



MORE LIGHT

Semiconductor and Electronics/ Life Science and MedTech

Dr. Ralf Kuschnereit

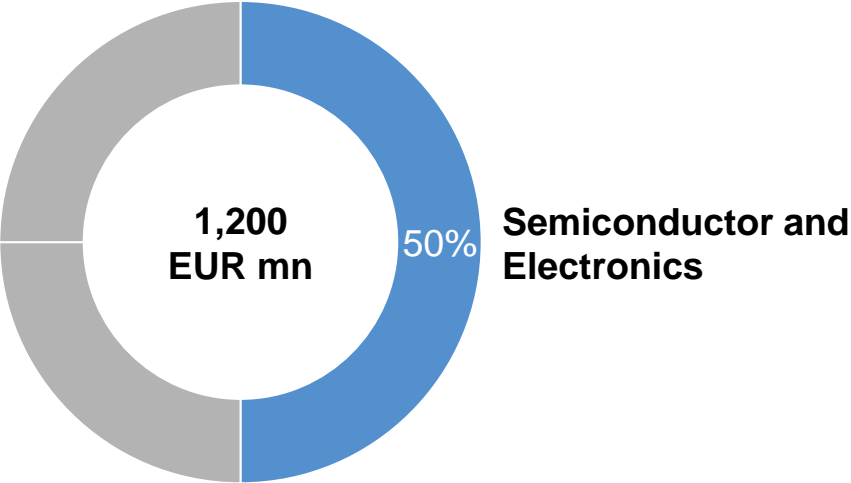
✓ Deep-dive included today

Ambition

We aspire to bring the next level of digitization to the people by photonic innovations

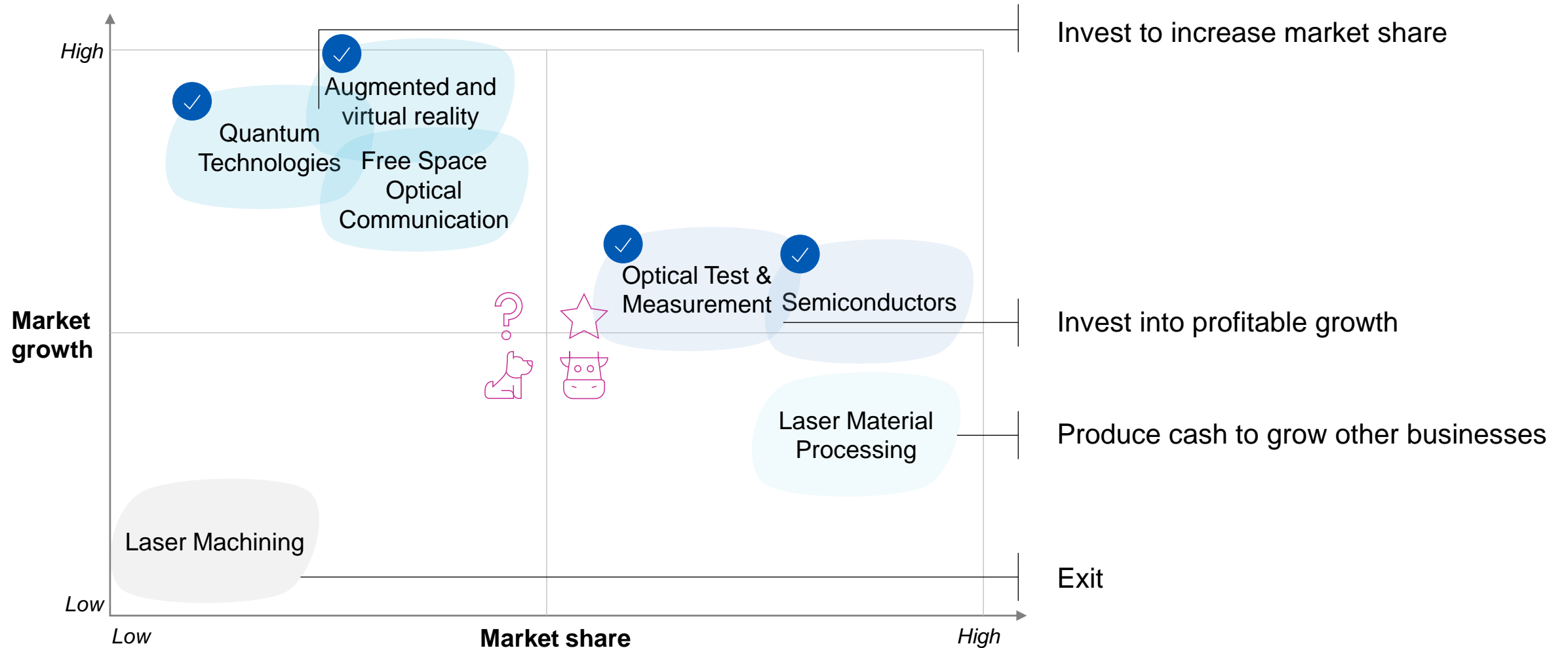
Businesses

- Semiconductors ✓
- Optical Test & Measurement ✓
- Extended reality (AR/VR) ✓
- Quantum Technologies ✓
- Free space optical communication
- Laser Material Processing
- Laser machining



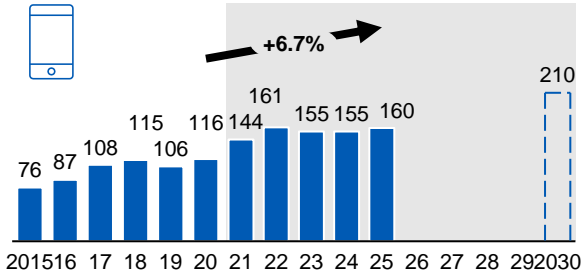
In the Semiconductor and Electronics market we have a well-balanced portfolio of high growth and high market share businesses

✓ Deep-dive included today

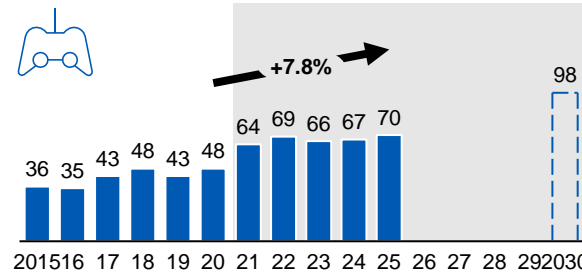


Semiconductor end-markets expected to grow ~7% longer-term

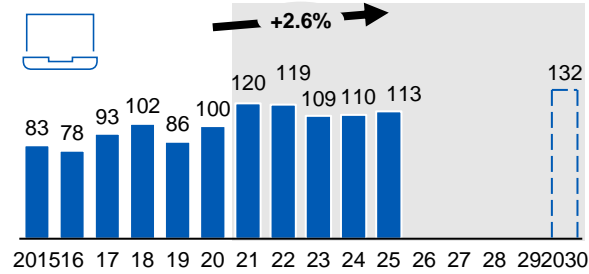
Smartphone (bUSD)



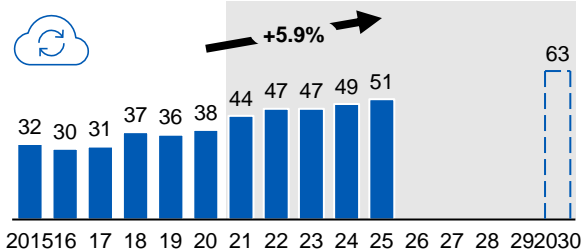
Consumer electronics (bUSD)



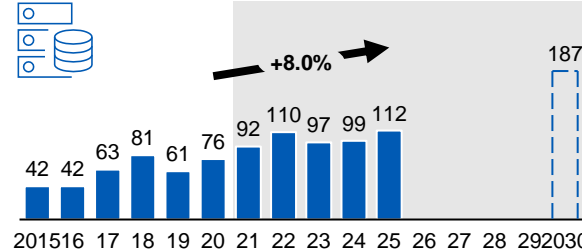
Personal computing (bUSD)



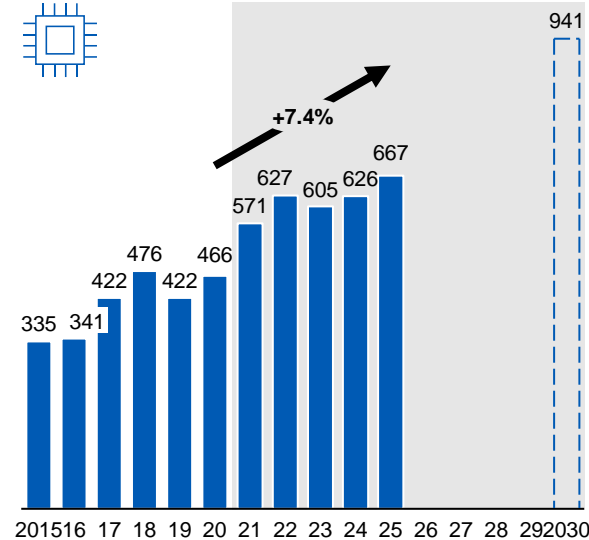
Wired and wireless infrastructure (bUSD)



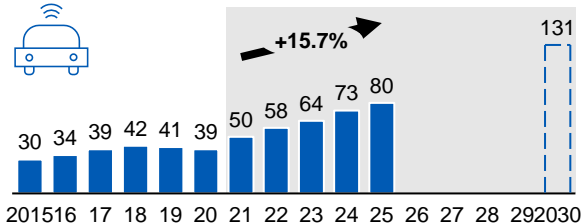
Servers, data centers, and storage (bUSD)



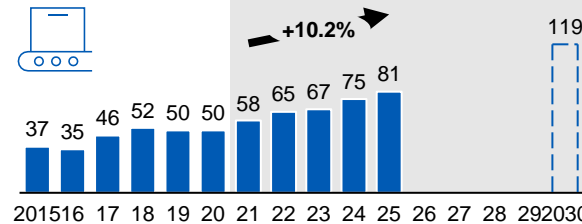
Total semiconductor (bUSD)



Automotive (bUSD)



Industrial electronics (bUSD)



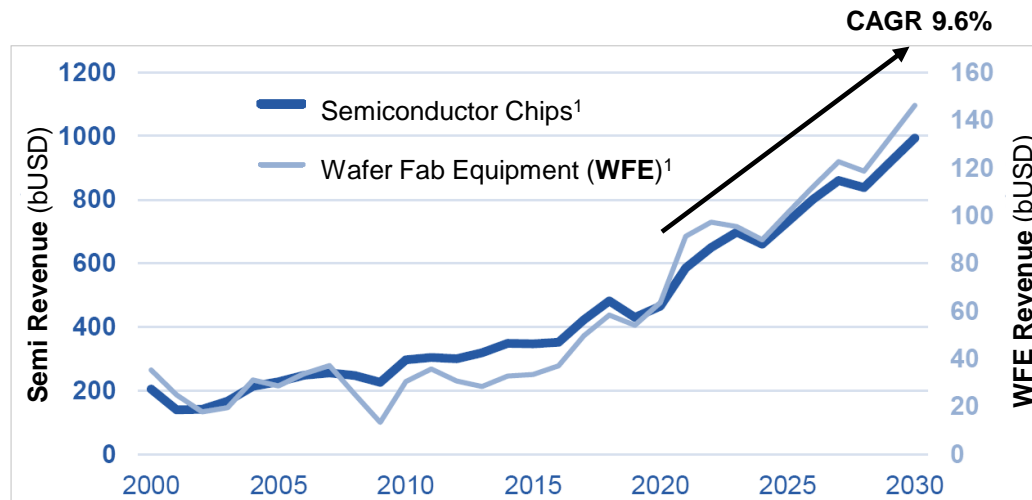
Forecast

Drivers for growth

- Smartphones, 5G, Gaming, Servers
- New types of computing including AI and other data crunching
- Sensors (self driving cars, etc.)
- Internet of Things
- Actual increased demand resulting from deceleration of chip supply in 2019/20

Source: Historical: Gartner. Forecast: Gartner 2Q21 forecast (Jun30 2021); 2030: ASML extrapolation of data to 2030 using '15-'25 Compound Annual Growth Rate (CAGR)

Continued strong market growth for Semiconductor Equipment



Unprecedented growth in demand for Semiconductor Equipment, driven by

Technology

- Data centers, faster wireless communication and automotive are driving advanced logic & memory chips

Geopolitics

- China self sufficiency
- New investments in US (Samsung, tsmc, Intel)
- Europe sees additional investments

New Opportunities for Litho

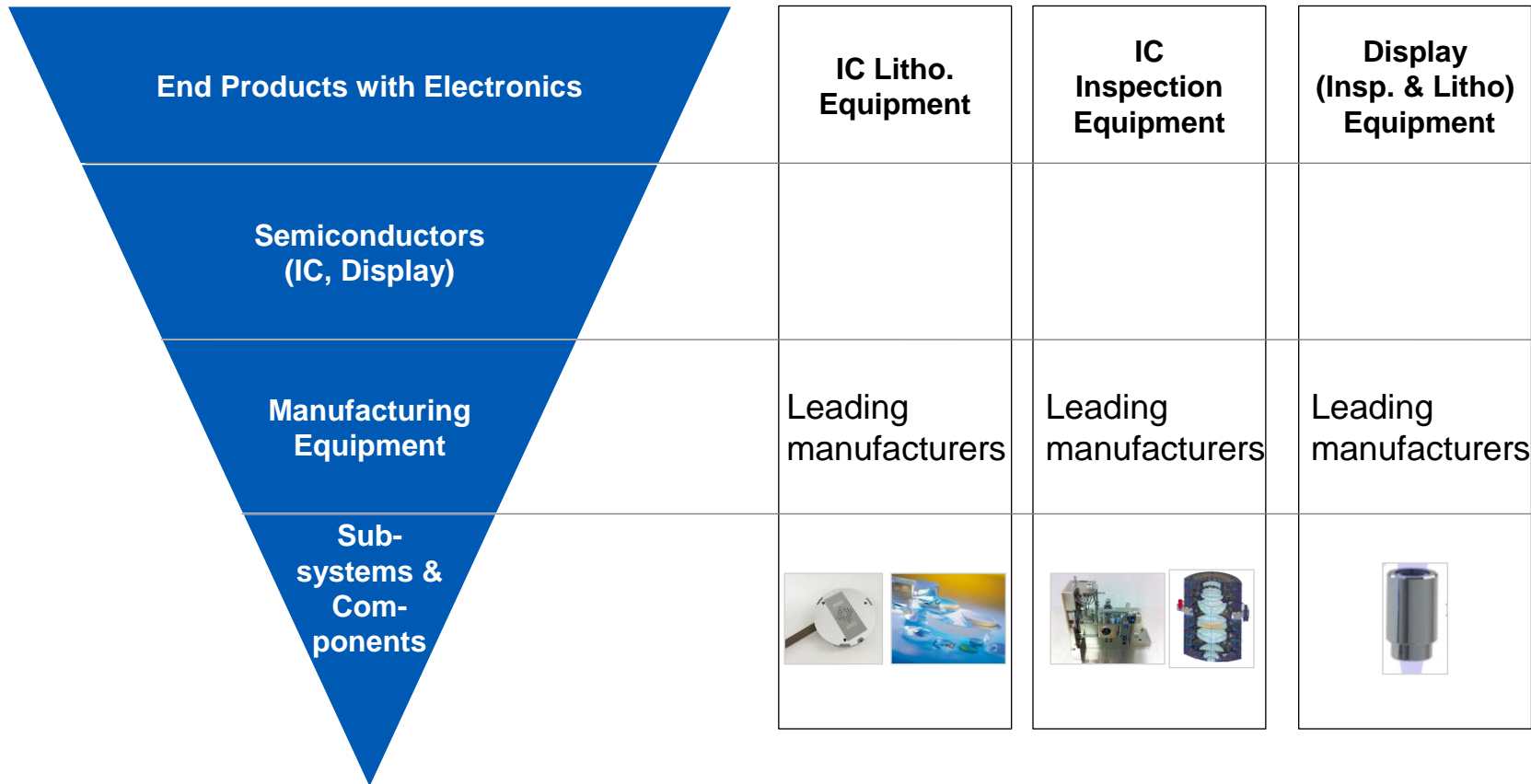
- DUV chip layer share to increase for several device architectures
- EUV introduction does not lead to significantly lower share for DUV

Outlook past 2025

- ASML¹: “We see significant growth opportunities beyond 2025. We expect (for our products) ...an annual revenue growth rate of around 11% for the period 2020 2030, based on third party research and our assumptions.”

1. VLSI research, Sept 2021

Business Fields and Strategic Approaches



“Where to Play, how to Win”

- A** Grow share of wallet with major customers
- B** Gain market share from competition and grow share of wallet
- C** Enter display litho market with innovative technology

Strategic approaches: customer proximity, technology leadership, innovation

Grow share of wallet with key customers



Achievements

1. New ebeam lithography system ordered, production start scheduled for begin of 2023
2. New Microoptics Cleanroom Fab at Dresden approved and detailed planning started, production start scheduled for early 2025
 - Investment of approx. 70 EUR mn
 - Doubling production capacity
3. Extension of product portfolio and related fabrication capacity by acquisition of SwissOptic

Summary and Outlook 2025: we continue to build our business and are well-prepared for the future

Jenoptik honored with ASML Sustainability Excellence Award 2021

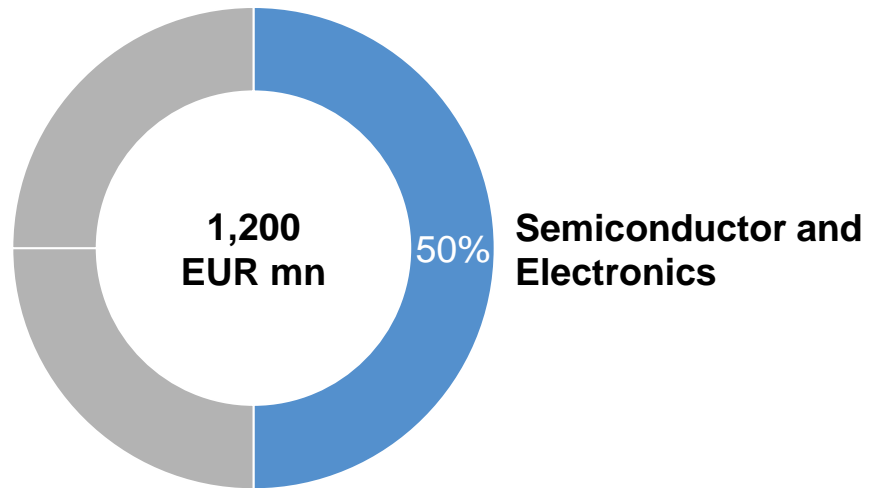


Outlook to 2025

We continue to build our Semiconductor business along the lines we just outlined

- Grow share of wallet with key customers
- Gain market share from competition
- Enter display market with innovative technology

We are well-prepared for the future, including our investment into the fab in Dresden that will support revenue growth



Ambition

We aspire to be globally recognized as the leading provider of application-specific optical test and measurement solutions for optics in high-end electronic products

Businesses

Semiconductors

Optical Test & Measurement

Extended reality

Quantum Technologies

Free space optical communication

Laser Material Processing

Laser machining

TRIOPTICS – strong growth and high profitability

- Gold standard for measuring and testing optics (for lenses, lens systems, and camera modules) in mobile devices
- Measurement solutions for augmented and virtual reality optics to enable the production of ever higher quality VR and AR products

For the coming years:

Growth and margin above group average

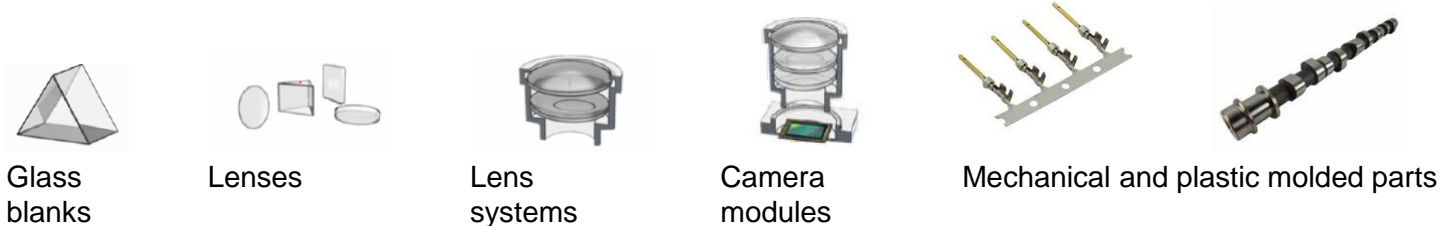


Jenoptik combines a broad product portfolio of optical test and measurement solutions and is positioned in attractive growth markets

End-user Devices



Components & Subsystems



Optical Test & Measurement Systems



Jenoptik provides application-specific test and measurement solutions based on optical technology combined with sophisticated software for image processing, customer intimacy and service

Attractive portfolio mix; Growth is expected to be driven by AR/VR and advanced driving assistance systems (ADAS) applications

CAGR



7%

Optics manufacturing

- Glass and lenses
- Optics mounting
- Laser technology



10%

Smartphones

- Mobile phone cameras
- Fingerprint sensors
- Facial recognition sensors
- Connectors



18%

Automotive²

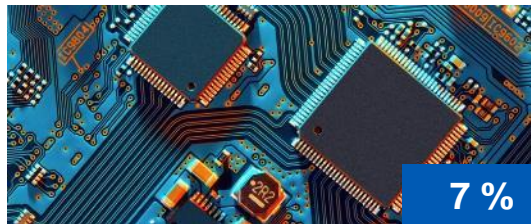
- ADAS cameras
- LIDAR systems
- Rearview mirrors
- Connectors and plastic parts
- Rotary symmetrical parts



6%

Communication

- Infrared systems
- Connectors
- Rotary symmetrical parts



7%

Microlithography

- UV optics
- Stepper lenses



30%

AR and VR

- Optical components
- Waveguides
- Cameras
- Plastic parts



6%

Medical technology

- Intraocular lenses
- Endoscopes
- Connectors
- Rotary symmetrical parts






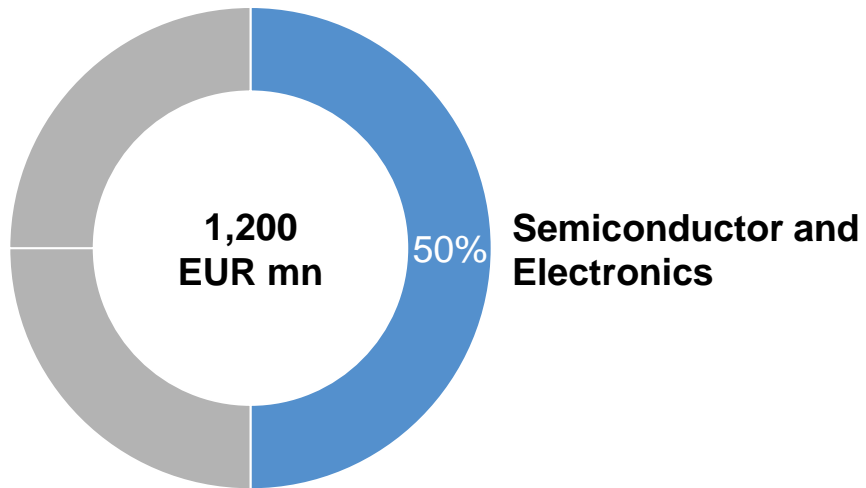
2%

Mechanical engineering

- Rotary symmetrical parts
- Connectors

Strategic initiatives to accelerate growth in key industries

Market		Mobile Phone		ADAS		AR/VR
Winning Aspiration	Safeguard Jenoptik's leading position in the mobile phone segment	Become the number one supplier for testing of camera modules and improve market position for active alignment of cameras and LIDAR systems	Position Jenoptik as the number one supplier for test equipment for AR/VR components – utilize synergies with Jenoptik's AR/VR component development and production			
Measures to achieve winning aspiration	<ul style="list-style-type: none">– Maintain close relationships with global OEMs and their supply chain, especially in Asia through key account system and local application and development centers– Push developments for new applications: testing of mobile phone cover (under-display cameras) and long EFL lenses– Develop in-line automated test systems	<ul style="list-style-type: none">– Strengthen relationships with Automotive Tier 1 companies– Introduce a new generation of focusing collimators, expand LiDar testing platform and offer complete test systems	<ul style="list-style-type: none">– Establish and maintain close relationships with key players to push sales of Image Master AR/VR– Develop solutions for display testing, metrology and customer-specific products			



Ambition

Jenoptik aspires to be globally known for enabling consumer acceptance of AR/VR devices by ensuring outstanding quality for optical components

Businesses

- Semiconductors
- Optical Test & Measurement
- Extended reality**
- Quantum Technologies
- Free space optical communication
- Laser Material Processing
- Laser machining

We distinguish between three types of extended reality: augmented, mixed and virtual

XR = Extended Reality



Real world with additions

Virtual world



AR

Augmented Reality

User still sees the real world, but receives additional information displayed



MR

Mixed Reality

User is linked to both real and computer-generated objects



VR

Virtual Reality

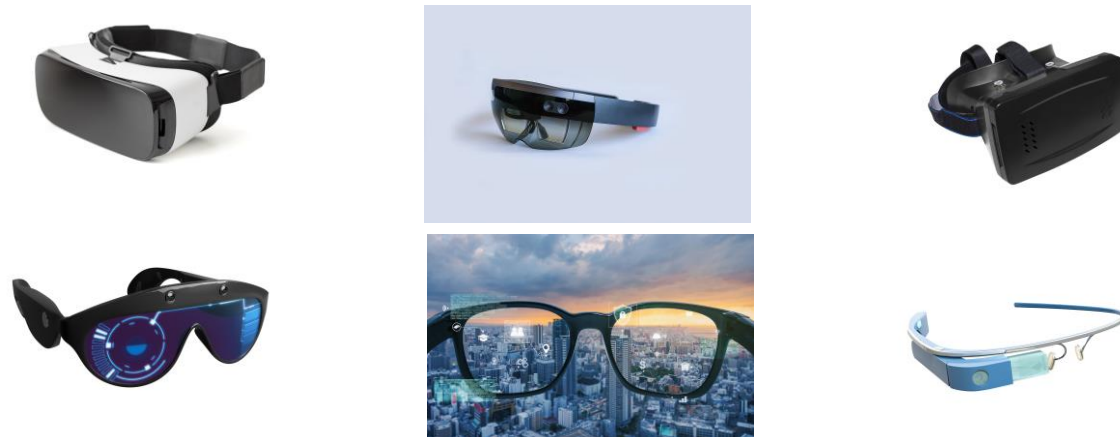
User only experience the digital 3D world with aids such as VR glasses

Jenoptik positioned to capture future growth

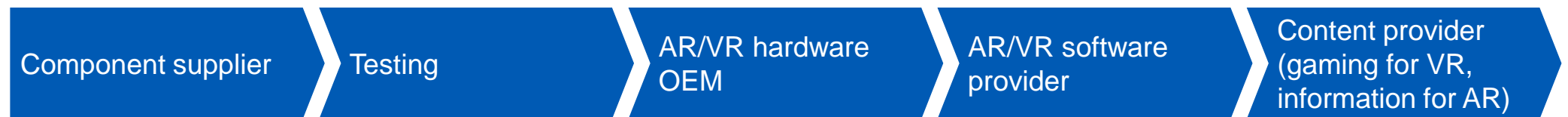
Jenoptik's offering today

Extended reality is at an inflection point – a large variety of hardware solutions are there; content is about to be developed... “Metaverse”

Today’s AR/VR value chain offers attractive EBIT margin >25%



Value chain



Often vertically integrated at OEM

Description

Development and production of sub-parts of AR/VR sets

Post-production functionality validation of components/ sub-assemblies

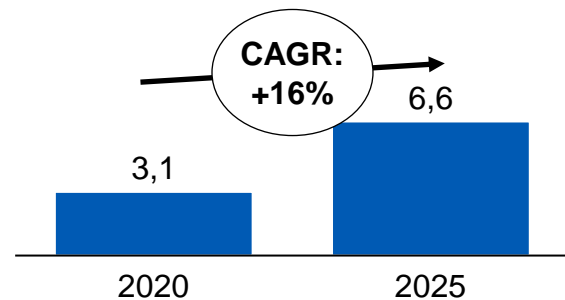
Development and refinement of full AR/VR sets based on market needs, assembly of full sets, firmware release, software development

Device specific content development

The VR market is significantly larger than AR in 2020 but an extraordinary growth is predicted for AR

■ Most optimistic scenario ■ Base scenario

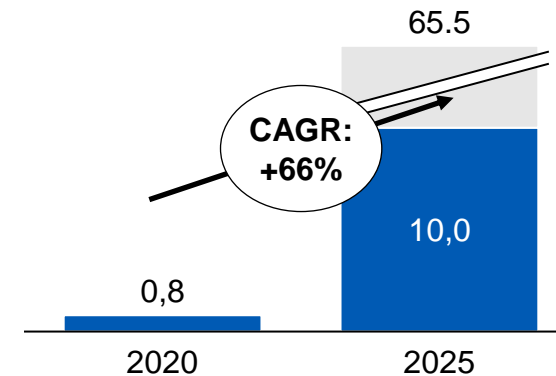
VR headset market, 2020–2025, in EUR bn



Growth assumptions: maturing of the market

- Unlock further use-cases
- Attract more customers due to experience in social contacts
- More focus on virtual interaction after COVID-19

AR headset market, 2020–2025, in EUR bn



Growth assumptions: Technical product challenges get solved, improving

- Optical performance
- Form factor

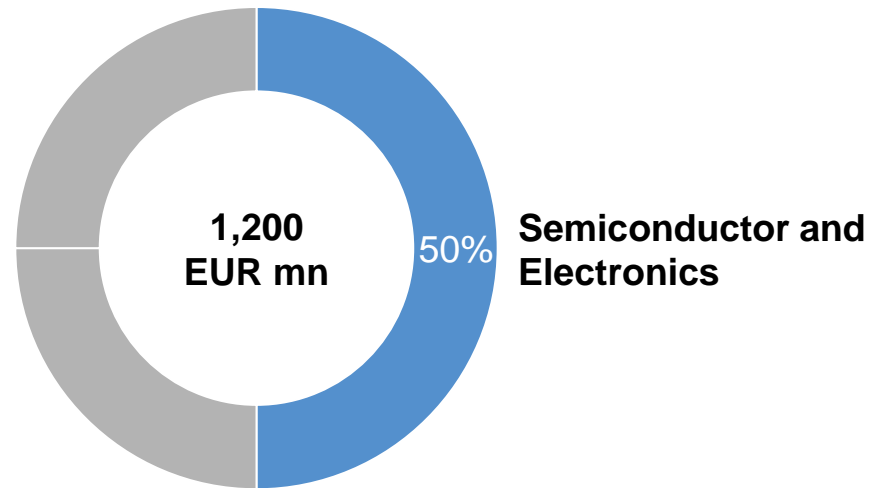
Source: McKinsey, Industry expert assessment

VR and AR headsets – used for consumer and commercial reasons

- Applications: near-eye display, smart glasses and smart helmets
- Customer industries: gaming, entertainment, education, manufacturing, education, defense, automotive and healthcare

Ambition

We aspire to be the photonics partner of choice in industrialization of selected Quantum Technology solutions



Businesses

Semiconductors
Optical Test & Measurement
Extended reality

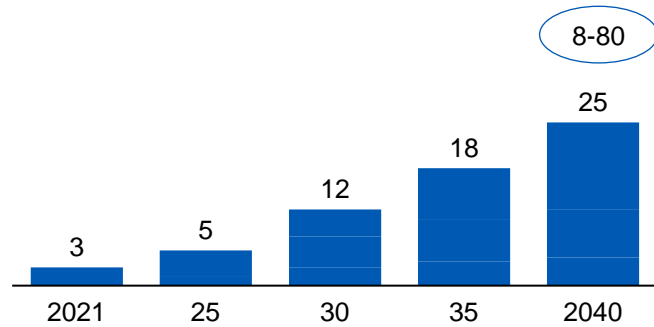
Quantum Technologies

Free space optical communication
Laser Material Processing
Laser machining

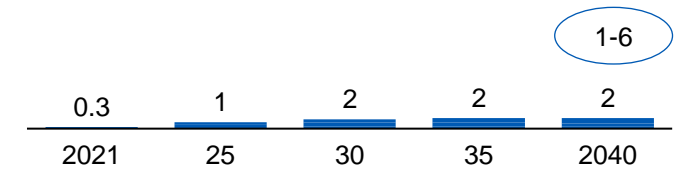
Quantum Technologies are a major market opportunity and scaling starts now

Market potential in base scenario, EUR bn
 (x) Range across low and high scenario

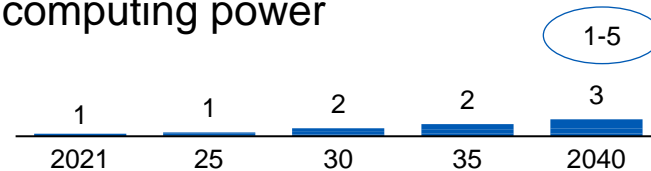
Quantum computing enables new territories of computing and allows for exponential performance improvement



Quantum sensing provides measurements of various quantities (e.g. gravity, time, electromagnetism) that are orders of magnitude more sensitive than classical sensors



Quantum communication ensures security of communication even in the face of unlimited computing power



Source: McKinsey's Quantum Technology Monitor

Right-to-play: Jenoptik has a broad portfolio of high-performance optical technologies and is already active in Quantum Computing development

Technology



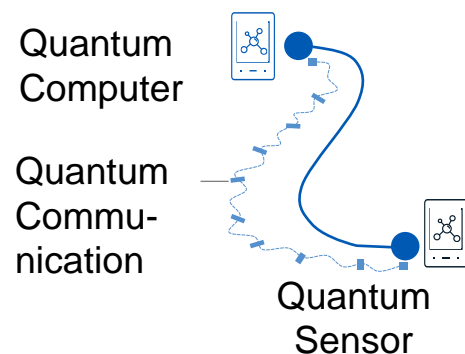
Broad portfolio of high performance optical technologies

Customer access

Existing customers

Trusted development partner for optical systems with trapped-ion Quantum Computing pioneer

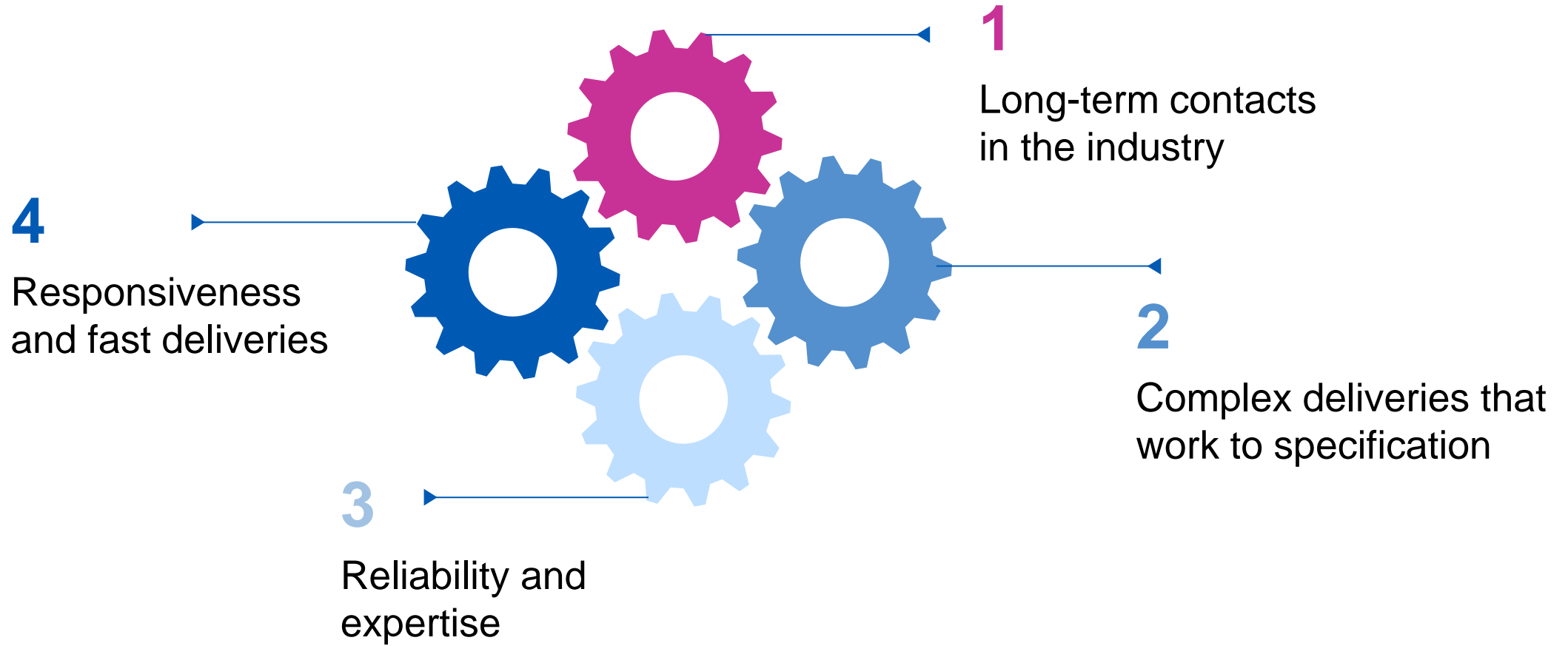
Track record



Proven competence and capability to cater for world leading players in quantum computing

Product-market fit with adjacent technologies in Quantum Communications (BF Optical Datacom), and Quantum Sensing (BF Bioimaging)

In future: we want to intensify overall efforts in quantum technologies



In selected Quantum Technologies, Jenoptik has already a starting point

Quantum Computing

Existing business

- Jenoptik delivers optical systems to Quantum Computing pioneer

Quantum Communications

Development possible

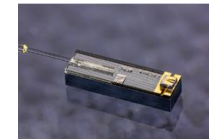
- Jenoptik delivers optical components based on greyscale lithography to Optical Data Communications customers as well as optical probecards for testing of Photonic Integrated Circuits
- Based on this, dedicated developments for Quantum Communications could be considered

Quantum Sensing

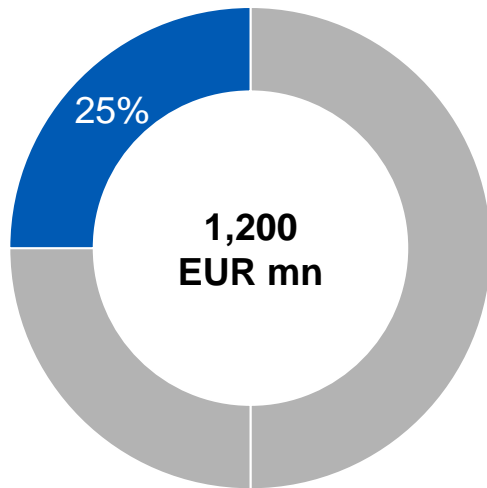
Development possible

- Jenoptik has strong capabilities in sensing hard- and software in Biophotonics and Optical Test & Measurement SBU
- Based on this, dedicated developments for Quantum Sensors could be considered.

Cross-cutting for Quantum Technologies



Life Science
and MedTech



Ambition

We aspire to be the leading photonic OEM partner helping to improve the lives of millions of people around the world

Strengthening global photonics business

Acquisition of Berliner Glas Medical and SwissOptic:

- Accelerated growth and stronger focus on photonics
- Expansion of global presence in attractive markets (semicon, medical)
- Broadening of customer and product portfolio

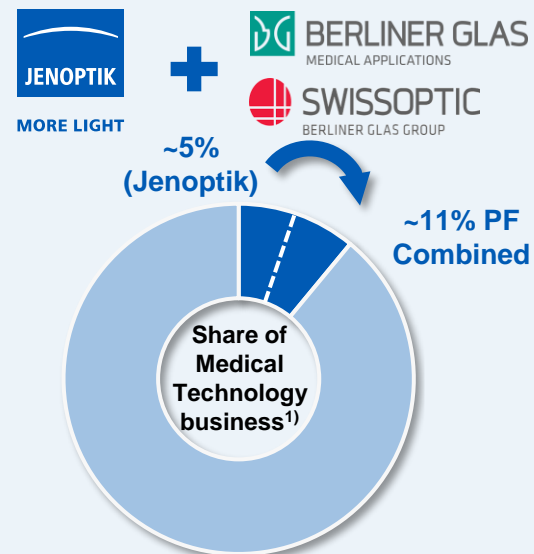
Acquisition of Berliner Glas Medical and SwissOptics – Broadening of product and technology offering

Medical Technology



Jenoptik's existing medical technology business will almost double

- Berliner Glas Medical adds two new complementary application areas (dental, robotic surgery) with technological proximity to existing Jenoptik technology base (cameras, optical components)
- SwissOptic's ophthalmology and life science businesses with similar OEM customer base, thus increasing Jenoptik's relevance to respective customers



Semicon



Strengthening offering for major semicon customers

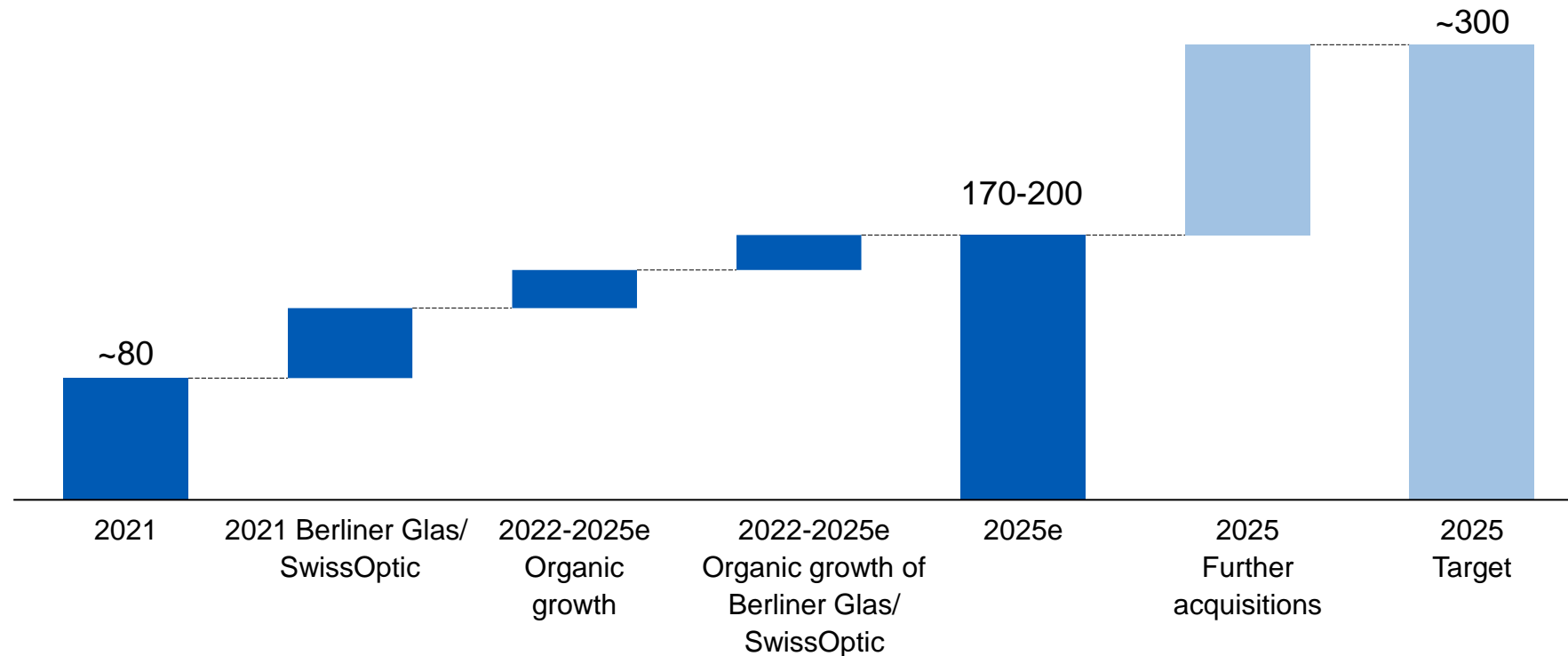
- Complementary product portfolios resulting in a comprehensive combined portfolio
- Applying Jenoptik's know-how in optics design & manufacturing to SwissOptics's semicon portfolio will allow Jenoptik to better address high customer requirements
- Increased flexibility and efficiency in product development and manufacturing ramp-ups due to similar R&D capabilities, supplier base and customer experience
- Further strengthening trusted long-standing relationship with ASML

Strengthening of Jenoptik's Medical Technology and Semiconductor Equipment business

Our ambitious growth path until 2025

■ Portfolio as of end 2021
 ■ Including portfolio additions

Revenue breakdown in Life Science and MedTech 2021-2025e, EUR mn



Key takeaways

We have the ambition to grow our Life Science and MedTech business to ~300 EUR mn

Possibility of M&A related growth dependent on target availability and deal viability

To identify targets, we have a clear search focus

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