

Vontobel

Vontobel Chips Day 2025

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4. Dezember 2025

Public



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Analyst Technology & Services
Swiss Equity Research
Private Clients

4. Dezember 2025

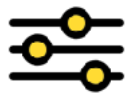
Die globale Halbleiterlandschaft und ihre Wachstumsdynamik



Inhalt



Der Halbleitermarkt im Überblick



Die Rolle der Künstlichen Intelligenz



Das Energieproblem



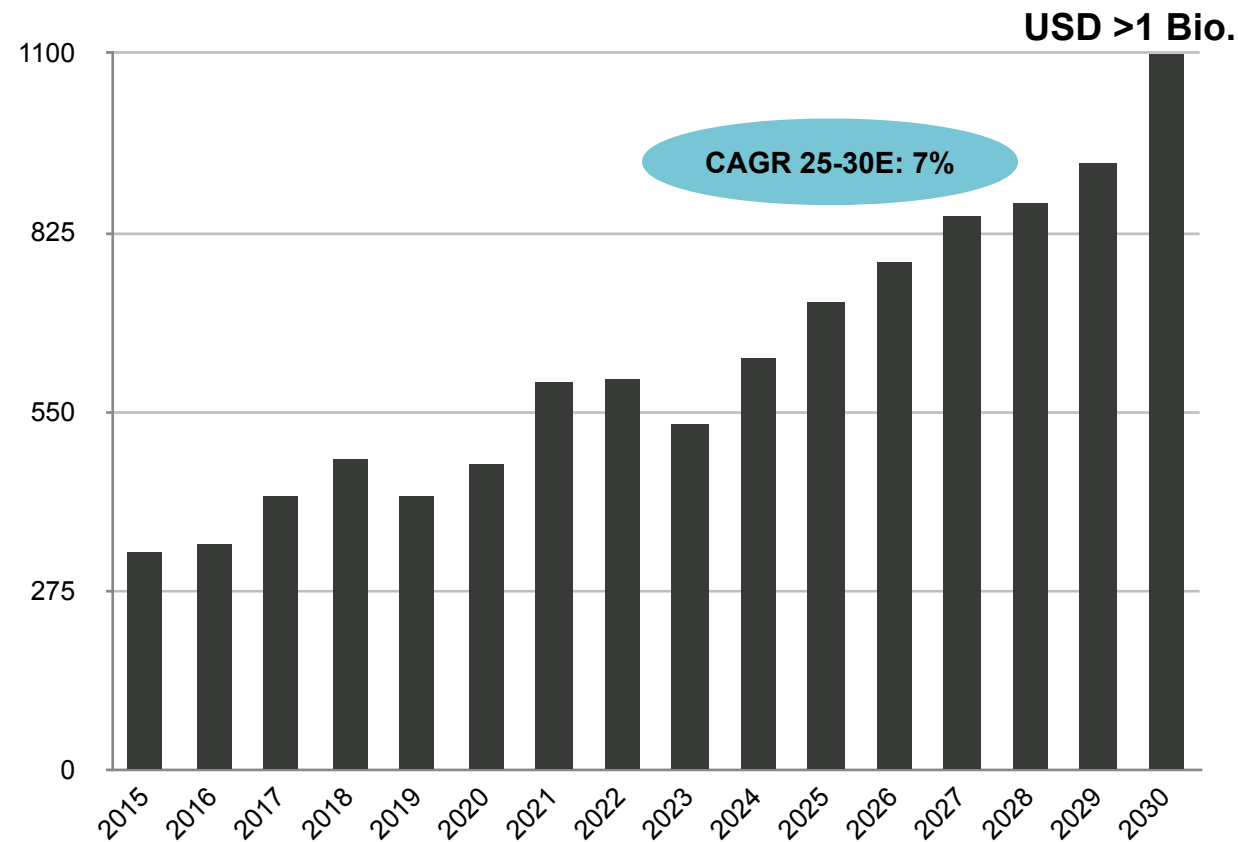
Wer ist wer im Halbleitermarkt



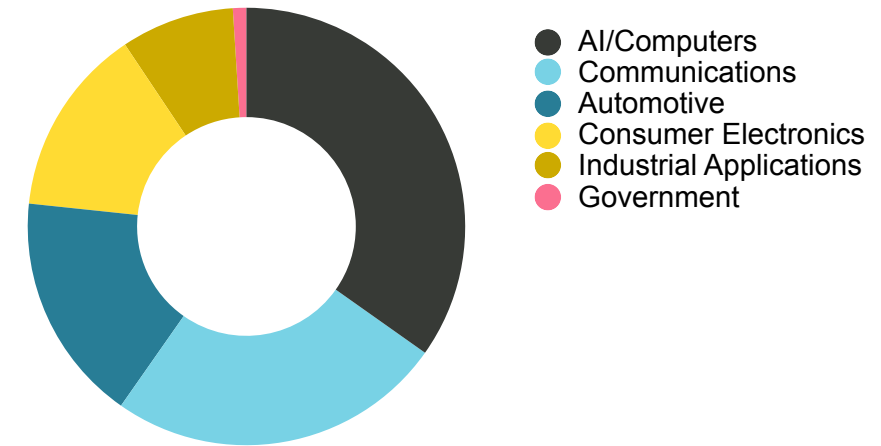
Wert und Volumen in der Chipproduktion

Langfristige Halbleiternachfrage beschleunigt sich

Globale Chipumsätze (in USD Mrd.)



Halbleitermarkt nach Anwendungen



Wachstumserwartungen (CAGR 2025-2030)

- ▶ Gesamter Halbleitermarkt 7% CAGR 2025-2030 auf >USD 1 Bio.
- ▶ AI/Data Center Chips 18% CAGR 2025-2030 auf USD 361 Mrd.
- ▶ Smartphone Chips 5% CAGR 2025-2030 auf USD 192 Mrd.
- ▶ Automobil Chips 8-9% CAGR 2025-30 auf USD 102 Mrd.
- ▶ Industry und IoT 7% CAGR 2025-30 auf USD 120 Mrd.
- ▶ Consumer Electronics Chips 8-9% CAGR

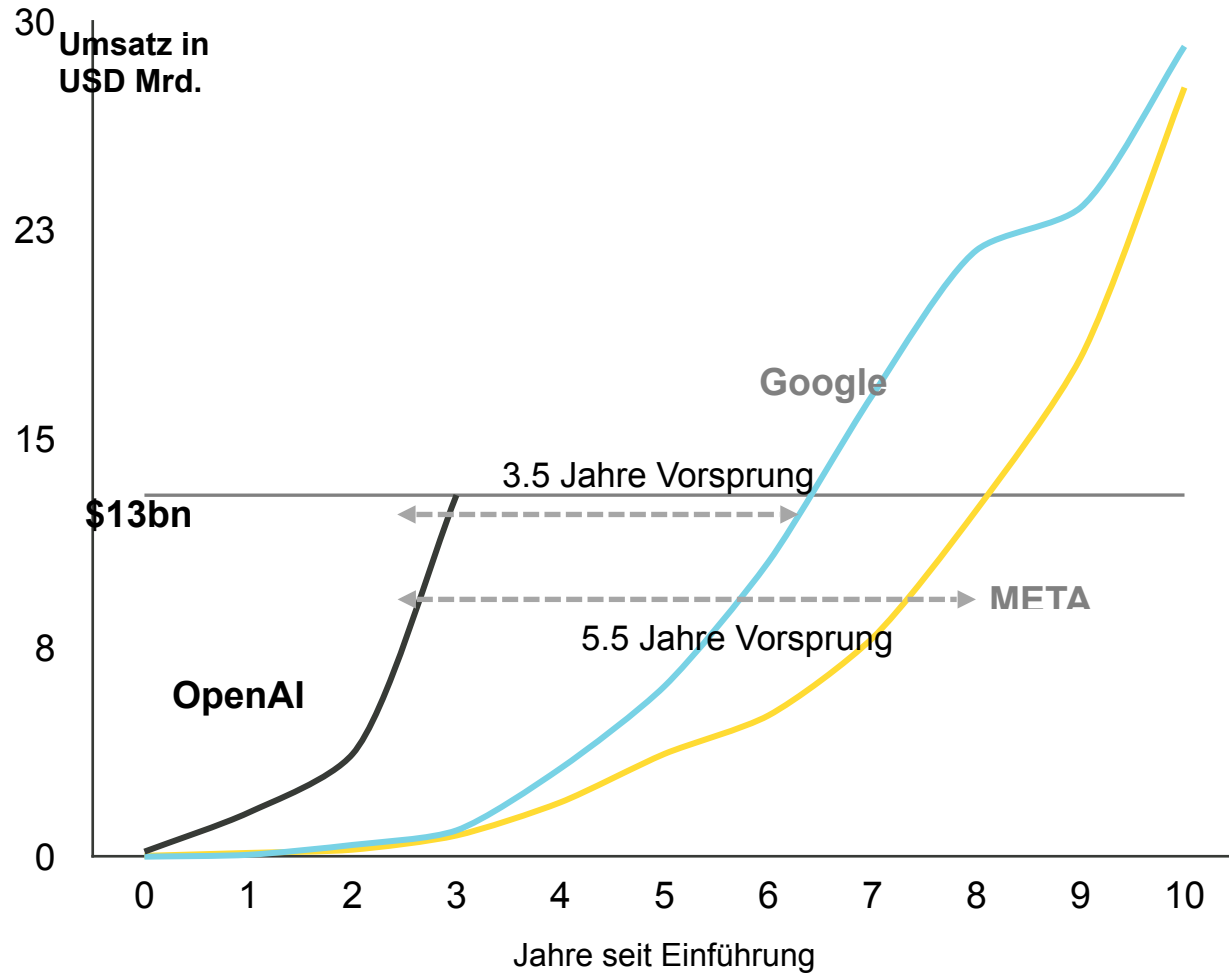
KI – Wo stehen wir?

Immer noch in den Anfängen – der Aufbau einer Infrastruktur ist entscheidend für zukünftiges Wachstum



Sehr hohe Einführungsgeschwindigkeit

Umsatzentwicklung seit Markteinführung

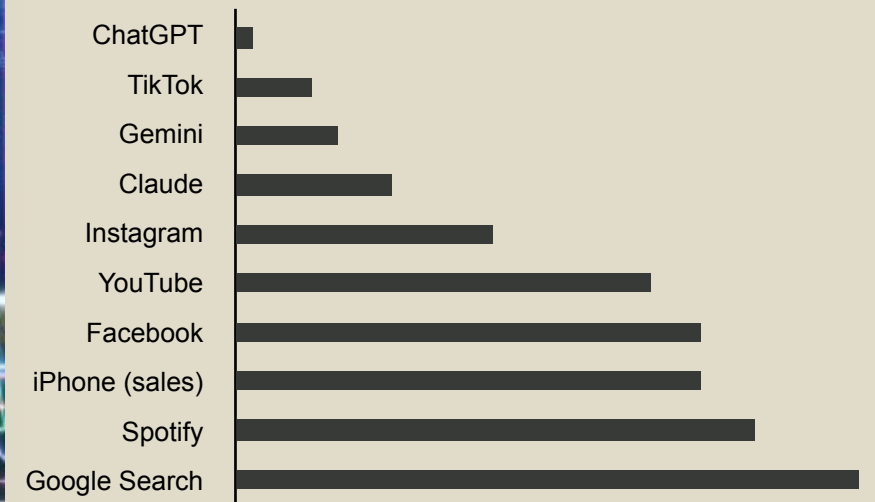


3.5 Jahre Vorsprung auf Google and 5.5 auf Meta

In **2 Monaten** 100 mn wöchentliche User

40% weniger Google clicks seit ChatGPT launch

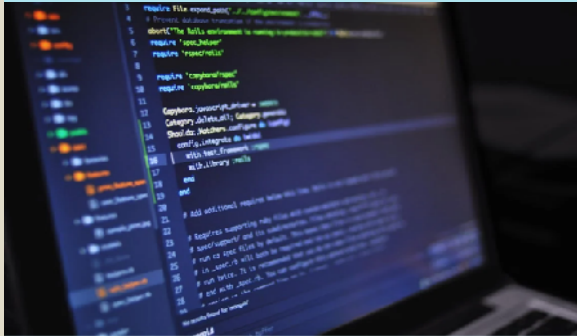
Monate um 100 mn User zu erreichen



➤ **Keine andere Technologie wurde schneller eingeführt und angewendet**

Bestandteile des KI-Ökosystems

KI Modelle

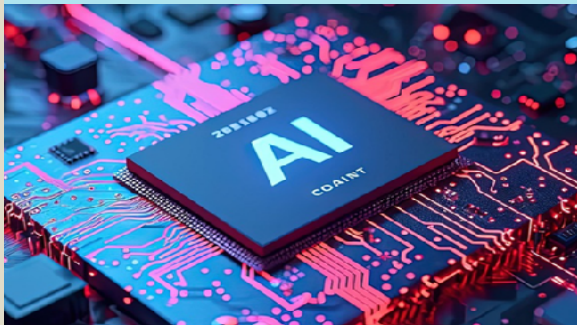


KI-Fabriken für die Zukunft

Hyperscalers



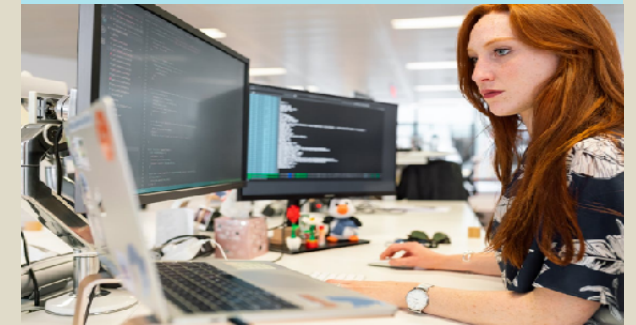
Halbleiter



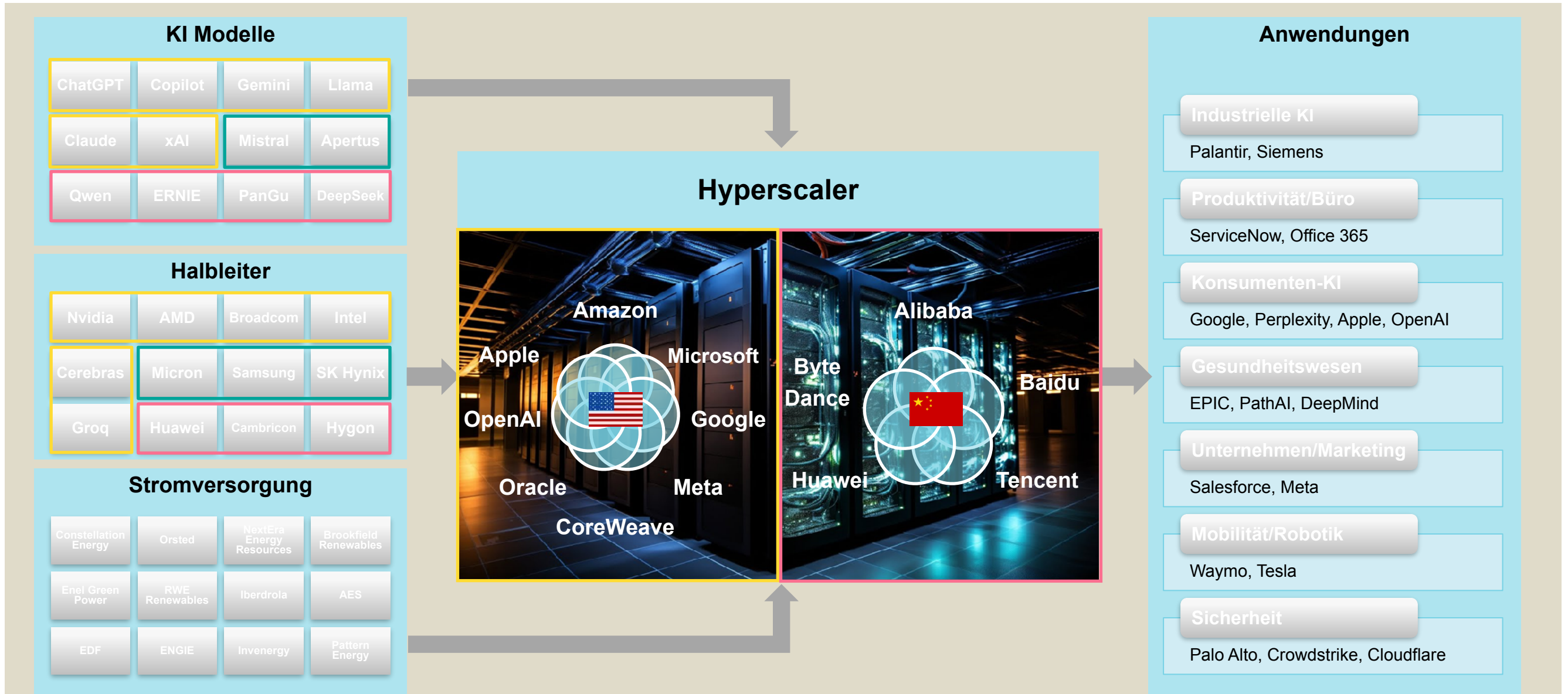
Stromversorgung



Anwendungen

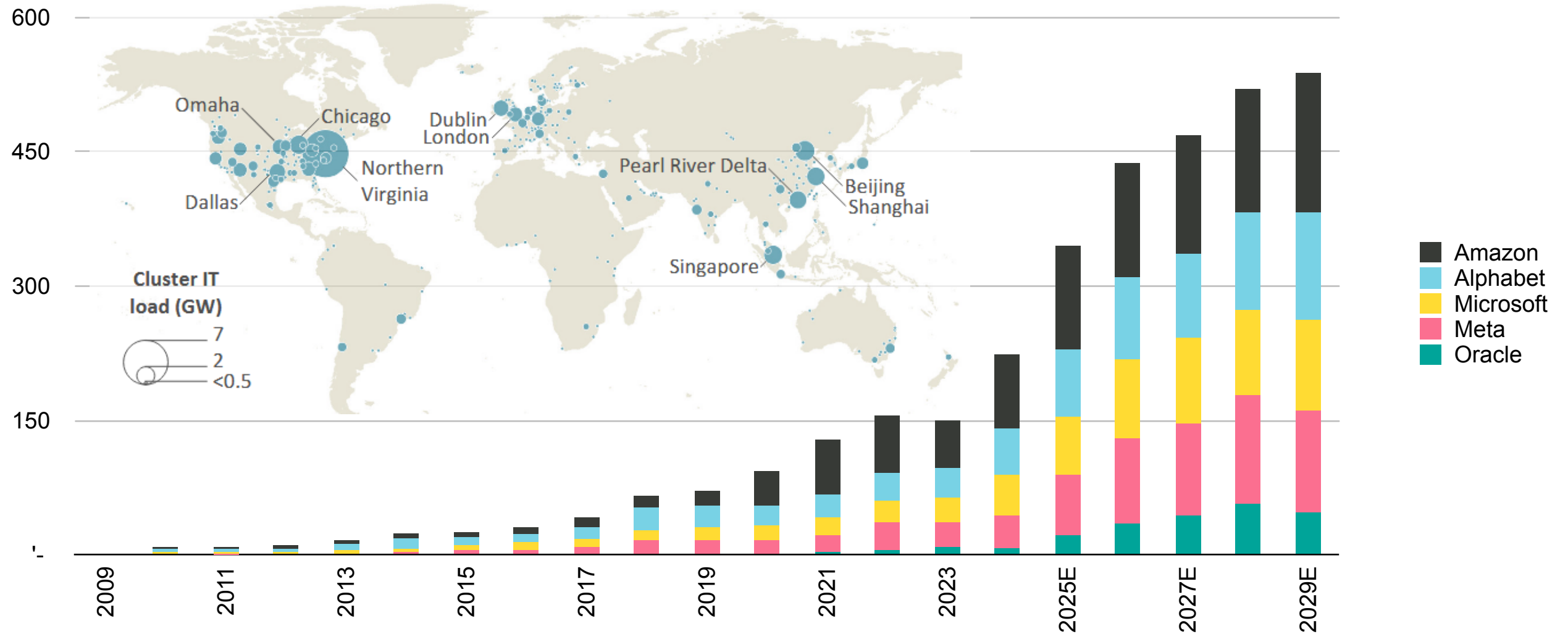


Überblick des KI-Ökosystems



Wichtig: Die Liste der Unternehmen dient nur zur Veranschaulichung und ist nicht vollständig. Die in dieser Tabelle aufgeführten Unternehmensnamen stellen in keiner Weise eine Empfehlung für einzelne Aktien dar, sondern dienen lediglich als Beispiel.

Investitionen der KI-Hyperscaler in Rechenkapazität



Die 5 größten Hyperscaler betreiben 486 Zentren (von ~1000), +288 sind in Planung. **Token Generierung verdoppelt sich all 2 Monate**

AI Investitionen – das Stargate Projekt



Gesamtinvestitionen \$500bn

The scope

Joint Venture (Stargate LLC): OpenAI, Softbank, Oracle, MGX
10 GW Rechenzentrumskapazität an **7 Hauptstandorten**
1 GW erfordert **400–500.000 GPUs** und etwa **USD 50 Mrd**

Primary sites

1. Stargate I in Alibene, Texas im Bau
2. Shackelford County, Texas
3. Dona Ana County, New Mexico
4. Milam County, Texas
5. Lordstown, Ohio
6. Undisclosed Midwest Location
7. Abu Dhabi, UAE

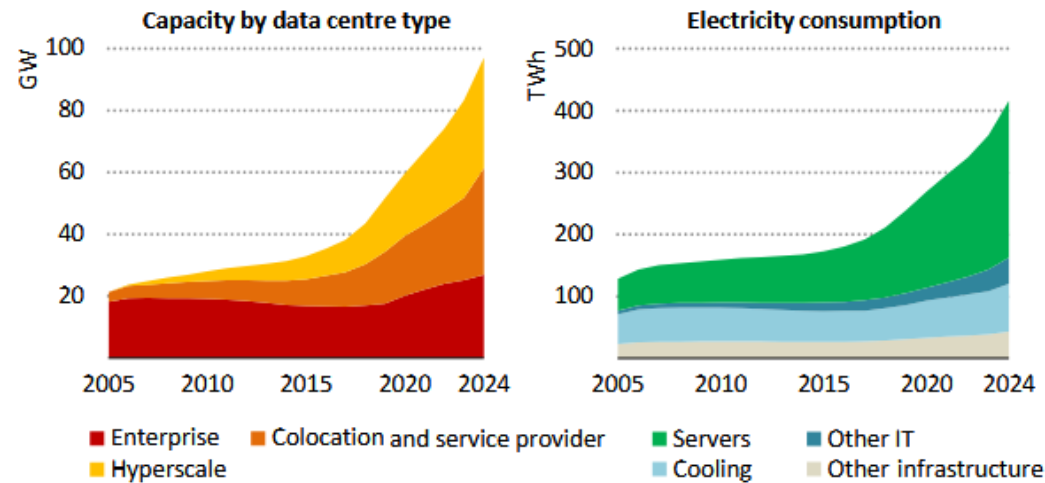
Additional sites

1. Norwegen (Stargate Europa, 230 MW)
2. Südkorea (Partnerschaft mit Samsung, SK Hynix)



Das Energieproblem

Globale Rechenzentrumskapazität und -verbrauch

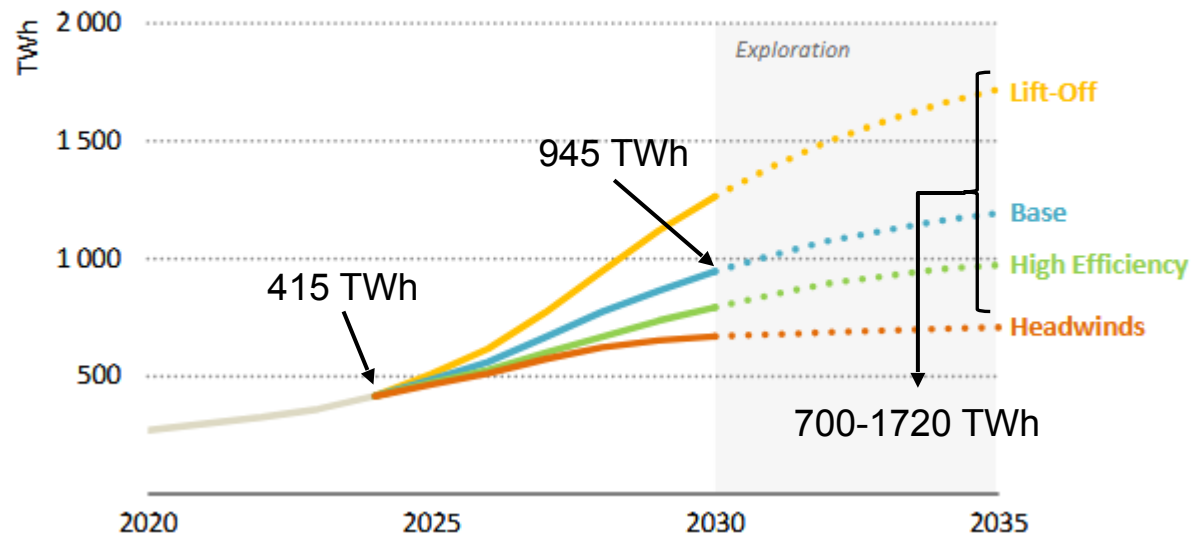


Stromverbrauch

Gesamtverbrauch 2024: 415 TWh (1,5 % vom Gesamtverbrauch, 7 x Gesamtstromverbrauch der Schweiz)

1 Rechenzentrum \approx 1 GW Leistung (24/7) \approx 9 TWh \approx **1 Kernkraftwerk**

Weltweiter Stromverbrauch von Rechenzentren 2020–2035



Emissionen

Emissionen pro neuem US-Rechenzentrum pro GW \approx 2 Mt CO₂/Jahr
(Energemix 50% Renewable/50% Gas)

Gesamtemissionen der Schweiz 2024: 41 Mt CO₂/Jahr

Das Energieproblem lösen

Aktuelle und potenzielle Einsparungen in Rechenzentren bis 2030

Technologie/Ansatz	Aktuelle Akzeptanz	Erwartete Einführung bis 2030	Energie-spar-potenzial
Hardware			
Low-Power Prozessoren	●●	●●●	●●●●
KI-Beschleuniger	●●●	●●●●	●●
Energieeffiziente Speicherchips	●●●	●●●●	●●
Innovative Kühltechnologien	●●	●●●●	●●
Software			
Energieeffiziente Algorithmen	●●	●●●●	●●●●
Aufgabenspezifische Modelle	●●	●●●●	●●●●
Übergreifend			
Co-Design-Software/Hardware	●●	●●●	●●
Edge-Computing	●●	●●●	●●●
Intelligentes Energiemanagement	●●●	●●●●	●●
Quanten-Computing	●	●	●●●
Neuromorphes Computing	●	●●	●●●●

Die relevante Frage: Kann KI dazu beitragen, mehr Emissionen zu reduzieren, als sie verursacht?

Wie viel Wert kann KI schaffen?

Treiber des BIP-Wachstums

- Demographie (Erwerbsbevölkerung)
- Kapital (Maschinen/Fabriken)
- Produktivität (Technologie)

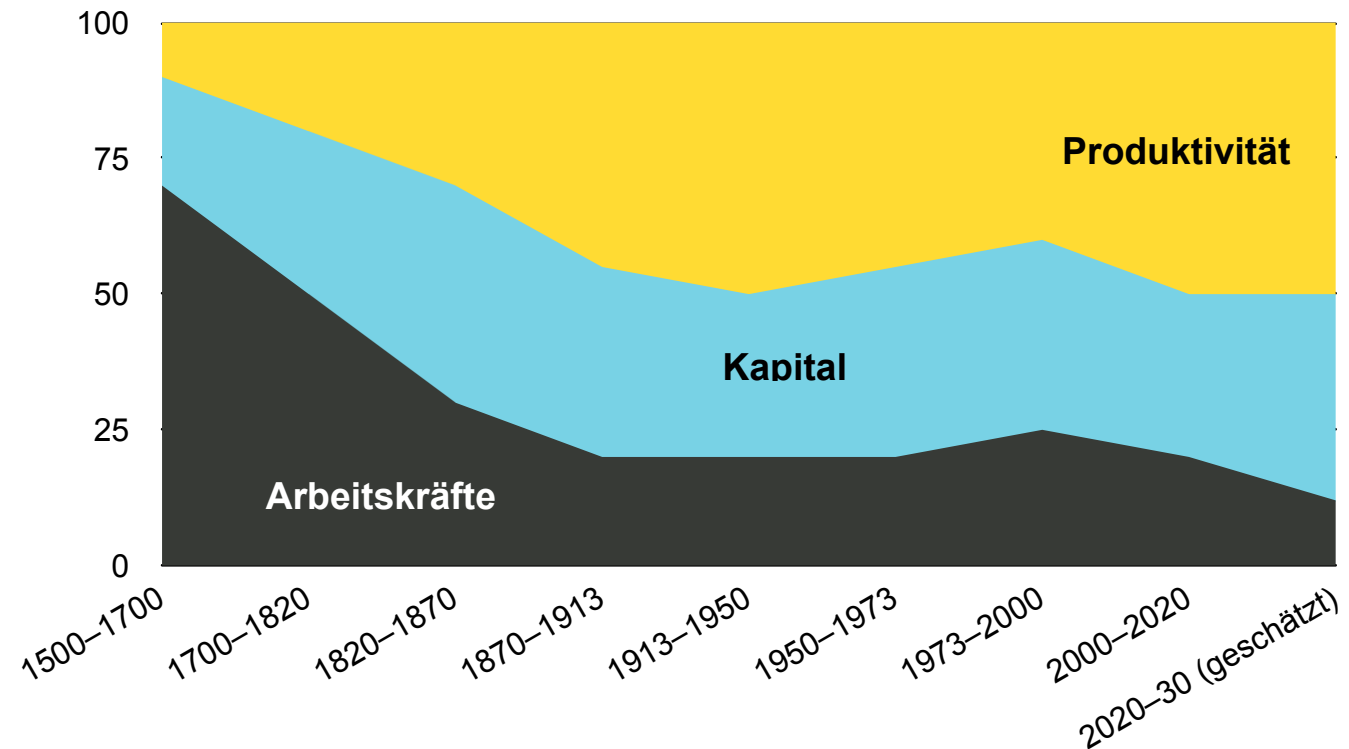
Beitrag der KI

- Künstliche Arbeitskräfte (KI Agenten)
- Rechenzentrumsinfrastruktur
- Steigerung der menschlichen Leistungsfähigkeit

Auswirkungen auf das globale BIP

- Das globale BIP 2024 ~110 Billionen US-Dollar (IWF)
- KI-Software und -Dienstleistungen könnten bis 2040 um **15,5-22,9 Billionen USD** generieren (McKinsey 2024)
- KI könnte das **BIP bis 2040 um 12–13 % steigern** (WTO, September 2025)
- Eine **Steigerung des BIP um 10%-20%** ist möglich (Michael Dell 2025)

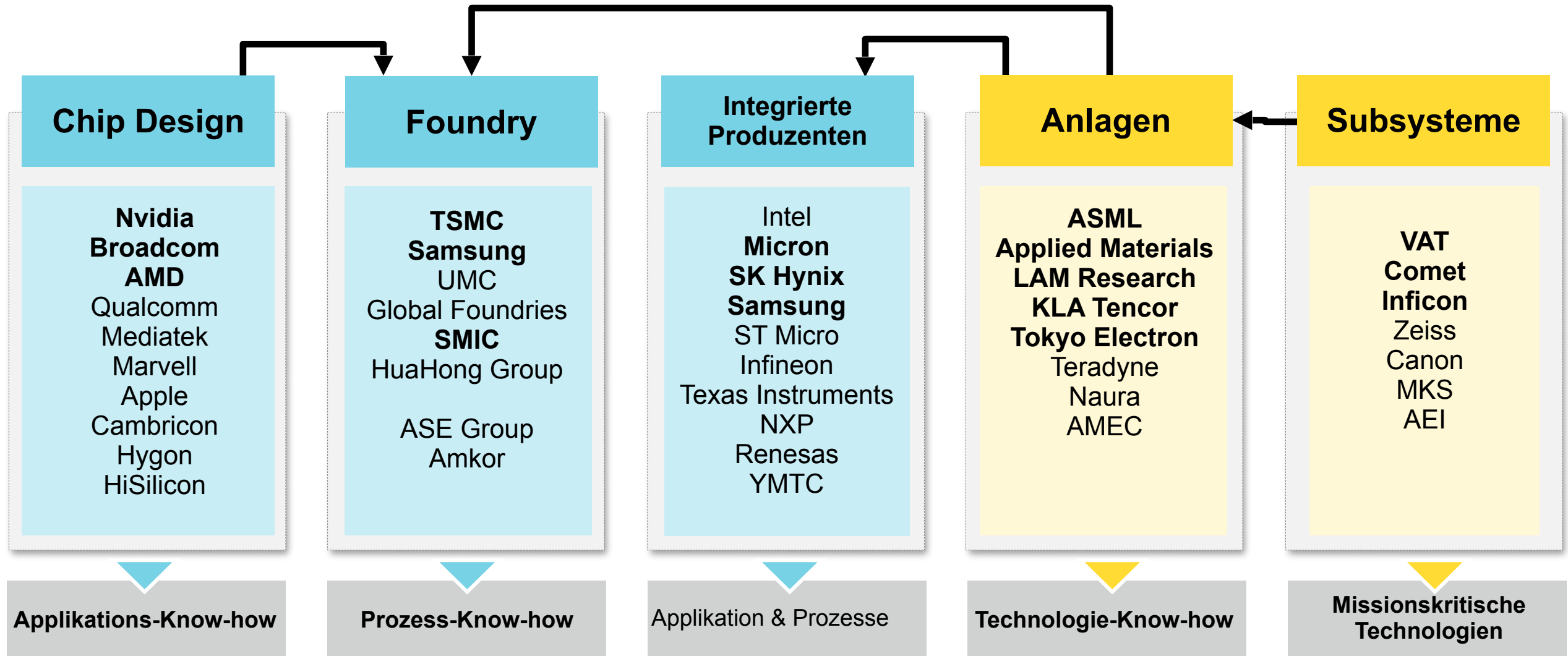
Komponenten des langfristigen Wirtschaftswachstums



Der **Produktivitätsgewinn** durch **KI** könnte weitaus **größer** sein als durch den **PC** und das **Internet**

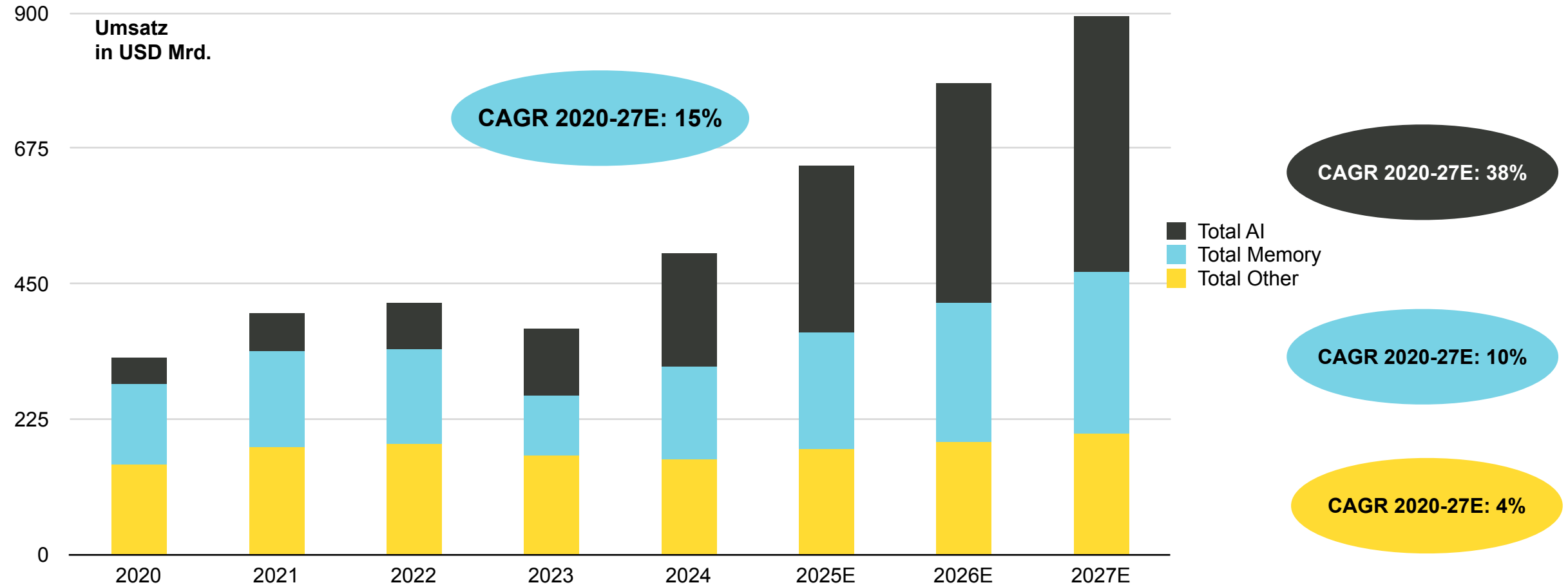
Halbleiter – Wer ist wer?

Klassifizierung nach Funktion



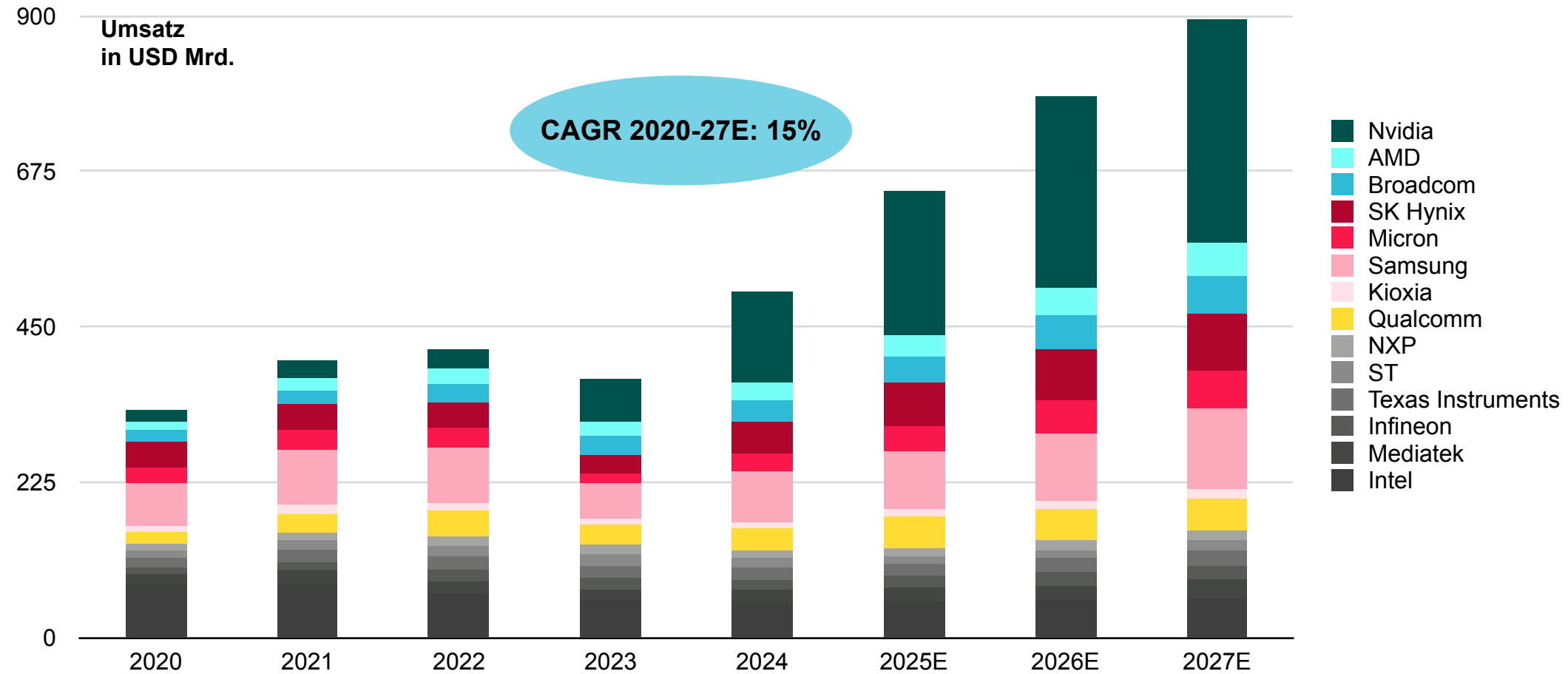
Die Auswirkungen auf die globale Halbleiterindustrie (I)

Gesamtumsatz 14 führender Chiphersteller nach Hauptanwendungsbereichen



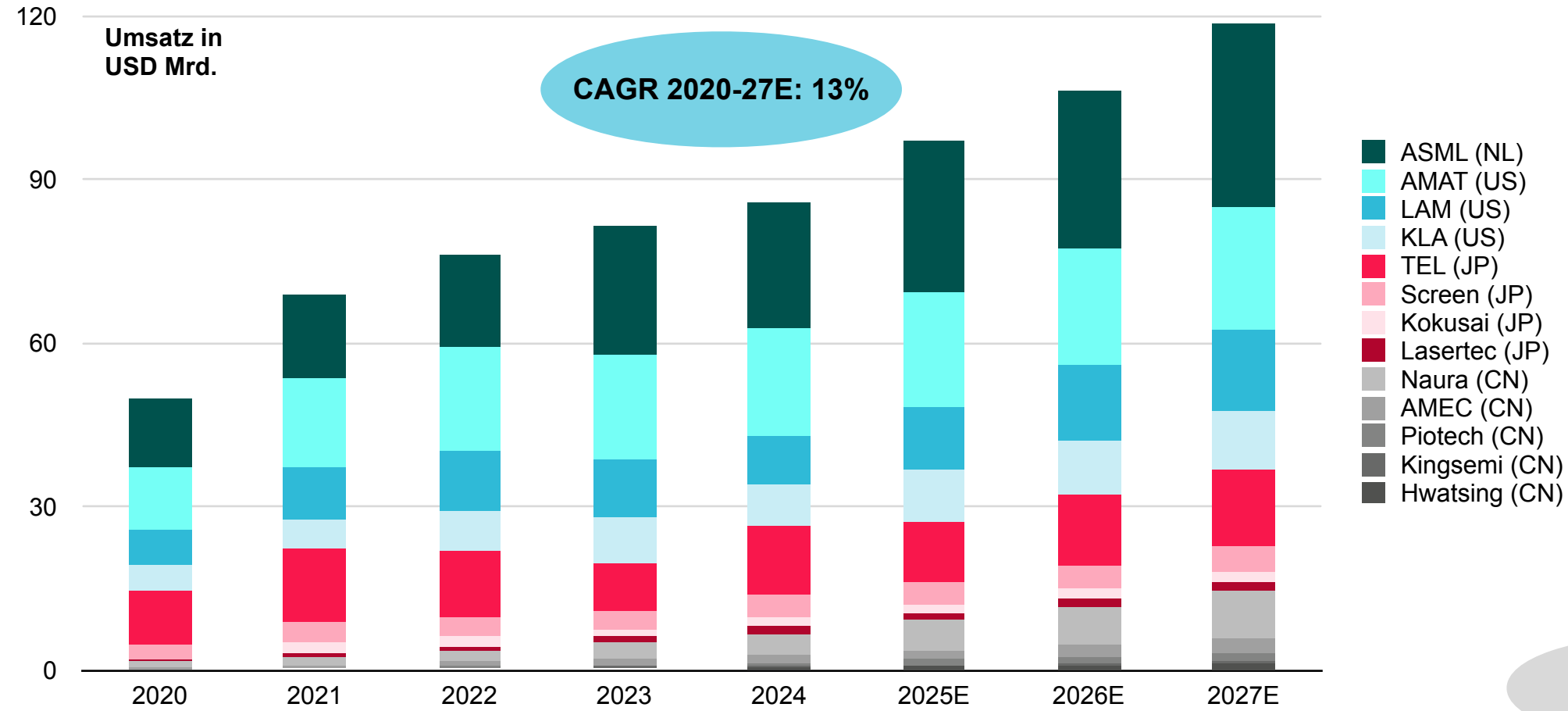
Die Auswirkungen auf die globale Halbleiterindustrie (II)

Gesamtumsatz 14 führender Chiphersteller



Die Auswirkungen auf die globale Halbleiterindustrie (III)


Gesamtumsatz von 13 führenden Herstellern von Halbleiterrausrüstung



Wert und Volumen (I)

Data Center

1 NVLink72 → 236 Chips + Speicher = USD 3 mn



72 Blackwell GPUs

18 Bluefield DPUs

72 ConnectX - NICs

36 Grace CPUs


576 memory chips (20TB)

18 NVLink switches

130 tn transistors

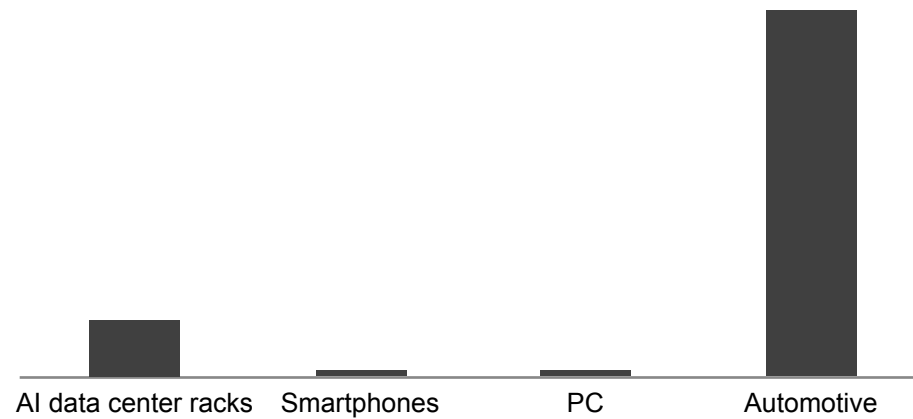
Automotive

1 Auto → >1500 chips = >1000 USD

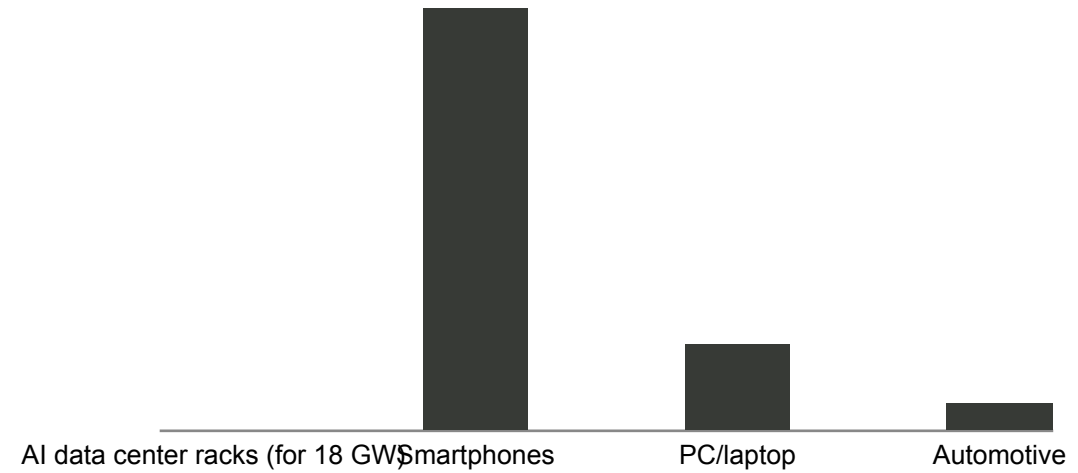


Wert und Volumen (II)

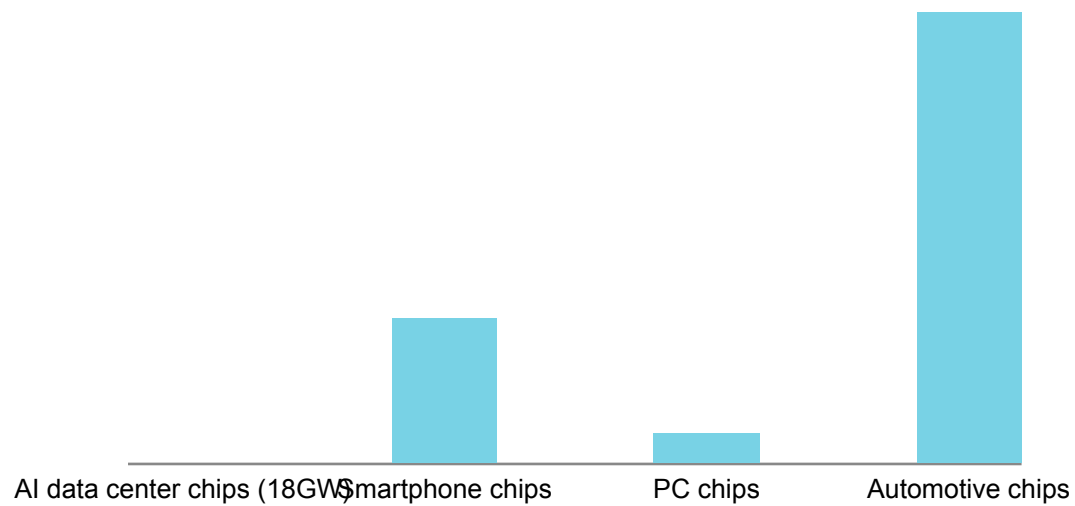
Chips pro Gerät (Stückzahlen)



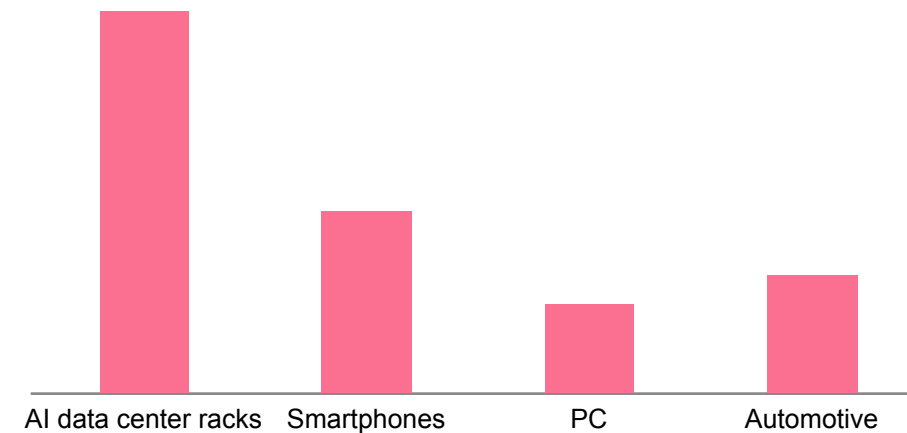
Geräte pro Jahr (Stückzahlen)



Gesamtzahl Chips pro Anwendung (Stückzahlen)

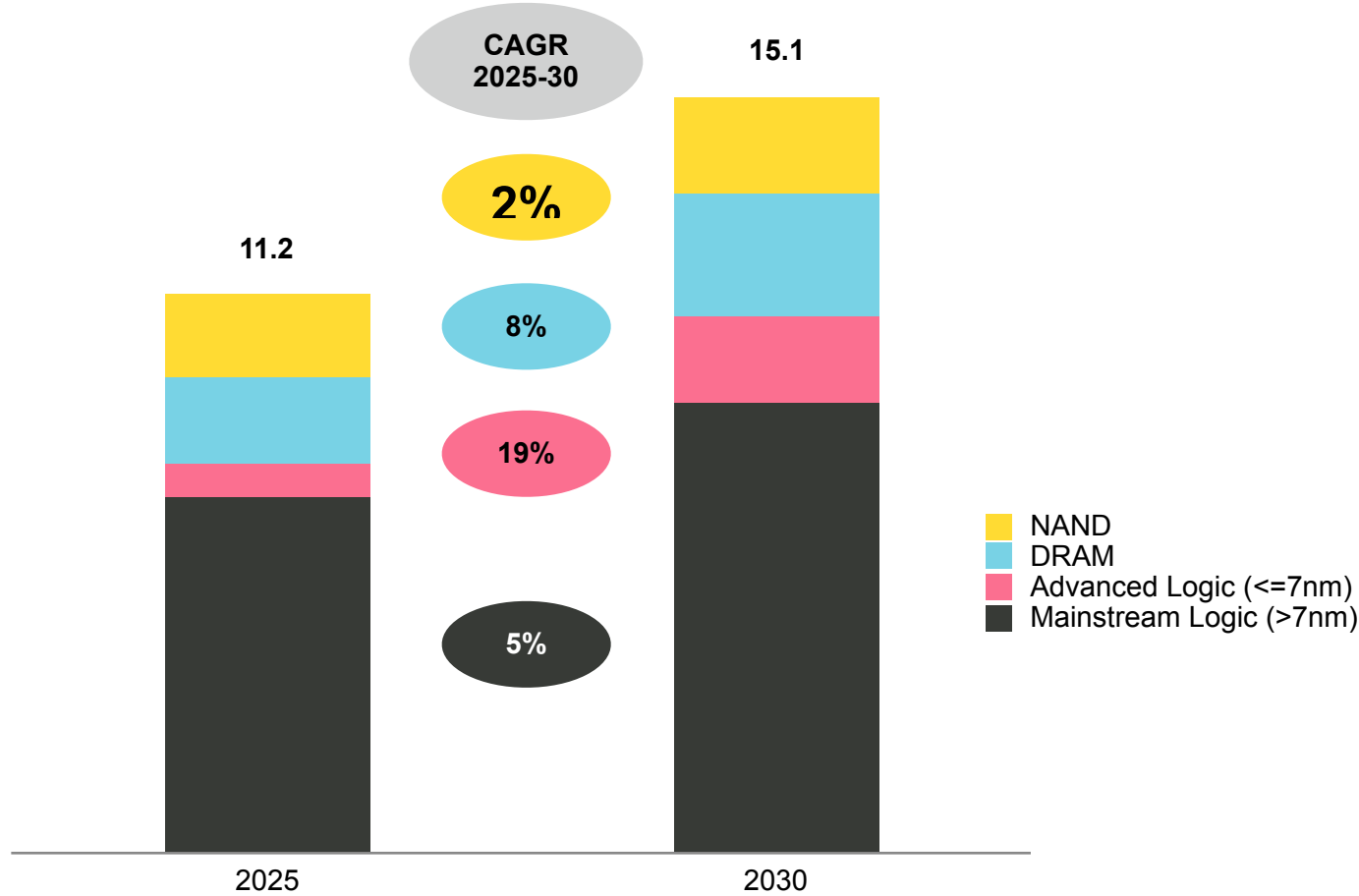


Gesamtwert pro Anwendung (USD Mrd.)

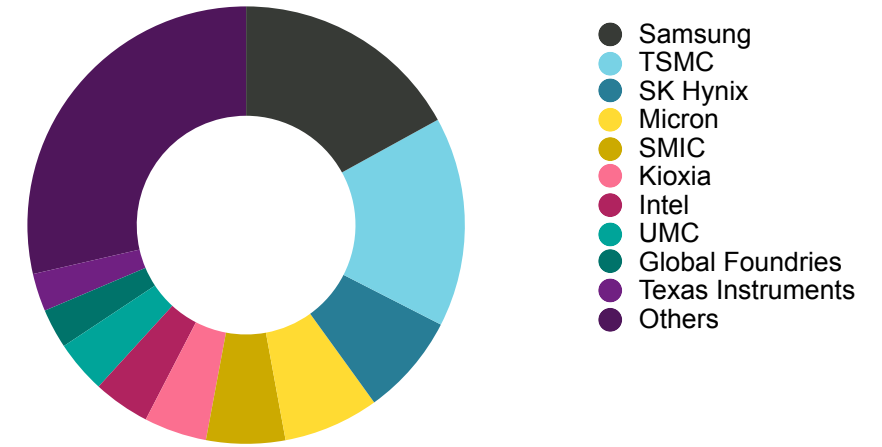


Globale Kapazität der Halbleiterfabriken

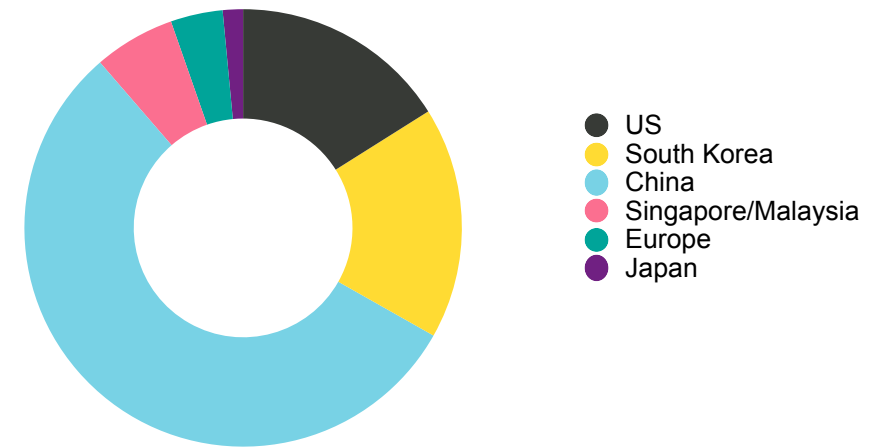
Wafer Starts pro Monat in Millionen (Mwspm)



Aufteilung Wafer Starts pro Monat (2024)



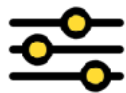
Chip Fabriken in Planung oder Bau (nach wspm)



Kernbotschaften



KI-Entwicklung befindet sich immer noch in einem **frühen Stadium**



Der Ausbau der Datenzentren birgt erhebliche **Opportunitäten** aber auch **Unsicherheiten**



Die Halbleiterindustrie kann wesentlich zur Steigerung der **Energieeffizienz** beitragen



Anlagenbauer und ihre **Zulieferer** spielen eine **zentrale Rolle** beim Ermöglichen dieser Entwicklung



Verschiedene **Chipsegmente** weisen **unterschiedliche Dynamik** aus



Der Halbleitermarkt bleibt auch in Zukunft ein **attraktiver Wachstumsmarkt**

Firmenpräsentation «VAT Group»

**Urs
Gantner**

Chief Executive Officer,
VAT Group





Vontobel Chips Day

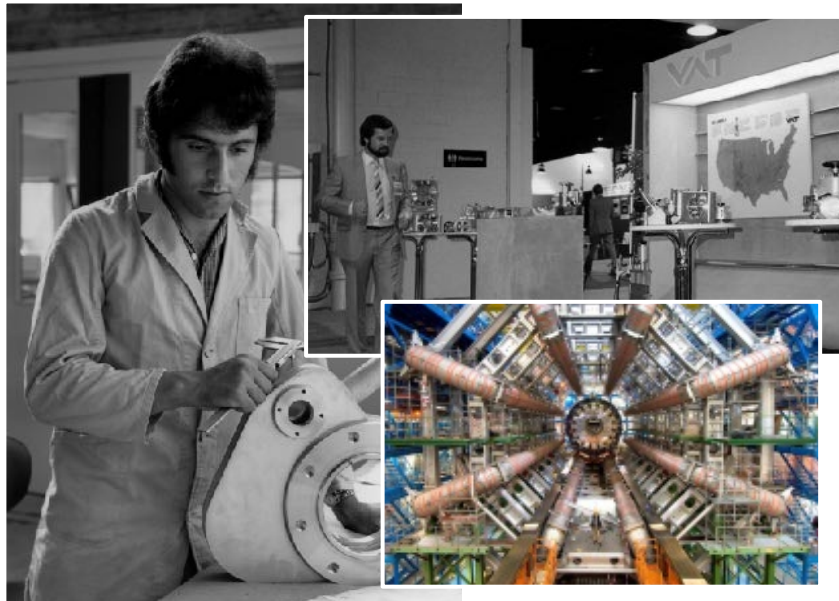
Empowering your tomorrow

December 4, 2025

VAT – we are the global vacuum valve leader

Since 60 years, VAT is the leading global provider of high-end vacuum valves for ultra-high vacuum environments.

All started with scientific research...



- VAT founded in 1965 by Siegfried Schertler
- Initially supplied valves for scientific and nuclear research
- In 1988, started supplying nascent semi industry

70%+ market share in semi valves

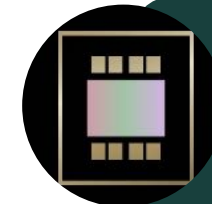


- VAT focused on supplying vacuum valves to the chip industry, which is essential in manufacturing
- Adjacencies offer additional wallet share and organic growth opportunities
- VAT also offers services and continues serving the industrial applications

Significant growth ahead for VAT



VAT outgrowing WFE by up to 2x



VAT's growth accelerated by advanced logic – GAA technology transition



Vacuum-related WFE (12%) growing faster than WFE (8%)



VAT solutions powering spec wins and share of wallet increases

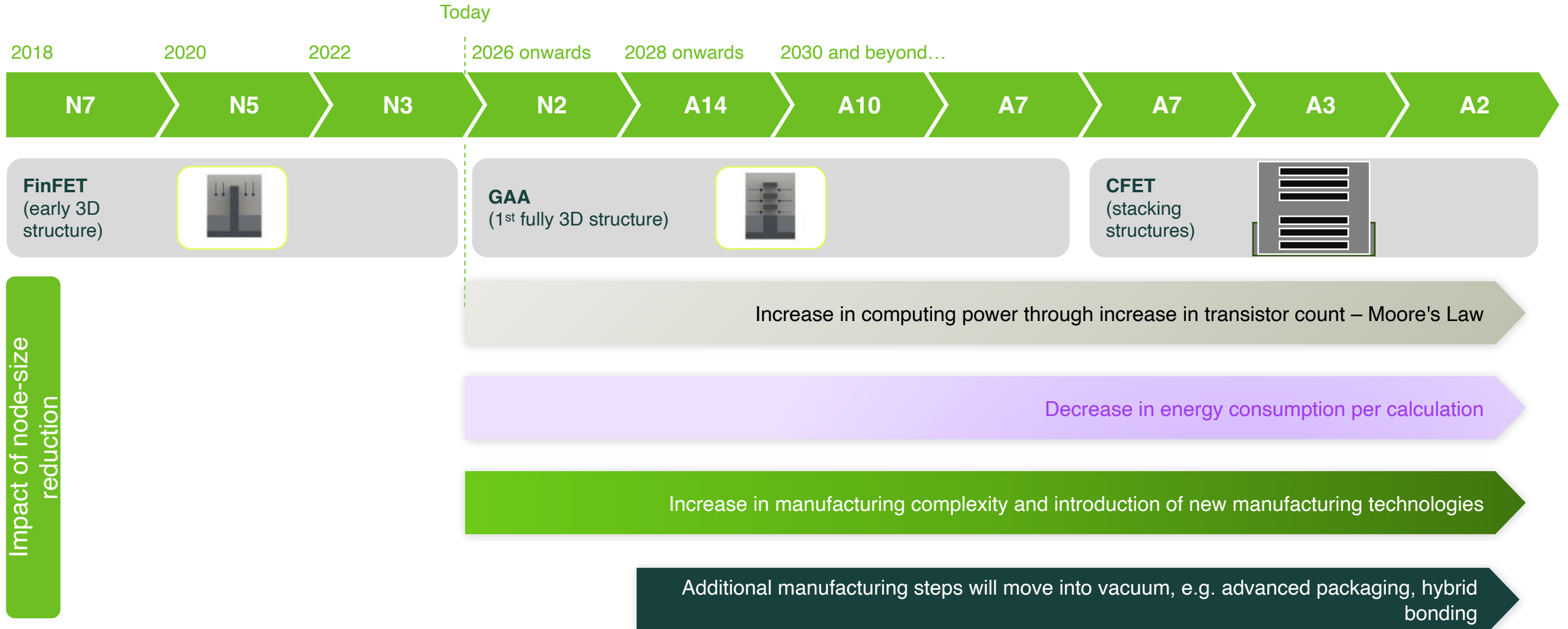
Chip manufacturing is a highly complex process

A modern chip can take over 2,000 process steps to complete – vacuum is essential to maintain yields and to achieve transistor structures at the nanometer level



Growth remains unabated in chip manufacturing

Node size reduction results in higher computing power, lower energy consumption and increased manufacturing complexity



Source: IMEC

VAT is an integral part of the semi supply chain

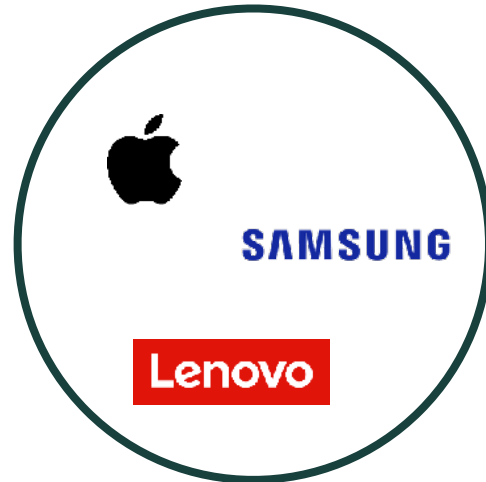
VAT is in a unique position in the semi supply chain as a mission-critical subsystem provider – not overtly exposed to customer cycles, but more to capex cycles

Consumers



- Seek latest technology and gadgets
- Limited budgets

Electronics manufacturers



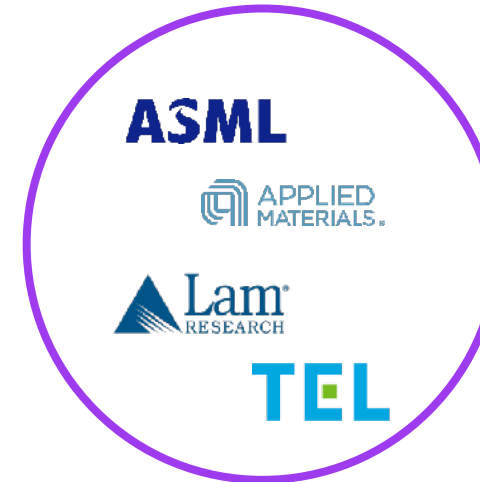
- Innovation is crucial
- Must deal with constraints such as budgets, battery life

IDM / chipmakers



- Provide the latest gadgets with computing power or memory capacity
- Manufacturing specialists

OEMs / toolmakers



- Provide IDMs with tools and machines to make chips
- Integration and materials specialists

Critical subsystems

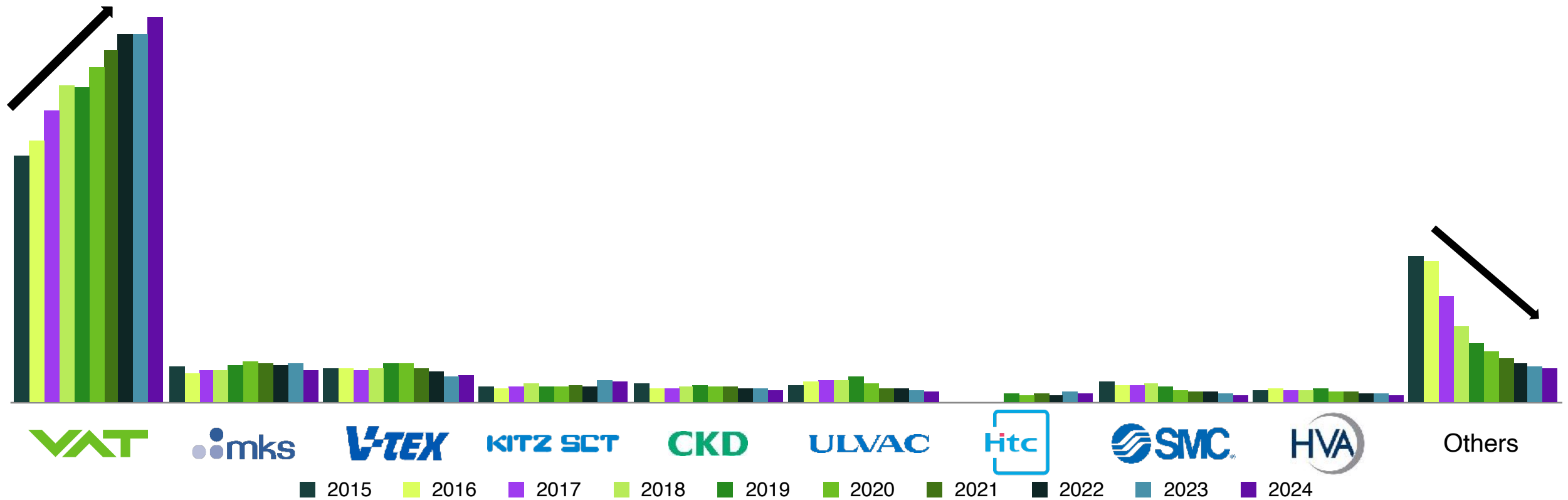


- Provide individual components for tools
- Innovation crucial in specific technologies

VAT is the clear market leader in vacuum valves

Since 2015, VAT has created value for our customers and their deep-seated trust fuels VAT's further growth. With a >70% market share, VAT will capture the semi market growth

Market share, semi and related(1)

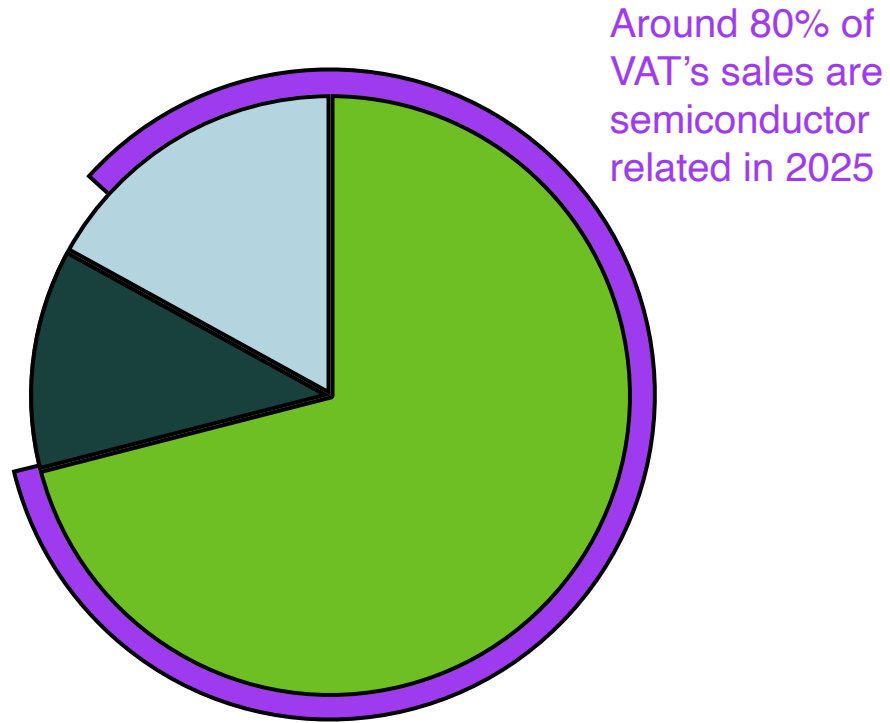


Source: TechnInsights data as of April 2025; (1) Semi and related includes semiconductors, displays, solar, LED lighting, hard disk drive

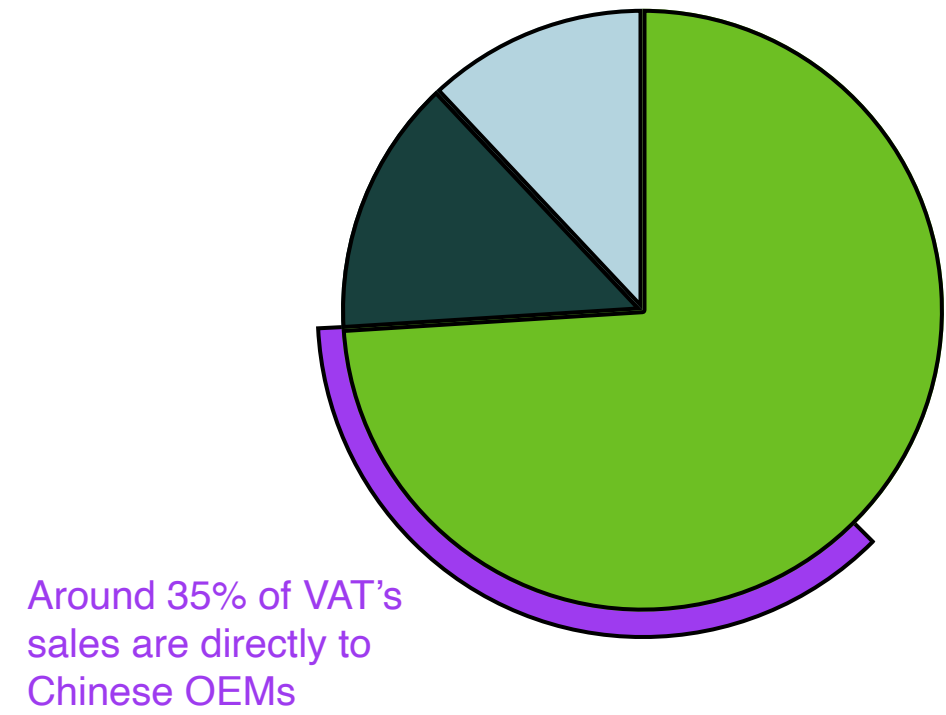
Sales breakdown by markets and regions

Semiconductor related businesses remain major sales contributor for VAT

Sales breakdown by market segment H1 2025



Regional sales breakdown H1 2025

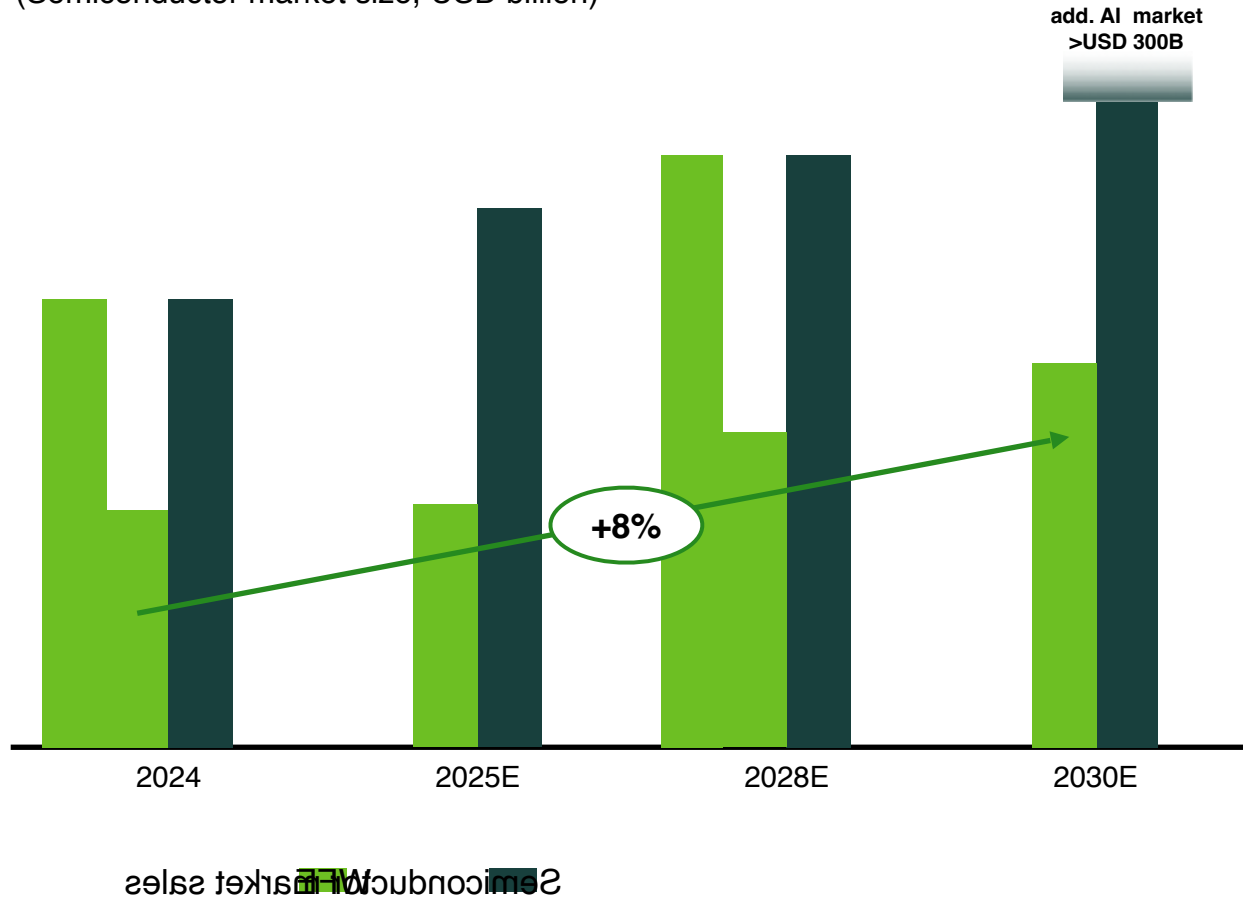


Chips market growing to over USD 1 trillion

3 factors drive VAT's outgrowth of the market – continued technology progress, increasing manufacturing complexity and additional VAT content

Semiconductor market expected to grow to over USD 1T

(Semiconductor market size, USD billion)



Source: Techn Insights (March 2025)

Market outgrowth driven by three factors

Technology transition	<ul style="list-style-type: none"> • Evolving manufacturing technology (GAA/2nm) • More leading-edge chips require more process steps • Leading edge WFE growing at 15% CAGR to 2029
Manufacturing complexity	<ul style="list-style-type: none"> • Precision, increased process steps • Multi-patterning • More process steps need vacuum – WFE growth at 12% CAGR to 2029
Share of wallet	<ul style="list-style-type: none"> • Increased market share and larger VAT content • More process chambers, e.g., deposition and etch • More advanced modules per tool

VAT's success is based on its superior toolkit

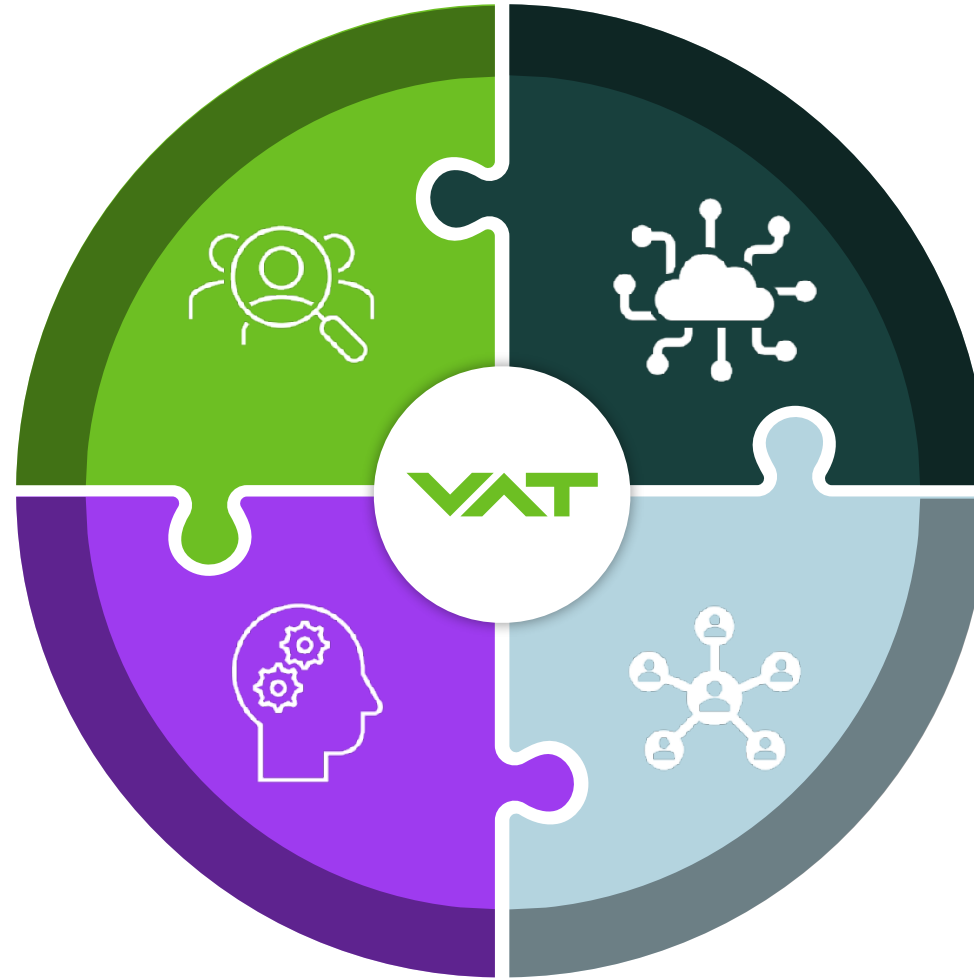
The "secret recipe" for VAT's success is a combination of customer focus, technology and know-how leadership as well as the ability to manage the cyclical semi industry

Customer focus

- Laser-focus on customers
- Pure-play focus on semi
- Global footprint that means VAT is always a call away

Skills and know-how

- 60 years of vacuum engineering competence
- Dual education system in CH and expanding to MY is a barrier to entry



Technology leadership

- Uncontested #1 in vacuum valve technology and integrated solutions
- Demonstrable outperformance of VAT products vs. competition

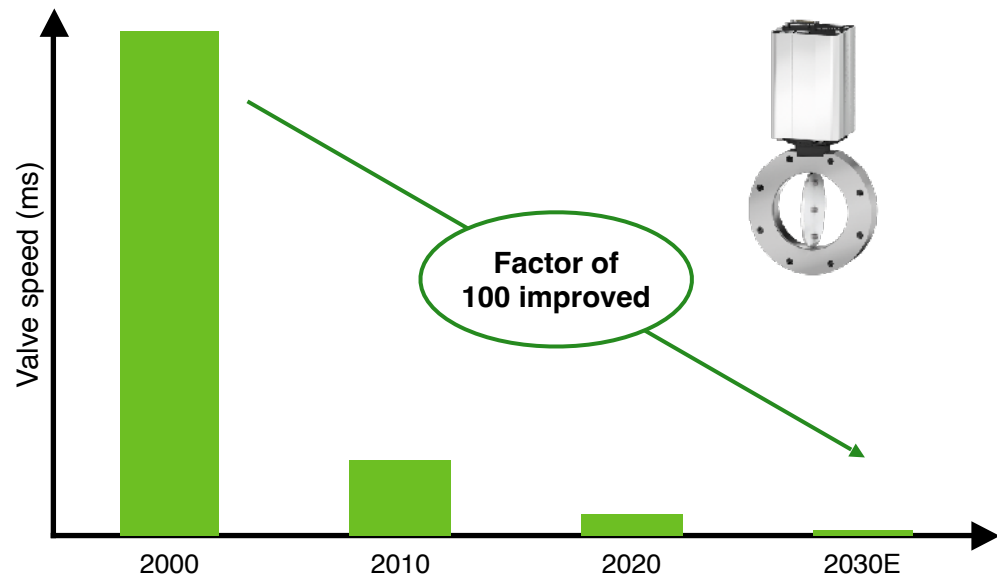
Flexible operating model

- Ramp capacity of +/-30% QoQ
- Outsourcing ratio of 75%/variable costs of 67%
- Increasing automation and BCC content

VAT demonstrates technology leadership

Our significant R&D spend translates into superior technology – which drive outperformance in precision, speed, and particle count

VAT offers superior valve speed



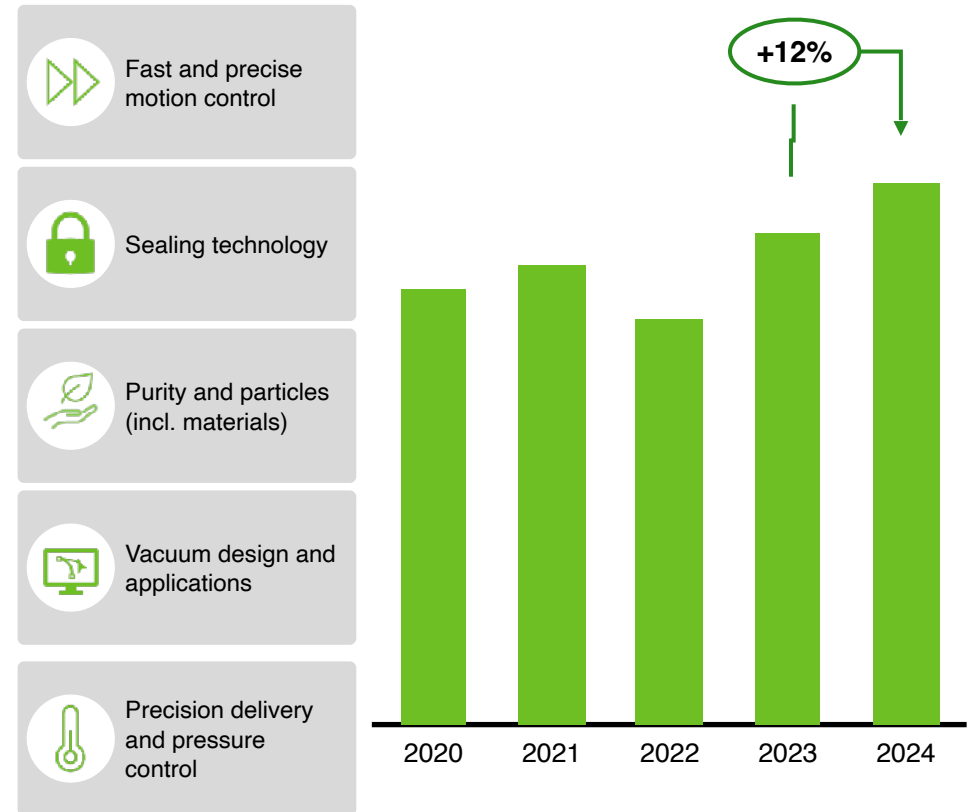
- Speed of gate results in superior control performance and high process repeatability
- This is a critical requirement for fast cyclic processes like ALD and advanced etch

Slow motion



Spec wins secure future growth

(Visibility of customer business 2 to 5 years out)



Profitability managed through flexible operating model

Our flexible operating model is a pre-requisite to manage volatility in the semi market and allows us to guide to a 30-37% EBITDA margin through the cycle

Resilience through the cycle

Flexible workforce

(up to around 25% of total FTEs are temporary employees – with no loss of know-how)

Best cost country sourcing

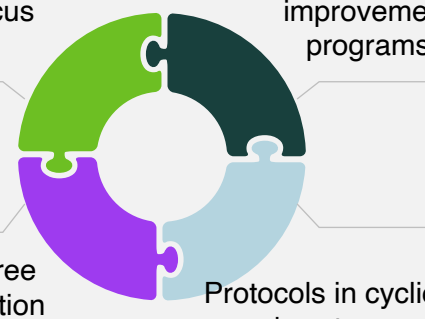
(VAT supply chain continuously optimizes for components sourced in best-cost country)

Ability to manage cost base flexibly

(Insource ratio of 25%)

- VAT demonstrates resilience in semi market downturns, which enables
 - Stable EBITDA margins
 - FCF generation

Enablers



Temp staff share during various stages of the cycle:

2022:	~25%
2023:	~5%
2024:	~12%

Best-cost country sourcing is expected to reach more than 55% by 2027 compared with 34% in 2024 (2022: 30%)

Costs of costs are variable)

Investments ahead of cycle – VAT is ready for the ramp

VAT's capacity expansions in Malaysia and in Romania are progressing well ahead of the potential market ramp



Malaysia 1B

- Doubles plant 1A capacity
- 56,000m² of space available
- Increases volume of semi manufacturing capacity

Romania

- Increases capacity in machining as internal supplier
- Focus on specific competencies required by our customers

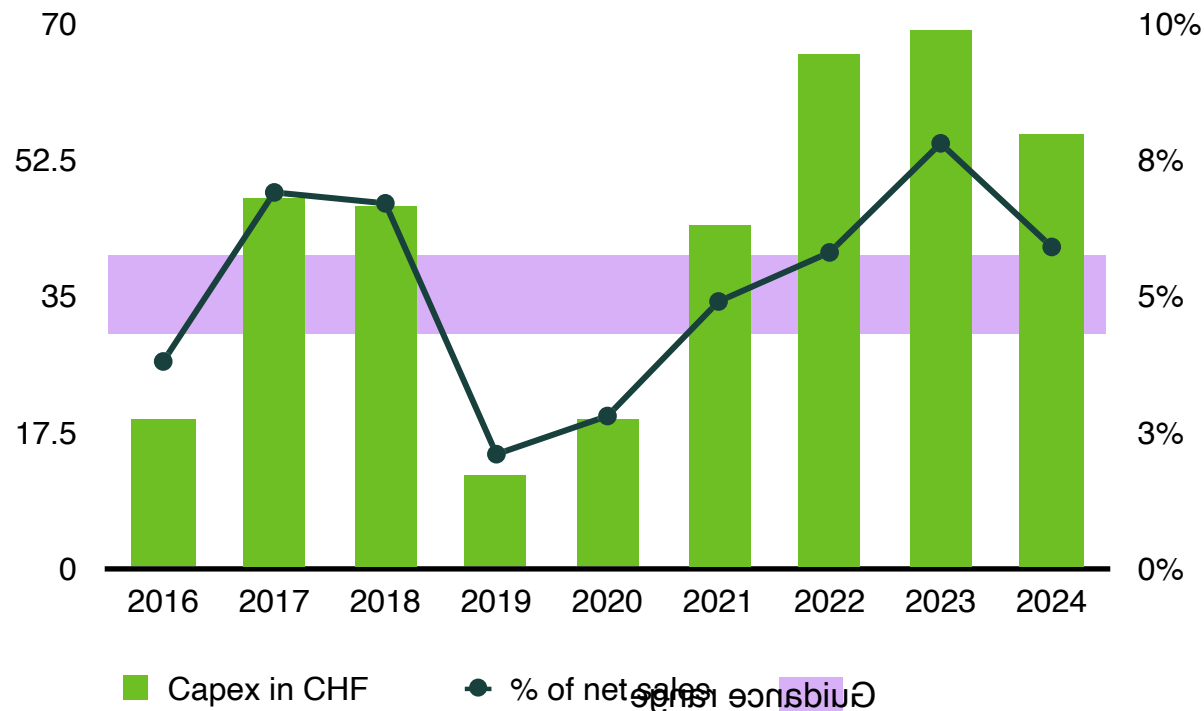


Capacity readiness established in Switzerland and Malaysia

Sufficient installed capacity for >CHF 2.4 billion of sales. Malaysia manufacturing creates a natural hedge for VAT

Net capex

(in CHF million)



- Significant growth capex programs completed
- Normalization of capex into guidance range from 2026E onwards

Installed manufacturing capacity

(in CHF million)

Utilization

Haag, Switzerland

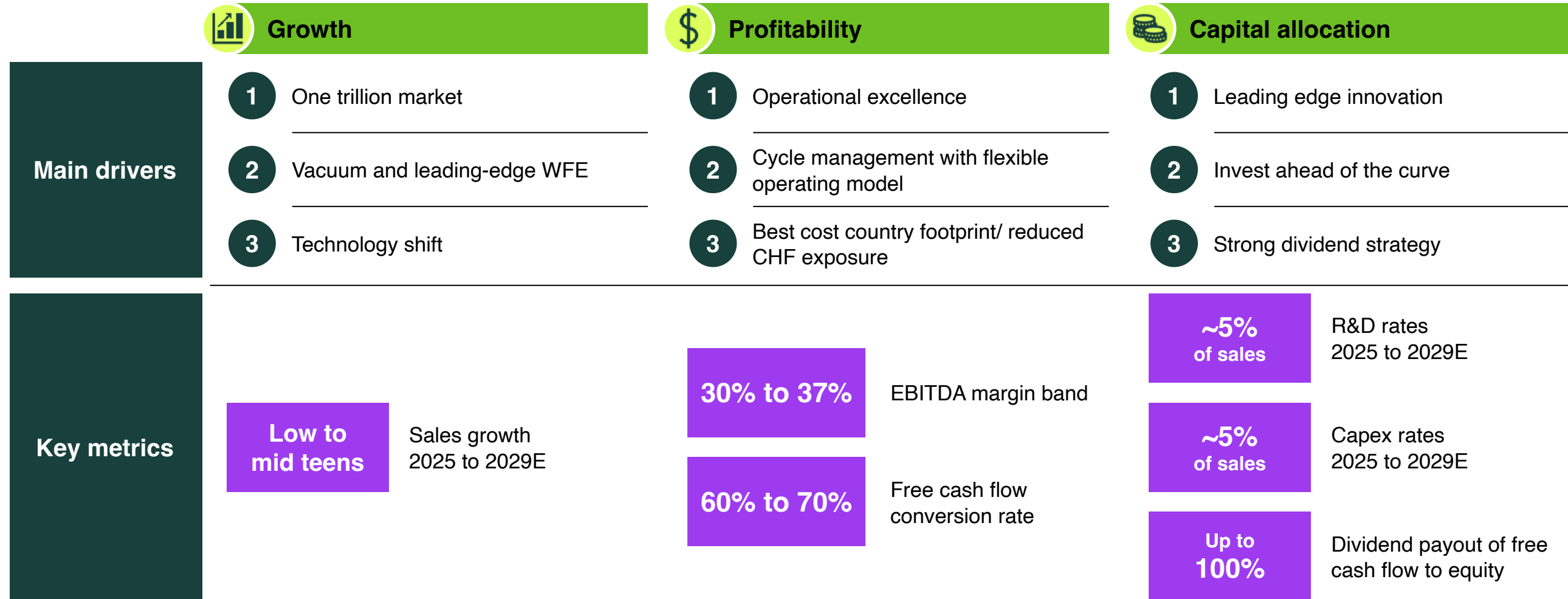
- Low volume/high mix semi manufacturing
- Advanced Industrial specialization
- Prototyping/service

Penang, Malaysia

- Volume semi manufacturing
- Display and solar
- Service

Strong business fundamentals – solid investment case

Stakeholder value proposition 2025 to 2029E is based on three key pillars – focus on total returns no matter the cycle



VAT – at home in the Rheintal... ...but a global player in semiconductor manufacturing



Additional information

Investor information

Listing: SIX Swiss Exchange
Currency: CHF
Ticker symbol: VACN
ISIN: CH0311864901

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Financial calendar

2026

Early January
Tuesday, March 3

Preliminary high-level order and sales figures FY 2025
Q4 and full-year 2025 results

Vontobel Chips Day – December 4, 2025

Forward-looking statements

Forward-looking statements contained herein are qualified in their entirety as there are certain factors that could cause results to differ materially from those anticipated. Any statements contained herein that are not statements of historical fact (including statements containing the words “believes,” “plans,” “anticipates,” “expects,” “estimates,” and similar expressions) should be considered to be forward-looking statements. Forward-looking statements involve inherent known and unknown risks, uncertainties, and contingencies because they relate to events and depend on circumstances that may or may not occur in the future and may cause the actual results, performance or achievements of the company to be materially different from those expressed or implied by such forward-looking statements. Many of these risks and uncertainties relate to factors that are beyond the company’s ability to control or estimate precisely, such as future market conditions, currency fluctuations, the behavior of other market participants, the performance, security, and reliability of the company’s information technology systems, political, economic and regulatory changes in the countries in which the company operates or in economic, or technological trends or conditions. As a result, investors are cautioned not to place undue reliance on such forward-looking statements.

Except as otherwise required by law, VAT disclaims any intention or obligation to update any forward-looking statements as a result of developments occurring after this presentation was made.

Firmenpräsentation «INFICON AG»

**Oliver
Wyrsch**

Chief Executive Officer,
INFICON HOLDING AG





Welcome to INFICON

Zurich, December 4, 2025
Based on ER 2025 Q3

INFICON Overview

Global leader and innovator in gas analysis and other sensor technologies and smart manufacturing software for semiconductor industry and other industries.

- 671m\$ revenue
- 1680 employees
- 11% 5yr CAGR
- Largely self financed

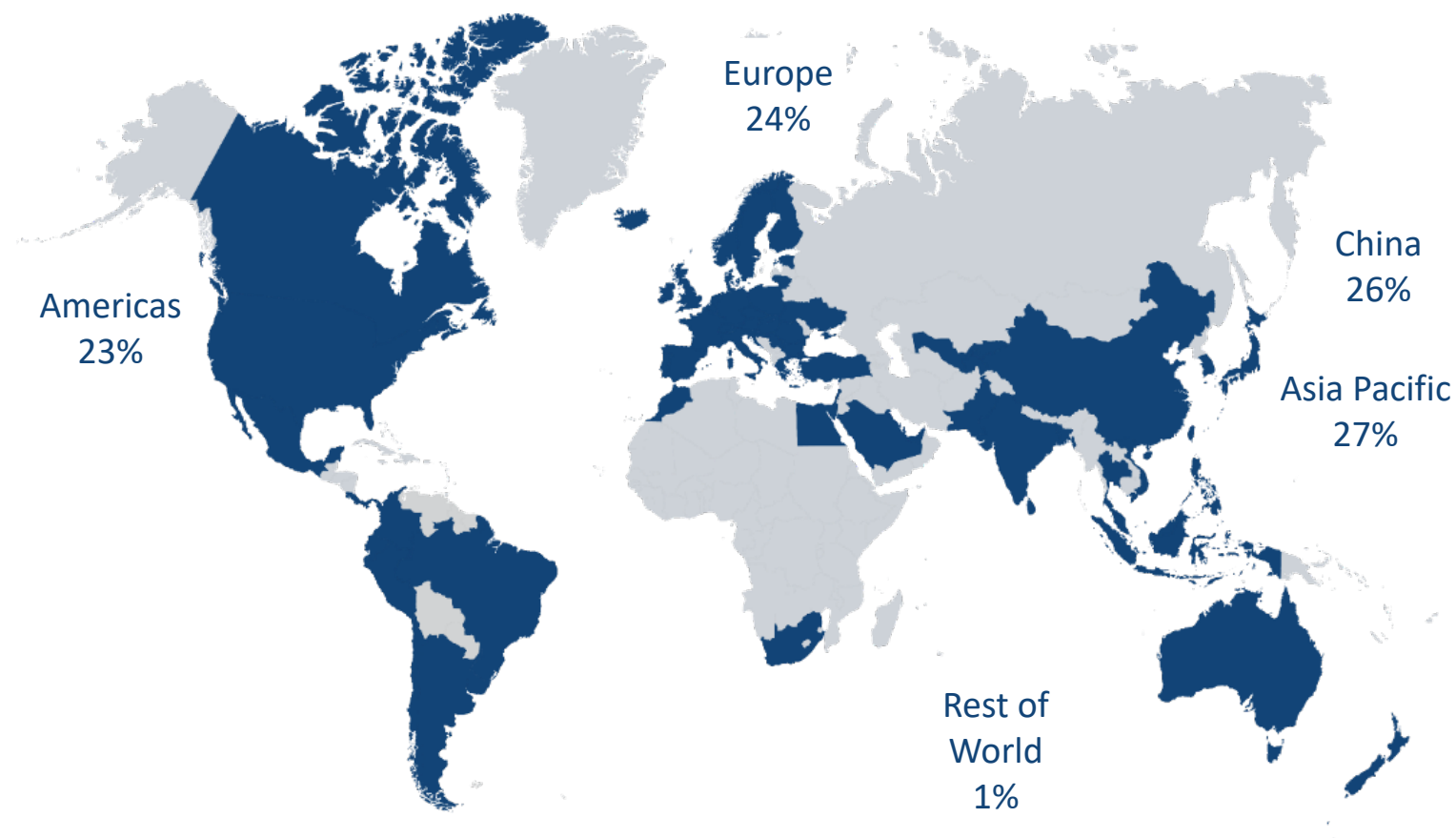
- ✓ INFICON provides world-class instrumentation & data analytics in vacuum applications. Hold the leading position in most of our addressed global markets
- ✓ Strength is the innovation capabilities at the forefront with all leading players in the industries driven by the centers of competence, and supported by the exceptional customer intimacy
- ✓ Significant organic growth opportunities through innovation, new market segments and applications. Supported through acquisitions and/or partnerships
- ✓ Diversified markets with focus on Semiconductor and other tech markets – all with attractive growth and profitability profiles
- ✓ 11% annual compound growth rate from 2019 to 2024
- ✓ Largely self-financed with a long-term investment and growth focus, strong cash generation



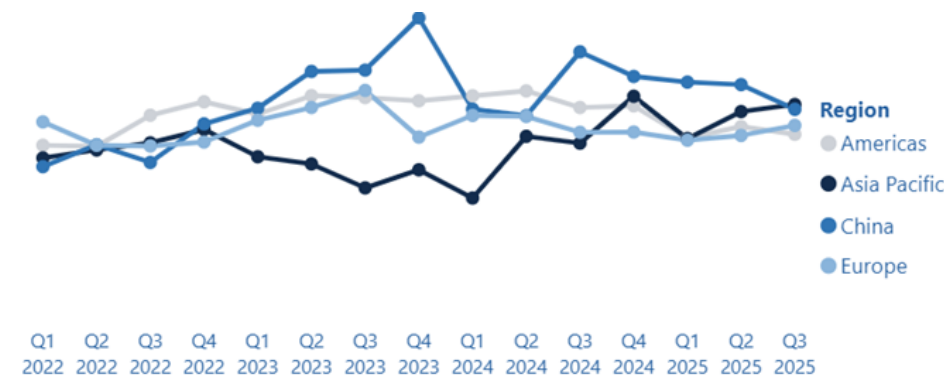
Worldwide Markets & Sales

Strong development for Asia Pacific and positive development in Europe; China and Americas slower recently, reflecting the impact of US trade restrictions in Semiconductors and timing of Security and Energy orders

Worldwide Sales in Q3 2025 by Region



Quarterly Sales Trend by Region

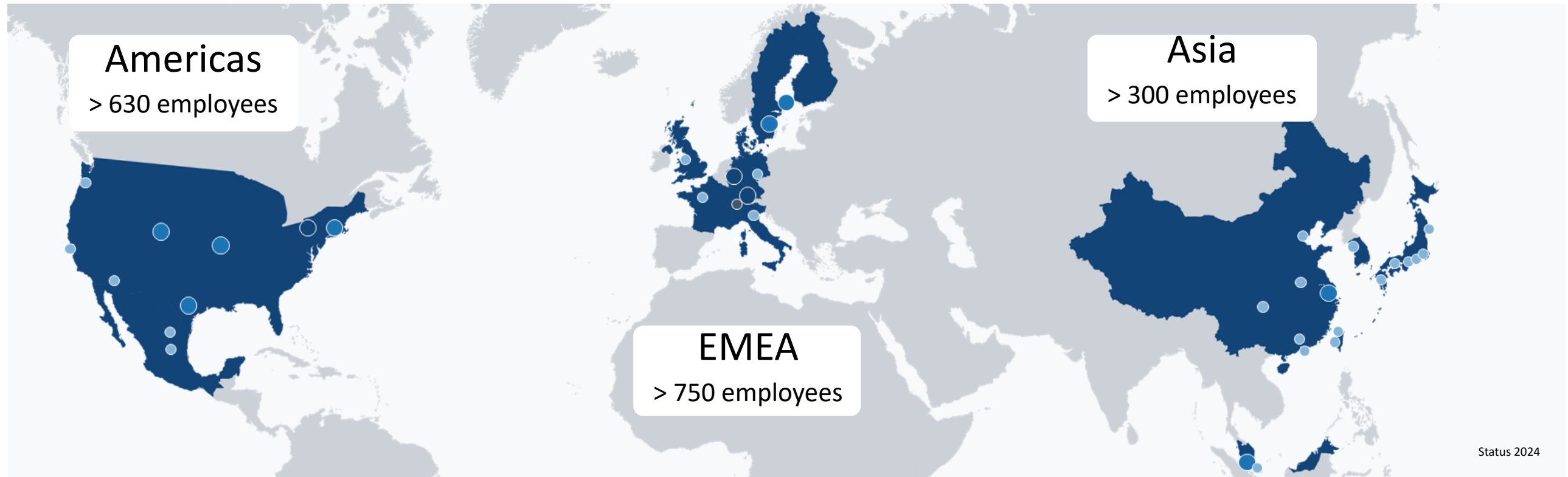


Q3 2025 Sales and Growth by Region

Asia Pacific:	~ 44 MUSD	+23.3 %
China:	~ 43 MUSD	-22.4 %
Europe:	~ 39 MUSD	+ 3.9 %
Americas:	~ 37 MUSD	- 13.3 %
Total: (including ROW)	~ 164 MUSD	- 4.9 % (vs. Q3 2024)

Worldwide Footprint

Global presence with competence centers and a global sales, application and service network with more than 1680 employees worldwide. High customer intimacy with direct innovation and deployment with end customers



- Global market organization with 7 sales, application & service regions and 20+ local offices
- 3 Main Centers of Competence: Syracuse (US), Cologne (DE), Balzers (LI)
- 8 Smaller Locations with Specialized Competence Centers
- Group in Bad Ragaz (CH)

Strong Foundation

INFICON was formed with three core instrumentation technologies, which have been continuously growing with more capabilities and products

IPO: 2000



1969 - 2019



Intelligent Sensor Solutions



INFICON Inc. Syracuse, NY, USA

Vacuum Control Products



INFICON AG Balzers, Liechtenstein

Leak Detection Tools



INFICON GmbH Cologne, Germany

Data Analytics/AI and Smart Manufacturing

Leveraging our strong instrumentation foundation, we have been adding for two decades Data Analytics/AI and Smart Manufacturing capabilities to our products

Smart Sensors

Integrated Process State Sensors and Gauges with Sophisticated Data Analytics/AI



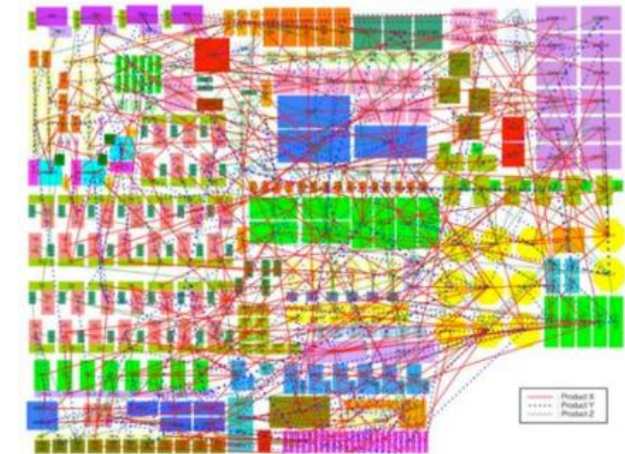
FabGuard®

Yield Maximization & AI Based Equipment and Wafer Intelligence



FPS

Intelligent Operational Excellence & Factory Scheduling

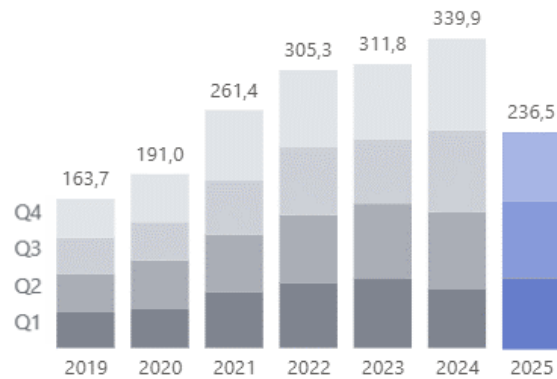


End Markets

Attractive diversified markets with focus on Semiconductor and other technology markets – good development also in challenging times. Semi stable on strong level, RAC/Auto and GV growing this year. Security in cyclical down



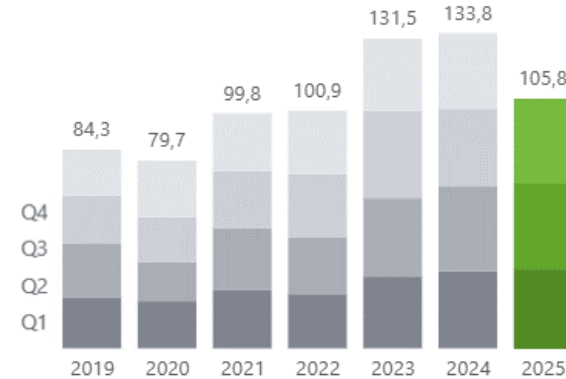
Sales to Semi & Vacuum Coating
+15.7% CAGR (2019 – 2024),
(in MUSD)



YtD - 1%
2025: Flat/Slow



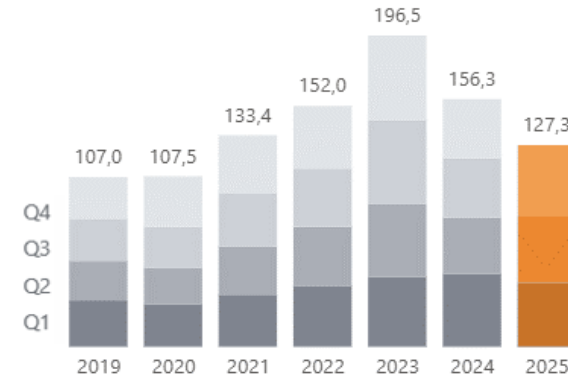
Sales to Automotive & Refrigeration, Air Con.
+9.7% CAGR (2019 – 2024) (in MUSD)



YtD + 4 %
2025: Growth



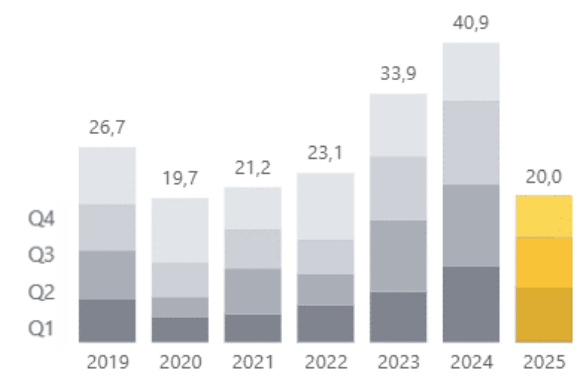
Sales to General Vacuum
+7.9% CAGR (2019 – 2024) (in MUSD)



YtD + 7 %
2025: Growth



Sales to End Market Security & Energy
+9.0% CAGR (2019 – 2024) (in MUSD)



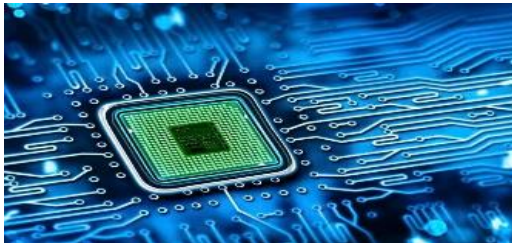
YtD - 40 %
2025: Decrease



Growth Markets for INFICON Technologies

Providing leading edge measuring and analytics capabilities to growth market segments

Semiconductor industry



Leading Logic



Smart Manufacturing & Sustainable Sub Fab



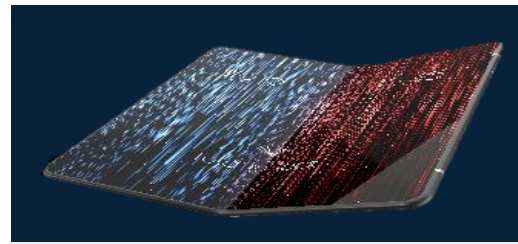
ICAPS*



Memory



Tool Makers



Display

Other high tech industries



Battery & Auto



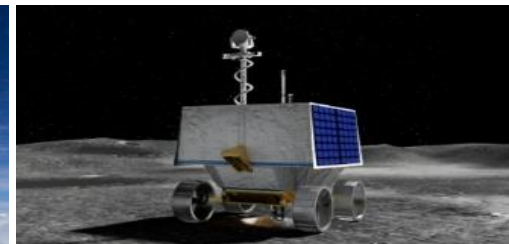
Solar Energy



HVAC-R



Old & New Gases



Space & Robotics



Security & Environment



Lifescience



Big Science



Industrial Vacuum

*) ICAPS: Internet of Things (IoT), Communications, Automotive, Power and Sensors

New Energy Growth Markets for INFICON Technologies

Vacuum and gas measurement as well as intelligent software for process control is used broadly in sustainability and new renewable applications



Semi Fab & Sub Fab Optimization



Battery Market



Solar Energy

Biomethane



Hydrogen

Recently at INFICON

Great moments that drive us forward...



Thank you for your attention.

Next Events on Corporate Calendar

→Q4 and full year 2025 Media conference

March 24, 2026



inficon.com/analyst-visit

dates are subject to change



INFICON believes that a deep understanding of our customers' challenges and their visions for success are paramount to everything we do. These long-standing partnerships and the commitment to see our customers succeed inspire our dedicated, talented employees to develop and build market-leading instruments that are a winning combination of outstanding innovation and proven performance.

And we value the trust our customers have in us to take risks, move fast and continue learning as we push the limits of technology to help them succeed.

Firmenpräsentation «Comet Group»

**André
Grede**

Chief Technology Officer,
Comet Group





Vontobel Chip Day

December 4, 2025

André Grede, Chief Technology Officer



Cautionary Statement Regarding Forward Looking Statements

This document contains forward-looking statements about the Comet Group that may be subject to uncertainty and risk. Readers should therefore be aware that such statements may deviate from actual future outcomes or events. Forward-looking statements in this document are projections of possible future developments. All forward-looking statements are made on the basis of data available to Comet at the time of preparation of this document. The Comet Group assumes no obligation whatsoever to update or revise forward-looking statements in this document, whether as a result of new information, future events or otherwise.

A Global Player with Roots in Switzerland ...



Full-year 2024



1800+
employees



12
Locations



Headquarters
in Flamatt,
Switzerland



Net sales:
CHF 445.4 mn



Distribution

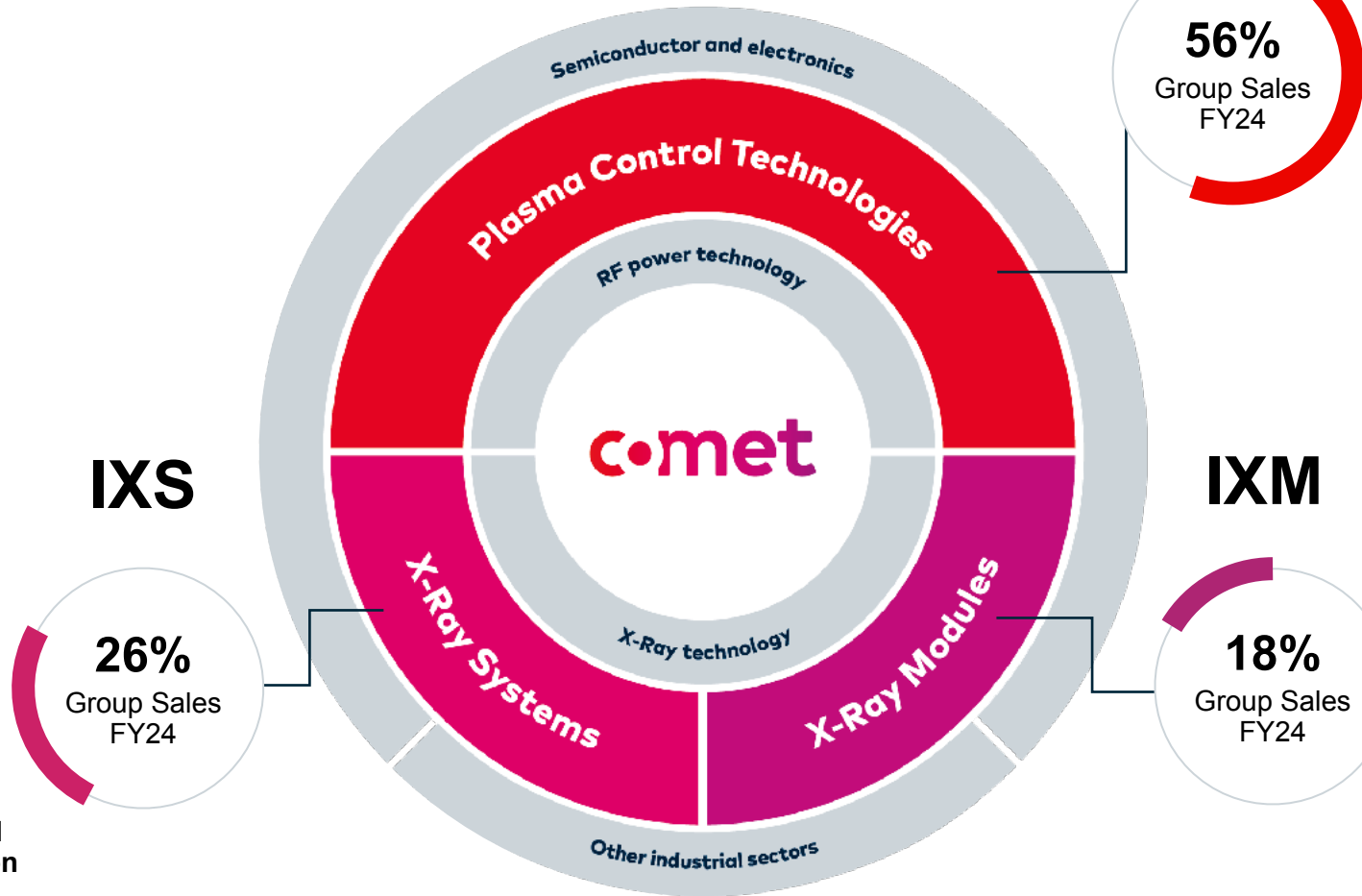
62% Asia
20% North America
16% Europe
2% Rest of World

Semiconductors are the Core of our Strategy...

Top 3
in served markets



High-end x-ray systems for industrial environments from R&D to production



#1
in Vaccaps & Matches



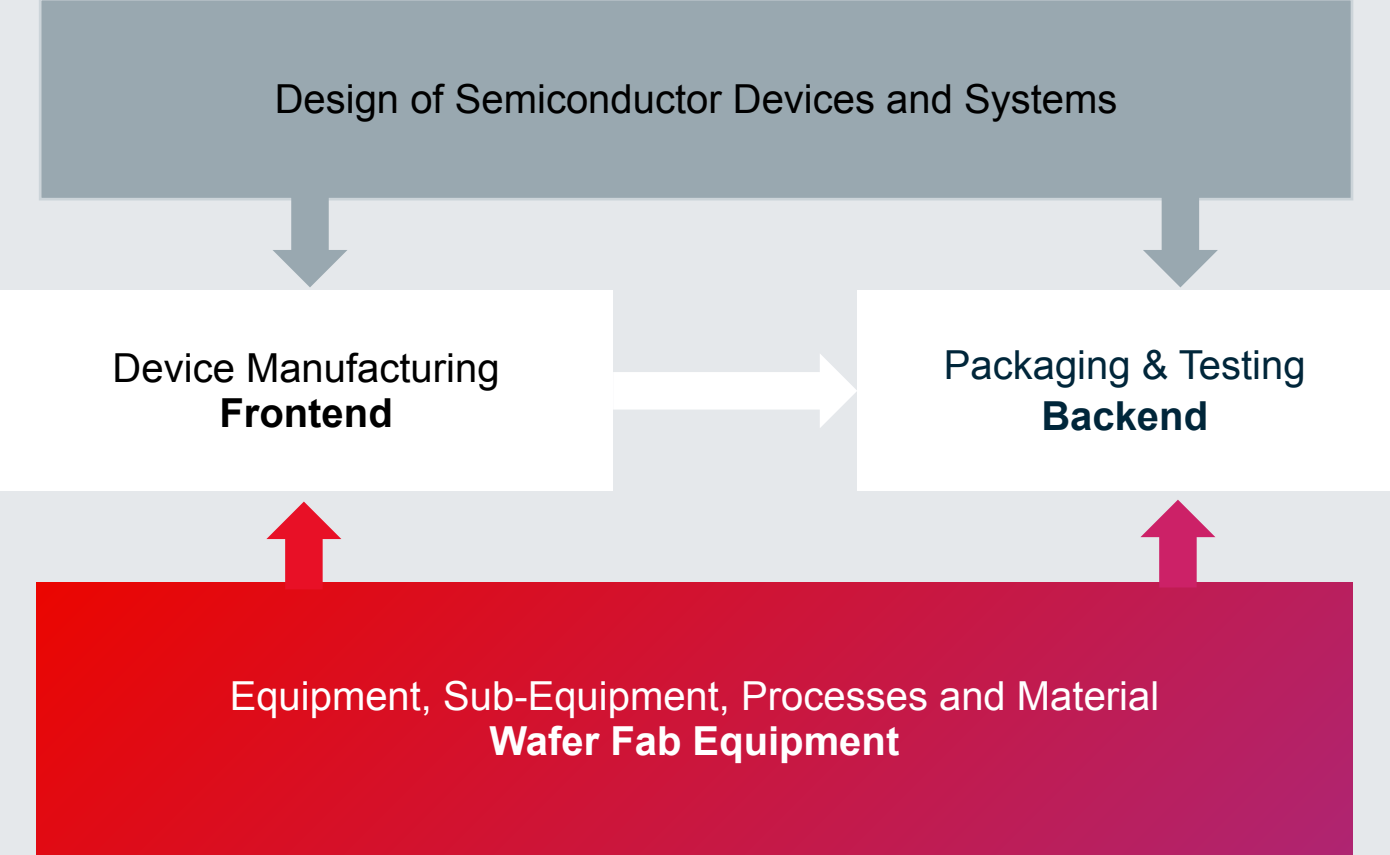
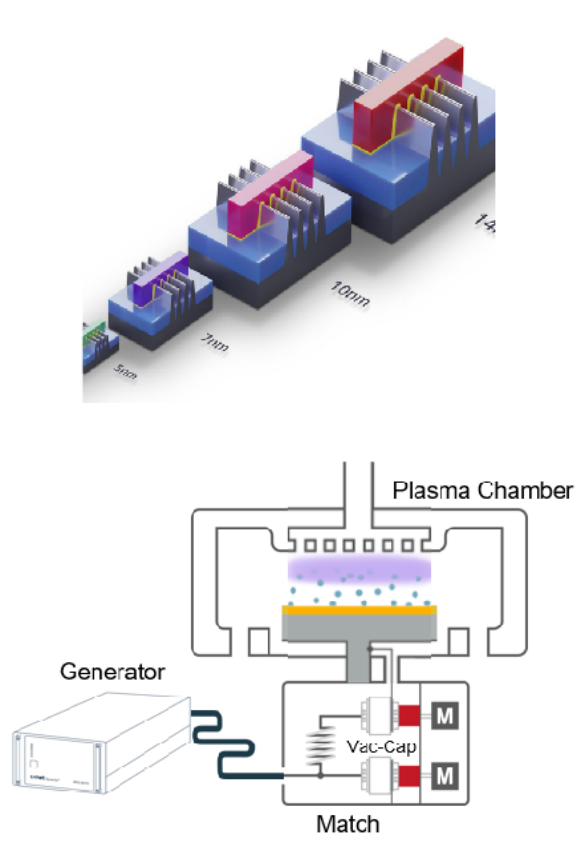
High-end RF Power delivery systems for plasma applications

#1
in industrial x-ray sources



High-end x-ray components and modules for industrial applications

Advances in SEMI rely on Supplier's Technologies.



Near Technology's Limits
Only a few manufacturers can afford cutting-edge environments for advanced nodes.

Pushing Technical Boundaries
The criticality and performance of manufacturing equipment are paramount for pushing the boundaries of the technical feasible.

Evolving Through Collaboration
Progress is driven not by sudden revolutions but by continuous evolution and co-creation built on many years of experience.

Importance of Specialized Partners
Consequently, dependence on specialized system- and subsystem suppliers - such as Comet - is greater than ever.

«What» is Pushing the Next Technology Nodes.

WHY

The semiconductor industry advances its progress...

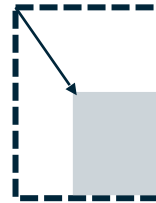
To enable higher performance, efficiency, and more functionality per cost

WHAT

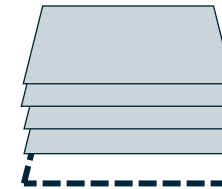
...through continual innovation in chip scaling, architecture, and technology...

Drivers

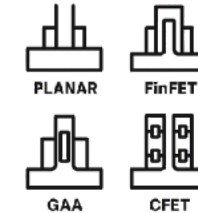
Scaling



Advanced Architectures



Technologies



HOW

...enabled by breakthroughs in new materials, processes, and inspection and testing

Enablers

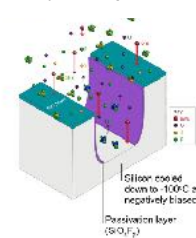
Materials



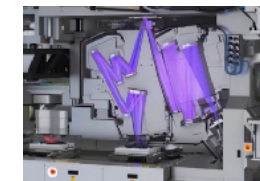
Manufacturing Processes

Examples

Cryo Etching



High NA-EUV



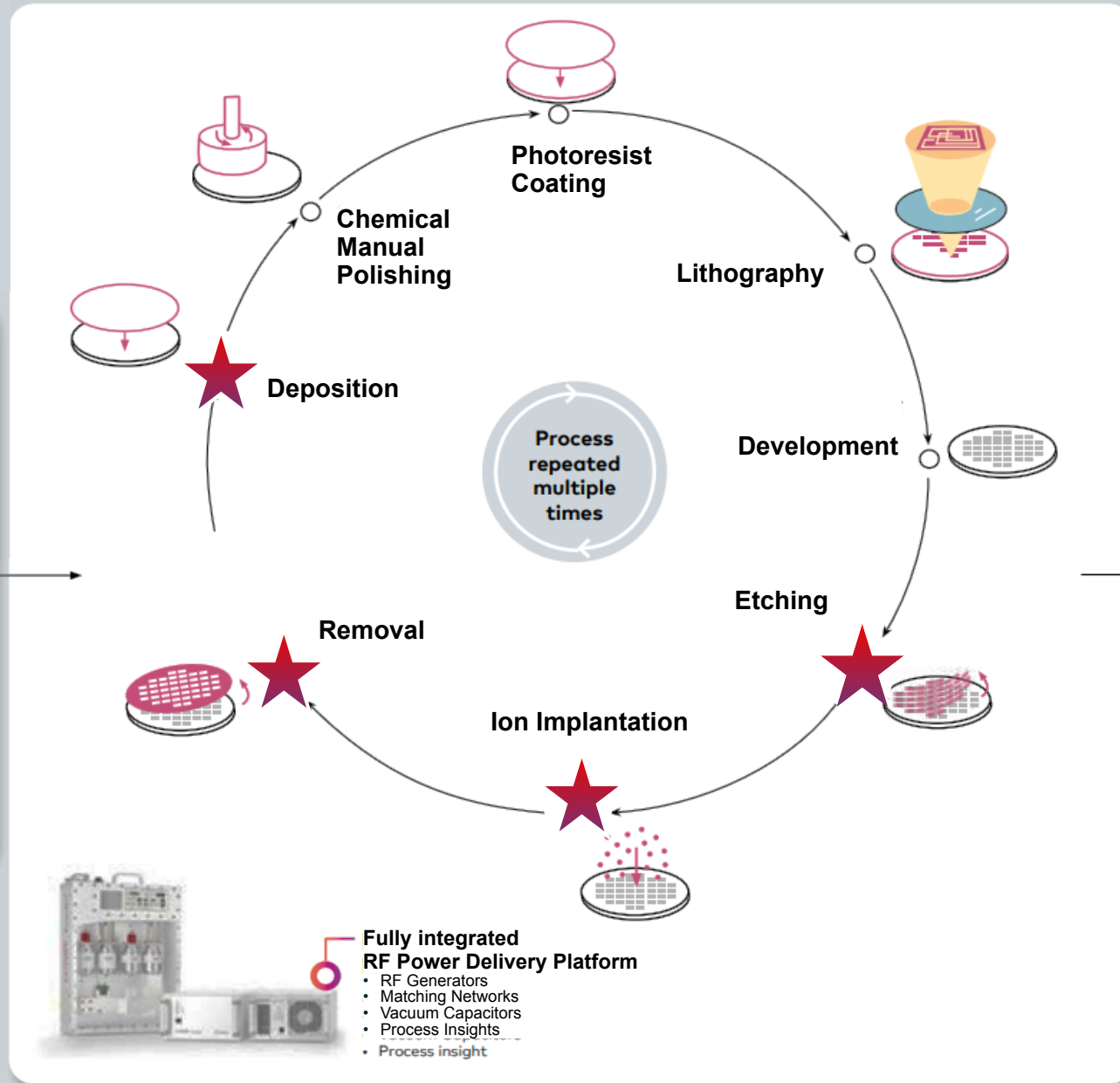
Inspection & Testing

Advanced X-Ray Inspection

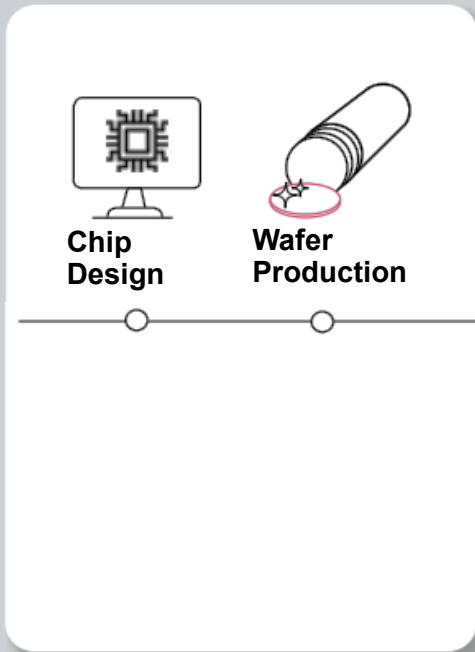


Driving Precision and Reliability across Semiconductor Production

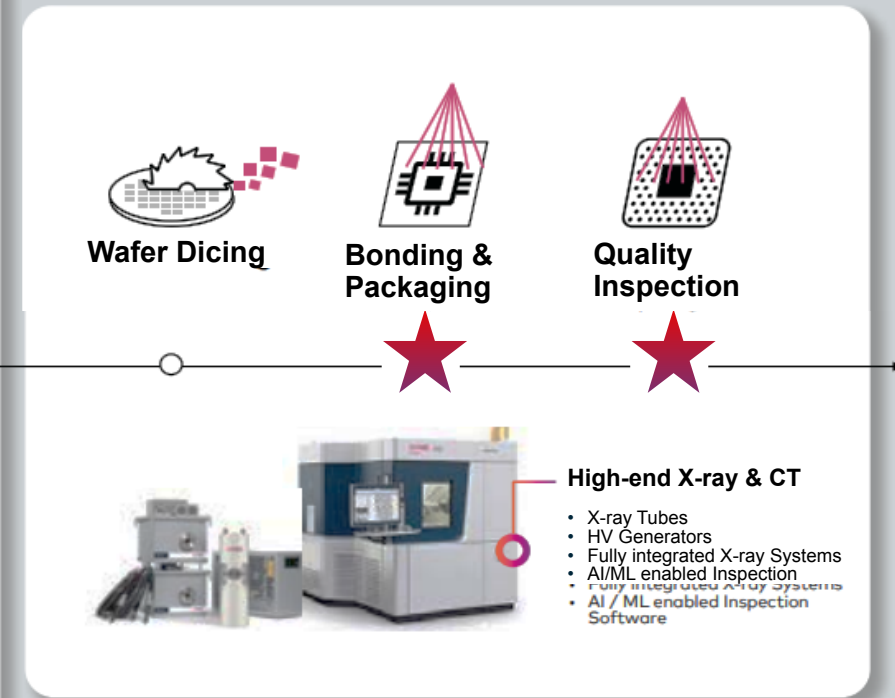
Wafer Fabrication (Front-end Processes)



Design & Raw Material



Assembly & Test (Back-end Processes)



★ Comet solution needed in the process



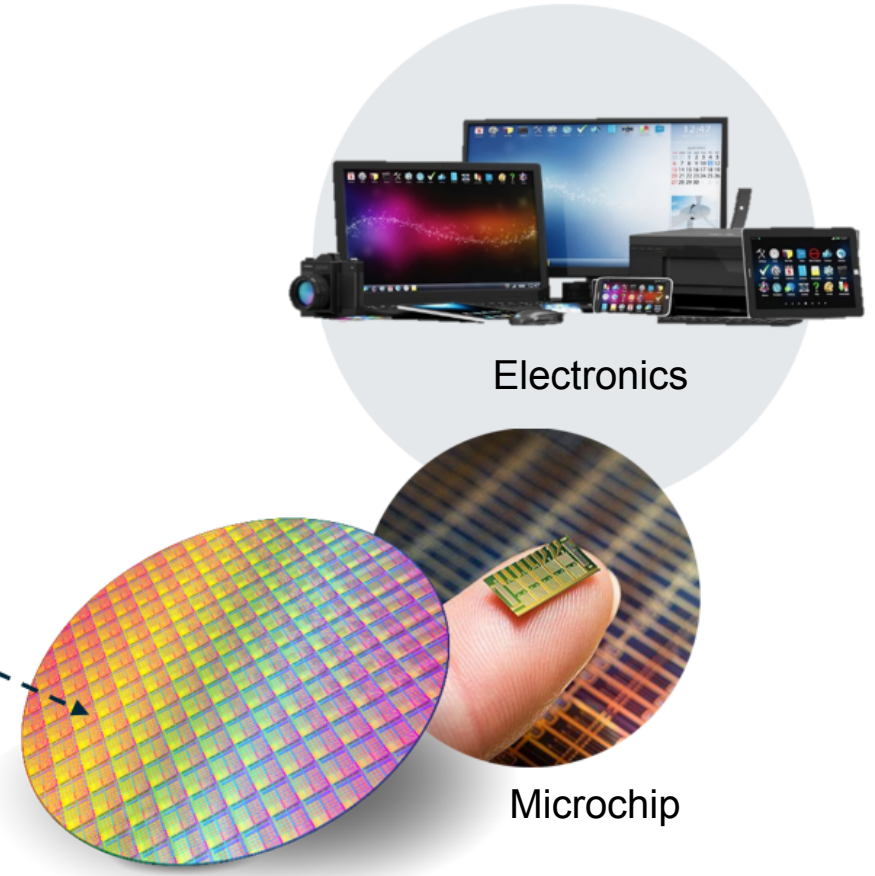
Comet RF power solutions enable critical plasma processes in the semiconductor industry



Semiconductor manufacturing tool in a FAB



Plasma based processing tool

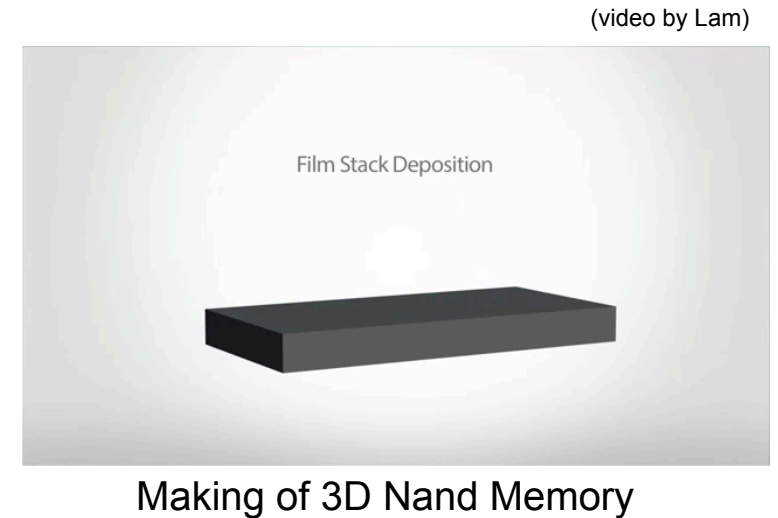
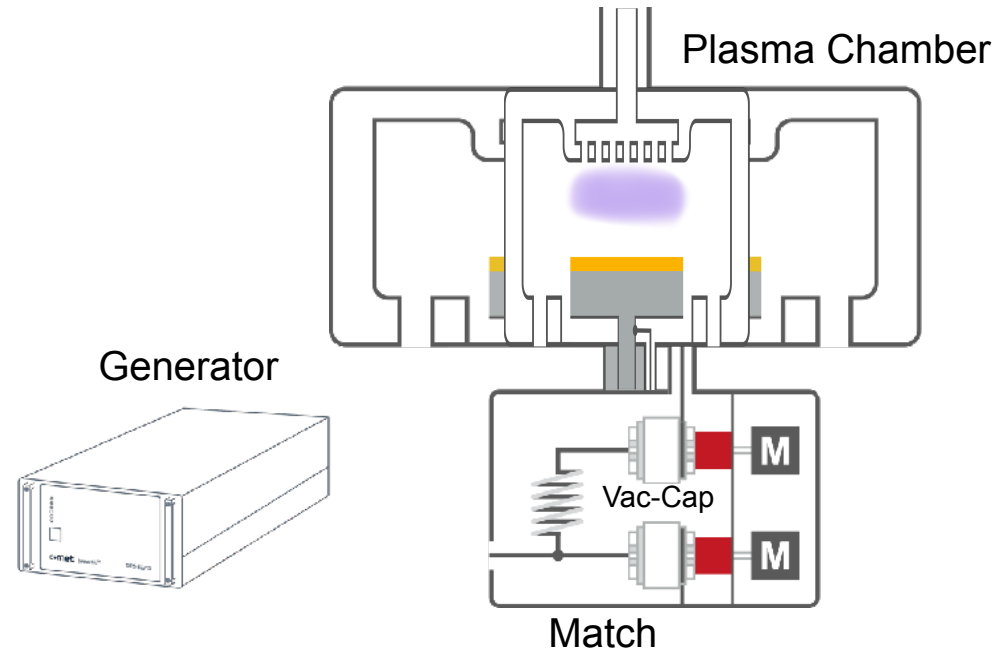


Electronics

Microchip

Silicon wafer

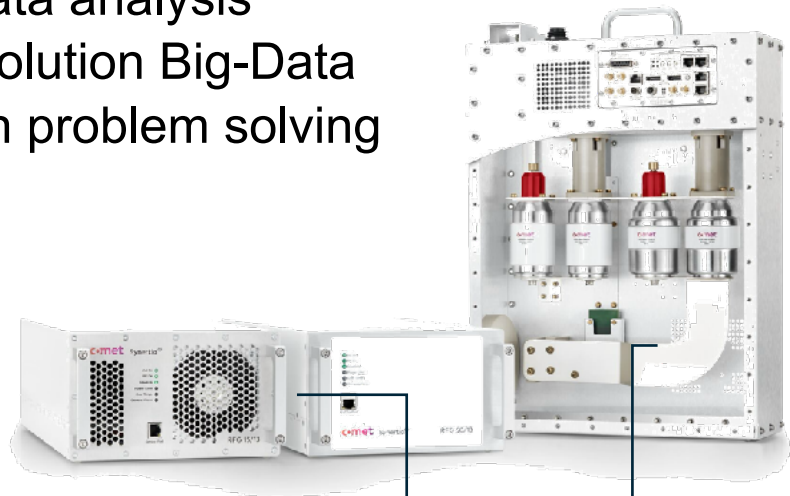
Delivering the energy for plasma processes



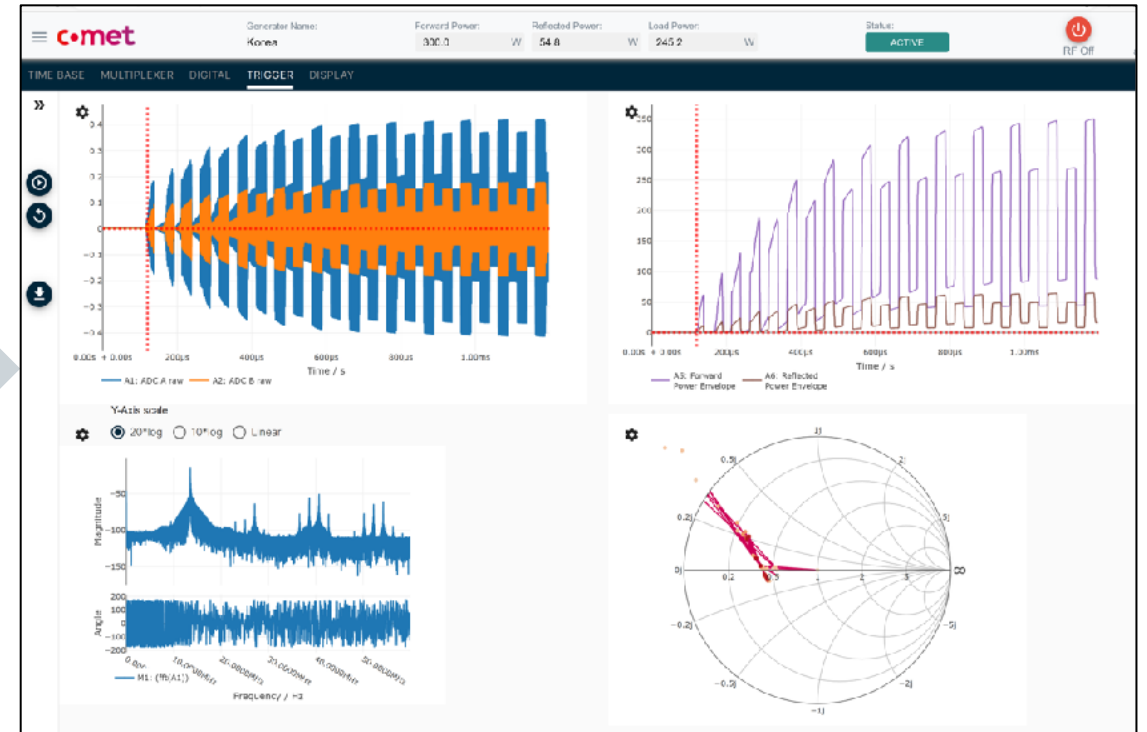
- Many important steps during semiconductor manufacturing like adding, removing or modifying material are done using plasma as a tool
- Comet PCTs products are generating high frequency process energy needed to run and control plasma processes
- The amount of energy, the shape of its envelope and the way it is controlled has a very strong influence on the plasma behavior and therefore on the results on the wafer

Synertia® Platform: Leveraging the power of data.

- Smart & synchronized
- Real-time communication and data analysis
- ns resolution Big-Data
- Built-in problem solving



Integrated Measurement Studio

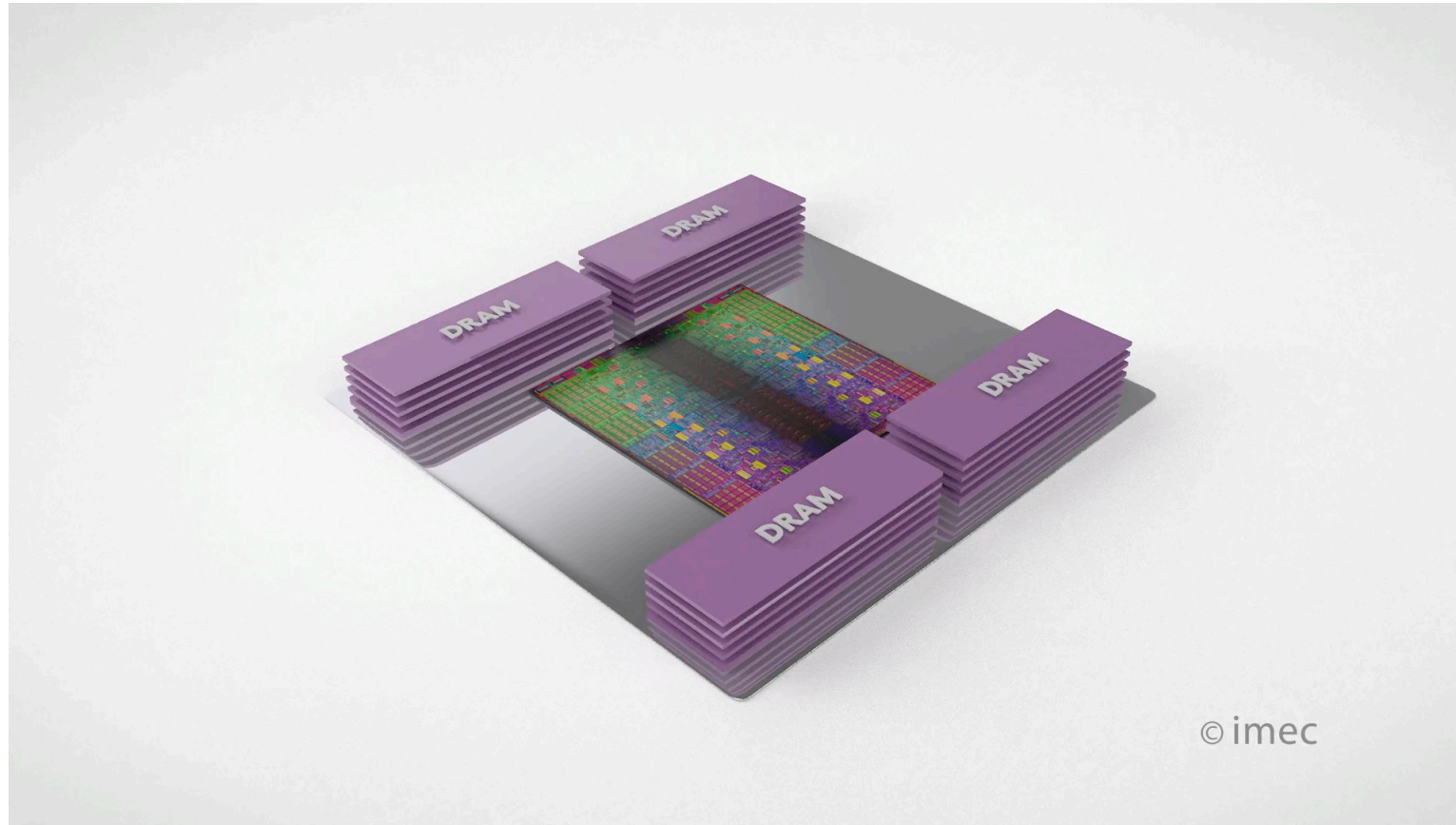


User

On-site Big Data post - processing



The increasing importance of the Backend.



(video by imec, link: <https://www.youtube.com/watch?v=cxnHyVj4dXo>)

Beyond Moore

From Devices to Systems

Perfect performance-cost balance

X-ray Solutions – All Technologies in one Hand

Comet X-ray Modules

Generator

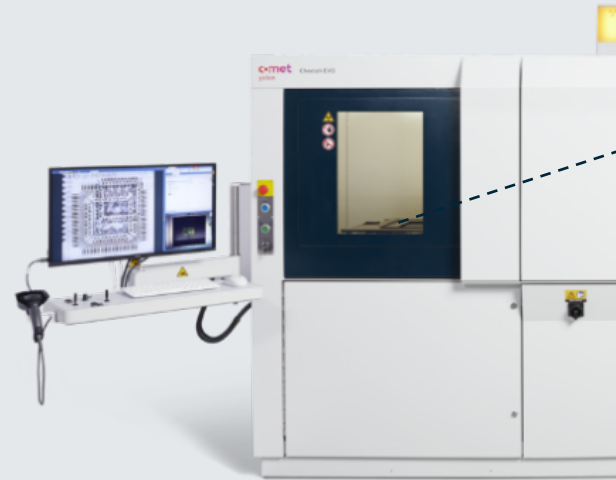


X-ray Tube

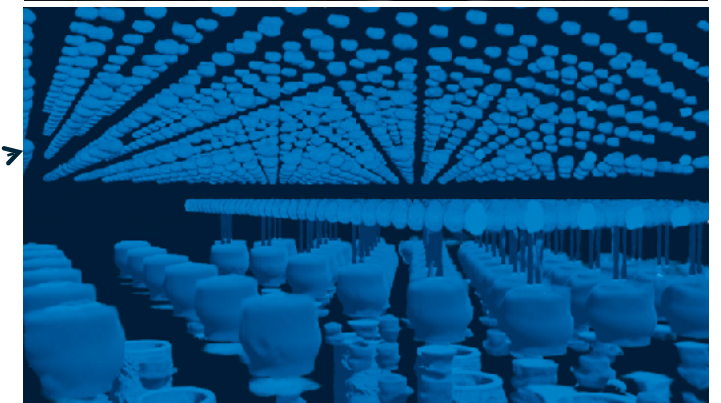
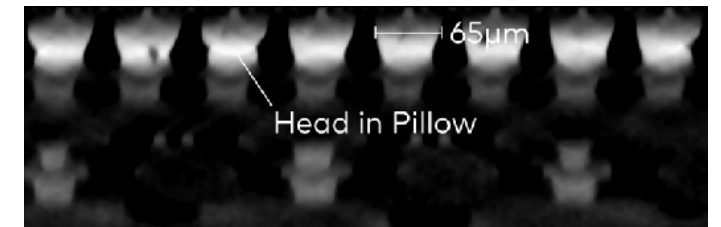
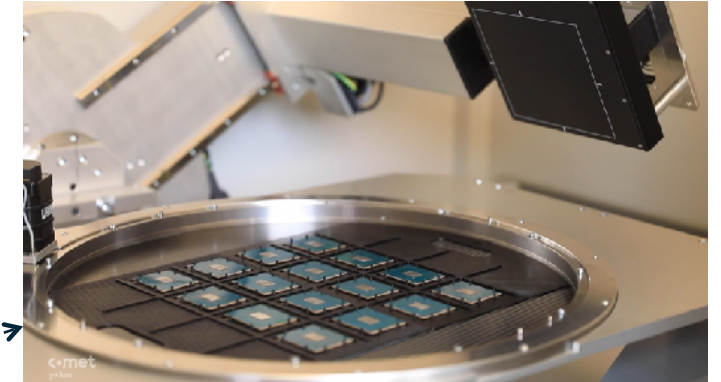


Comet Yxlon X-ray Systems

X-ray inspection system for production optimization and research & development



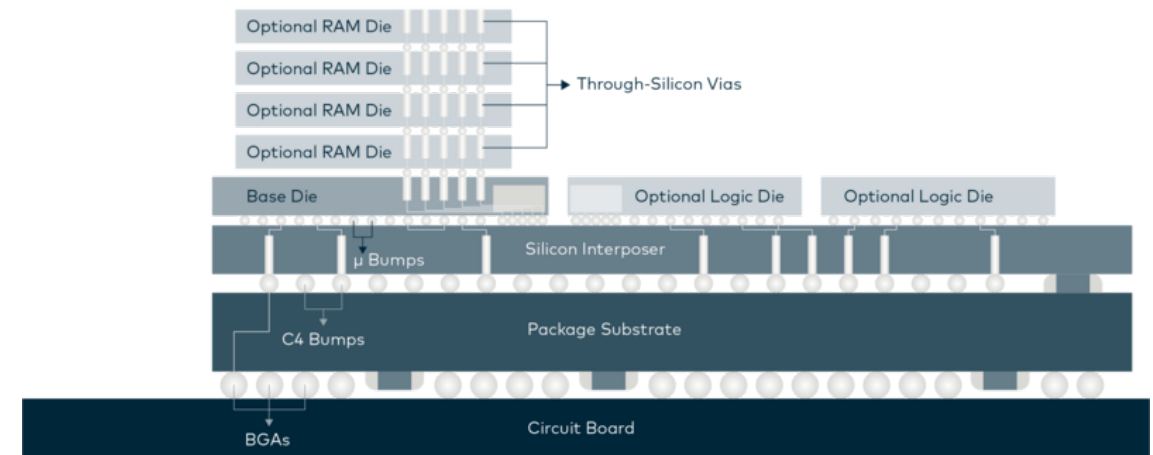
AI- and ML-based production information, depending on system and implementation



3D X-ray to support Advanced Packaging

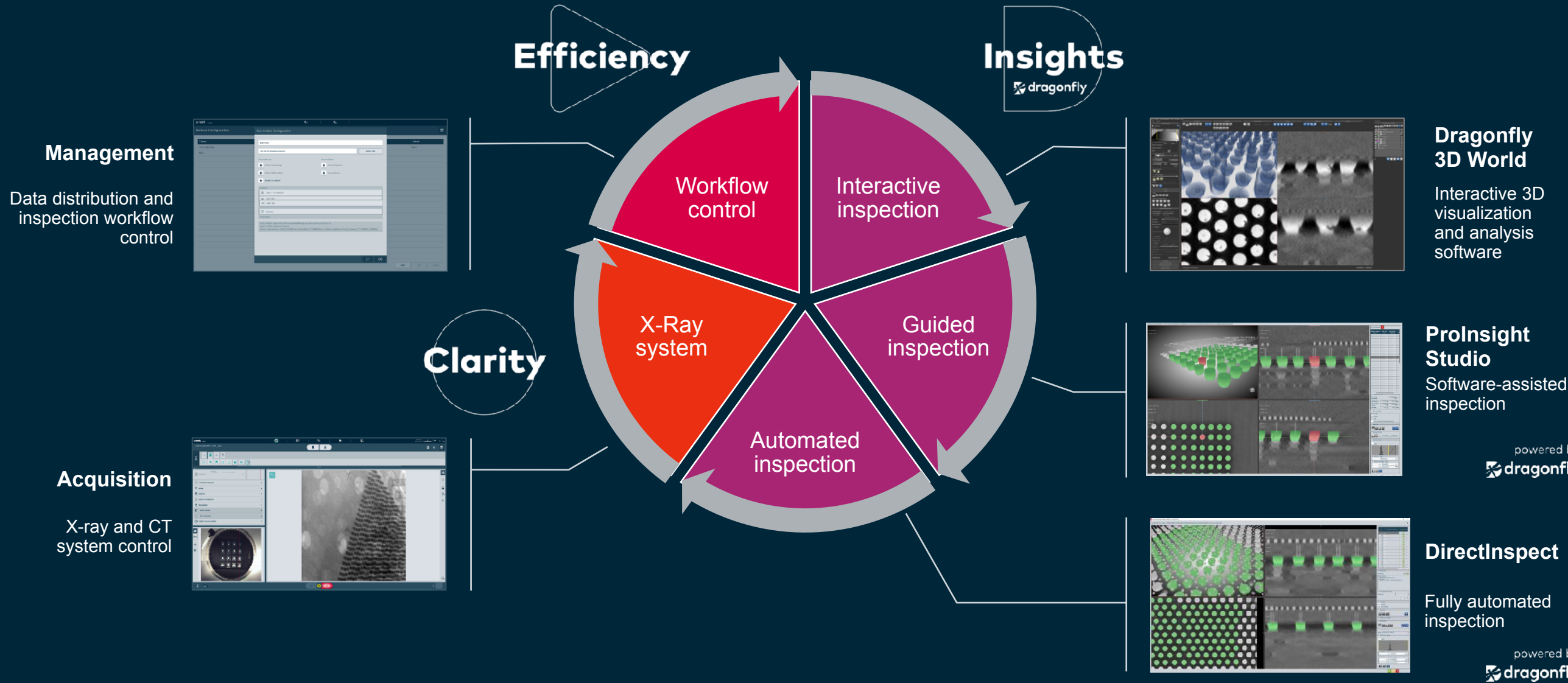
CA20 – especially designed for the semiconductor industry

- Non-destructive technology to investigate advanced 3D packages as needed for AI
- 3D insights into solder bumps and TSV within minutes
- Repeatable results to discover sub um defects
- Efficient software-assisted review
- Dose Manager: protection of X-ray sensitive components
- CA20 Fab: launch of automated version in 2024

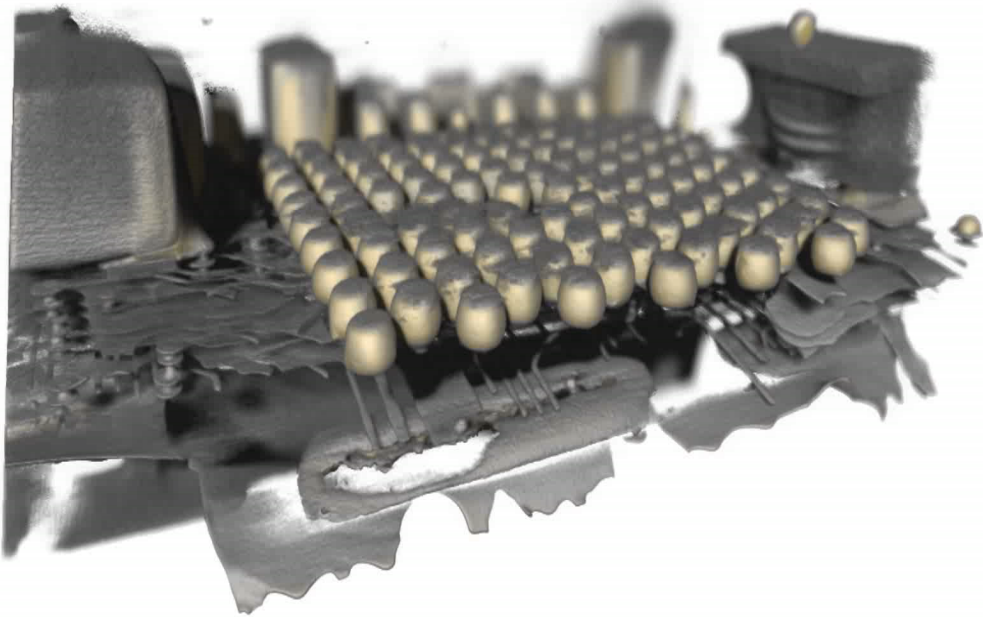


Typical structure of an integrated, complex processing unit as need for AI computing, using advanced 3D packaging

AI-Based Platform as key to solve structural challenges.



AI and Deep Learning at Comet.



Artificial Intelligence

Overall activities related to artificial intelligence

Machine Learning

Training of machines to learn from data

Deep Learning

Machine learning based on artificial neural networks

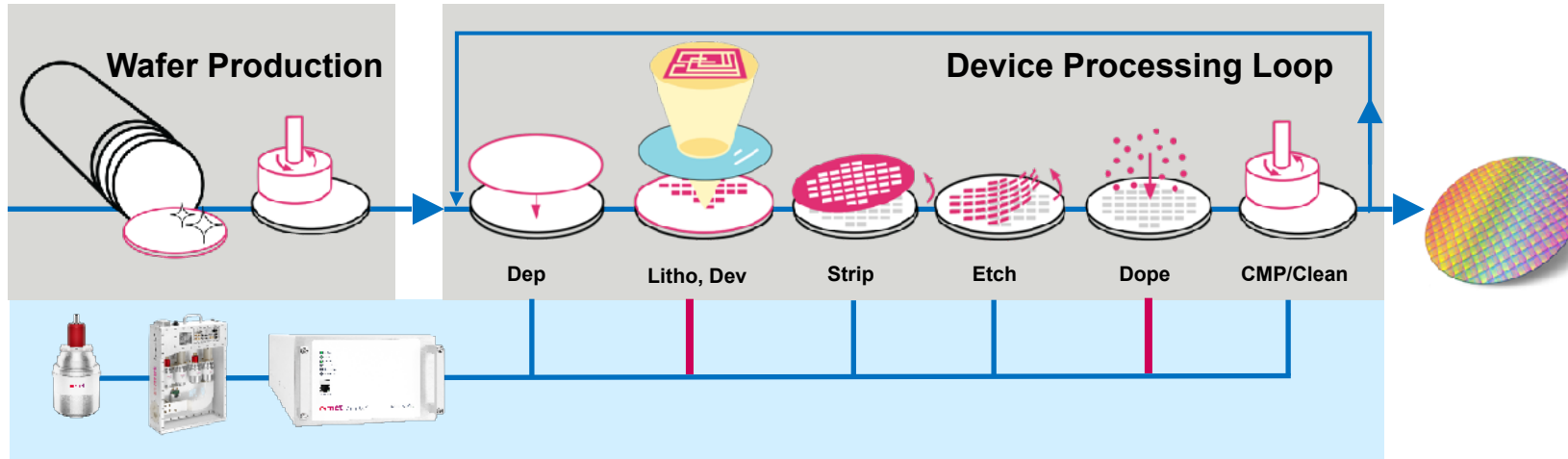
Generative AI

Generating new data, based on information as used during training

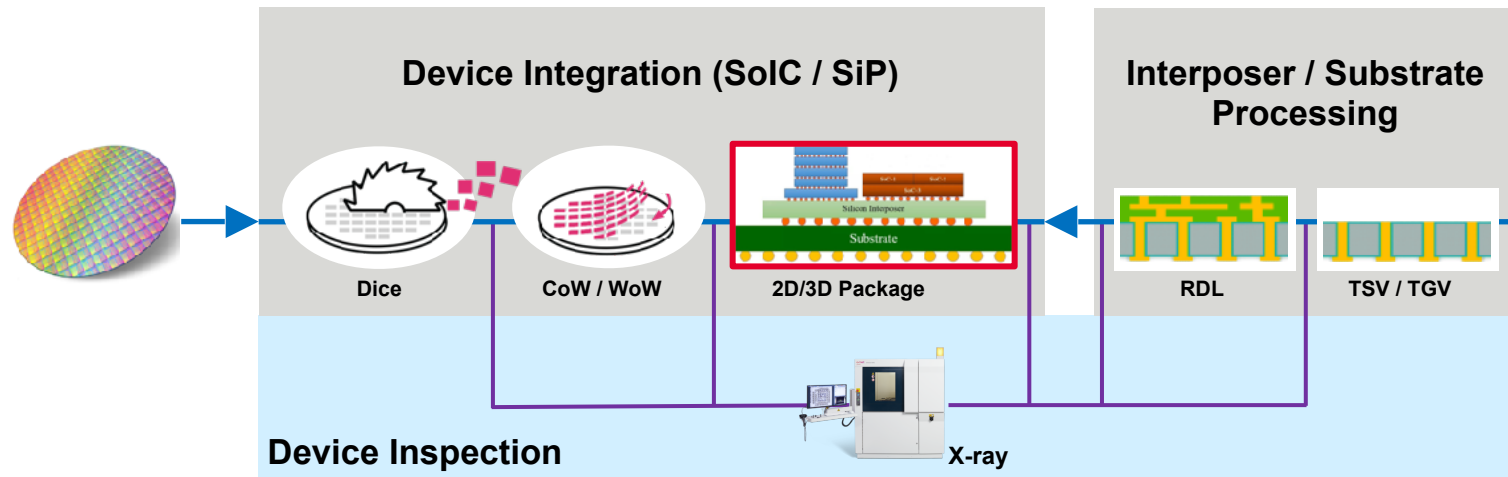
- ▶ **Image Segmentation:**
partitioning volumetric data into distinct regions, or segments, that correspond and represent specific parts of a structure
- ▶ **Filtering:**
Image enhancement e.g., noise reduction, feature extraction, or super-resolution
- ▶ **Image stabilization:**
compensation and correction of hardware deficiencies
- ▶ **Automated Failure detection:**
training models on customer data to automatically identify & classify defects
- ▶ **Data fusion:**
combination of information generated by different inspection methods

Where our Technology plays. Today and Tomorrow.

Frontend



Backend



Leverage VacCaps, Matches

Expand Synertia generator, match and system, new sensors, real-time data, new processes in front and backend

Broaden Into new technologies with high adoption rate and market share

Leverage FYNE Focus, 2D & 3D CT

Expand CA20, Dragonfly and plasma backend processes

Broaden AI based software solutions and data fusion

When the first atomic layer is placed...

...a race for the best algorithms,
nanoscale technologies and
manufacturing equipment...

...decides who drives the next
breakthrough of the Angstrom Era.

**Comet is well positioned
to increase its footprint
and relevance in SEMI**

Led by experience. Driven by curiosity.

c•met



Vontobel Chips Day 2025

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