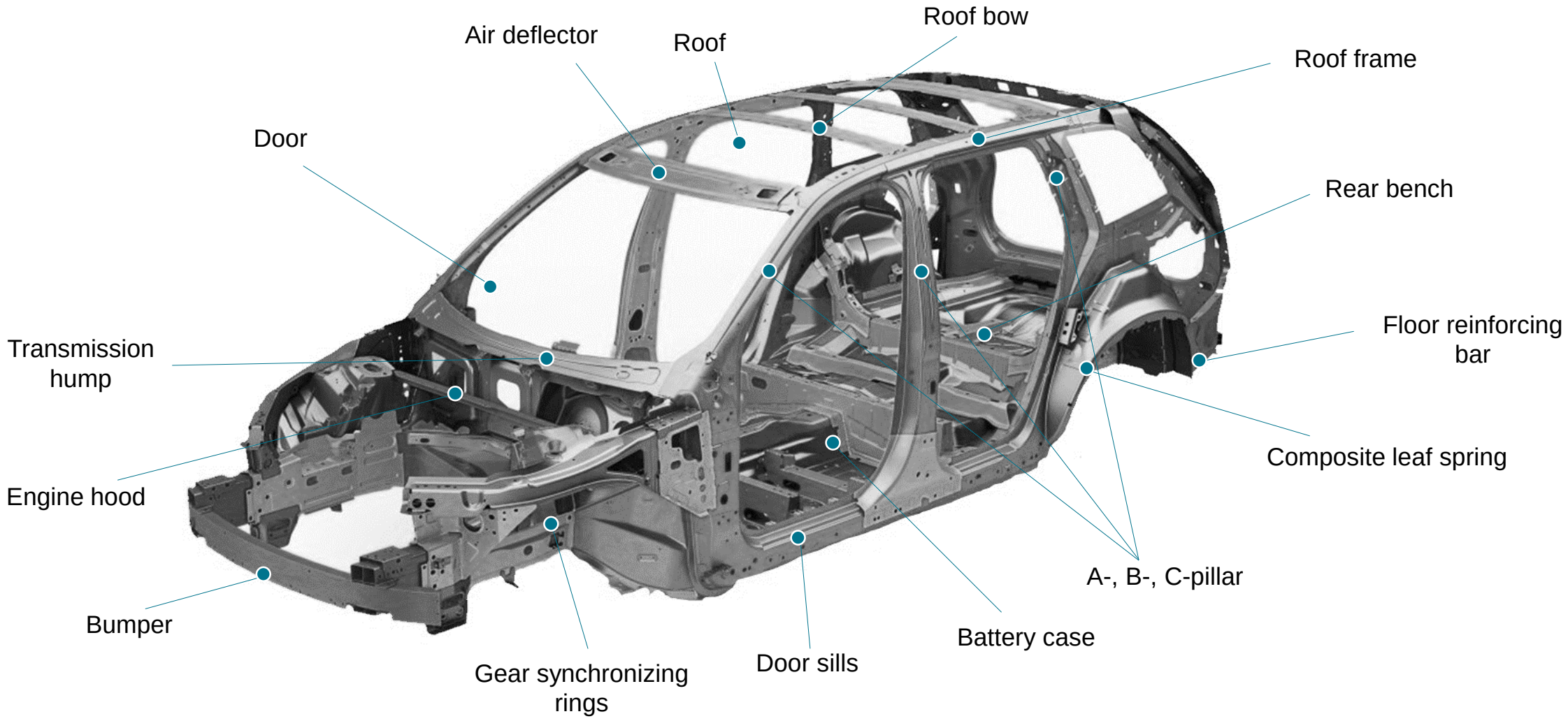
Market Segment	Automotive	Aerospace	Wind Energy	Industrial Applications	Acrylic Fibers
Sales 2017	30%[1]	6%	12%[2]	23%	29%
Sales 2018	53%	5%	2%	17%	23%

[1] Automotive sales in 2017 before effect from full consolidation of joint ventures with Benteler and BMW
[2] Wind energy sales in 2017 including full consolidation of SGL Kümpers, sold end of 2017

Automotive

SGL Carbon acts as full service and solution supplier to the automotive industry by offering engineering, prototyping and large-scale serial production for materials and components.
Together with our global customers we develop new and innovative composite automotive applications, hence transforming the existing material world into a more dynamic one and introducing flexible ways of using high-tech composite materials for diverse customer needs.

Materials and components are suitable for various automotive parts.



Source: SGL Carbon, based on Volvo XC 90 chassis model

SGL Carbon is already well-positioned in the automotive industry.

Existing projects in different automotive vehicle segments

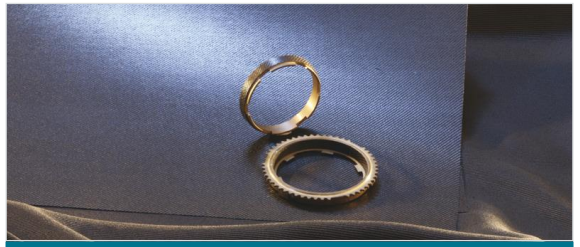
- Rear bench for performance sports cars
- Structural components for electric vehicles (EV)
- Leaf springs for light commercial vehicles and passenger car suspension systems
- Hybrid designs for large series passenger vehicles
- Friction materials for modern gear boxes

Audi MSS platform

BMW i3/i8

VW Crafter & **Daimler** Sprinter

BMW 7 series



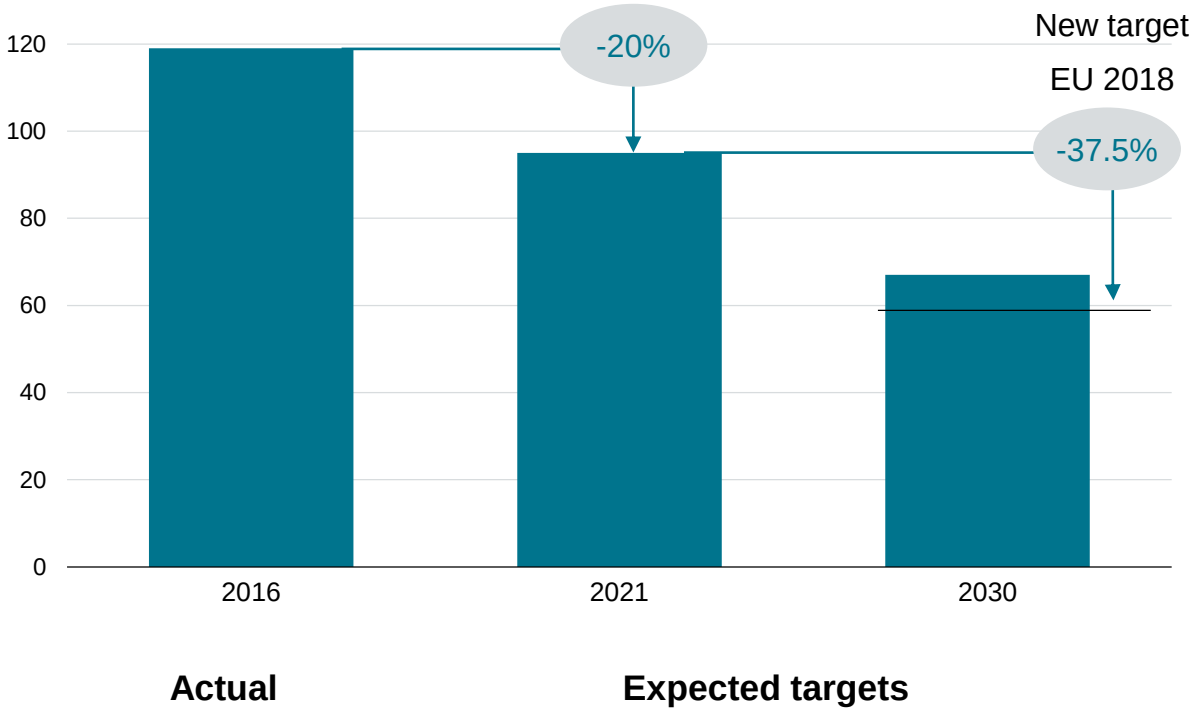
Friction materials

Volvo XC 90

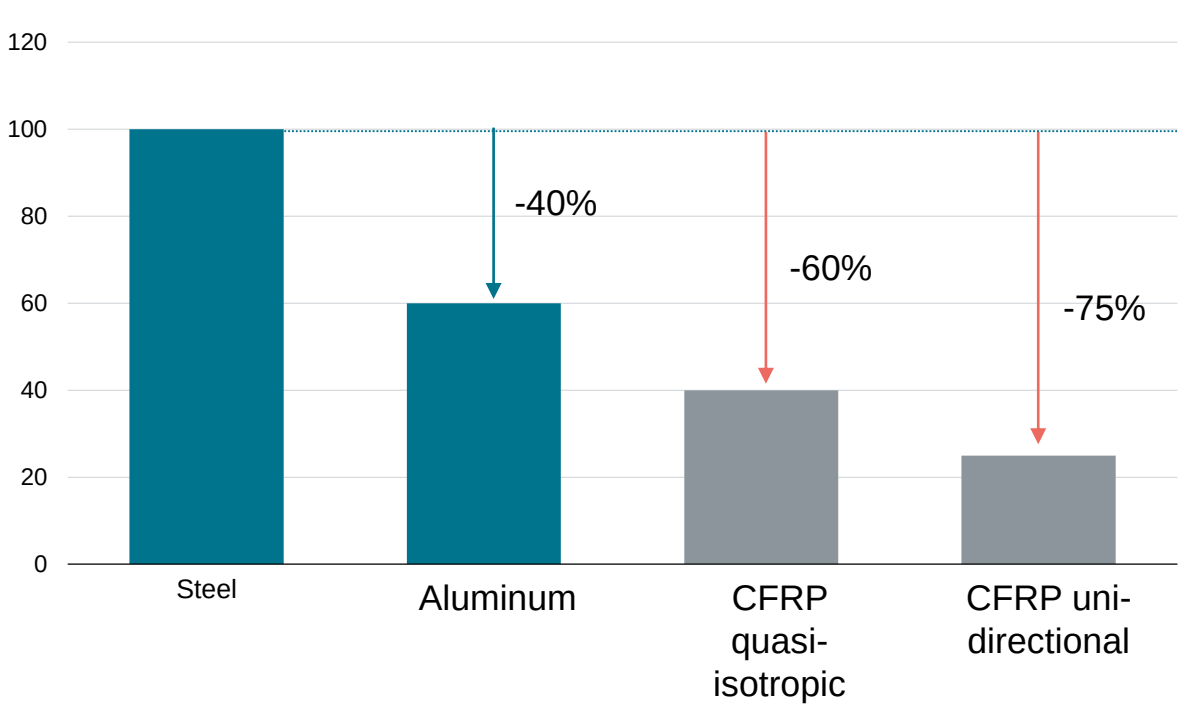
Source: Audi AG, BMW AG, Vokswagen AG, Volvo CC, SGL Carbon

CO_2 targets drive lightweight construction in the automotive industry.

OEM fleet target development (EU)[1]
(in g CO_2/km)



Relative component weight[2]
(in %)



[1]status as of 17/12/2018
[2]with same functionality
Source: ICCT, SGL estimates

Automotive: By 2030 most cars expected to have fiber-reinforced polymer (FRP) parts.

Production volumes

Racing/ Super sports car

- Monocoques

1981–2003

Small series

- “Class A” Carbon
- Roofs
- Mirror caps

2008

Serial production

- “Life Cell”
- Pillars
- Roofs
- Rear benches
- etc.

2013

Serial production

- “Carbon Core”
- Multi-material mix
- Center roof rail
- Windshield frames
- Etc.

2015

Industrial standard

- Local FRP reinforcement
- Thermoplastic components
- Hybrid materials for battery enclosures
- Leaf springs

2030

Source: RedBull F1, Daimler AG, Audi AG, BMW Group

Automotive growth is expected to be driven by …

Local reinforcements

- A- and B-pillar reinforcements
- Roof rail

Leaf springs for passenger cars

- Pick-up trucks, SUVs, Vans
- New BEV vehicle concepts

Thermoplastic components

- Structural parts
- Easy to integrate into OEM assembly plants

Battery cases for BEVs

- Hybrid material solutions

Automotive: Current CFM project pipeline.

Since the beginning of 2018 nominated for 13 new serial products

SOP*	2019	2020	2021	2022
Newly awarded projects**	3	8	1	1

*Start of production; **Status: March 27, 2019

- Leaf springs
- Trunk lids
- Stiffening elements
- Battery housings
- Preforms

Aerospace

Materials and components must be reliable and safe under extreme conditions. Fuel consumption must be reduced through lightweight design. These demands can be met with our carbon fiber reinforced composites. We offer the right solutions for primary and secondary structures, sub-systems or internal fittings.

The high production volume of narrow body commercial aircrafts requires serial production competency.

Airbus monthly production volume forecast

	2016	2020
A350 (wide body)	4	10
A320 (narrow body)	46	60+

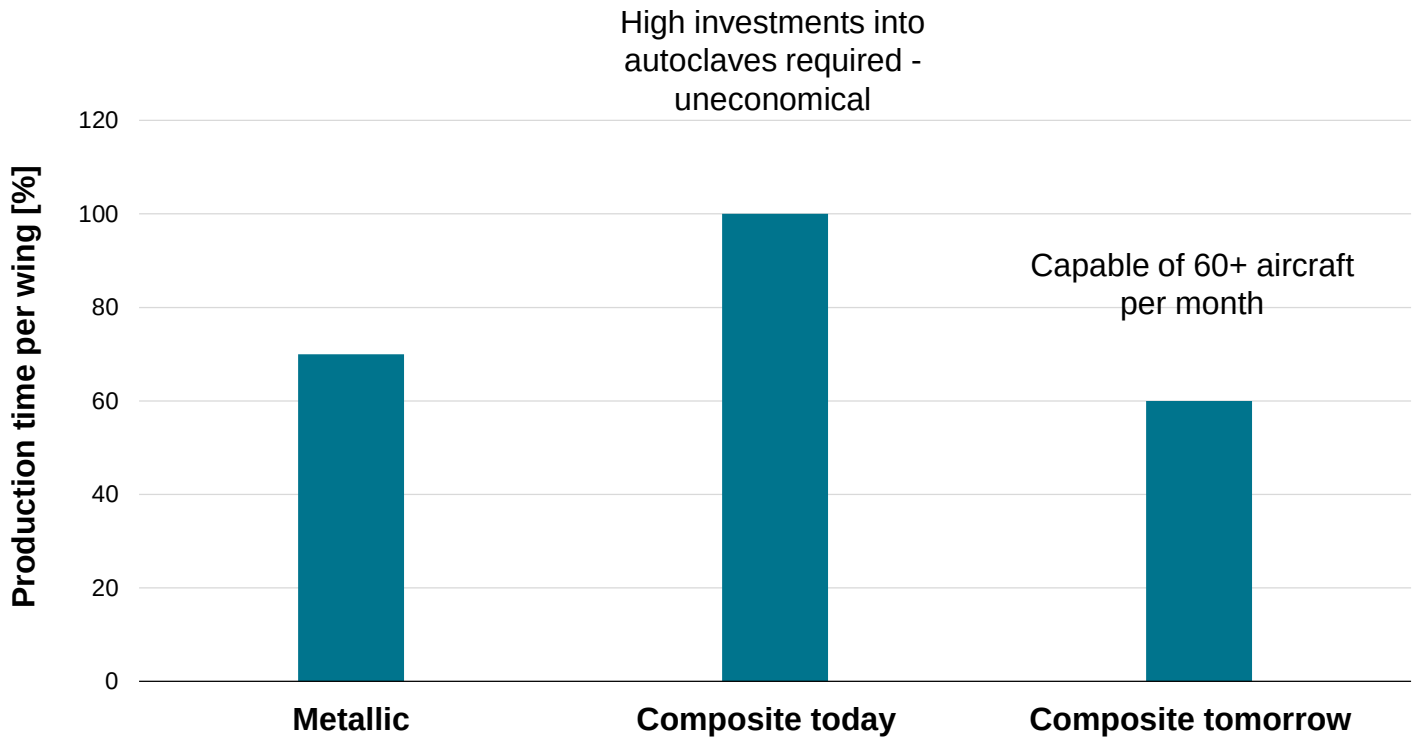
Boeing monthly production volume forecast

	2016	2020
B787 (wide body)	11	12
B737 (narrow body)	42	58

Remark: “Narrow body” typically describes single aisle aircrafts, “wide body” aircrafts with double aisles.
Source: Airbus, Boeing

Aerospace: Composites market will continue to grow.
Focus on operating cost efficiency

- Airline industry extremely competitive, constant battle over **cost reduction**
- Composites address this key customer requirement as lightweight construction reduces **fuel consumption**
- Strong commercial aircraft **CFRP market growth (CAGR > 8%)**[1] driven by aircraft programs (e.g. A350, B787, B777X)
- Additionally, other commercial aircraft aerospace markets are accelerating – launcher, UAV, etc.
- Clear incentive to use composites, as customers are willing to pay for **reduced weight**



Source: SGL Carbon

[1]Source: CompositesWorld, JEC, MarketsandMarkets.com, internal analysis

Composite materials and components for commercial aircraft parts.

Source: SGL Carbon

Aerospace growth expected to be driven by …

Non-crimp fabrics for primary structures

- Automated textile preforming processes based on lay-up technologies
- Liquid resin infusion and out-of-autoclave curing

High-performance insulation

- Spare parts business for aero-engines, e.g. thrust reverser heat shield
- Fuselage insulation components

TowPreg materials in combination with fiber placement processes

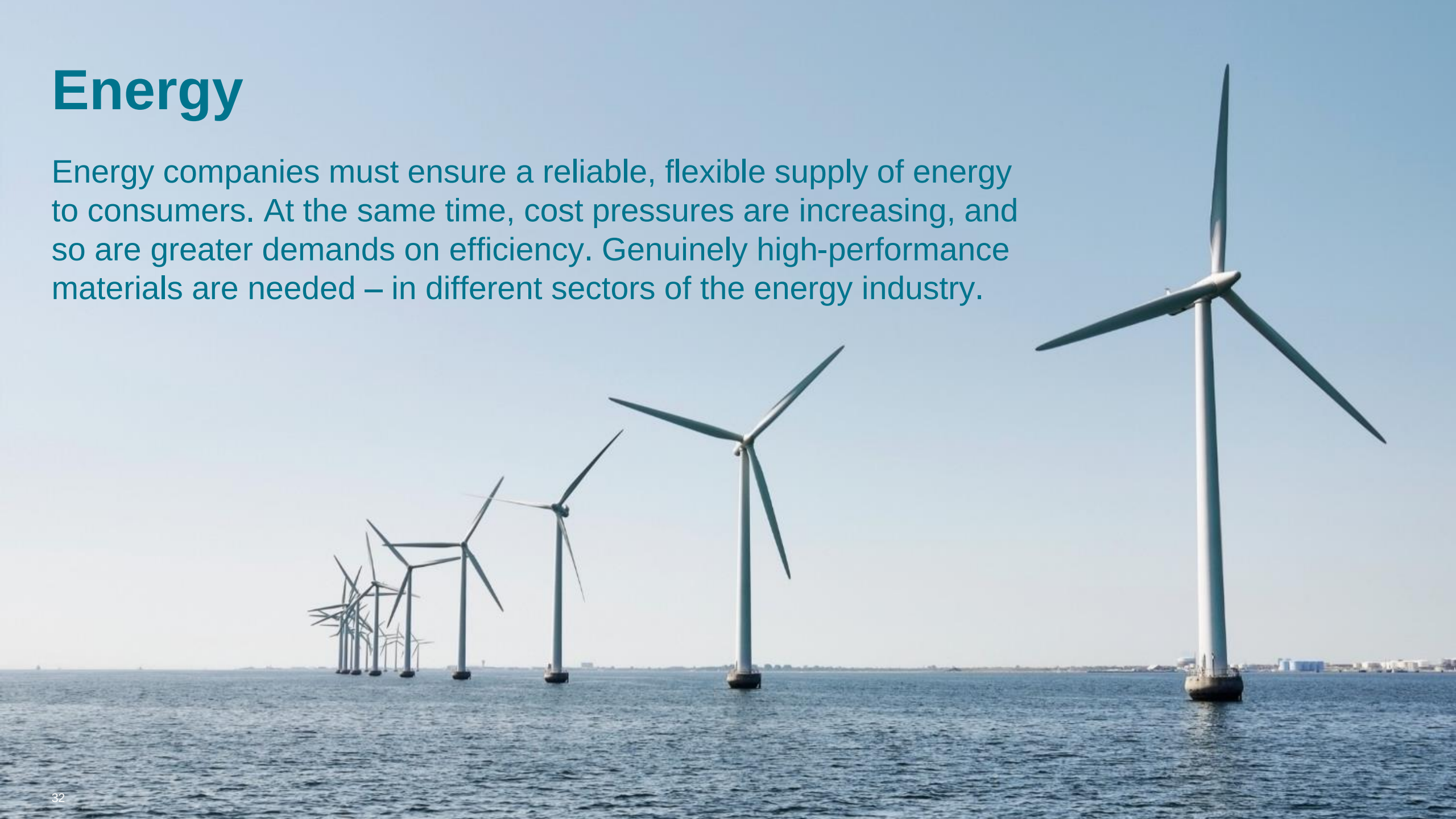
- Fast curing pre-impregnated carbon fiber tow materials
- Automated material deposition by fiber placement processes

Next generation aircraft brakes

- 3D carbon fiber based preforms
- Dedicated carbon fiber for dry friction applications

Energy

Energy companies must ensure a reliable, flexible supply of energy to consumers. At the same time, cost pressures are increasing, and so are greater demands on efficiency. Genuinely high-performance materials are needed – in different sectors of the energy industry.

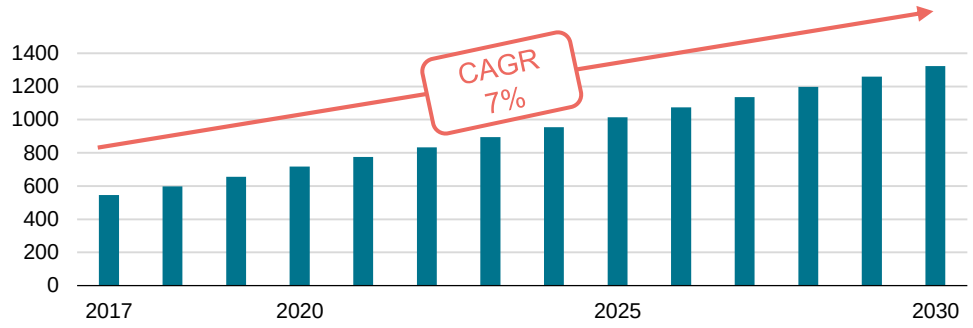


Wind energy is the key driver for the energy segment.

Key benefits of composites in the wind energy industry:

- Corrosion resistance
- Strength-to-weight ratio

Global cumulative installed wind power capacity in gigawatt[1]



Efficiency requirement for rotor blade design leads to potential for composites:

- The growing demand of efficient wind energy plants has led to new developments in wind turbine designs
- Plants with a large number of wind turbines with short rotor blades are being upgraded with a smaller number of wind turbines with longer rotor blades
- The requirement of longer rotor blades has resulted in a huge potential for composite use in rotor blade construction

[1]Source: Globaldata

Energy growth expected to be driven by …

Supply of carbon fiber to growing pultrusion market

- Technology change from prepreg/textile to pultruded profiles
- Pultrusion provides better mechanical properties

Increasing carbon fiber need for on- and offshore wind turbines

- Increased blade length possible
- Reduced levelized cost of energy by using longer blades

Political driven need to reduce CO_2 emission

- Countermeasure against global warning

Industrial Applications

SGL Group is the only company to master all types of production processes, manufacturing everything from carbon fibers to composites. Our unique expertise allows us to tap the full potential of new materials. We offer solutions that fully meet our customers' expectations in many different industrial sectors.

Industrial Applications growth expected to be driven by …

Industrial grade carbon fiber for civil engineering

- Carbon fiber materials to be used e.g. for infrastructure repairs
- Usage for concrete reinforcement in renovation and new buildings

Fiber intermediates for compounding applications

- Chopped carbon fibers within applications for consumer electronics
- Milled carbon fibers as anti-static coatings

Tailor-made pre-impregnated materials for component manufacturing

- Material basis for professional sports gear

Small series components for engineering solutions

- Lightweight applications within machining/tooling parts
- Customized parts for highly stressed applications

Levers to further profitability improvement.
CFM by value chain

Precursor + Carbon Fibers*

- Develop advanced carbon fibers; e.g. aerospace, energy
- Sales growth will lead to increased capacity utilization of carbon fiber lines
- Conversion of low profitability textile fiber lines to precursor lines and increase efficiency of precursor production
- Leverage own precursor production and improve properties
- Develop higher margin acrylic fiber products

Materials

- Develop new materials and enhance production know-how, leveraging expertise of Lightweight and Application Center
- Broaden competencies in materials for energy and civil engineering market

Components

- Leverage series manufacturing capabilities (former Benteler SGL)
- Expand manufacturing footprint to USA and China
- Develop further products/technical capabilities

* including Textile Fibers

Levers to further profitability improvement.
CFM by market segments

Overall:
Leverage Lightweight and Application Center: Gain know-how, provide tailor made products and win customer projects

Automotive:
- Full integration of SGL ACF and Benteler SGL post acquiring of remaining JV interests
- Increase presence in regions outside Europe
- Important projects won: significant German OEM project (SOP 2021)
- Numerous projects with OEMs and tier 1 (for leafspring, battery cases, components)

Aerospace:
- Expand product portfolio based on own precursor and sell products across entire value chain
- Extension of contract with Elbe Flugzeugwerke (Airbus) for A350 floor panels
- Product development with large aircraft manufacturers for adoption of SGL (50k) fiber in structural components (SOP beyond 2022)
- Planned increase in vertical integration with aerospace supplier for secondary structural parts (SOP beyond 2022)

Energy:
- Temporary sales decline by divestment of Kümpers joint venture
- Significant order with additional wind energy customer won for deliveries from 2019 onwards

Industrial Applications:
- Increase market penetration through leveraging sales agent network
- Increase presence in regions outside Europe
- Develop materials for civil engineering market

Textile Fibers:
- Improve profitability by operational improvements & development of higher margin products (pigmented fibers and flame resistant fibers)

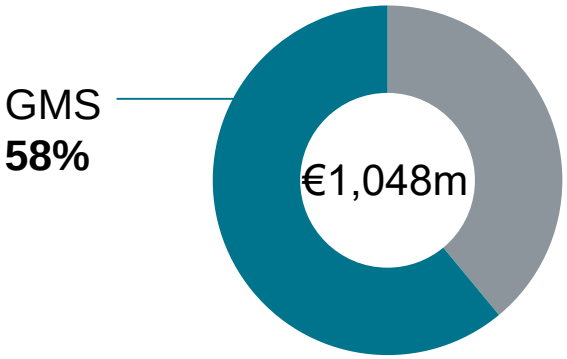
Business Unit
Graphite Materials & Systems (GMS)

Reporting Segment.
Graphite Materials & Systems (GMS)

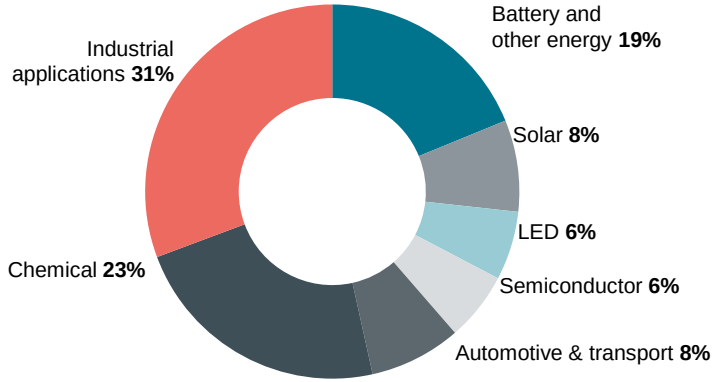
Activities

- Anode materials
- Isostatic graphite
- Fiber materials
- Extruded graphite
- Die molded
- Expanded graphite
- Process technology

Group sales 2018



GMS sales 2018



Key industries served

- Lithium-Ion Battery
- Solar
- Semiconductor
- LED
- Chemical
- Automotive & transport
- Industrial applications[1]

Characteristics

- Higher value-added products enabling customer innovations
- Specialized, partially tailor-made, products for differentiated customers
- Innovation driven business
- Engineered products & solutions for customers from > 35 industries – some with high growth potential

Strategic priorities

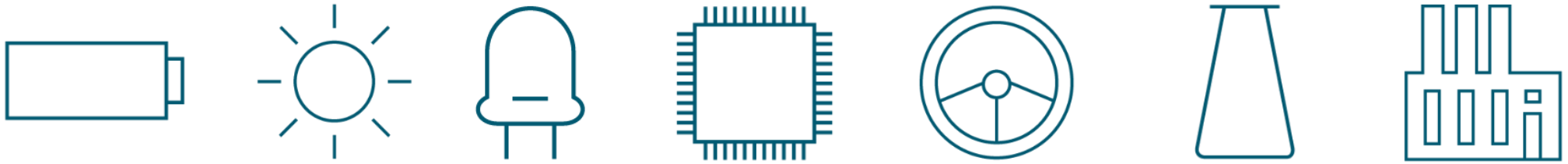
- Focus on forward integration and innovation
- Combine material know-how and engineering competence
- Advanced material, equipment, and process solutions in cooperation with customers
- Global competence and presence
- Improve cost competitiveness
- Target new market segments

[1] e.g. electric discharge machining (EDM), oil and gas, glass, high temperature applications, metallurgy

GMS – the hidden champion.

Active in very attractive market segments

Market Segment



Sales	Battery & other Energy	Solar	LED	Semi-conductor	Automotive & Transport	Chemical	Industrial Applications
2018	**19%**	**8%**	**6%**	**6%**	**8%**	**23%**	**31%**
2017	19%	10%	4%	5%	7%	24%	31%

GMS positioned in high growth markets

Market segment Battery & other Energy

Our products for energy storage.

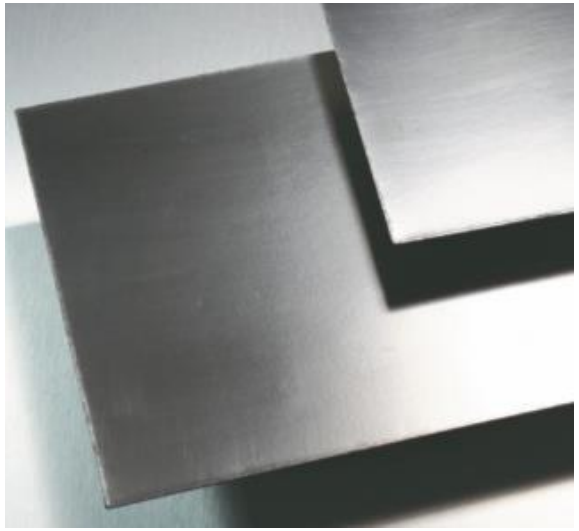
Fields of application and product examples

Lithium-ion batteries

Flow and advanced batteries

Specialty graphite for lithium-ion battery anodes

Porous electrodes made from SIGRACELL® battery felt

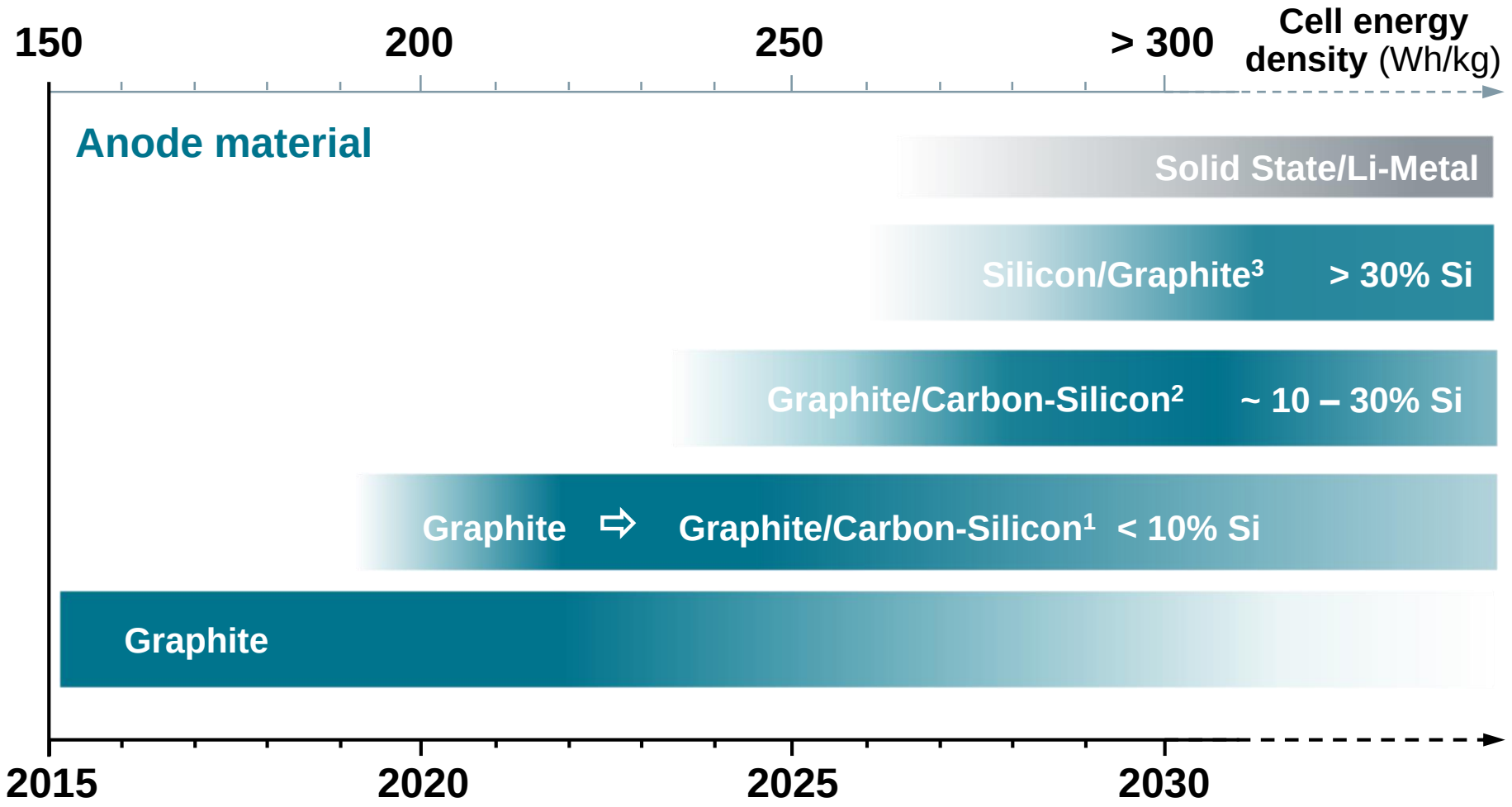


SIGRACELL® bipolar plates made of expanded graphite compounds

SIGRACELL® graphite foils

Graphite is essential for lithium-ion batteries (LiB).

Graphite based anodes expected to remain dominant at least until 2030.

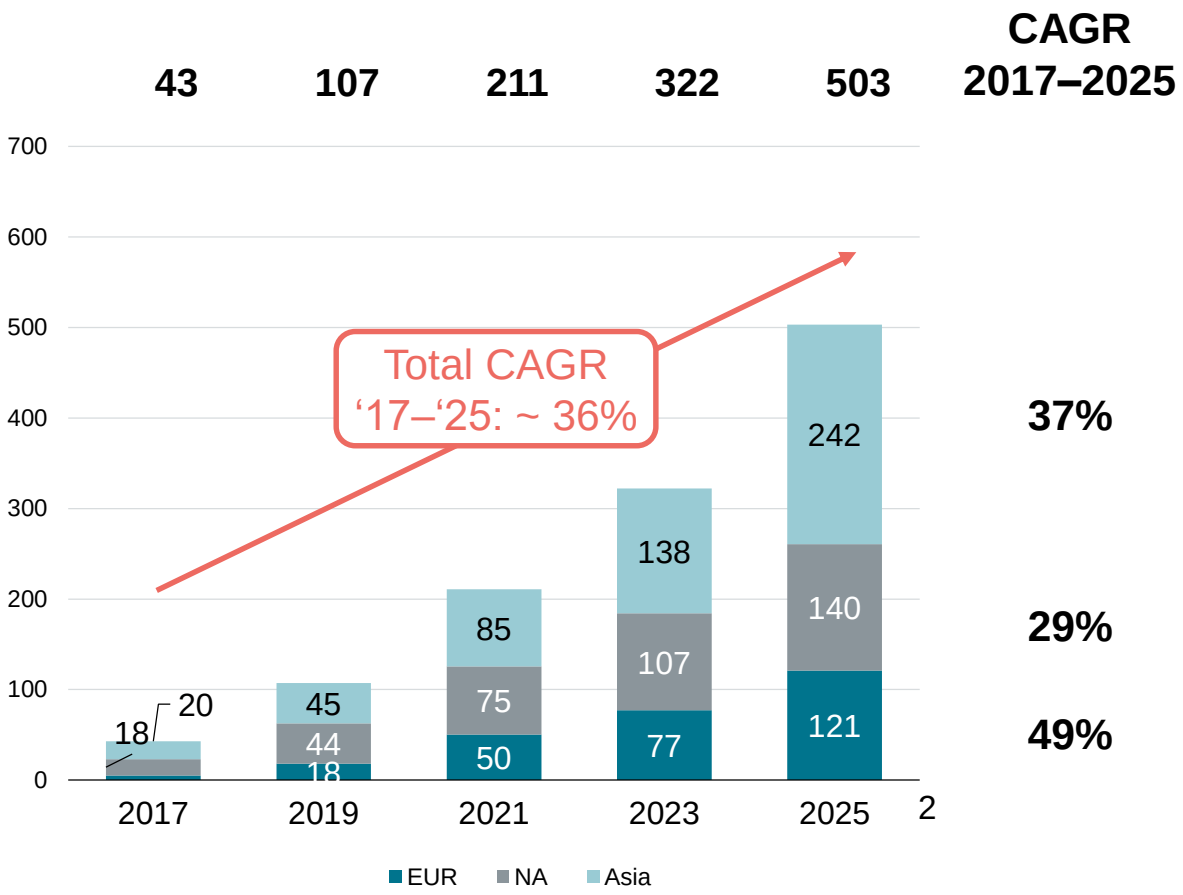


Source: Roadmap Nationale Plattform Elektromobilität and GMS assumptions

[1]SiO_x or carbon-silicon blended with major share of graphite; [2]carbon-silicon: graphite blend ~ 1:1 [3]Si-dominant carbon silicon anode with graphite as additive

SGL opportunity supported by the regional shift of EV and cell production.

EV LiB demand by region (in GWh)[1]



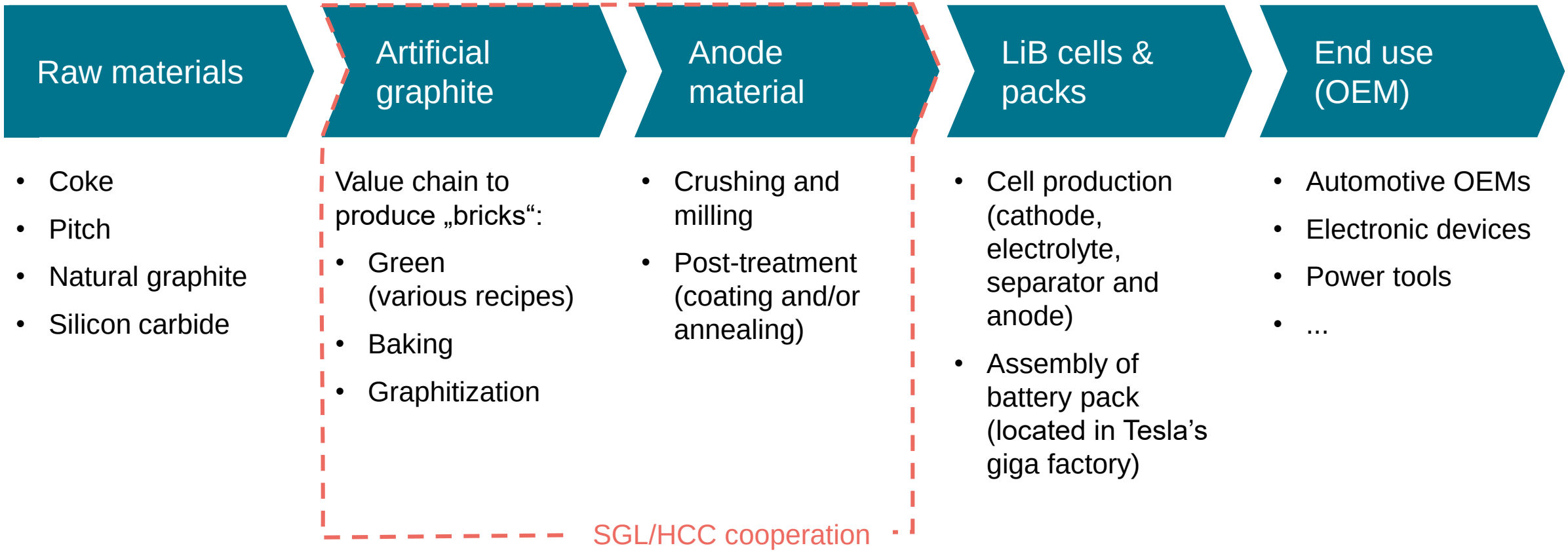
Market Details

- LiB-cell mass production will be established in Europe and America
- Center of cell production will continue to be in Asia
- Announced cell production capacity for Europe: ~100 GWh
- Opportunity for SGL to participate in European supply chain for European cell manufacturing sites
- Comparable situation and opportunity for SGL in North America

[1] IHS Markit (BEV,PHEV, Full-Hybrid, only LIB) + own research [2] IHS Markit Data max forecast until 2023: CAGR 2023–2025: 25% (own estimate)

SGL supplies artificial graphite as key component into LiB supply chain.

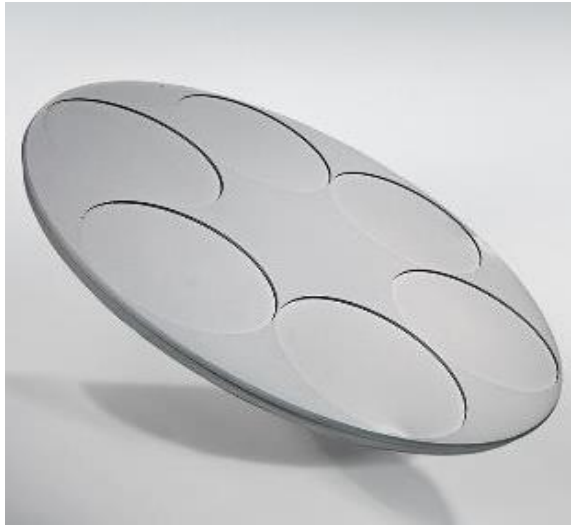
Value chain



Market segment Semiconductors

Our solutions and products for the semiconductor industry.

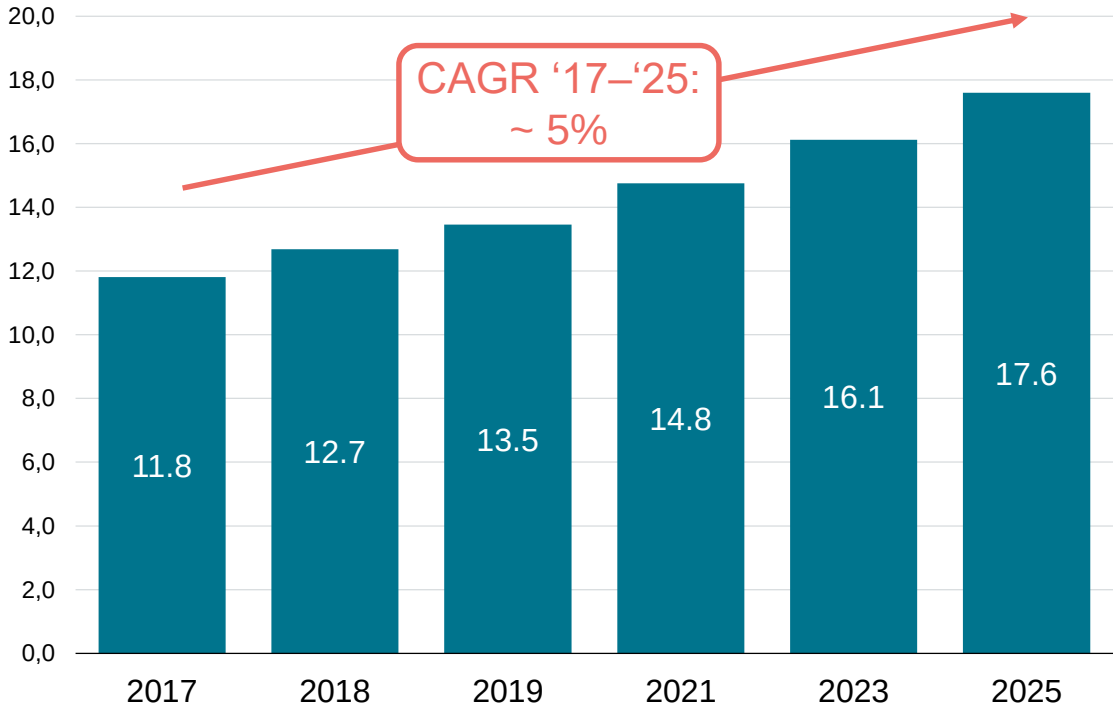
Fields of application and product examples

Polysilicon production	Silicon single crystal growth	Silicon epitaxy	Compound semiconductor epitaxy (in MOCVDs[2])
			
SIGRAFINE® electrodes for Siemens reactors	SIGRAFINE® meander heater for CZ[1] units	SIGRAFINE® SiC coated susceptors for silicon epitaxy reactors	SIGRAFINE® SiC coated wafer carrier for compound semi[3] wafer production

[1]Czochralski process; [2]MOCVD: Metal Organic Chemical Vapor Deposition reactor in which; [3] compound semiconductors are built by a thermo-chemical reaction of two or more semiconductor elements in gas-form

Semiconductor industry in super cycle supports base growth for years to come.

Semiconductor – Silicon wafer shipments
(in 1000 x MSI[1]/a)



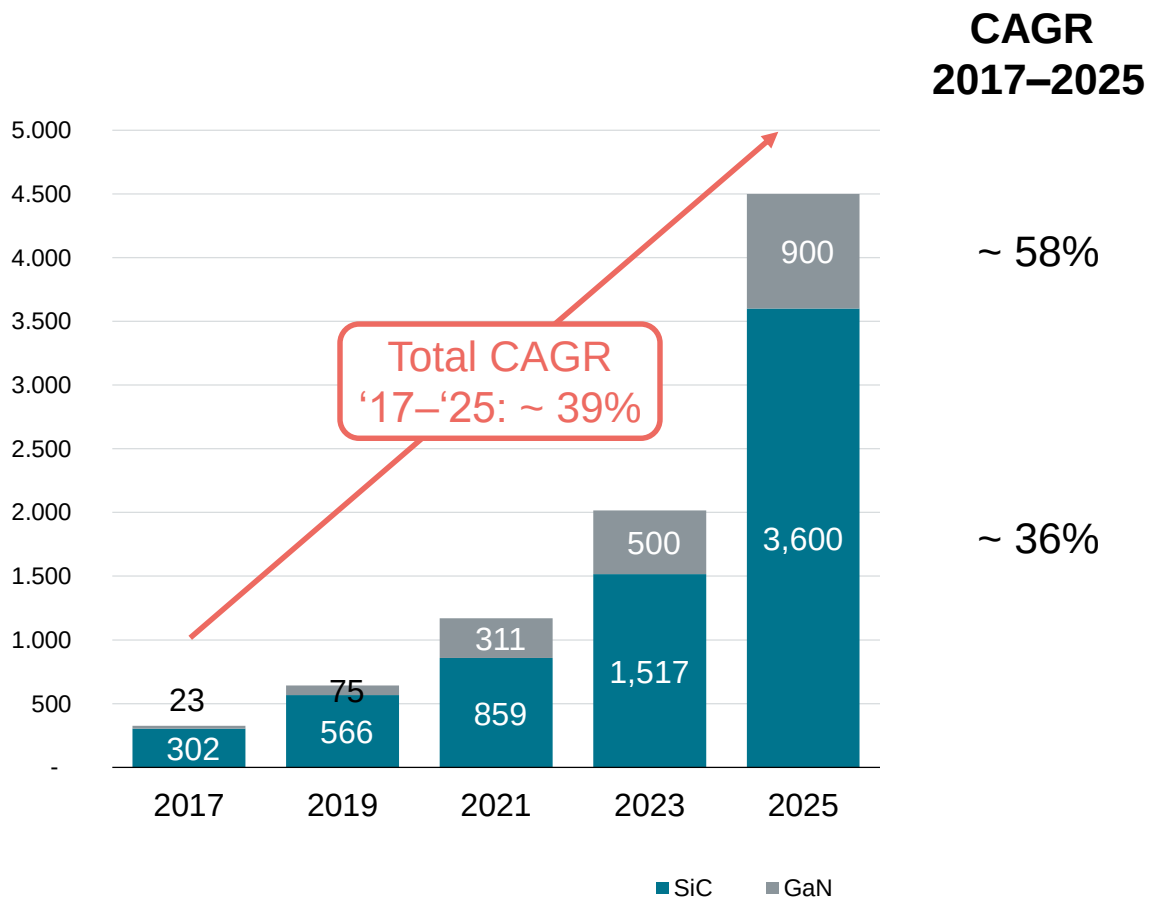
Market details

- Silicon wafer shipments are proportional to graphite demand
- Semi is in a super-cycle with main drivers being AI[2], IoT[3], 5G, automotive and China 2025
- Memory for mobile and computing drive 300mm silicon wafer demand
- Power electronics and MEMS[4] for automotive and mobile drive demand for ≤ 200mm Si wafers
- Wafer supply expected to remain short until 2020
  - Wafer prices continue to rise
  - Key players cautiously expand wafer capacity
- Increasing performance requirements

Source: SEMI, GMS estimates based on Gartner, Credit Suisse; [1] MSI: mio square inch; [2] AI: Artificial Intelligence; [3] IoT: Internet of Things; [4] MEMS: Sensors

Our expected double digit growth is fueled by high power applications, based on SiC[1] and GaN[2] semiconductors.

SiC and GaN power device market (in $m)

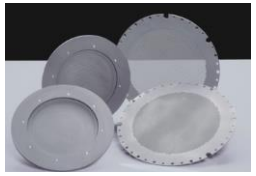
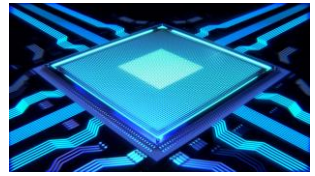


[1]Silicon Carbide; [2]Gallium Nitride
Source: Yole Development. IHS Market

Market Details

- Wide Band Gap semiconductors offer new options where silicon reaches its limits
- Especially in power electronics, SiC and to some extent GaN are expected to establish themselves
  - PV inverters and power supply (as existing markets)
  - Electric vehicles, supposed to reach 40–50% of the SiC device market
  - Rail and industrial motor drives
- GMS is well positioned to meet high customer demands

Graphite solutions are mainly required along the entire silicon-based semiconductor value chain.

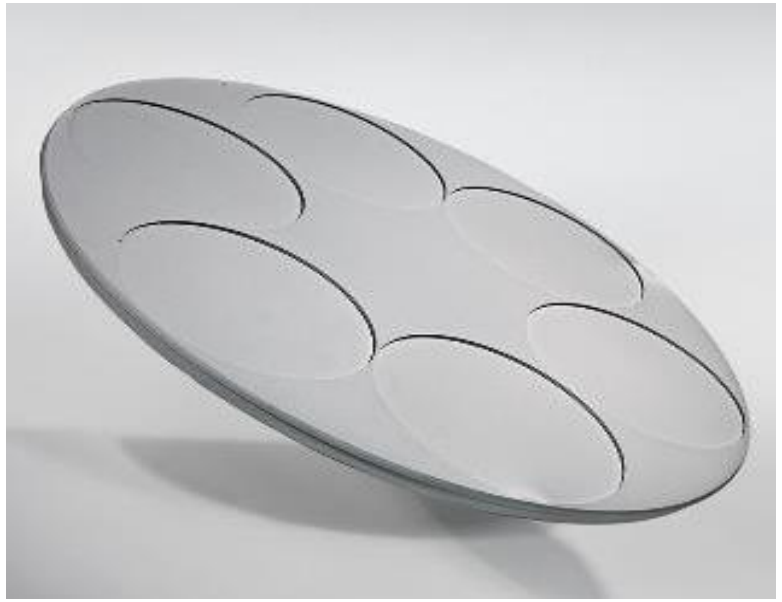
Metallurgical silicon	Polysilicon	Si crystal growing	Epitaxy wafer	Wafer processing	(Chip) Packaging
					
Graphite products	• Heaters • Heat shields • Reactor internals • Small electrodes	• Heaters • Crucibles • Cones • Insulation	• Susceptors • Liners	• Arc slits • Etch electrodes	
Materials	Iso Extruded SiC coating CFRC[1], felts			Extruded CFRC, felts	GMS business

[1]Carbon fiber reinforced carbon

Market segment LED

Our solutions for the LED industry.

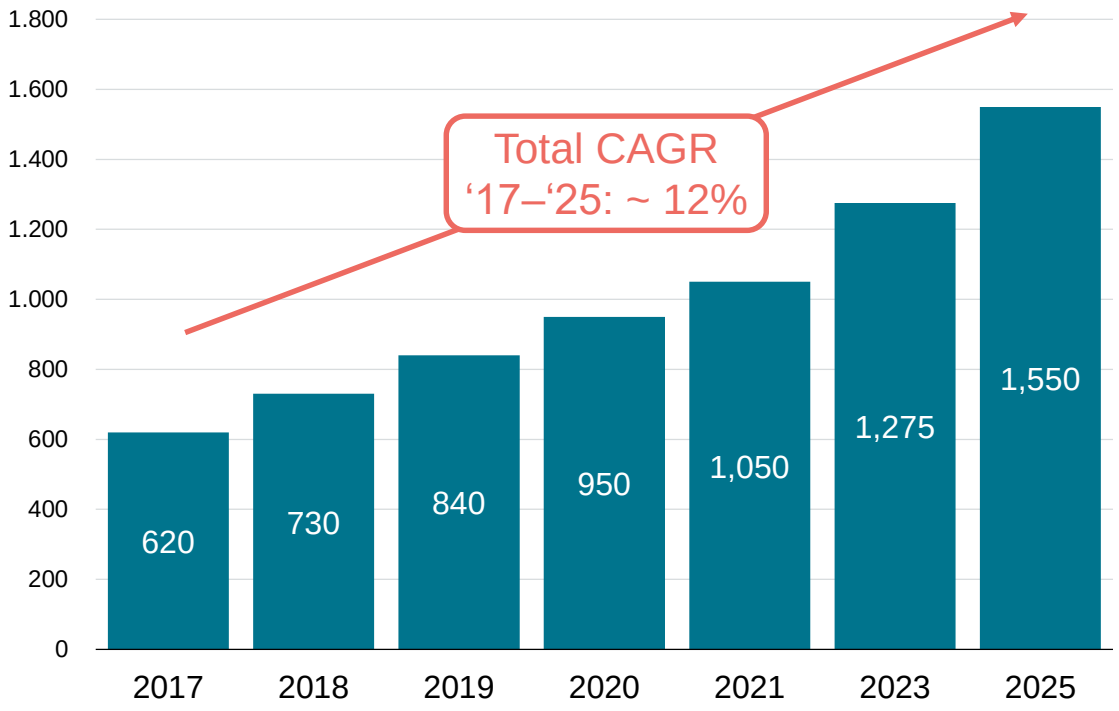
Fields of application and product examples

Crystal growth	Crystal growth	LED (MOCVD)
		
SIGRAFINE® meander heater for crystal growth furnaces	SIGRATHERM® rigid felt insulation cylinder	SIGRAFINE® SiC coated wafer carrier for LED wafer production in MOCVD reactors

LED market expected to more than double by 2025.

Driven by general lighting, specialty LEDs and micro LEDs in the long-term

Demand for packed LEDs (in bn units/a)



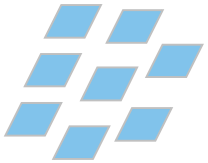
Market details

- General lighting remains the LED volume driver
- LED markets are diversifying
  - LED technologies open up numerous applications
  - Specialty LEDs (e.g. IR, UV, horticultural) are booming
- China plays a key role in both supply and demand, driven by government subsidies

Sources: Strategies Unlimited; Yole Development; Merrill Lynch; GMS estimates

LED production requires graphite solutions mainly upstream, in sapphire crystal growth and especially in the MOCVD[1] process.

Graphite products in the LED value chain

	Crystal[2] growth	Substrate wafers[2]	LED-wafers (MOCVD)	LED chips/dies	LED module
	 Sapphire boules[3]	 Sapphire ingots & wafers[3]	 AIX G5+ C Planetary Reactor®[4]		 LED lamp[5]
Graphite products	• Heating elements • Heat shields • Insulation		• Wafer carriers • Planetary susceptors • Satellite discs • Ceilings		
Materials	Iso Extruded Felts		Iso SiC-coating		

GMS business

[1]MOCVD: Metal Organic Chemical Vapor Deposition; key equipment for the production of LED wafers; [2]> 90% of LEDs are based on sapphire substrates; [3]images with courtesy of Monocrystal; [4]image with courtesy of AIXTRON SE; [4]ID 52110090 © Yana Bardichevska | Dreamstime.com

Market segment Solar

Our products and solutions for the photovoltaic industry.

Fields of application and product examples

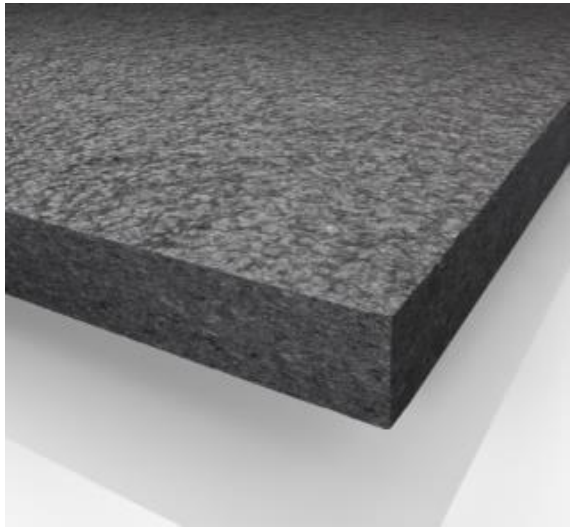
Polysilicon production

SIGRAFINE® electrodes for Siemens reactors

Silicon mono crystal pulling

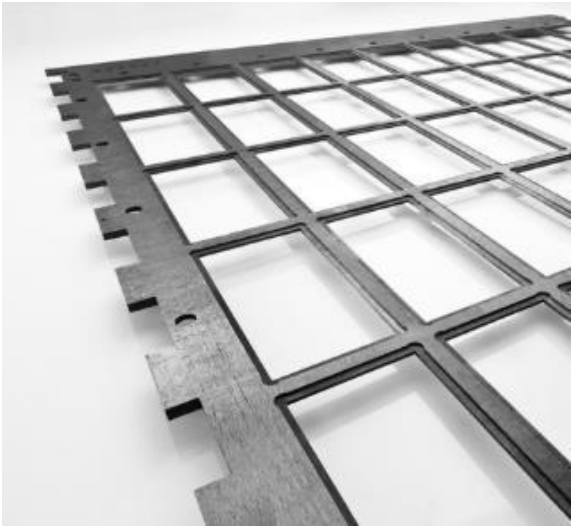
Support crucible made from SIGRABOND® CFRC

Production of multi-crystalline silicon



SIGRATHERM® MFA graphite rigid felt sheet

Anti-reflection coating

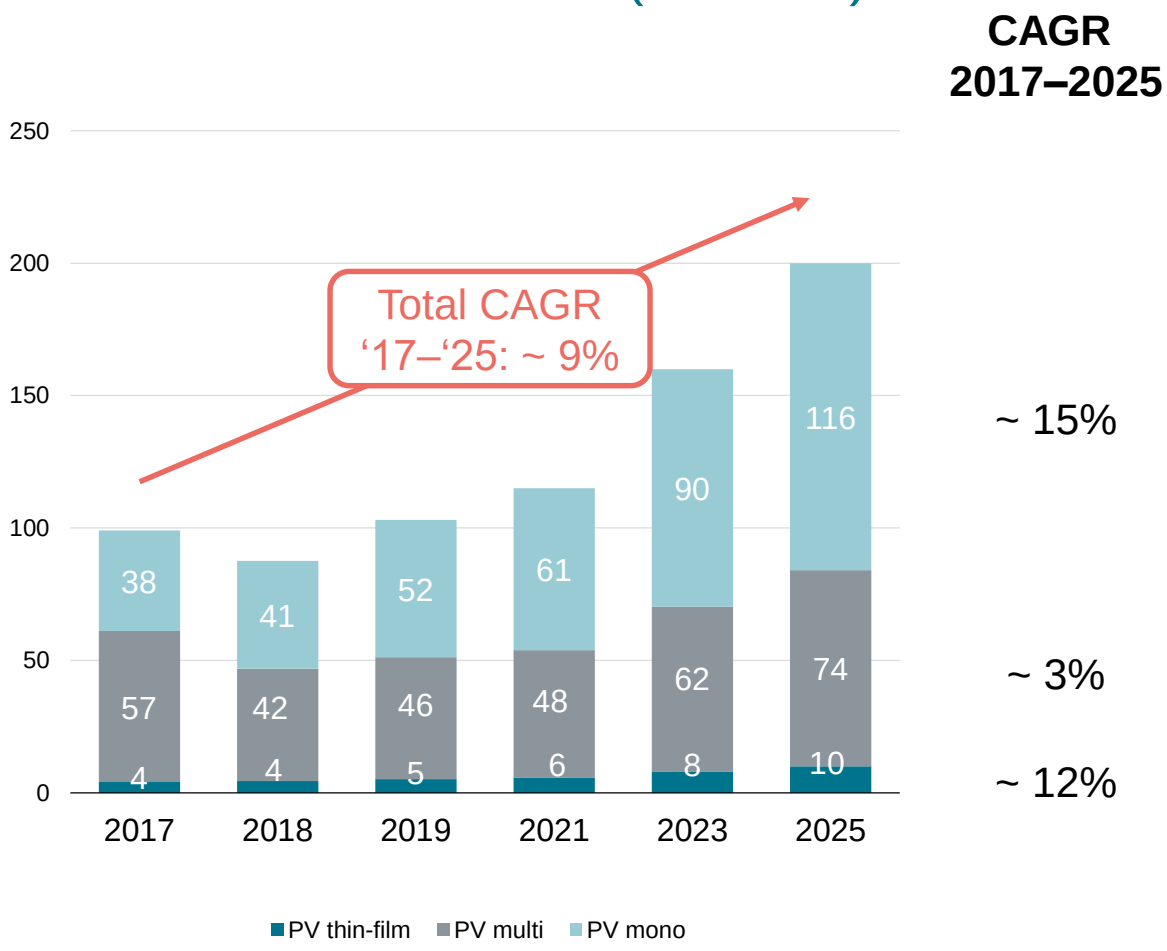


SIGRABOND® CFRC carrier frame for solar wafers

2018 likely to see dip in PV demand but long-term growth path intact.

Mono PV technology is set to dominate the growth

Global PV installations (in GW/a)



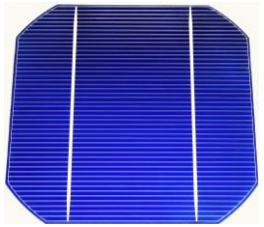
Market details:

- China subsidy cut in May 2018 leading to a temporary market decline
- Replacement demand for graphite unaffected
- History proved PV demand to be highly price elastic, thus growth expected to continue
- Switch from multi to mono technology impacts the full PV value chain and is beneficial for graphite consumption

Source: GMS estimate based on Solar Power Europe (Global Market Outlook 2018-2022), ITRPV_9th Edition, IHS Markit, Bernreuter Research, Bloomberg

Graphite is required along the entire photovoltaic value chain.

Graphite products in the photovoltaic value chain

	Polysilicon	Silicon crystal growing	Cell	PV module
				
Graphite Products	• Heating elements • Heat shields • Poly chucks	• Crucibles, cones, plates • Heating elements • Insulation	• Wafer boats • Wafer carriers	
Materials	CFRC[1] Felts Extruded/Vibro Iso SiC/PyC[2] coating			

GMS business

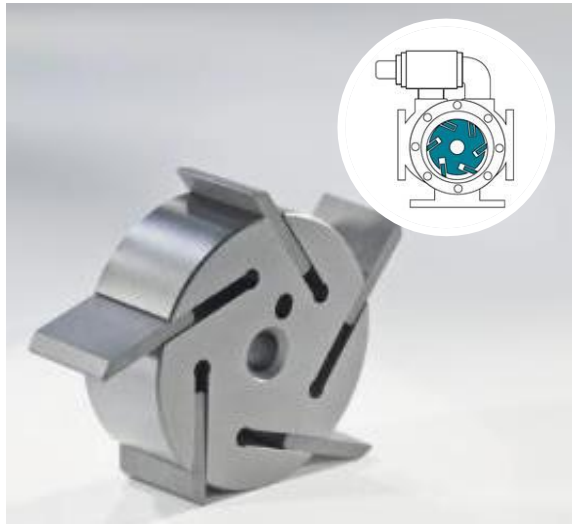
[1]Carbon fiber reinforced carbon; [2]Pyrolytic carbon-coating

Market segment Automotive & Transport

Our solutions for the automotive industry.

Fields of application and product examples

Vacuum pumps

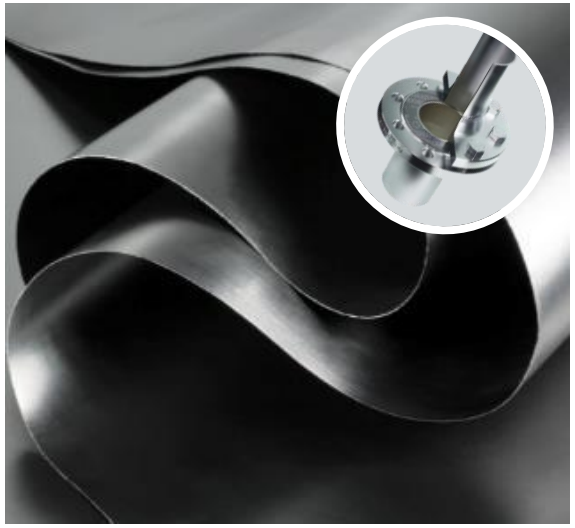


SIGRAFINE® PTS rotor with vanes for brake assist pumps

Fuel and water pumps

SIGRAFINE® PTS bearings made from carbon graphite

Sealings and gaskets



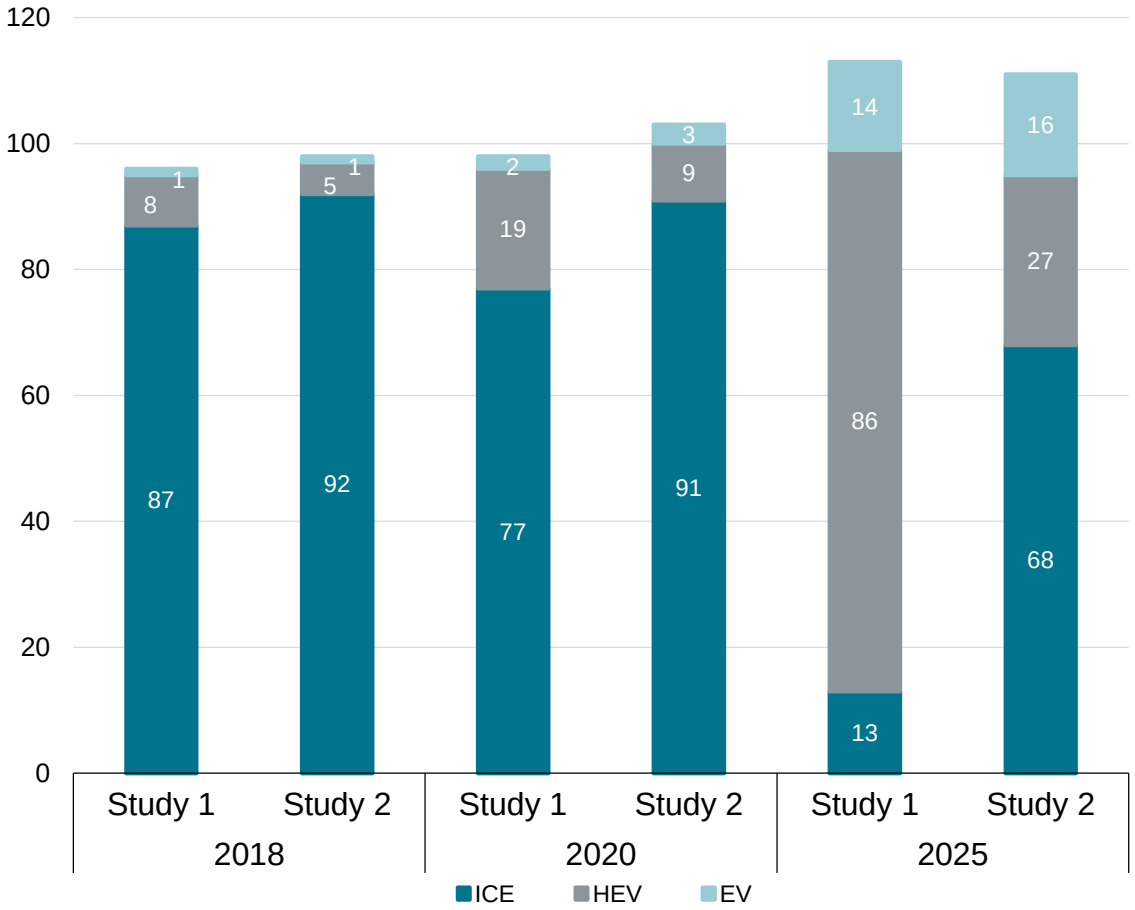
SIGRAFLEX® expanded graphite foil for cylinder head and recirculation gaskets

Exhaust gas recirculation

SIGRAFINE® graphite bearings for exhaust gas recirculation valves

Automotive industry is forecasted to grow. GMS offers solutions for both EV and internal combustion engine (ICE) powertrains

Automotive global sales (in million units/a)



Market details

- Environmental legislation/CO_2 reduction targets
- Strong growth of e-mobility
- Market shifts towards Asia

Significance for SGL

- ICE: CO_2 reduction enabled by SGL products
- EV: Significant opportunities for SGL solutions in electric water pumps for cooling and in brake assistant pumps

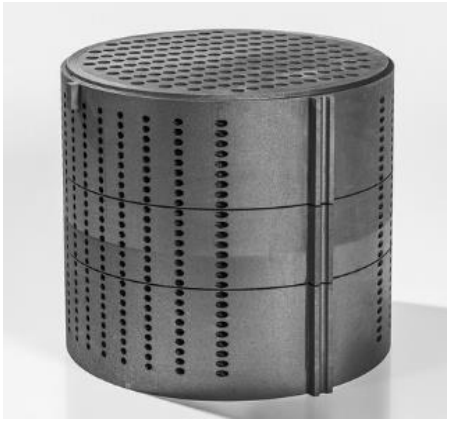
Sources: Diverse sources and own calculations (2017/2018)

Market segment Chemicals

Our solutions for the chemical industry.

Selected product examples

Heat exchanger



DIABON® graphite block heat exchanger

Columns

POLYFLURON® PTFE lined column

Pumps

DIABON® centrifugal pump group in graphite for hot corrosive fluids

HCl synthesis

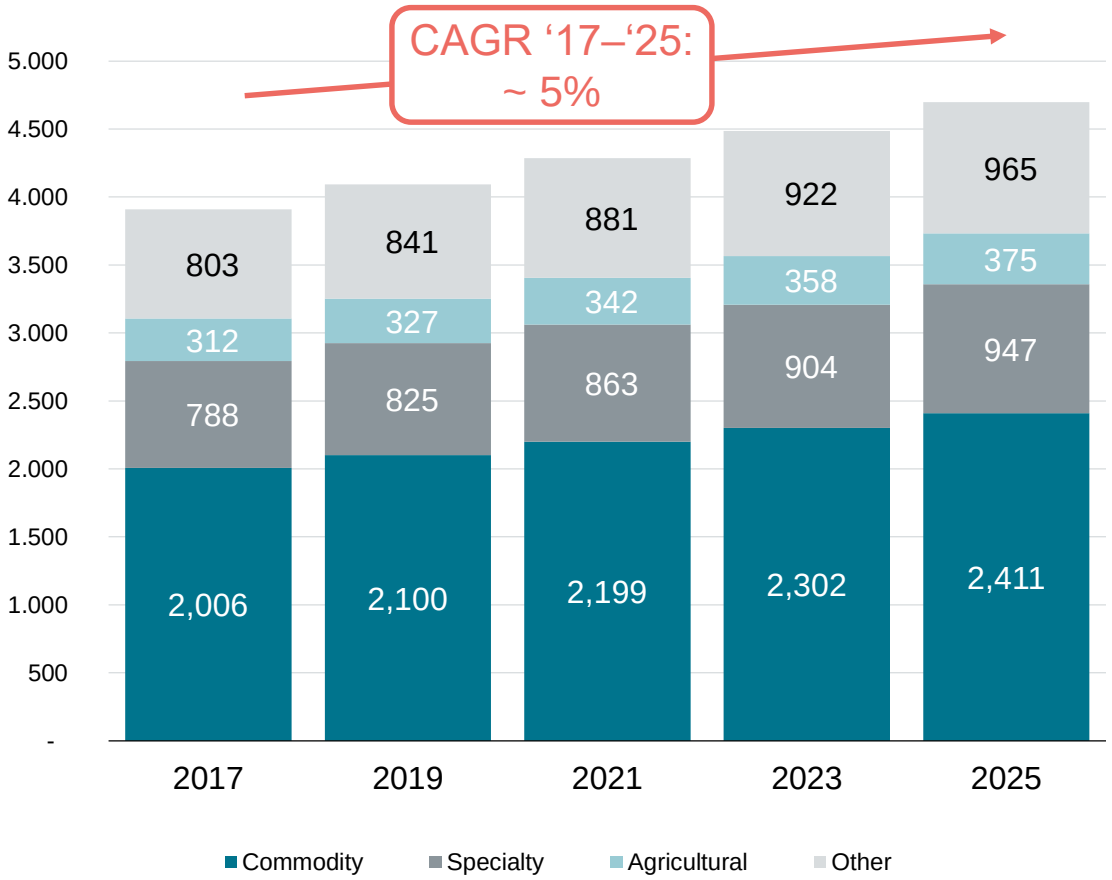
Bottom burner section of HCl synthesis unit

Sealing materials

SIGRAFLEX® graphite sheet for gaskets

Global chemicals market grows with global GDP.
With high dependence on China

Global chemicals demand (in €bn)



Market details

- New entrants, mainly from China, with the effect of overcapacities and price pressure
- Volatility in exchange rates, raw material prices and margins
- Consolidation ongoing especially in the area of commodities
- High dependence on Chinese growth

Source: Marketline, own calculations

SGL solutions enable many technologies and applications along various chemical value chains.

Chemicals – General description of typical corrosive chemical processes

	Intermediates	Chemical process	Chemical products
		 	 
Process technologies & systems	• Acid production, e.g. hydrochloric or phosphoric • MDI/TDI[1] production • VCM[2] production	• Various technologies, e.g. leaching, concentration, dilution, purification, desorption, absorption, distillation • Polyurethane production • PVC production • Phosphoric acid purification	• Variety of end products of chemical industry, e.g. plastics, food additives, fertilizer, pigments
Sealing technologies	• Corrosive and high temperature processes		

GMS business

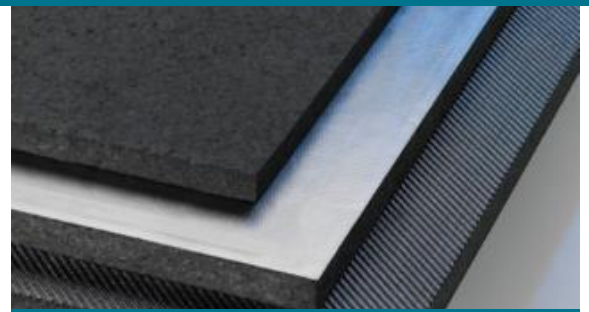
[1] Methylene diphenyl diisocyanate/tolylene diisocyanate; [2] Vinyl chloride monomer

Market segment Industrial Applications

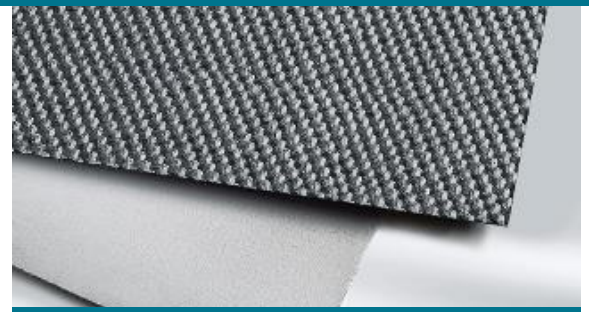
Market segment Industrial Applications.

Our solutions for high temperature furnaces

Heating elements and systems



Thermal insulation



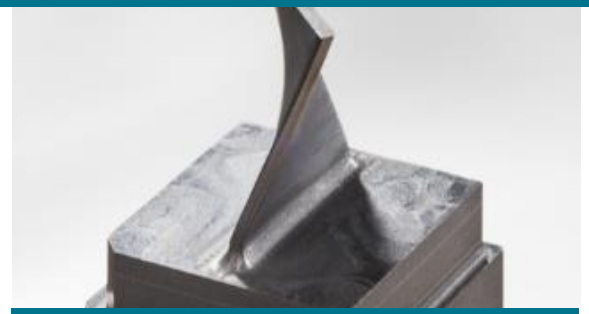
Heat shields and insulation protection

Charging systems and elements

Our solutions for electrical discharge machining in toolmaking

Standard ready-to-run electrode

Detail electrode for precise geometries



Rib electrode

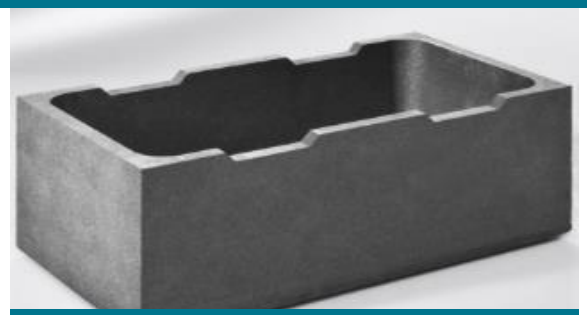
Electrode for turbine blade production

Market segment Industrial Applications.

Our solutions for the metal industry

Continuous casting

Pressure sintering



Powder metal industry

Gas injection and distribution systems

Our solutions for the glass and refractory industries

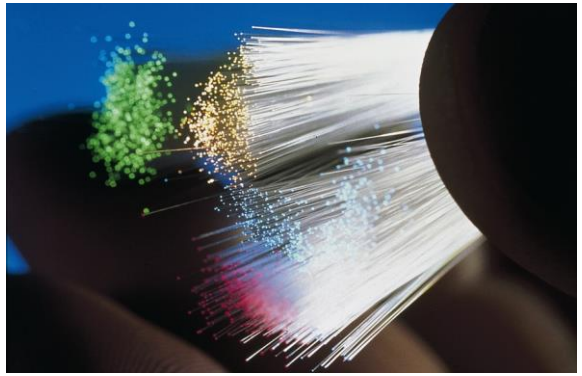
Container glass

Float glass

Mid term innovation. New markets for our graphite based solutions are continuously developing

Glass bending

- Graphite needed as molds for bending of glass
- Today‘s applications: smart phones
- Tomorrow: automotive displays

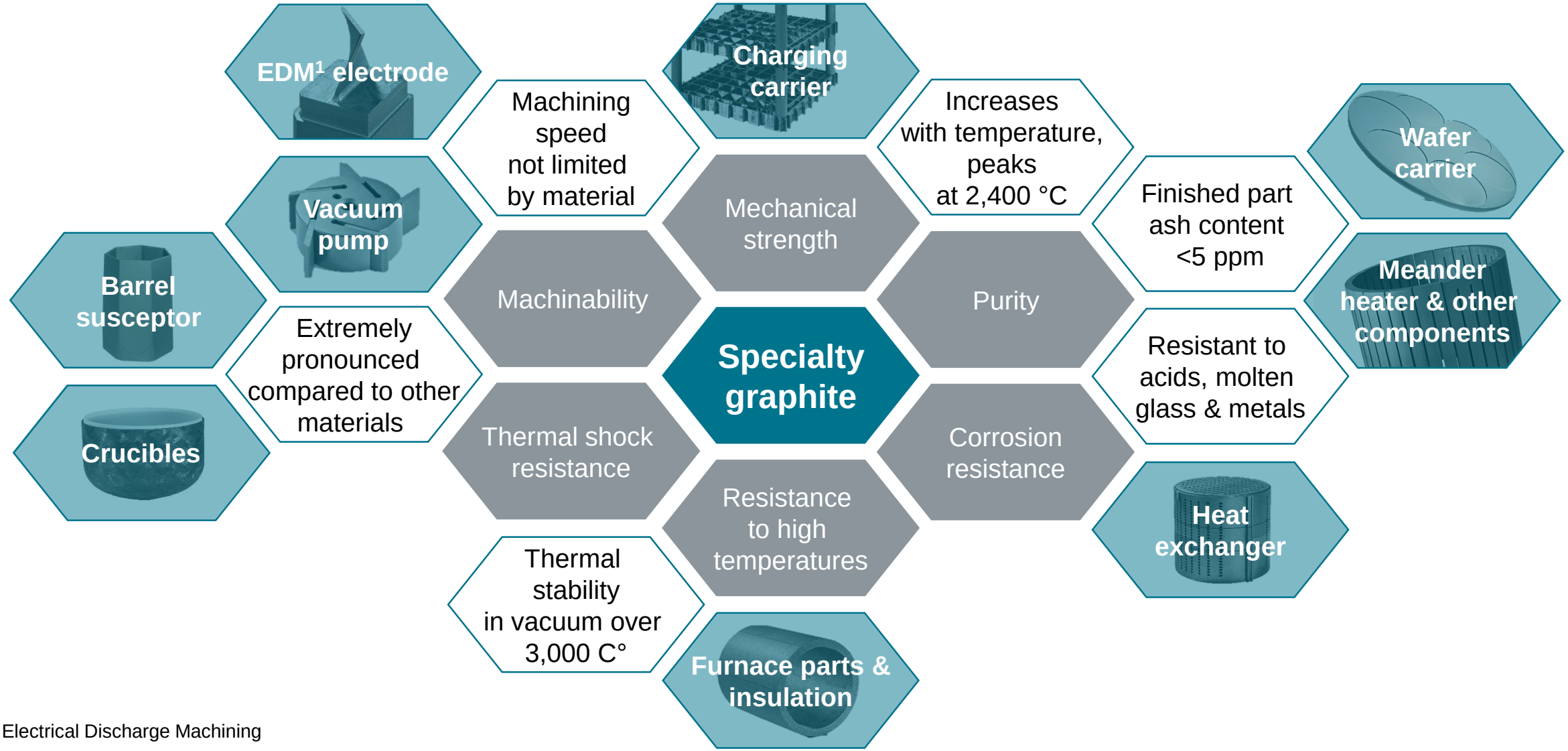


Optical fiber

- Ever increasing data quantities require more fibers
- Products: heating elements, insulation & CFRC support high temperature customer processes

The importance of the value chain

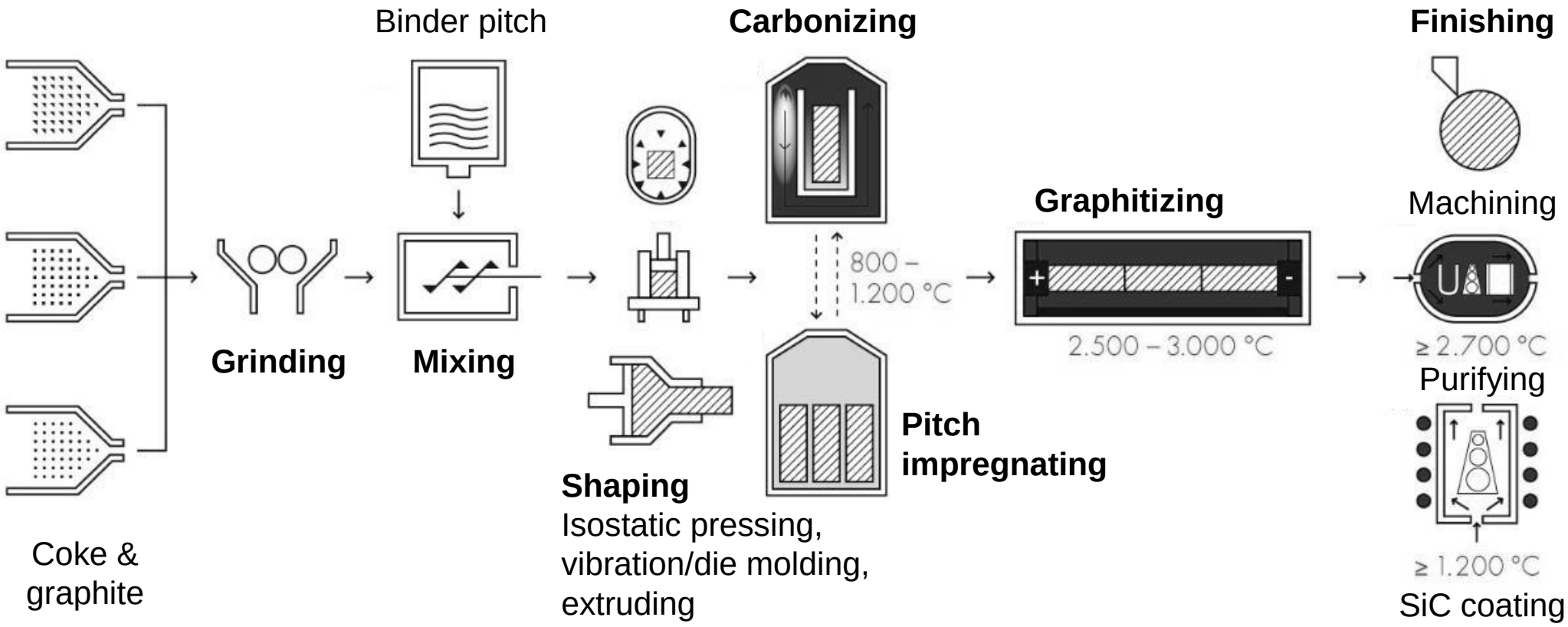
Specialty graphites come into play where other materials fail.



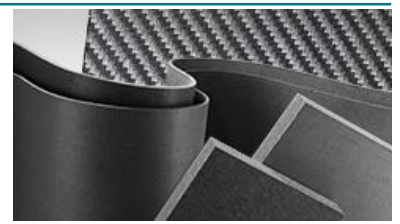
[1] Electrical Discharge Machining

Fine grain graphite manufacturing is complex and know-how intensive with long production times.

Manufacturing process of fine grain graphite

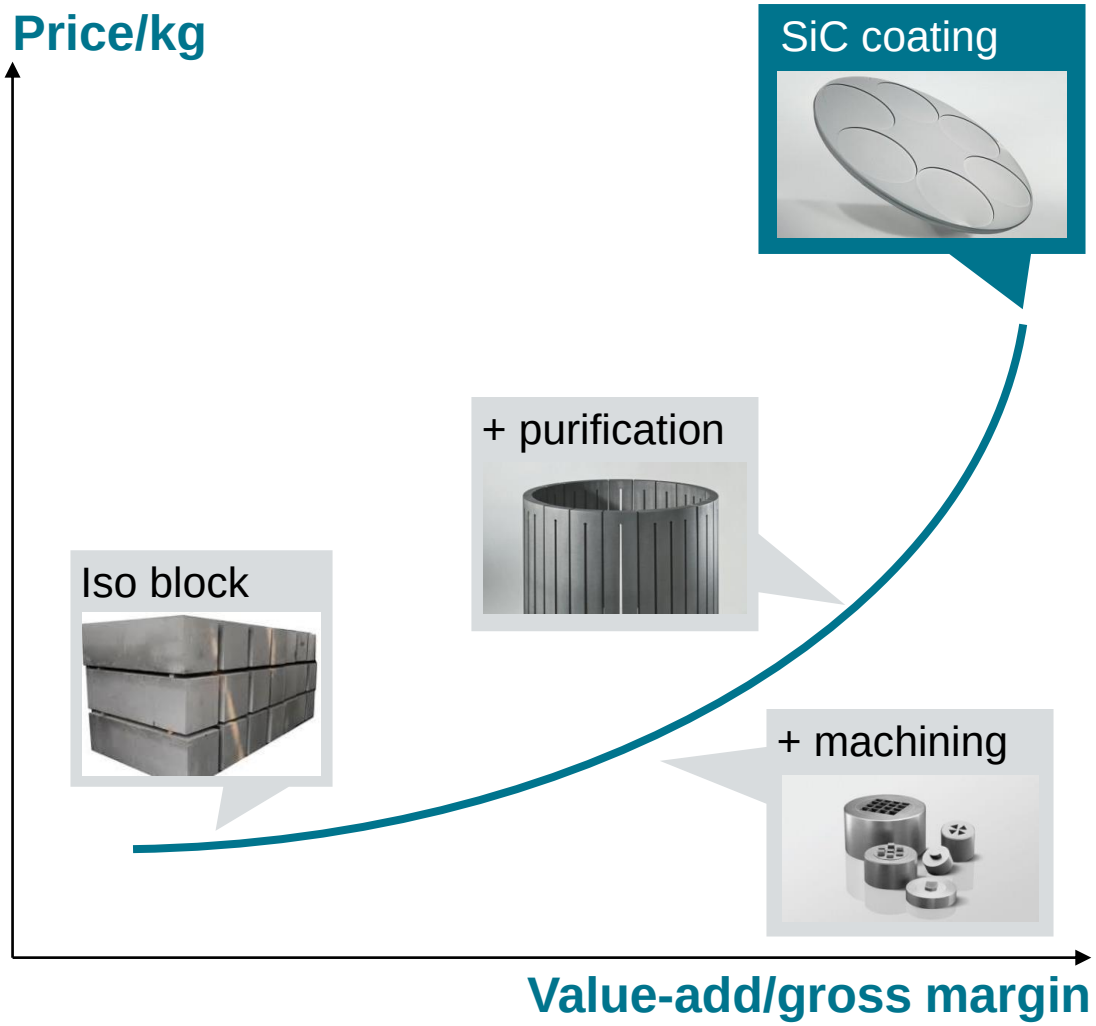


GMS can offer tailored solutions for customer applications due to broadest portfolio and capabilities in the industry.

Fine grain graphite	• Isostatic • Extruded	• Vibro molded • Die molded	
Expanded natural graphite	• Foils & Sheets • Yarns	• Panels • Additives	
Carbon fiber-reinforced carbon and felts	• CFRC[1] • Rigid felt	• Soft felt	
Value-add process capabilities	• Base machining • Advanced machining • Purification • SiC Coating	• Process & product modeling • System design • System assembly	

[1]CFRC: carbon fiber reinforced carbon

SiC coating is an example for high-value-add applications, offering premium sales prices and margins in the respective markets.



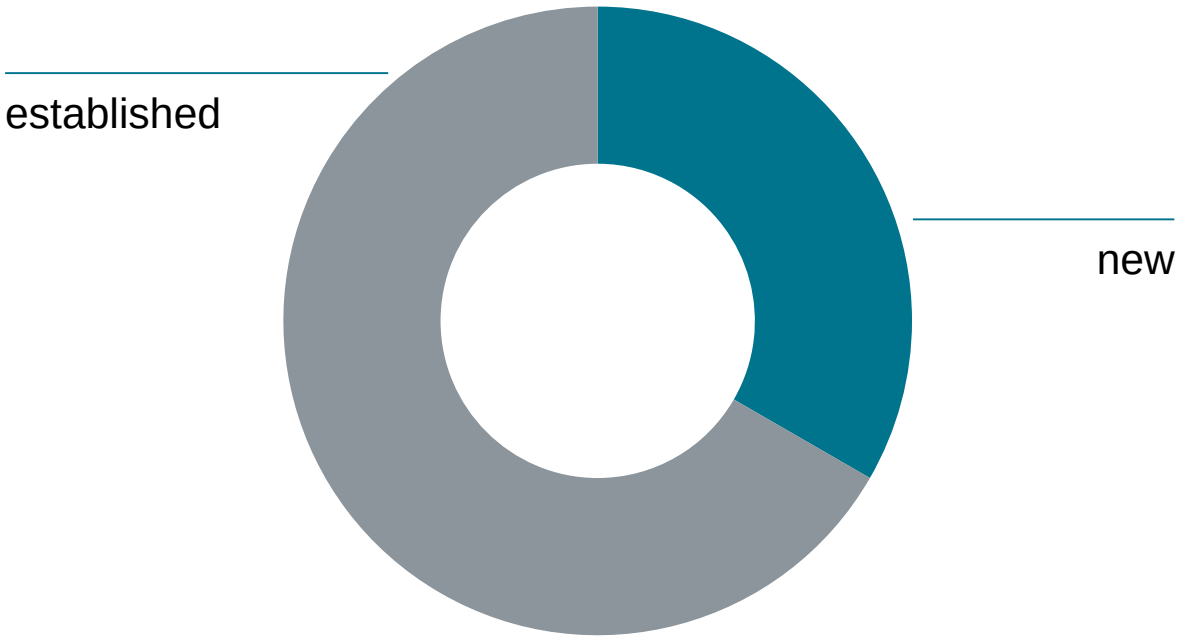
- Full leverage of GMS value chain
- Difficult to replicate by new-entrants:
  - Special iso grades applied and highly precise machining needed
  - High degree of innovation, technological expertise & process stability required
- High level of technological differentiation vs. competition
- Applications in fast growing LED and semiconductor industries
- Business opportunities with OEMs as well as aftermarket sales

Graphite materials enable innovation.

Examples:

- Advanced graphite anode materials for lithium-ion batteries
- Graphite foils and felts for stationary energy storage
- Additives for advanced lead acid batteries
- Advanced silicon carbide coated carriers for LED and semiconductors
- CFRC charging racks carriers for high-temperature applications
- Extra large reactors for polysilicon production
- CFRC column internals for chemical processes
- Special graphite grades for glass bending
- Graphite felts for fuel cell applications

Target approx. 1/3 of sales based on new products introduced over the last 4 years



Graphite Materials & Systems.

Leading market shares in major end markets

Global markets shares 2017

Chemicals	30%
Batteries & other energy	20%
LED	20%
Solar	15%
Semiconductor	15%
Automotive & transportation	15%
Industrial applications	10%-50%

Source: SGL Group’s own estimates

GMS already achieves sales growth and EBIT margin targets but expected to grow further. GMS by value chain

Feedstock

- Operational improvements (energy efficiency, de-bottlenecking, portfolio optimization)
- Sourcing excellence

Intermediate products

- Strong growth in energy markets driven by expansion of product and customer portfolio
- Organic growth with investments (following customers – production in the region for the region)

Solutions/ Components

- Strong growth in high margin digitization market (LED, semiconductor)
- Leverage ability to provide one-stop shop solutions based on the industry's most comprehensive product portfolio
- Focus on total cost of ownership
- Participate in the fast changing mobility market
- Customize graphite anode materials for electric vehicles
- Components for solutions reducing CO_2 emissions (e.g. vacuum pumps, water pumps) serving automotive industry
- Technical competence close to the customer to strengthen position as solution partner
- Focus high labor cost activities in low cost countries (Poland, China)
- Automation

Levers to further profitability improvement.
GMS by market segments

Overall:
- Efficiency gains in operations improve profitability

Battery & other energy:
- Expand capacities to grow with new customers
- Investment into battery laboratory: develop next generation material
- “Economies of scale” and operational improvements compensate potential pressure on prices

Semiconductor & LED:
- Strongly growing and attractive market
- Utilize capacity in St. Marys and further expansion in other regions (China)
- Invest into technology & know-how

Automotive:
- Major customer projects won (e.g.: Bosch: parts for diagnosis tank leakage module pumps, Pierburg: parts for brake assistant pump)
- Focus high labor cost activities in low cost countries (Poland)

Solar
- Grow with market while improving profitability

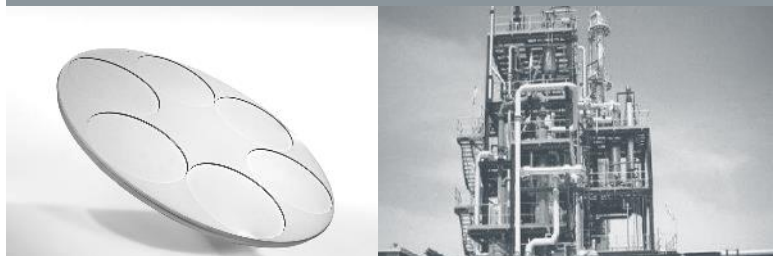
sgl carbon

Innovation

SGL Innovation.
Focused on future growth markets

SGL Innovation

GMS Application & Technology



- Graphite anode materials for lithium-ion batteries
- Isostatic and extruded graphite
- Coated graphite for semiconductors
- Carbon and graphite felts
- Thermal management solutions
- Sealing materials
- Equipment for chemical industry
- Die molded materials for automotive

Central Innovation

- Strategic scouting
- Advanced & future carbon fibers
- Future composites
- Future coatings
- 3D printed materials
- Next generation materials for lithium-ion batteries
- C/SiC[1] ceramics
- Gas diffusion layers for fuel cells

CFM Technology

- Textile and carbon fibers
- Textile materials
- Pre-impregnated materials
- Thermoplastic materials
- Wet friction materials
- Lightweight solutions & prototypes

[1] C/SiC: Carbon fiber reinforced Silicon Carbide

SGL Central Innovation – Future Growth Areas.

From research and development to profitable business

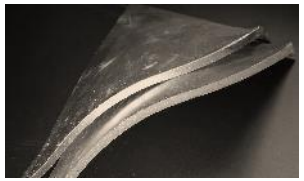
Startups:
Develop business with profitable growth

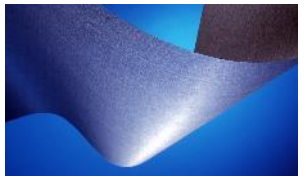
Development: Products & technology in cooperation with customers and partners

Future growth areas:
Defined by analysis of markets and Megatrends in technology

Startup GDL[1] for fuel cell

C/SiC ceramics


C/SiC[2] ceramics


GDL for fuel cell

3D printing

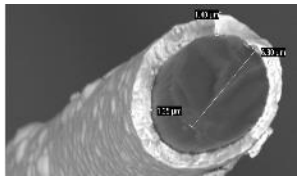
Nano Si/C for next generation lithium-ion batteries

Nano Si/C[3] for LIB


3D printing

Future carbon fibers & textiles

Future composites

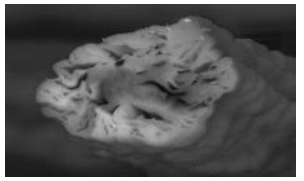

Future coatings


Fut. composites

Future coatings

Scouting: Medtec, water treatment, etc.


Water treatment

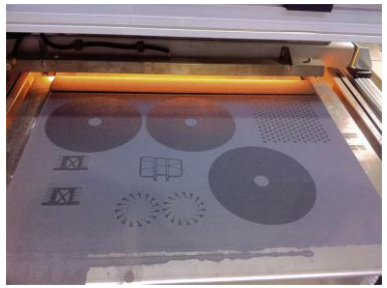

Future C-fibers

[1]GDL: Gas diffusion layer; [2]C/SiC: Carbon/Silicon carbide; [3]Si/C: Silicon/Carbon

SGL Central Innovation – Future Growth Areas.

SGL Carbon – A Pioneer in 3D Printing of Carbon Materials

Base Process*
3D printing of carbon/SiC materials

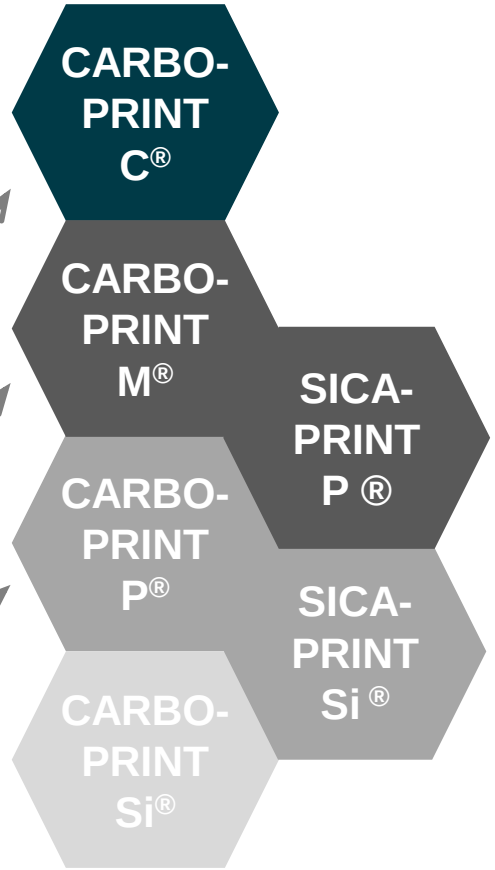


+ Post Treatment**
Metal impregnation

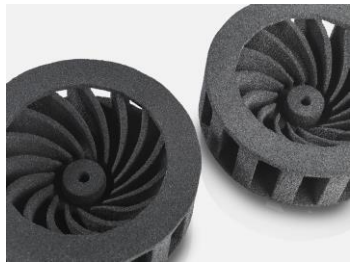
Polymer impregnation

Siliconization

Trademarks



Prototypes



Customers Advantage

- Degree of freedom
  Arbitrary design
- Individualization
  Prototypes & small series
- High flexibility
  Fast set up
- Cost reduction
  Avoid/reduce machining

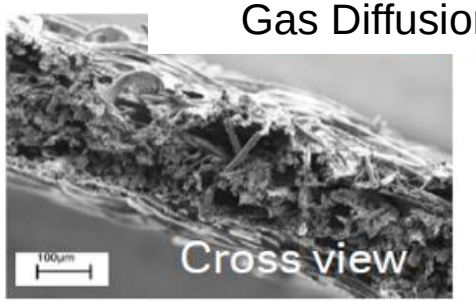
⇨ Developing prototypes with customers,
First products sold into real application

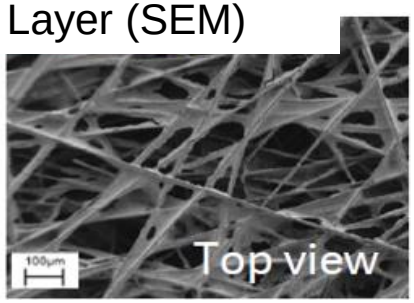
* Developed in cooperation with ExOne, Crosslicenced; ** SGL Group patents pending

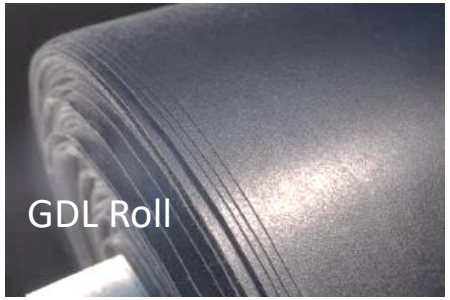
SGL Innovation – Start Ups.

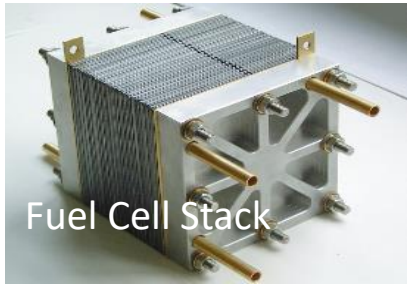
Fuel Cell Materials – Profitable Growth in Mobility & Energy

Microstructure of a
Gas Diffusion Layer (SEM)









- Gas Diffusion Layers are a non substitutable component in all major fuel cell types. The typical GDL raw material is carbon fiber paper.
- SGL Group has 20 years experience in development, production and sales of GDL material.
- SGL is a quality leader for GDL materials.
- Fuel cell market has grown with high double digit annual growth rates during last years .
- SGL Group delivers more than 50 customers in all continents.
- In 2017 we signed a long term supply contract with Hyundai Motor Corporation, one of the leading fuel cell car OEMs.

Summary

The new SGL Carbon.
In a nutshell:

- Material competence based on **carbon**[1] and **high temperature processes**
- Commands **entire** carbon fiber and graphite **value chain**
- **High tech** carbon fiber & graphite based **engineered solutions**
- **Diversified customer base** – servicing more than 35 industries
- **Sales growth** fueled by the **megatrends energy, mobility** and **digitization**
- Targeting **earnings growth more than proportionate** to sales growth

[1] Carbon refers to the chemical element – graphite and carbon fiber are forms of carbon

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Thank you for your attention !

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Backup

Outlook for fiscal year 2019

Reporting segment outlook 2019.
CFM – guidance revised downwards significantly

- Slight **increase** in **sales** expected mainly driven by market segment **Wind Energy**

- **FY2019 guidance** for recurring **EBIT** now negative mid to high single digit million € amount due to
  - Continued weakness becoming apparent for Q4/2019 in the market segments **Textile Fibers** and **Industrial Applications**
  - Despite the strong growth in the market segment **Wind Energy**, a substantial year-over-year earnings decline is also expected in this market segment due to the deteriorated product mix.

Reporting segment outlook 2019.
GMS – guidance revised upwards slightly again

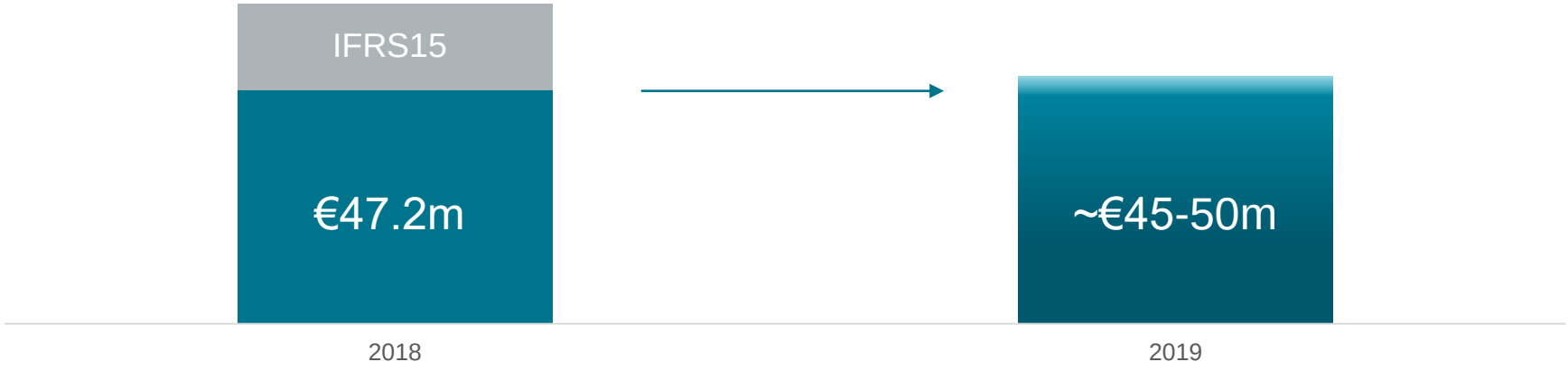
- **Sales** expected to increase slightly on prior year level which was boosted by initial adoption of IFRS 15
  - Mainly driven by market segments **Semiconductors** and **Automotive & Transport**
- Due to strong 9M/2019, we now expect **FY 2019 EBIT** to slightly increase
  - Prior year level was also boosted by initial adoption of IFRS 15
  - Lower shipments planned for Q4/19 as well as measures to reduce inventory, which decreases fixed cost absorption but improves cash flow
- **ROS_{EBIT}** target of 12% should again be exceeded in this business unit and thus **stability of GMS' business model** proven in a weaker overall economic environment

Reporting segment outlook 2019.
Corporate – guidance revised upwards slightly again

- **Recurring EBIT** anticipated **substantially better than** prior year level mainly due to
  - Lower net expenses in Central Innovation resulting from much stronger business development in fuel cell components
  - Lower expenses for management incentive plans following results decline in CFM and thus also at Group level
- Significant improvement in recurring EBIT expected despite prior year benefiting from a €3.9 million **one-time impact** from a land sale in Q1/2018

Group outlook 2019. Guidance for recurring EBIT revised downwards

- Full year **Group sales** expected to increase mid single-digit mainly driven by volume increases
  - Despite weakening of overall economic environment
  - Prior year boosted by high effects from initial adoption of IFRS 15
- **Group recurring EBIT** expected at €45-€50m compared to prior year level which was boosted by positive IFRS 15 effects
  - Adjusted for effects from initial adoption of IFRS 15, Group EBIT in 2019 is approx. on the same level as in 2018



Group outlook 2019. Adverse impact on net profit guidance due to lower outlook for CFM and impairment losses

- **Net result – continued operations** now expected at approx. negative €100m (2018: €41m)
  - Prior year included a high positive one-time effect of €28m from the full consolidation of SGL ACF
  - Current year includes approx. €75m impairment losses at CFM and approx. €7m DTA write-offs
  - In addition, we expect substantially higher interest cost in net financial results mainly from the corporate bond issue in April 2019
- **Capex** 2019 to increase compared to prior year to approx. €100m
- Substantial improvement in negative **free cash flow** from continued operations to a low double-digit m€ amount expected mainly due to working capital improvement and despite higher capex and higher interest costs – i.e. **free cash flow positive** on normalized capex levels
- **Net debt** at end 2019 to increase by a mid double-digit m€ amount
- **Net debt** and **free cash flow** target attainment could be slightly affected by earnings decline in CFM

Sneak preview on 2020.

- **Sales revenues to be slightly lower than 2019 level**
  - 2019 sales expected between €1.05 and €1.1bn
- **Recurring EBIT to be 10-15% lower than in 2019**
  - 2019 recurring EBIT expected between €45 and €50m
- Further details in January 2020 at the latest

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Latest financials 9M/2019

Composites – Fibers & Materials.

in € million	9M/2019	9M/2018
Sales revenue	328.6	323.9
EBITDA[1]	24.1	45.8
EBIT[1]	-1.8	20.9
EBIT[1]-Margin (in %)	-0.5	6.5
$ROCE_{EBIT}$[1] (in %)	-0.3	4.6

- **Sales revenue** in 9M/2019 slightly above prior year level (currency adjusted 1%)
  - Strong growth in market segment **Wind Energy** (albeit from a very low base) offset by market segments **Industrial Applications** and **Textile Fibers** (weakening global economy and structural reasons) as well as **Aerospace** (project billings skewed to H2/2019)
  - Remaining market segment **Automotive** approximately on prior year level
- **EBIT**[1] in Q3/2019 significantly declined compared to the first two quarters due to the deterioration in **Textile Fibers, Wind Energy and Industrial Applications**
- Overall **EBIT**[1] in 9M/2019 substantially below prior year level
  - Mainly due to earnings decline in market segments **Textile Fibers** (weak economic conditions and structural effects), **Wind Energy** (lower earnings despite higher sales due to unfavorable product mix), **Automotive** (temporary unfavorable product mix), **Aerospace** (different billing patterns)

[1] before non-recurring items of minus €81.0 million in 9M/2019 and €18.1 million in 9M/2018

Graphite Materials & Systems.

in € million	9M/2019	9M/2018
Sales revenue	471.3	436.8
EBITDA[1]	91.2	76.5
EBIT[1]	70.9	59.5
EBIT[1]-Margin (in %)	15.0	13.6
$ROCE_{EBIT}$[1] (in %)	16.9	16.0

- **Sales revenue in 9M/2019** up 8% (currency adjusted by 6%)
  - Substantial double-digit growth in market segments **Semiconductors, Automotive & Transport** and **LED**
  - Slight increase also in **Industrial Applications** and **Chemicals**
  - **Battery & other Energy** close to prior year level as expected
  - Sales to market segment **Solar** again limited to below prior year level as supply to **LED** and **Semiconductor** industries again prioritized
- **EBIT[1] in 9M/2019** increased by 19% and thus more than proportionately to sales to a record level
  - Due to improvements in most market segments
  - **Automotive & Transport** was able to improve earnings significantly in Q3 vs. the first half 2019 (reduced start-up costs), thus stabilizing earnings over the reporting period
  - Earnings in the market segment **Battery & other Energy** were also maintained close to the prior year level
  - **Solar** below prior year level due to shift of business to more profitable Semiconductor customers

[1] before non-recurring items of €0.6 million in 9M/2018

Corporate.

in € million	9M/2019	9M/2018
Sales revenue	32.5	25.6
- of which Central Innovation	*9.4*	*3.6*
EBITDA[1]	-8.1	-16.6
EBIT[1]	-14.9	-21.2
- of which Central Innovation	*-4.0*	*-6.1*

- Higher **sales revenue** resulting primarily from stronger demand in the market segment **Energy** relating to parts for fuel cell customers supplied by our central research and development department (Central Innovation)
  - Accordingly, sales revenue at Central Innovation more than doubled in the reporting period to €9.4 million
- **EBIT**[1] improved significantly compared to the prior year level – despite a €3.9 million one-time gain from a land sale in the prior year period
  - Lower expenses for management incentive plans mainly as a result of the weak performance in CFM and thus in the Group
  - Central Innovation net expenses of €4.0 million below prior year level of €6.1 million due to higher earnings contribution from business with parts for fuel cells

[1] before non-recurring items of €1.8 million in 9M/2018

Group.

in € million	9M/2019	9M/2018
Sales revenue	832.4	786.3
EBITDA before non-recurring items	**107.2**	**105.7**
EBIT before non-recurring items	**54.2**	**59.2**
$ROCE_{EBIT}$ (in %)	*4.7*	*6.1*
Non-recurring items	-81.0	20.5
EBIT	-26.8	79.7
Net financing result	-32.6	-21.3
Results from continuing operations before income taxes	-59.4	58.4
Income tax expense and non controlling interests	-14.7	-6.4
Result from discontinued operations, net of income taxes	-0.1	-4.0
Consolidated net result attributable to shareholders of parent company	**-74.5**	**47.7**

- **Recurring EBIT** declined by 8% to €54.2 million due to gain from a land sale in prior year period (impact of €3.9 million in Q1/2018). Excluding this effect in the prior year period, EBIT would have been nearly stable as higher earnings contribution from GMS and lower expenses in Corporate almost entirely compensated for lower CFM contribution
- **Net financing result** deteriorated mainly due to the one-time expense of €6.3 million for the repurchase of the convertible bond 2015/2020 as well as due to higher interest expenses from new convertible bond issued in September 2018 and the new corporate bond issued in April 2019 as well as from the first time adoption of IFRS 16.
- Lower **net result** due mainly to impairment losses and lower financial result in the current year and non-recurrence of positive non-recurring items of approximately €28 million from the full consolidation of former JV with BMW (SGL ACF) in the prior year period

Free cash flow.

in € million (continuing operations)	9M/2019	9M/2018
Cash flow from operating activities	29.9	7.6
• Capital expenditures in property, plant, equipment and intangible assets	-50.7	-38.7
• Cash flow from other investing activities[1]	11.2	-8.8
Cash flow from investing activities	-39.5	-47.5
Free cash flow	-9.6	-39.9
Free cash flow from discontinued operations	-9.8	58.6

- **Cash flow from operating activities** improved significantly to €29.9 million from €7.6 million due to
  - The lower increase in working capital
  - A higher positive non-cash effect from IFRS15 in the prior year result
- **Free cash flow** also improved significantly to close to break even level due to
  - Improvement in operating cash flow
  - Lower cash outflow from investing activities despite significantly higher capex as prior year period included payment for German part of SGL ACF (Wackersdorf site)
- **Free cash flow from discontinued operations** included
  - Cash outflow relating to final settlement payments to the buyer of HITCO Aerostructures in the reporting period
  - Prior year benefited from cash inflow from the final outstanding payments for the sale of former PP activities

[1]dividends received, payments for capital contributions in investments accounted for At-Equity and other financial assets, payments for acquiring remaining stakes in our joint ventures, proceeds from sale of intangible assets and property, plant and equipment

Balance sheet.

in € million	30.09.2019	31.12.2018
Equity ratio (in %)	26.6	33.5
Total liquidity	146.7	181.6
Net financial debt	279.5	242.2
Gearing (net debt/equity)	0.68	0.46
Leverage ratio (net debt/EBITDA)	2.2	1.9

- **Equity ratio** deteriorated mainly due to the lower net result impacted by the impairment and decreased equity from adoption of lower interest rates on pension liabilities. Positive effects from FX were not sufficient to compensate for these adverse effects
- Higher **net financial debt** primarily reflects final settlement payments to the buyer of HITCO Aerostructures, the small negative free cash flow, and incurred costs for the corporate bond issue

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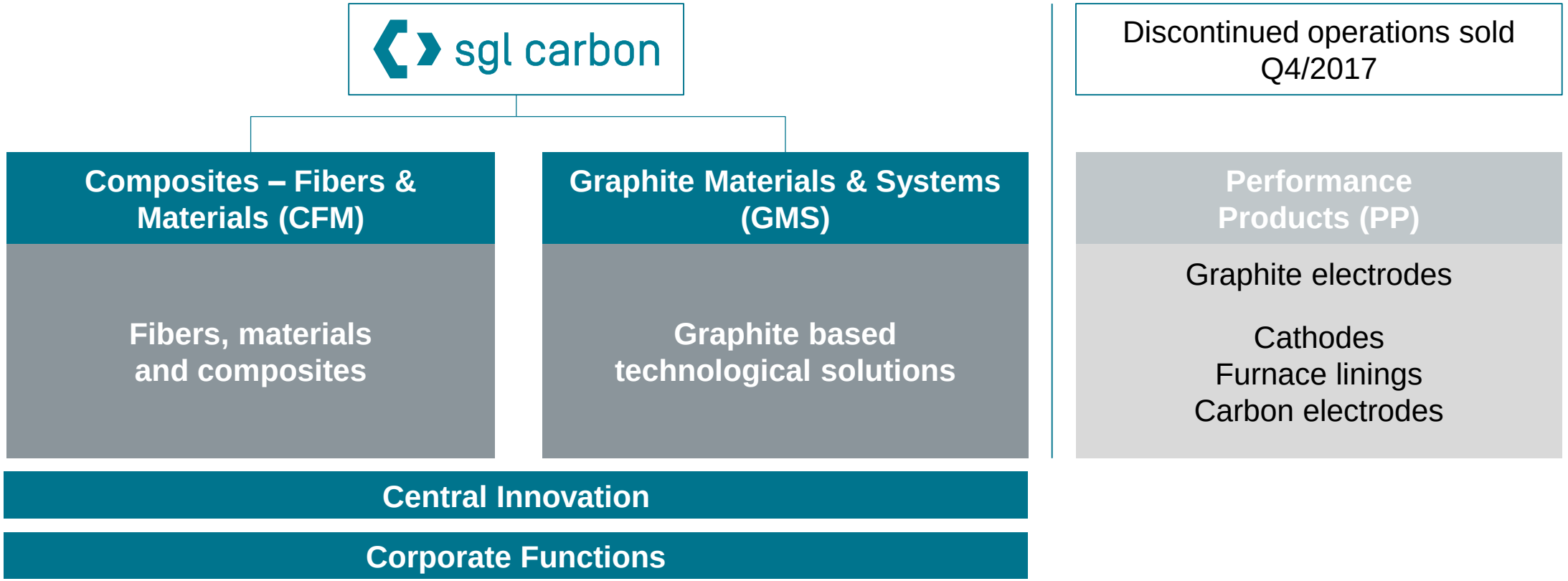
Appendix

The transformation of SGL Group.
We have implemented the announced strategy



- ✓ Disposal of the PP business to **concentrate** our resources on the **growth areas CFM and GMS**
- ✓ Focus on CFM and GMS improves the balance between markets and industries, and thus **reduces volatility in our business**

Regional Sales Distribution.

Sales by destination

Sales	Germany	Europe outside Germany	North America	Asia	Rest of World
2018	**34 %**	**18 %**	**16 %**	**28 %**	**4 %**
2017	26 %	22 %	19 %	28 %	6 %

Sales by origin

Sales	Germany	Europe outside Germany	North America	Asia
2018	**39 %**	**31 %**	**23 %**	**7 %**
2017	41 %	32 %	21 %	6 %

Shares in issue and shareholder structure.

Basic shares

Security Identification Number	723530
ISIN Number	DE0007235301
Cusip Number	784 188 203
Number of Shares (as at November 30, 2019)	122,341,478
Free float	~ 46%

Reported shareholdings according to §§ 21 f. WpHG and other notifications

SKion GmbH	28.5%
BMW AG	18.4%
Volkswagen AG	7.4%

Debt market instruments.

Convertible notes 2018/2023

ISIN-Number:	DE000A2G8VX7
Coupon	3.0%
Principal Amount	€ 159.3 million
Initial Conversion Price	€ 13.0220
Conversion Right	12.234 million shares
Issue Date	20 September 2018
Date of Maturity	20 September 2023

Corporate bond 2019/2024

ISIN-Number:	XS1945271952
Coupon	4.625%
Principal Amount	€ 250 million
Issue Date	10 April 2019
Date of Maturity	30 September 2024

Convertible notes 2015/2020

ISIN-Number: DE000A168YY5

Repaid fully ahead of maturity in July 2019 following a tender offer.

Financial calendar/contact details.

Financial calendar 2020

March 12, 2020	Annual Report 2019
April 22, 2020	Annual General Meeting
May 14, 2020	Report on the first quarter 2020
August 13, 2020	Report on the first half year 2020
November 12, 2020	Report on the nine months 2020

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Important Note

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Due to rounding, numbers presented throughout this and other documents may not add up precisely to the totals provided and percentages may not precisely reflect the absolute figures.