# INVESTOR PRESENTATION

August 2024

# Safe Harbor Statement

This presentation contains statements about management's future expectations, plans and prospects of our business that constitute forward-looking statements, which are found in various places throughout the presentation, including, but not limited to, statements relating to expectations of orders, net sales, product shipments, expenses, timing of purchases of assembly equipment by customers, gross margins, operating results and capital expenditures. The use of words such as “anticipate”, “estimate”, “expect”, “can”, “intend”, “believes”, “may”, “plan”, “predict”, “project”, “forecast”, “will”, “would”, and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. The financial guidance set forth under the heading “Outlook” contains such forward-looking statements. While these forward-looking statements represent our judgments and expectations concerning the development of our business, a number of risks, uncertainties and other important factors could cause actual developments and results to differ materially from those contained in forward-looking statements, including any inability to maintain continued demand for our products; failure of anticipated orders to materialize or postponement or cancellation of orders, generally without charges; the volatility in the demand for semiconductors and our products and services; the extent and duration of the COVID-19 and other global pandemics and the associated adverse impacts on the global economy, financial markets, global supply chains and our operations as well as those of our customers and suppliers; failure to develop new and enhanced products and introduce them at competitive price levels; failure to adequately decrease costs and expenses as revenues decline; loss of significant customers, including through industry consolidation or the emergence of industry alliances; lengthening of the sales cycle; acts of terrorism and violence; disruption or failure of our information technology systems; consolidation activity and industry alliances in the semiconductor industry that may result in further increased customer concentration, inability to forecast demand and inventory levels for our products; the integrity of product pricing and protection of our intellectual property in foreign jurisdictions; risks, such as changes in trade regulations, conflict minerals regulations, currency fluctuations, political instability and war, associated with substantial foreign customers, suppliers and foreign manufacturing operations, particularly to the extent occurring in the Asia Pacific region where we have a substantial portion of our production facilities; potential instability in foreign capital markets; the risk of failure to successfully manage our diverse operations; any inability to attract and retain skilled personnel, including as a result of restrictions on immigration, travel or the availability of visas for skilled technology workers; those additional risk factors set forth in Besi's annual report for the year ended December 31, 2023 and other key factors that could adversely affect our businesses and financial performance contained in our filings and reports, including our statutory consolidated statements. We expressly disclaim any obligation to update or alter our forward-looking statements whether as a result of new information, future events or otherwise.

# Agenda

I. Company Overview

II. Market Overview

III. End-User Market Trends

IV. Strategy

V. Financial Update and Summary

VI. Appendix

# I. COMPANY OVERVIEW

# Besi at a Glance

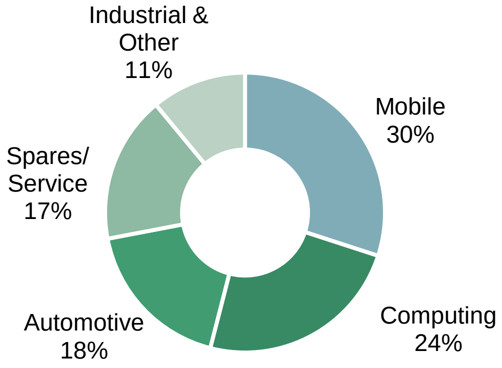
## LTM Key Performance Indicators

€ MM

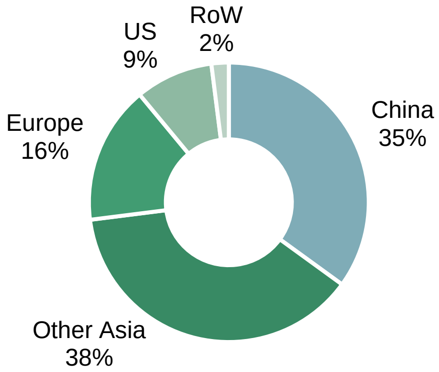
| Orders | Revenue | Gross Margin |
|---|---|---|
| € 607 MM | € 580 MM | 65% |
| **EBITDA Margin** | **Cash Flow: Operations** | **Net Cash Position*** |
| 39% | 32% | € 74 MM |

## 2023 Revenue Breakdown

### Revenue by end-market




### Revenue by Geography




## Corporate Profile

- Leading assembly equipment supplier with #1 and #2 positions in key markets
- ~35% addressable market share
- Broad portfolio: die attach, packaging and plating
- Strategic positioning in substrate and wafer level packaging
  - ~70% of systems used for advanced packaging
  - ~50% for advanced die placement
  - ~50% of LTM orders for AI applications
- Global operations in 7 countries; 1,783 employees**. HQ in NL

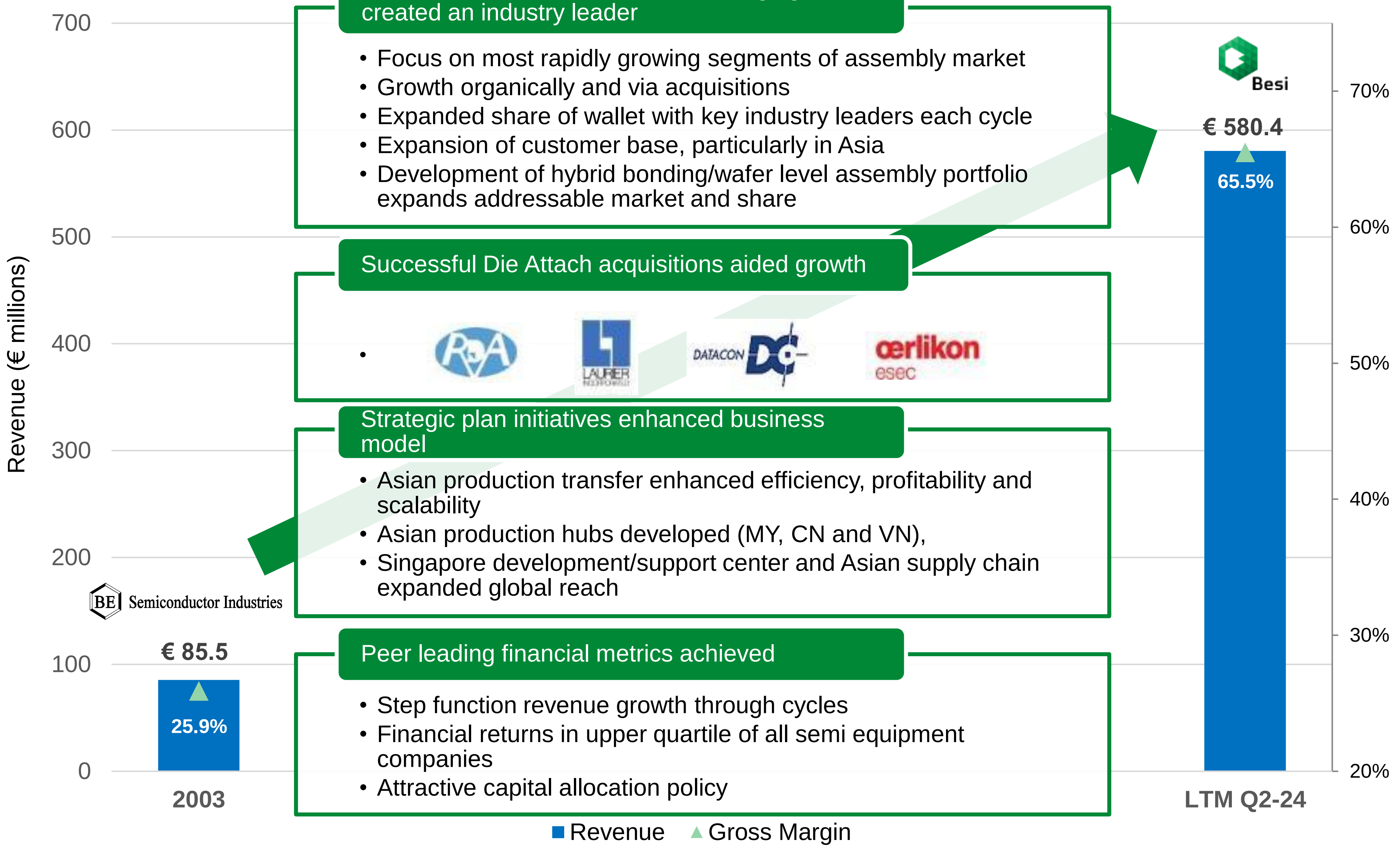
## Investment Considerations

- Leading position in advanced packaging. Ever more critical part of semi value chain
- Peer leading financial metrics
- Multiple growth drivers: AI, digital and cloud infrastructure build, smart everything, 5G/6G, vehicle electrification and autonomous driving
- Hybrid bonding/wafer level assembly expands revenue and profit potential

* Calculated as Cash and cash equivalents, including deposits minus total debt. Excludes lease liabilities

** As of June 30, 2024

# Company History




## Consistent focus on Advanced Packaging has created an industry leader

- Focus on most rapidly growing segments of assembly market
- Growth organically and via acquisitions
- Expanded share of wallet with key industry leaders each cycle
- Expansion of customer base, particularly in Asia
- Development of hybrid bonding/wafer level assembly portfolio expands addressable market and share

## Successful Die Attach acquisitions aided growth

## Strategic plan initiatives enhanced business model

- Asian production transfer enhanced efficiency, profitability and scalability
- Asian production hubs developed (MY, CN and VN),
- Singapore development/support center and Asian supply chain expanded global reach

## Peer leading financial metrics achieved

- Step function revenue growth through cycles
- Financial returns in upper quartile of all semi equipment companies
- Attractive capital allocation policy

# Superior Long-Term Value Creation

## Capital Allocation

**Attractive capital allocation program**

**€ 2.0 billion of dividends and share repurchases since 2011***

**Represents ~32% of total revenue**

## Strategic/Financial

**Disciplined execution has created leader in advanced packaging**

**Best in class financial metrics**

**Superior through cycle financial performance versus peers**

## Shareholder Return

**Superior Total Returns**:**
**150% (1 year)**
**210% (3 year)**
**812% (5 year)**

**Consistent TSR outperformance versus peers**

**Upper quartile ranking for all semi-equipment companies**

* Includes share repurchases through July 31, 2024
** Through December 31, 2023

# From Processed Wafer to Assembled Chip

**Total Semiconductor Manufacturing Equipment 2023: $110 Bn**

| Front end: $99 Bn (90%) | Assembly: $4 Bn (4%) | Test: $7 Bn (6%) |
|---|---|---|

**Besi focus**

**Assembly Process**

| Dicing | Die Attach | Wire Bond | Packaging | Plating | |
|---|---|---|---|---|---|
| | ✓ | | ✓ | ✓ | **Leadframe** Wire Bond |
| | ✓ | | ✓ | | **Substrate** Wire Bond |
| | ✓ | | ✓ | | **Substrate** Flip Chip / TCB |
| | ✓ | | ✓ | | **Wafer Level** Hybrid, EMIB, TCB, Flip Chip, FOWLP |

✓ Besi offering

Source: TechInsights, June 2024

# Industry Leading Assembly Equipment Portfolio

## Die Attach (77% of 2023 Revenue)

**Multi-Module Attach**

**Epoxy / Soft Solder**

**Flip-chip**

**Direct Lid Attach**

**Embedded Bridge Attach**

**Thermo Compression**

**Hybrid Bonding**

## Packaging and Plating (23% of 2023 Revenue)

**Leadframe Molding**

**Substrate Molding**

**Wafer and Panel Molding**

**Trim and Form**

**Singulation**

**Plating**

**Wet Processing**

# Serving Blue Chip Customers Across Key End-Markets

Besi

## Customers

- **Diversified, blue chip customer base**
  - Top 10 customers ~52% of 2023 revenue
  - No customer > 10%
- **Supplying leading IDMs, fabless producers and subcontractors**
  - Sell direct to IDMs
  - Sell to fabless producers via subcontractors
  - 52% IDMs/48% subcontractor order split in 2023
- **Long-term relationships**
  - Many exceed 50 years

### Independent Device Manufacturers (IDMs)

ams OSRAM, BOSCH, infineon, intel, Micron, NXP, qorvo, RENESAS, SAMSUNG, SKYWORKS, ST, TDK, Texas Instruments, tsmc

### Subcontractors

ASE GROUP, Amkor Technology, fabrinet, FOXCONN, HUA TIAN, INNOLIGHT, JCET, LG Innotek, PTI, SPIL, SHARP, TF·AMD, UTAC

### Fabless IDMs

AMD, BROADCOM, DELL, DELPHI, FUJITSU, hp, lenovo, MEDIATEK, MOTOROLA MOBILITY, NVIDIA, QUALCOMM

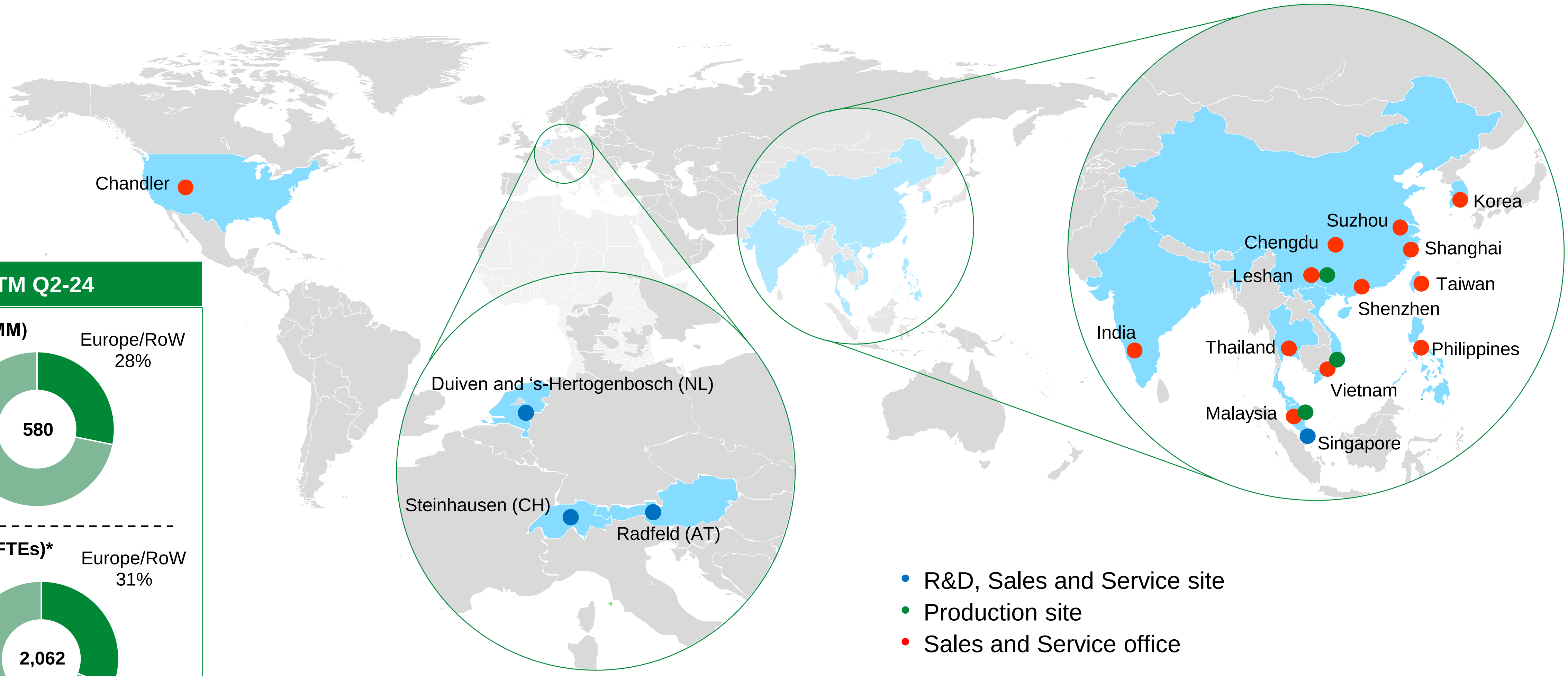
## End-Products

Mobile 30%

Computing 24%

Automotive/ Industrial 29%

# Global Operations Supported by European Development Centers and Asian Production Footprint/Supply Chain




**LTM Q2-24**

**Revenue (€ MM)**

Europe/RoW 28%
580
Asia 72%

**Headcount (FTEs)***

Europe/RoW 31%
2,062
Asia 69%

- R&D, Sales and Service site
- Production site
- Sales and Service office

* Including temporary headcount

# Summary Financials

| Year Ended December 31, (€ MM) | 2021 | 2022 | 2023 | H1-24 | H1-23 |
|---|---|---|---|---|---|
| ***Orders*** | **939.1** | **663.7** | **548.3** | **313.0** | **254.6** |
| *Growth (%)* | *99%* | *(29%)* | *(17%)* | *23%* | |
| **Revenue** | **749.3** | **722.9** | **578.9** | **297.5** | **295.9** |
| *Growth (%)* | *73%* | *(4%)* | *(20%)* | *1%* | |
| ***Gross Profit*** | **446.8** | **443.1** | **375.8** | **196.5** | **192.2** |
| *Margin (%)* | *60%* | *61%* | *65%* | *66%* | *65%* |
| **EBITDA** | **335.1** | **317.1** | **239.1** | **103.8** | **117.5** |
| Margin (%) | 45% | 44% | 41% | 35% | 40% |
| **Operating Income** | **317.6** | **294.1** | **213.4** | **90.0** | **104.6** |
| *Margin (%)* | *42%* | *41%* | *37%* | *30%* | *35%* |
| **Net income** | **282.4** | **240.6** | **177.1** | **75.9** | **87.1** |
| *Margin (%)* | *38%* | *33%* | *31%* | *26%* | *30%* |
| **Net Cash*** | **370.4** | **346.5** | **113.0** | **74.4** | **74.0** |

* Calculated as Cash and cash equivalents, including deposits minus total debt. Excludes lease liabilities

**Long-term, step function growth in cyclical business**

- Increased revenue, profitability and market share per cycle

**H1-24 revenue +0.5% and net income -12.9% vs. H1-23**

- Contrasting growth trends: AI vs. mainstream assembly
  - Strength in AI for 2.5D and 3D applications
  - Extended mainstream assembly downturn
    - Weakness in smartphone and auto markets
- Gross margins increased to 66.1%
- Lower profitability due to:
  - Higher R&D spending in support of new and existing products for next market upturn
  - Higher share-based compensation expense

**Orders up 22.9% vs. H1-23**

- Due to increased AI demand for hybrid bonding, photonics and 2.5D assembly solutions

**Strong margins and profitability**

- Attractive gross and net margins maintained due to favorable product mix, cost control efforts, flexible supply chain

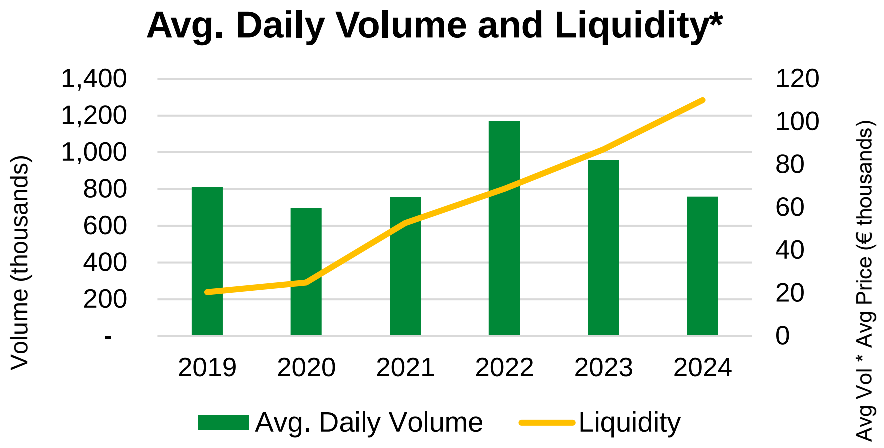
**Strong cash generation supports shareholder friendly capital allocation policy**

# Besi Market Cap and Liquidity Have Expanded
# Shareholdings Have Migrated to US/UK

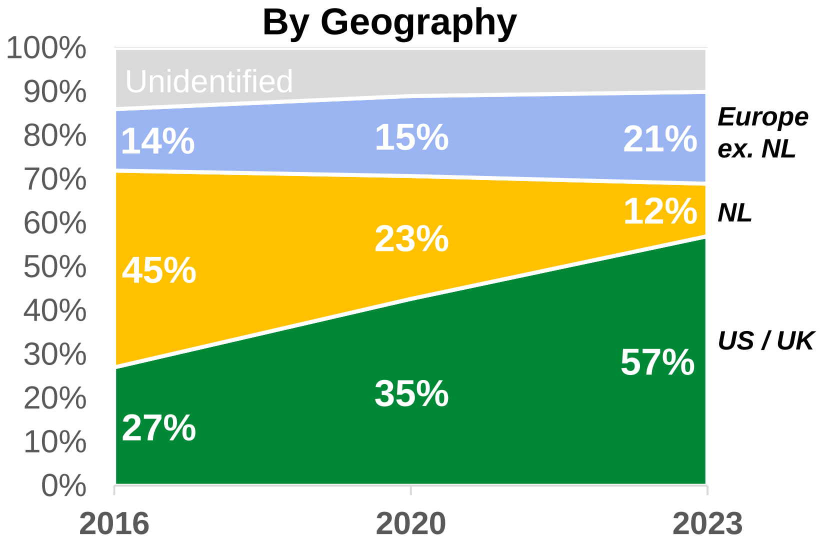
Besi

## Market Profile

| | |
|---|---|
| Symbol/ Index | • BESI<br>• Euronext AEX |
| Market Cap* | • € 12.4 billion<br>($ 13.3 billion) |
| Dividend Policy | • Pay out 40-100% of net income per annum |




## Share Ownership


Share ownership is based on information per AGM of presented year.

* As of June 30, 2024 ** Besi estimates

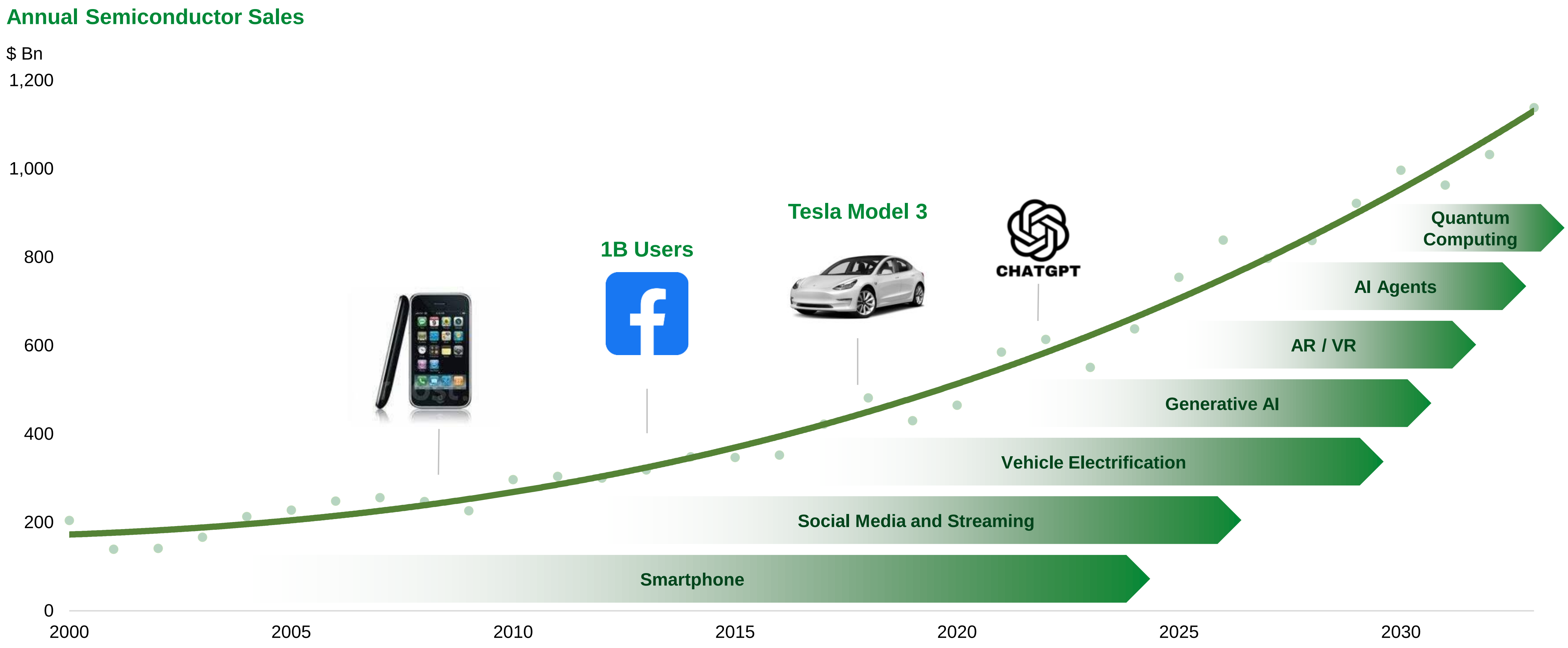
# Business Model

## Business Model

| | |
|---|---|
| **Revenue** | € 1 billion+++ |
| **Addressable Market Share** | 40%+ |
| **Gross Margin** | 62-66% |
| **Operating Margin** | 35-50% |
| **Headcount Split** | 75% Asia/25% Europe/NA |
| **Scope 1 and 2 Emissions** | Net Zero GHG by 2030 |
| **Global Energy Needs** | 100% from renewable sources |


# II. MARKET OVERVIEW

# Semiconductor Sales Expected to Reach $1 Trillion by 2030 Driven by Various Megatrends

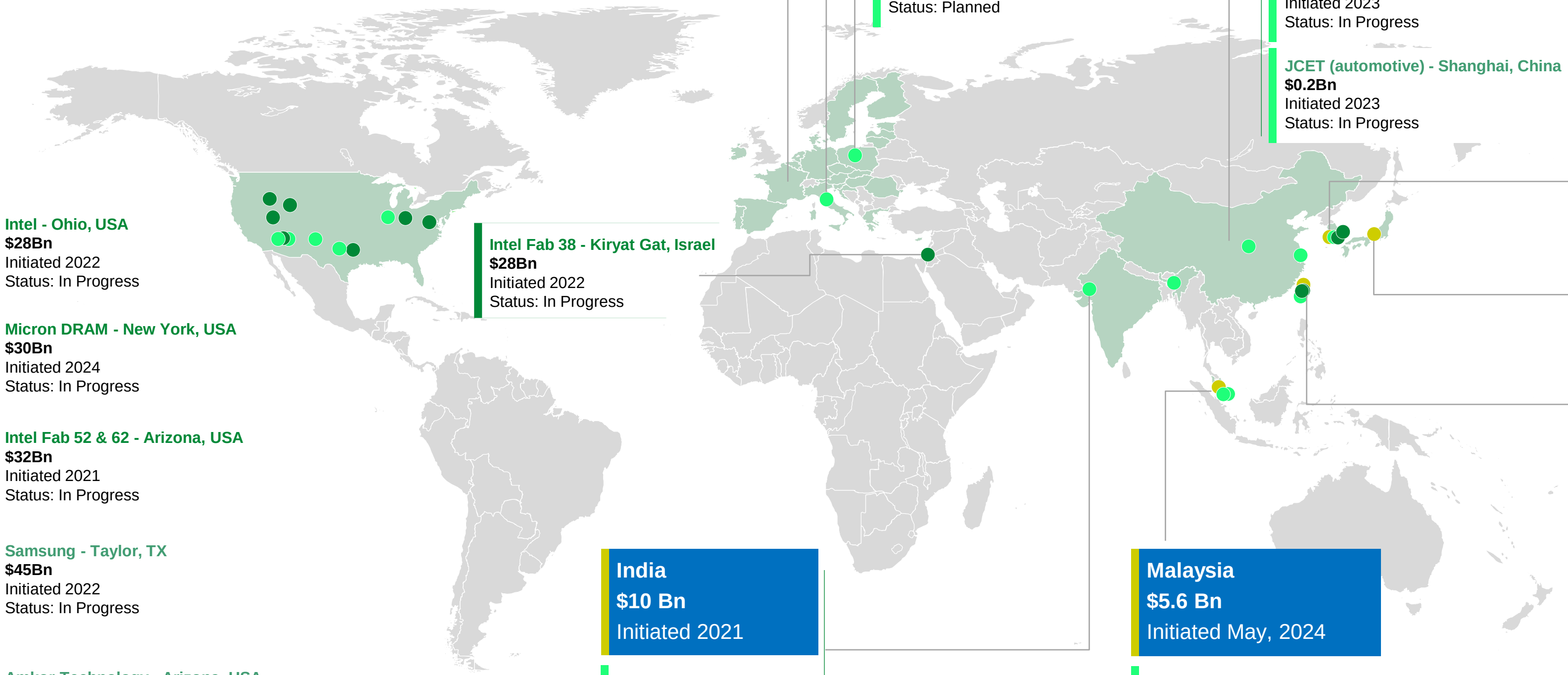



Source: TechInsights

# Government Funding Helps Drive New Fab Capacity Globally

Besi

- Government Funding of Semiconductor Capacity
- Key Front End Fab Projects
- Packaging Fab Projects



**US Chips Act**
**$52.7 Bn**
Initiated 2022
Includes $11 Bn R&D

**Texas Instruments - Lehi, UT**
**$11Bn**
Initiated 2023
Status: In Progress

**Micron DRAM - Idaho, USA**
**$15Bn**
Initiated 2022
Status: In Progress

**Texas Instruments - Texas, USA**
**$30Bn**
Initiated 2022
Status: In Progress

**TSMC - Arizona, USA**
**$65Bn**
Initiated 2021
Status: In Progress

**Intel Fab 9 & 11x - New Mexico, USA**
**$4.0Bn**
Initiated 2021
Status: Ramping

**Samsung - Texas, USA**
**$4.0Bn**
Initiated 2024
Status: Planned

**Intel - Ohio, USA**
**$28Bn**
Initiated 2022
Status: In Progress

**Micron DRAM - New York, USA**
**$30Bn**
Initiated 2024
Status: In Progress

**Intel Fab 52 & 62 - Arizona, USA**
**$32Bn**
Initiated 2021
Status: In Progress

**Samsung - Taylor, TX**
**$45Bn**
Initiated 2022
Status: In Progress

**Amkor Technology - Arizona, USA**
**$2.0Bn**
Initiated 2024
Status: Planned

**SK Hynix HBM - Indiana, USA**
**$3.9Bn**
Initiated 2024
Status: Planned

**EU Chips Act**
**$46.5 Bn**
Initiated 2023
Includes $3.1 Bn R&D

**Intel Fab 38 - Kiryat Gat, Israel**
**$28Bn**
Initiated 2022
Status: In Progress

**Silicon Box - Italy**
**$3.6Bn**
Initiated 2024
Status: Planned

**Intel - Wrocław West, Poland**
**$4.6Bn**
Initiated 2023
Status: Planned

**India**
**$10 Bn**
Initiated 2021

**Micron - Gujarat, India**
**$2.8Bn**
Initiated 2023
Status: In Progress

**Tata TSAT - Assam, India**
**$3.2Bn**
Initiated 2024
Status: Planned

**China Big Fund**
**$27 Bn (Phase 2)**
Initiated 2019 New $47.5 Bn round announced

**Micron - Xi'an, China**
**$0.6Bn**
Initiated 2023
Status: In Progress

**JCET (automotive) - Shanghai, China**
**$0.2Bn**
Initiated 2023
Status: In Progress

**Malaysia**
**$5.6 Bn**
Initiated May, 2024

**Intel - Penang, Malaysia**
**$7.1Bn**
Initiated 2022
Status: In Progress

**SPIL P1 - Pulau Pinang, Malaysia**
**$1.3Bn**
Initiated 2024
Status: In Progress

**South Korea**
**$19.7 Bn**
Initiated 2022

**SK Hynix M15 Expansion - South Korea**
**$1.0Bn**
Initiated 2024
Status: In Progress

**SK Hynix DRAM - Cheongju, South Korea**
**$11Bn**
Initiated 2022
Status: In Progress

**Samsung - Pyeongtaek, South Korea**
**$34Bn**
Initiated 2022
Status: In Progress

**Japan**
**$13.9 Bn**
Initiated 2021

**Taiwan**
**$16 Bn**
Initiated 2023

**TSMC 3nm - Tainan, TW**
**$60Bn**
Initiated 2021
Status: In Progress

**TSMC 2nm - Hinschu, TW**
**$40Bn**
Initiated 2022
Status: In Progress

**TSMC 2nm - Kaohsiung, TW**
**$26Bn**
Initiated 2023
Status: In Progress

**TSMC CoWoS & SoIC - Chiayi, Taiwan**
**$15Bn**
Initiated 2024
Status: In Progress

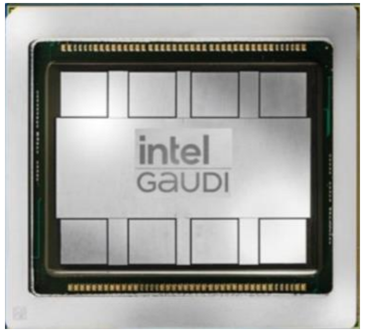
Source: TechInsights, May 2024; Company estimates

Non-exhaustive list

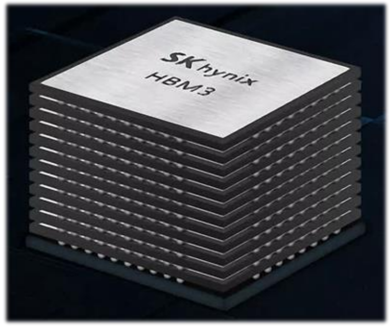
# AI Drives Significant Growth: Particularly in Advanced Logic and Memory Markets

## Data Center AI Devices

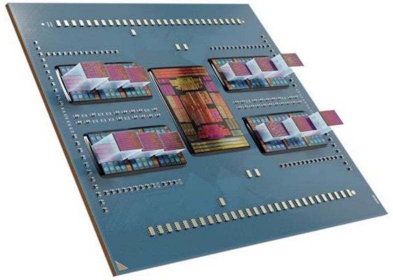
GPU / Accelerator




HBM




CPU

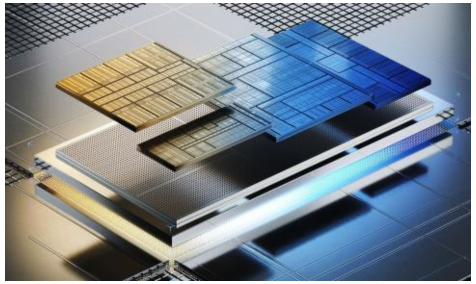


Source: Intel, SK Hynix, AMD

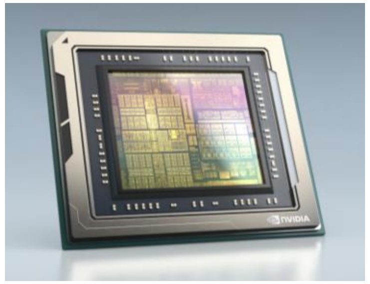
## Edge AI Devices

Mobile


PC



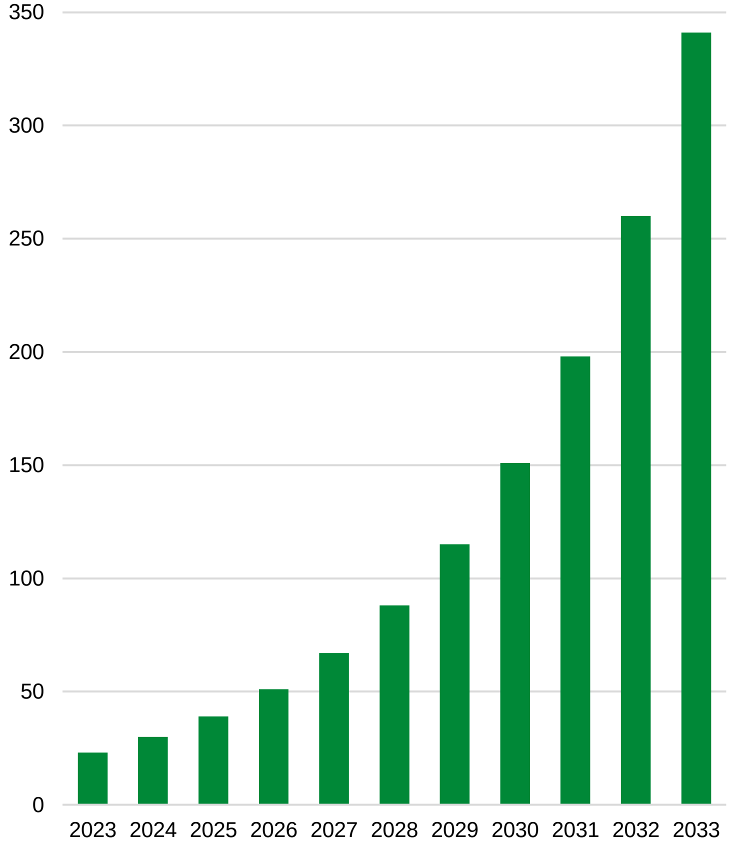
Automotive



Source: Google, Intel, NVIDIA

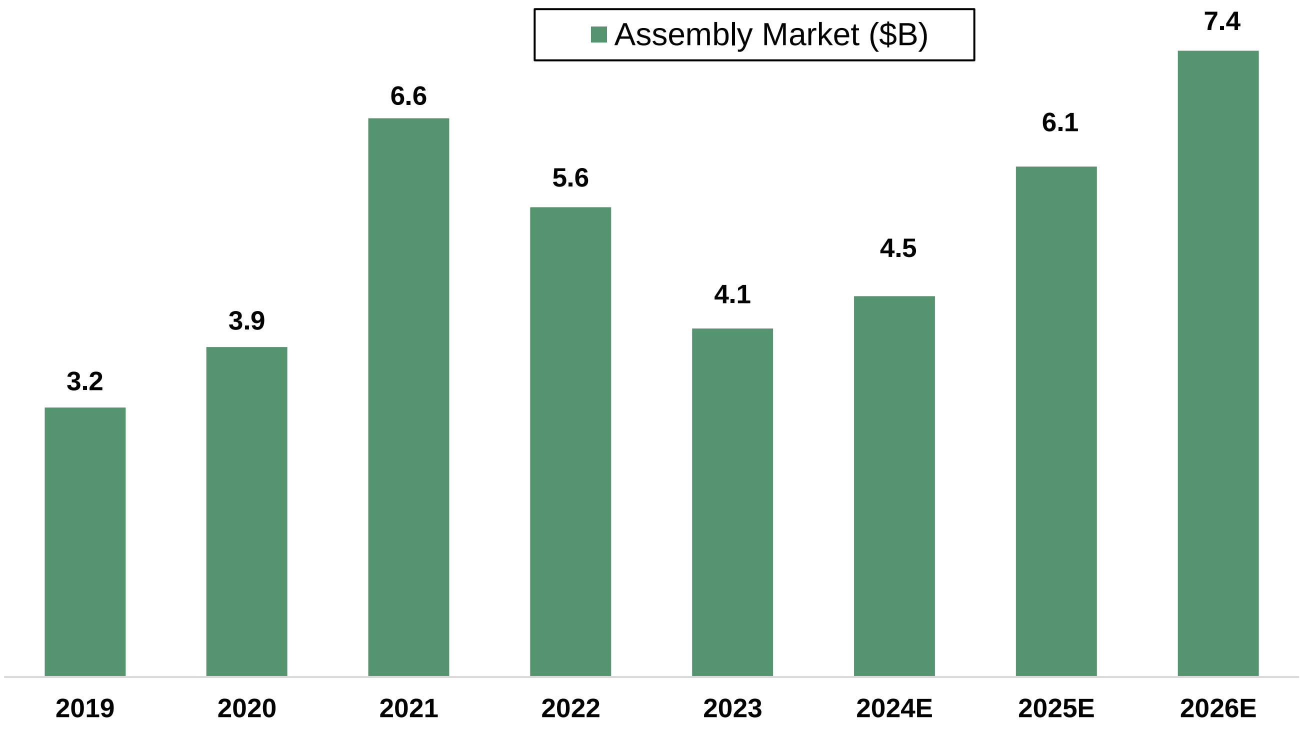
## AI Chip Market Revenue 2023 - 2033

Annual Revenue ($ Bn)




Source: Statista 2024

# Assembly Equipment Market Expected to Rebound Post 2023 Trough




| | 2019 | 2020 | 2021 | 2022 | 2023 | 2024E | 2025E | 2026E |
|---|---|---|---|---|---|---|---|---|
| Growth Rate | (29.6%) | 22.5% | 69.4% | (15.9%) | (25.8%) | 9.3% | 34.0% | 22.7% |

**2024 growth revised downwards reflecting slow mainstream recovery**
- 2024 forecast expects 9.3% increase
  - Down from original forecast of 31%
  - Driven by AI

**Market expected to recover strongly in 2025/2026**
- Forecast $ 7.4 billion in 2026
  - +80% from 2023 levels

**Secular fundamentals intact:**
- AI, Datacenter, HPC, 5G-6G primary drivers
- Investment in new process technologies: hybrid bonding/CSP
- Onshoring new advanced packaging fabs

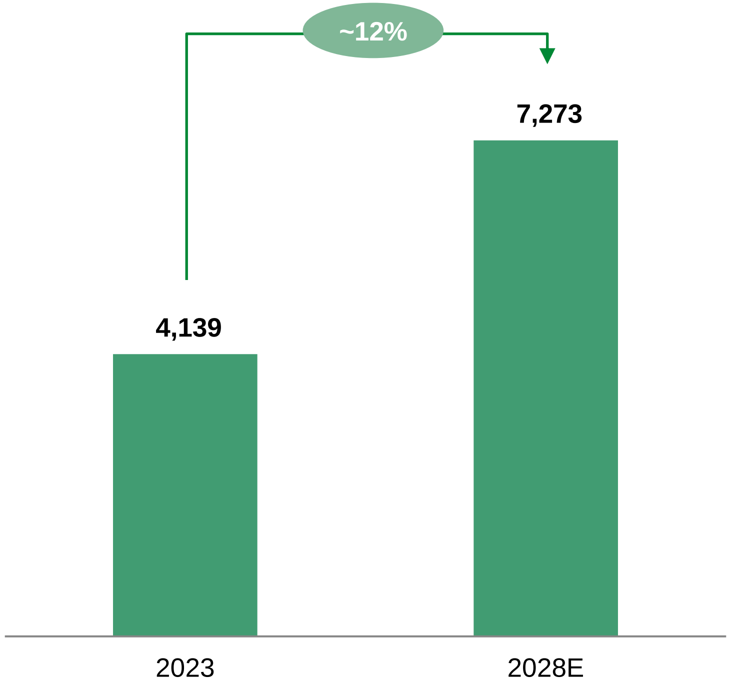
Source: TechInsights, June 2024. Assembly equipment revenue excludes service revenue

# Strategic Focus on Highest Growth Segments of Assembly Market

## Assembly Equipment Market (~18% share)

$MM

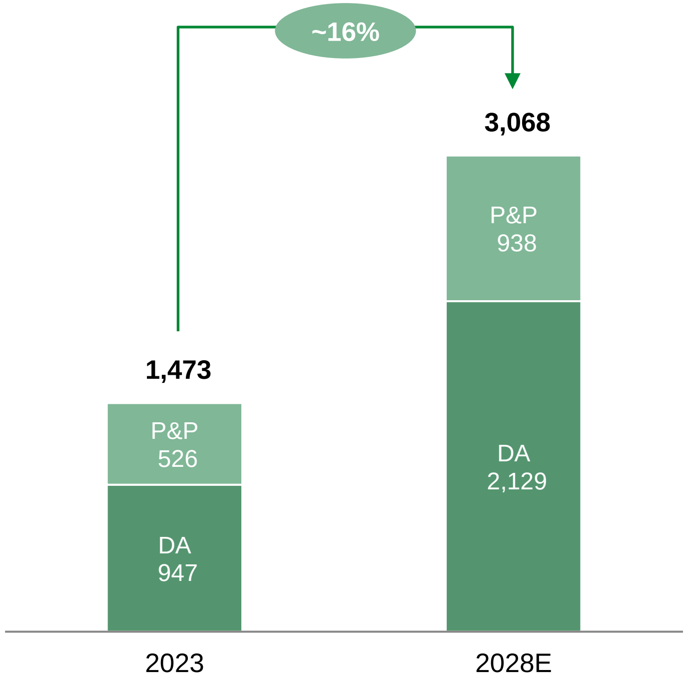
| CAGR (2023-2028E) | |
|---|---|
| Assembly Market | ~12% |




## Besi Addressable Market (~35% share)

$MM

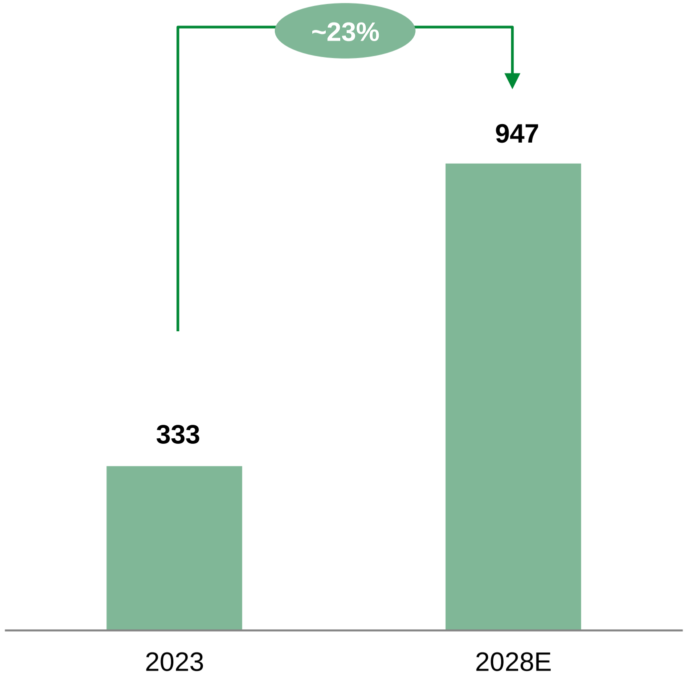
| CAGR (2023-2028E) | |
|---|---|
| Packaging and Plating | ~12% |
| Die Attach | ~18% |
| Total Addressable | ~16% |




## Advanced Die Placement (~67% share)

$MM

| CAGR (2023-2028E) | |
|---|---|
| Advanced Die Placement | ~23% |

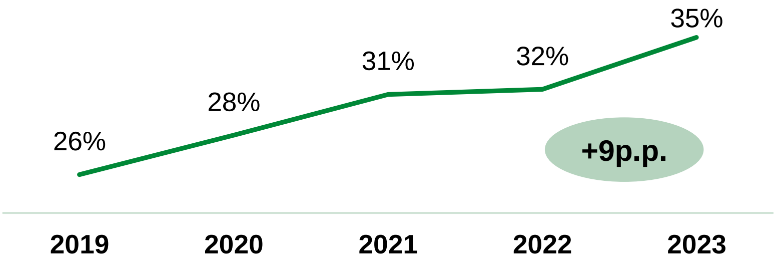



Source: TechInsights, June 2024

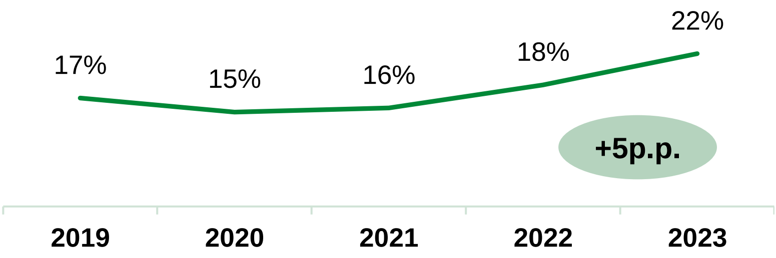
# Increasing Market Share in Key Market Segments

## Besi Market Share

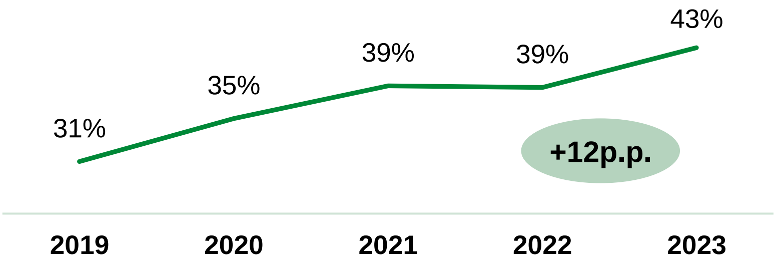
**Addressable Market***



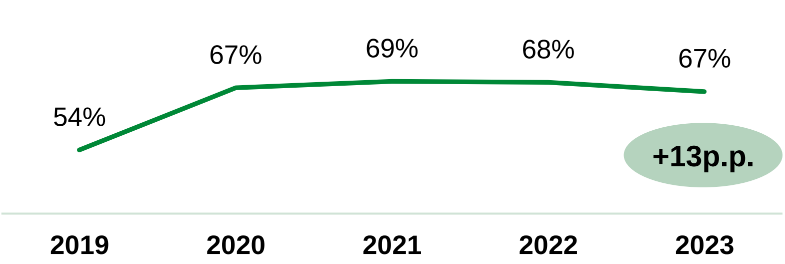

**Packaging & Plating**




**Die Attach**




**Advanced Die Placement****



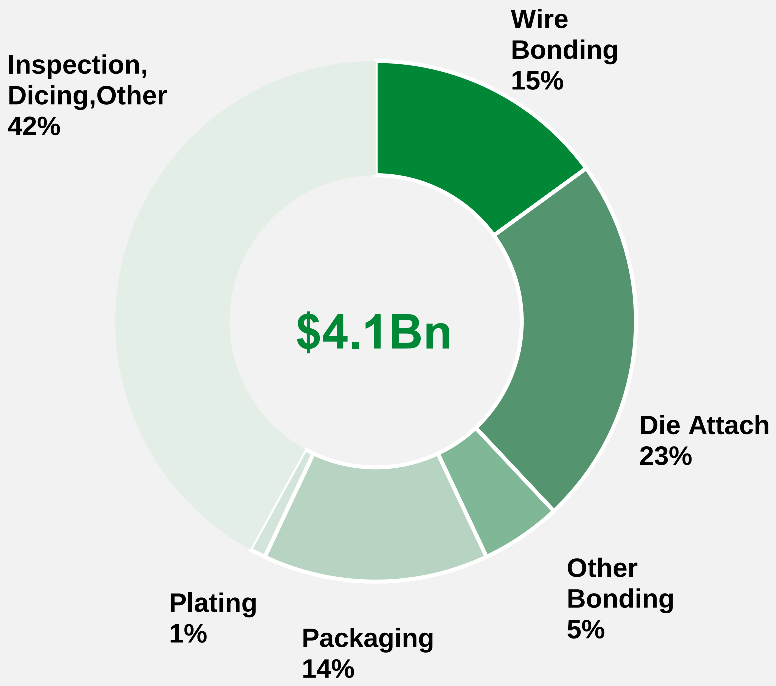

Source: TechInsights, May 2024

* Excludes wire bonding, dicing, and other

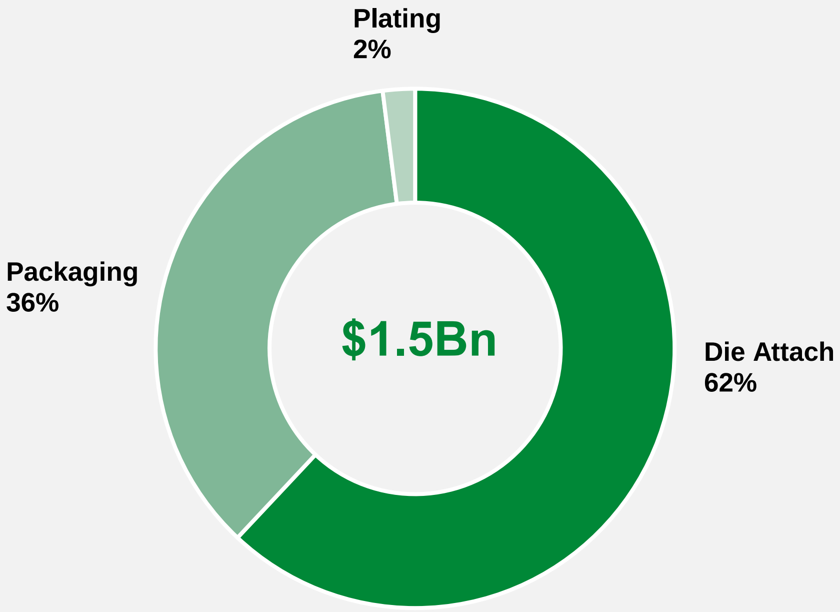
** Advanced die placement defined as < 7 micron accuracy per TechInsights

# Assembly Equipment Market Composition

## Assembly Equipment Market (2023)




## Besi Addressable Market (2023)




Source: TechInsights, June 2024

# III. END-USER MARKET TRENDS

# Principal Growth Drivers in Besi's End-User Markets

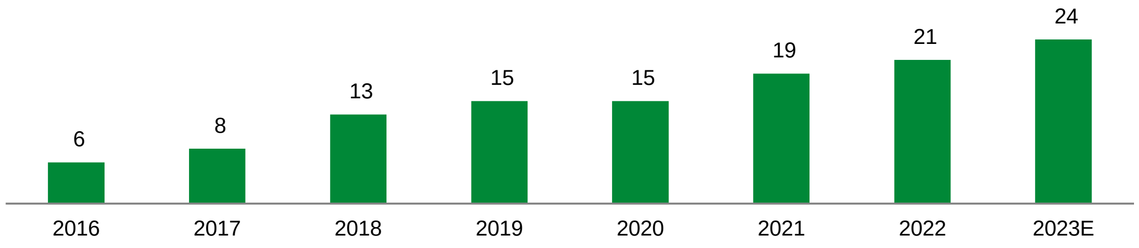
| Mobile | Computing | Automotive | Industrial / Other |
|---|---|---|---|
| <br>Generated by ImageFX |  |  |  |
| **On Device AI** | **Generative AI** | **Autonomous Driving** | **Automation** |
| Foldable Phones<br>Camera Technology<br>5G Advanced → 6G | Datacenter<br>Gaming<br>Photonics | Vehicle Electrification<br>Connectivity<br>Infotainment | Smart Grid<br>Industrial IoT<br>Clean Energy |

# Mobile – Key Market Drivers

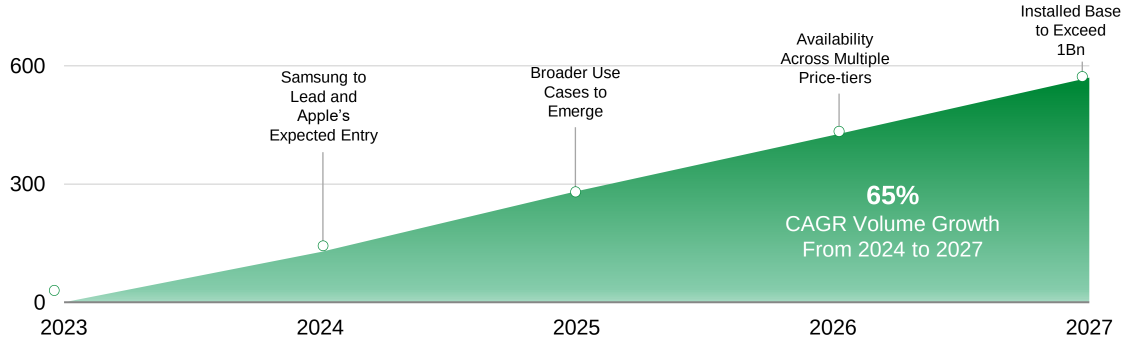
## Fast Growing Market for Premium Smartphones, Wearables and Other Mobile Devices

**Premium Smartphone Market Share Growing Rapidly**
(% of Total Smartphone Market)

**3X** volume growth in 2023 compared to 2016




**Global GenAI Smartphone Shipment Forecast**
Shipments (Units in Million)




Source: Counterpoint

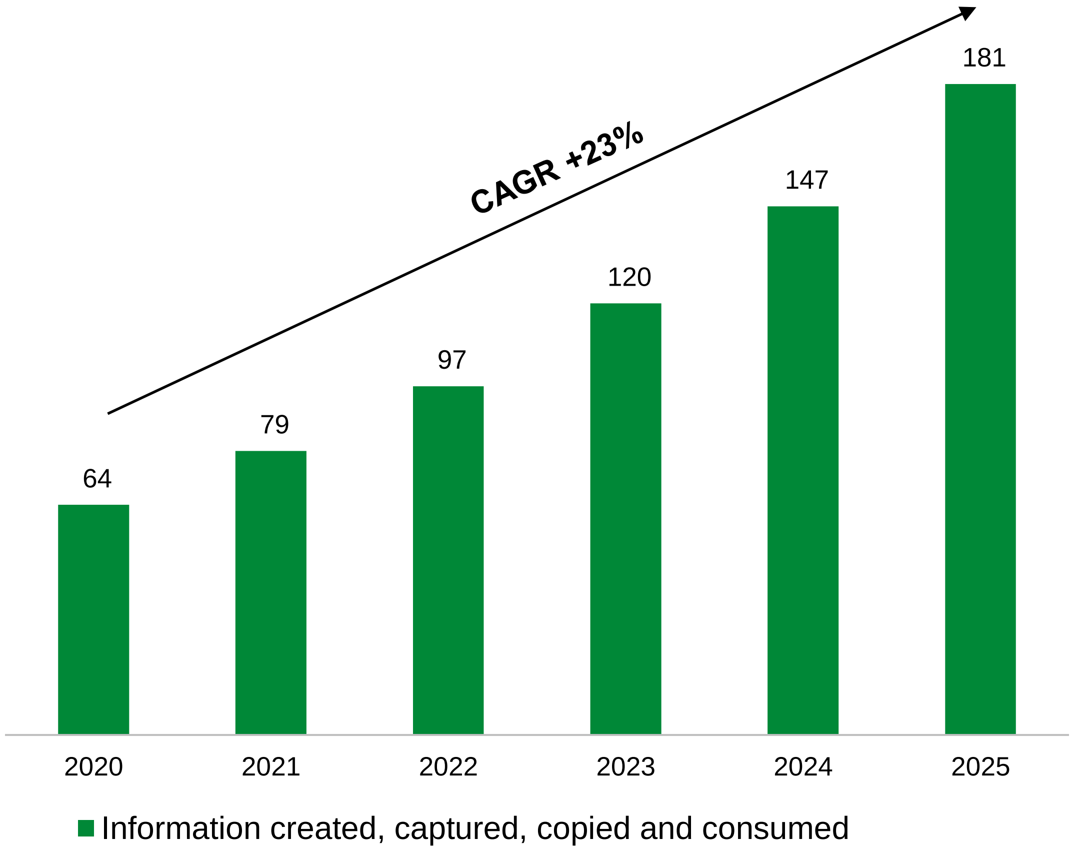
## Driven by Key Megatrends

- New generative AI engines
- Edge/AI enabled phones
- Advanced cameras and 3D imaging
- Under display biometric ID
- New AR/VR devices
- 5G advanced devices

# Computing – Key Market Drivers

## Data Volumes Growing Exponentially

Zetabytes




## Driven by Key Megatrends

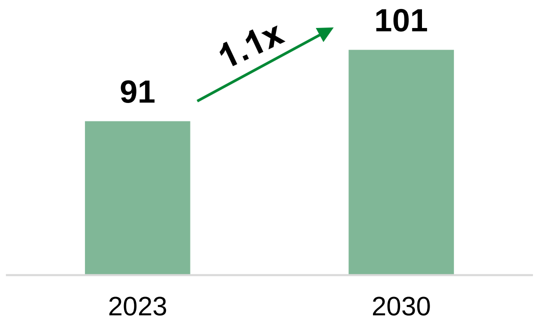
- Data volumes growing exponentially
- New generative AI engines
- Supercomputers
- Datacenters
- Edge AI tablets, PCs, laptops
- Gaming and infotainment

Source: Statista, December 2022; OpenAI

# Automotive / Industrial and Other – Key Market Drivers

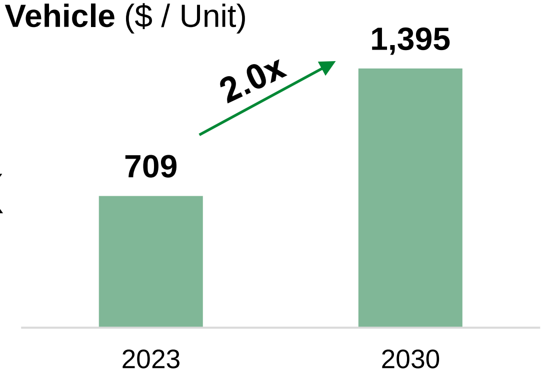
## Favorable Automotive Market Outlook

**Global Vehicle Production** (MM Units)

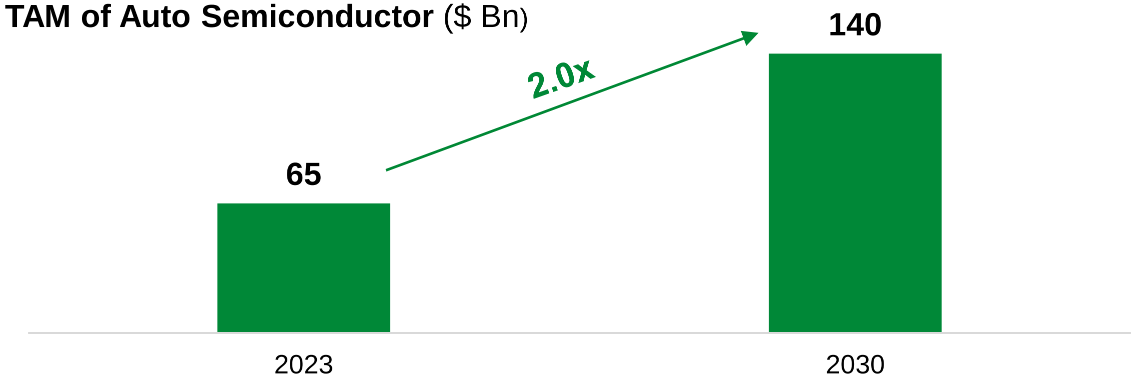



X

**Avg. Semiconductor Content per Vehicle** ($ / Unit)




**TAM of Auto Semiconductor** ($ Bn)




Source: TechInsights

## Driven by Key Megatrends

- **EV Adoption**
- **Edge AI enhanced features**
- **SiC and GaN power devices**
- **Advanced camera modules and sensors**
- **Autonomous driving**
- **Factory automation 4.0**

# Advanced Packaging Solutions Critical to Development of Next Generation Applications

Greater Miniaturization

Higher Accuracy

Greater Performance

## Besi Solutions

- Hybrid bonding
- TCB chip to wafer
- Embedded bridge die attach
- EVO multi module die attach
- Advanced flip chip
- Wafer/substrate molding

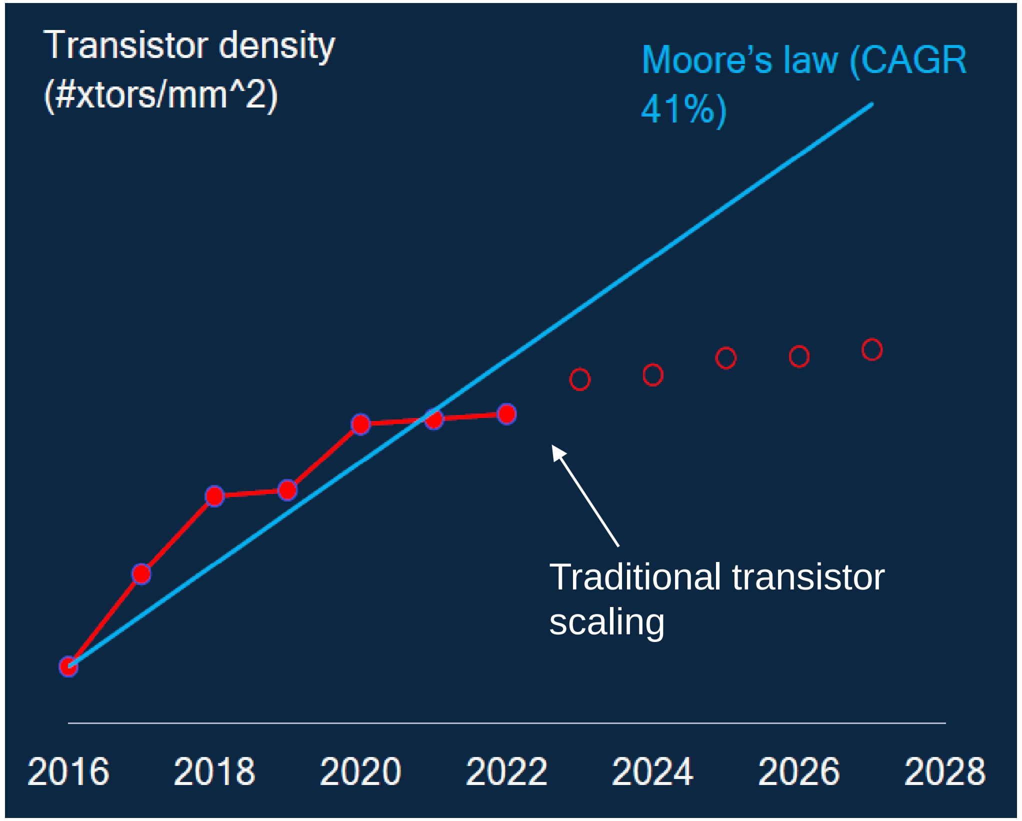
Lower Power Consumption

Increased Density

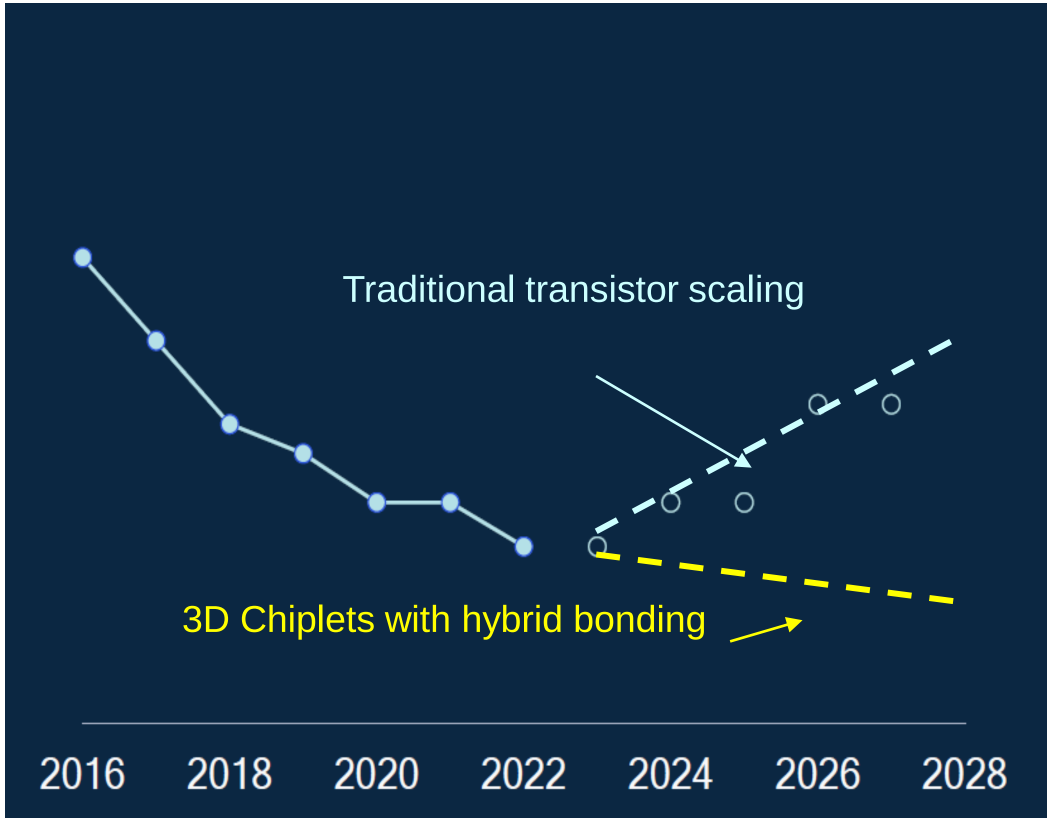
Higher Complexity

# New Wafer Level Assembly Technologies Extend Moore's Law

## Moore's Law Scaling Is Slowing



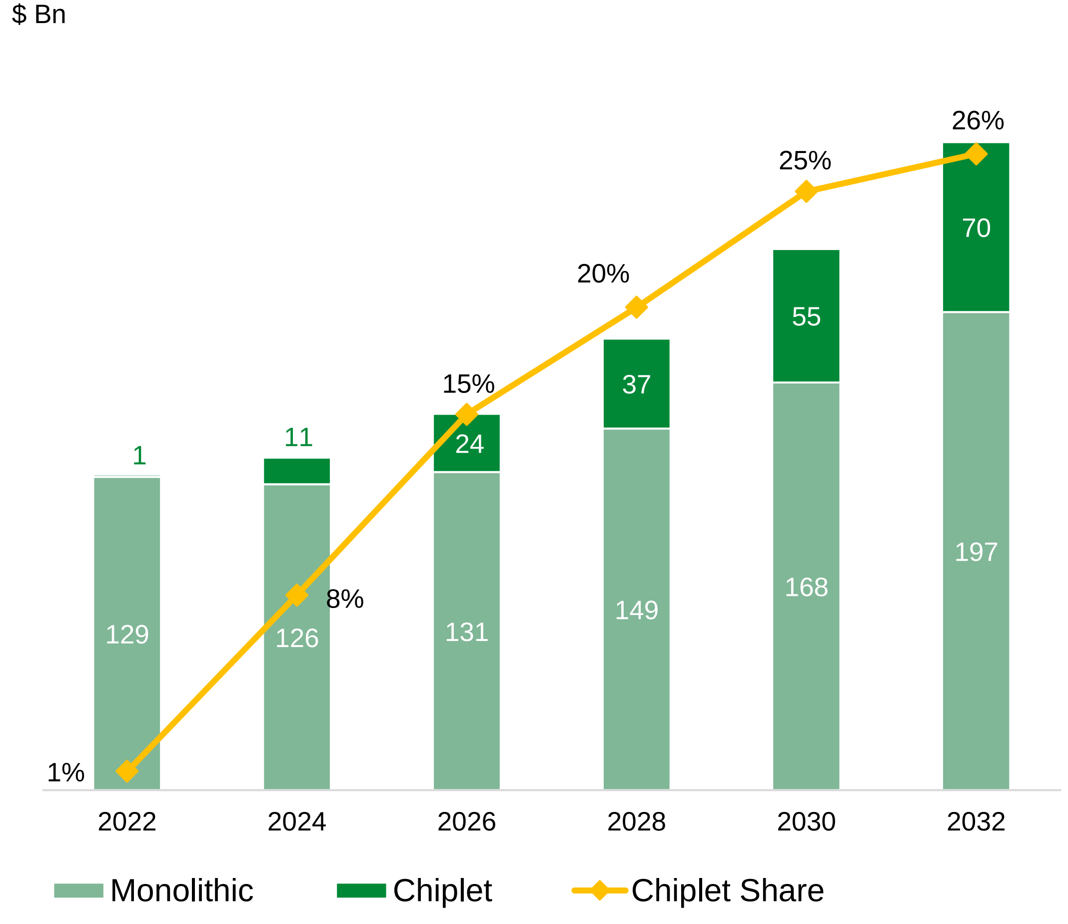

## Cost Per Transistor Is Increasing




Source: Qualcomm and Besi

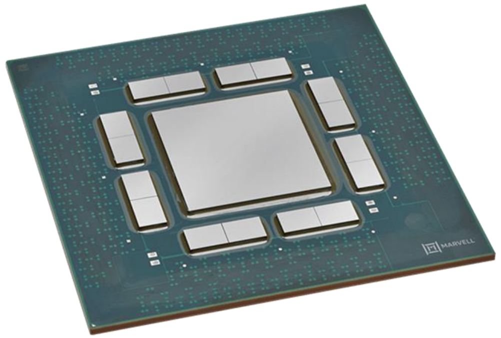
# Chiplet Usage Increasing Rapidly Due to Favourable Economics for Advanced Applications

## Wafer Foundry Addressable Market




Source: CSM foundry model, ISM foundry model

## Examples of chiplets



Marvell Data Center
Switch 17 chiplets


Amazon Data Center
CPU 7 active chiplets

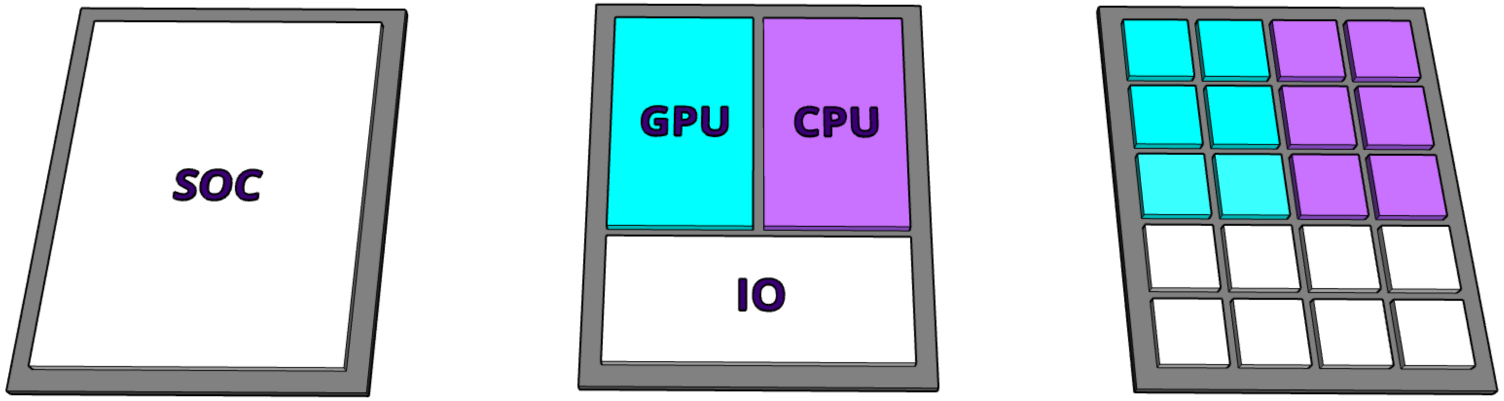
**Favourable economics due to:**

- Reduced die cost
- Increased die yield resulting from smaller die sizes
- Faster development cycle times
- Increased flexibility and technology reuse

**Besi's tools facilitate chiplet packaging**

# Chiplet Adoption Drives Higher Capital Intensity

**Single Chip Design** | **Multi Chip Module** | **Multi Chiplet System**




**Monolithic:** Integrated SoC

**Multiple Dies:** process optimized

**Individual IPs:** process optimized

Source: Intel

**1 Step** → **More die attach steps** → **Dozens**

**10µm** → **Higher accuracy** → **100nm**

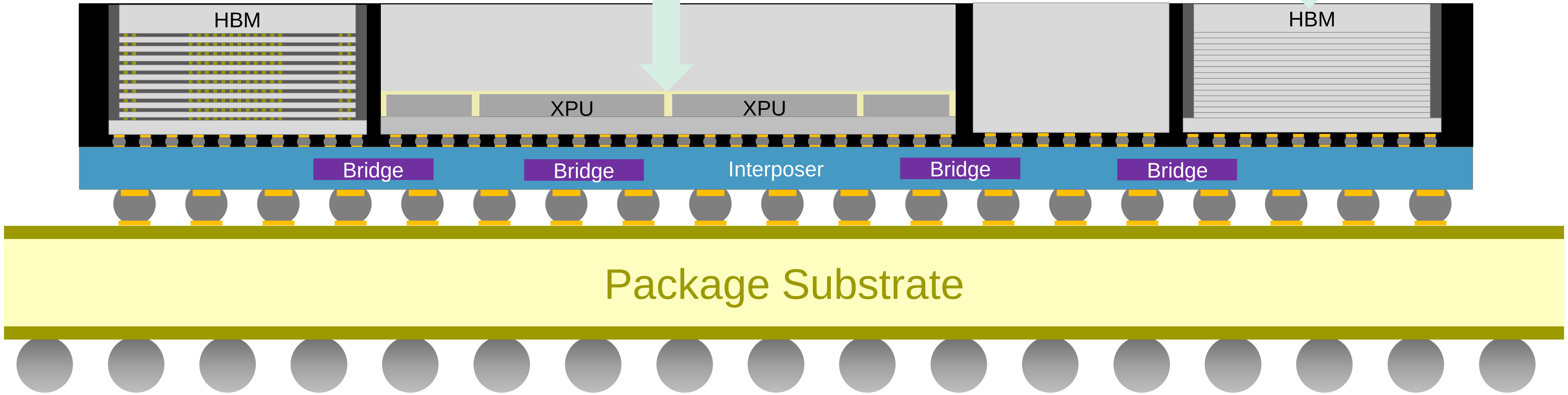
# Chiplet Packages Use a Variety of 2.5D/3D Assembly Processes Including Hybrid Bonding and Thermo Compression Bonding (TCB)

## High Performance Computing


Hybrid dominant interconnect technology for High Performance Computing

## High Bandwidth Memory


Hybrid and TCB complementary technologies – Both needed for next gen HBM

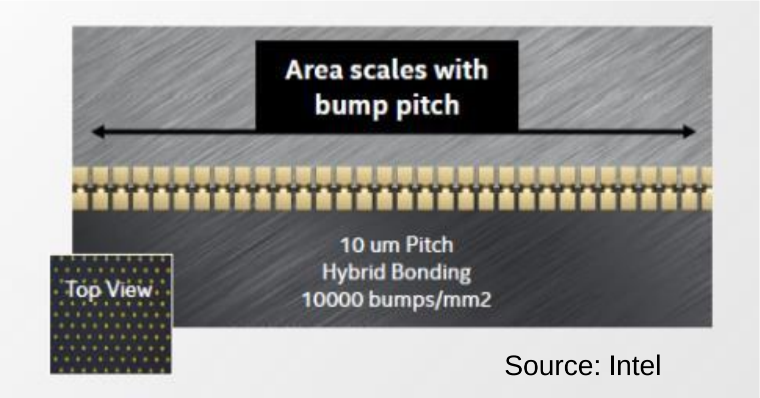



**Besi is a leader in Hybrid Bonding and TCB solutions and well-positioned to gain market share**

**Note:** XPU can be a GPU, CPU or other

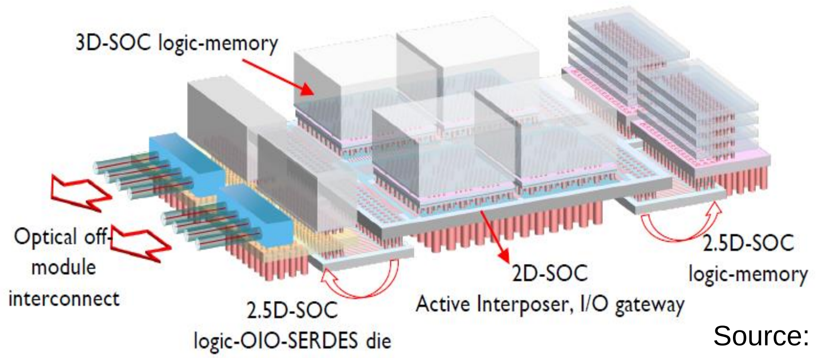
# Hybrid Bonding Enables Faster, More Complex Devices With Submicron Placement Accuracy and Less Heat/Power Generation

## Direct Cu-Cu 3D Interconnect




1,000x increase in contact density

## Heterogeneous Chiplet Integration




Source: IMEC

More transistors per package

### New Chip Architectures

- Quasi-monolithic 3D
- Optimal use of nodes
- Customized designs
- Highly configurable

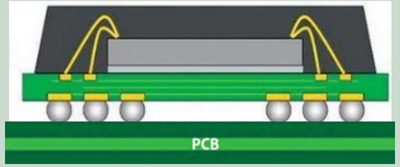
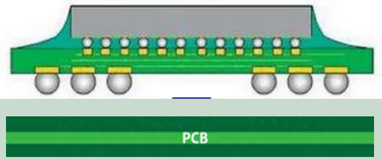
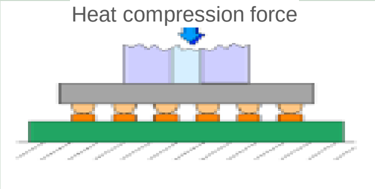
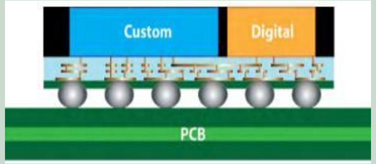
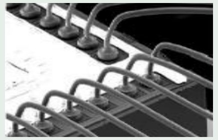
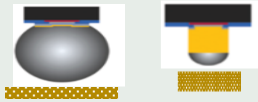
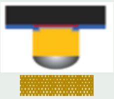
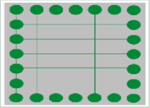
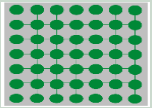
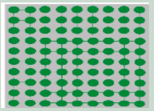
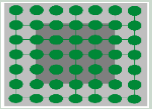
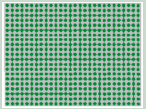
### Increased Performance

- Highest compute power
- Increased data transfer
- Higher bandwidth
- Higher speed

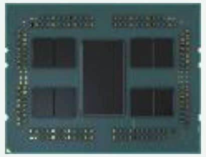
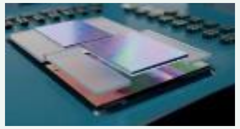
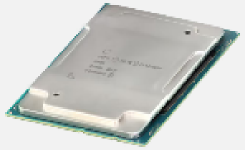
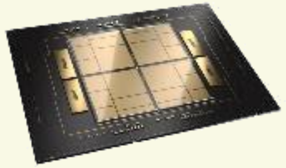
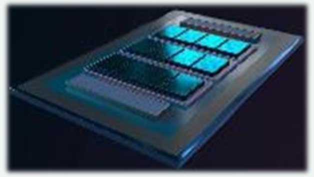
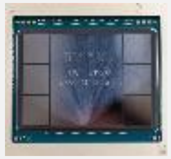
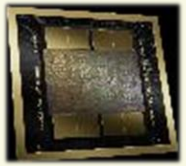
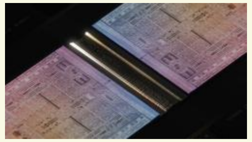
### Lower Cost of Ownership

- Higher die yield
- Lower energy per bit
- Lower cost per contact
- Lower heat dissipation

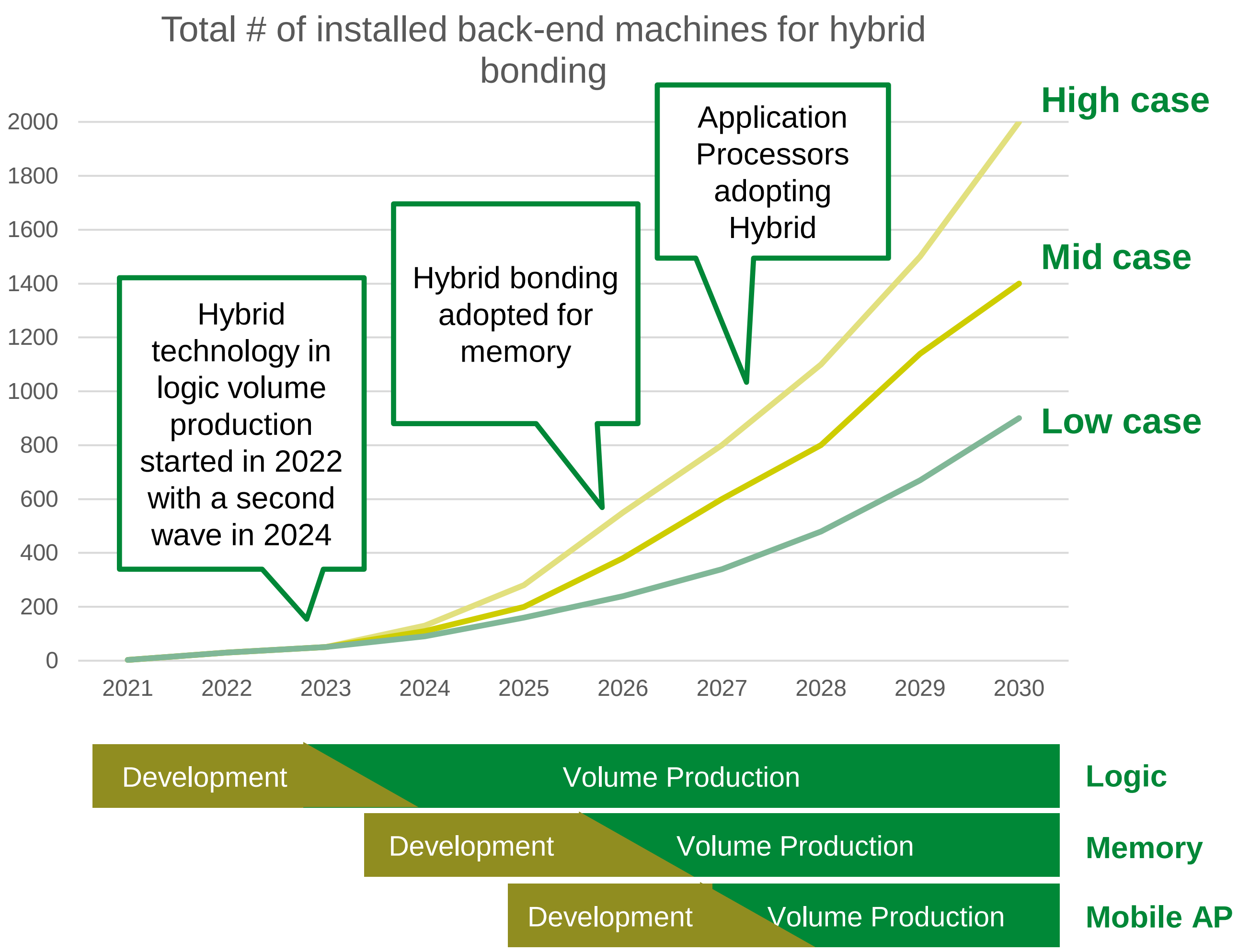
# Moore's Law Helps Drive Growth of Wafer Level Assembly

| | Wire Bond (1975) | Flip Chip (1995) | TCB Bonding (2012) | HD Fan Out (2015) | Hybrid Bonding (2018) |
|---|---|---|---|---|---|
| Architecture |   |   |   |   |   |
| Contact Type |  Wire |  Solder ball or copper pillar |  Copper pillar |  RDL or copper pillar |  Copper to copper |
| Contact Density |  5-10/mm² |  25-400/mm² |  156-625/mm² |  500+/mm² |  10K-1MM/mm² |
| Substrate | Organic/leadframe | Organic/leadframe | Organic /Silicon | None | None |
| Accuracy | 20-10µm | 10-5µm | 5-1µm | 5-1µm | 0.5-0.1µm |
| Energy/Bit | 10pJ/bit | 0.5pJ/bit | 0.1pJ/bit | 0.5pJ/bit | <.05pJ/bit |

# Important Process Step for Future Product Roadmaps

| | SoC | Split Die | Chiplets and Hybrid Bonding |
|---|---|---|---|
| AMD | Opteron Server CPUs  | 1st Gen EPYC CPU (2017)  | 2nd Gen EPYC (2019)  3rd Gen EPYC (2022) with Hybrid Bonding  |
| intel |  | Sapphire Rapids CPU (2023)  | Clearwater Forest CPU w/ Hybrid Bonding (2025)  |
| NVIDIA | H100 GPU  | B100 GPU (2024)  | Future chiplet architectures |
| | M1 MaxCPU  | M1 Ultra CPU (2022)  | |

# Hybrid Bonding Market Potential – Logic and Memory Cases Confirmed




Source: Besi estimates, June 2024

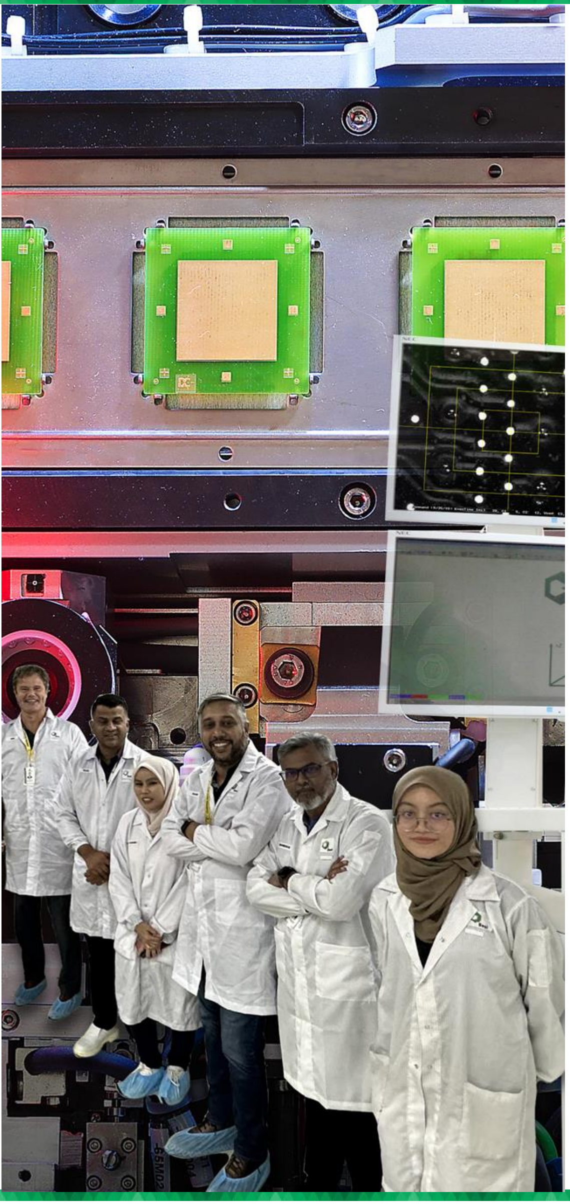
**Estimated 900 – 2,000 systems by 2030**

Changes vs. Prior Forecast

- Market potential for each case increased 6% because of HB adoption expanding from 3-9 customers
- Logic adoption increased with 2nd customer in volume production and capex forecasts of leading players. TSMC projects 100% annual growth until 2026
- Memory adoption confirmed but shifted out one year
  - First Hybrid packaged HBM4(E) 16high stacks in 2026
- Edge AI driving hybrid adoption for mobile AP

Potential upside to estimates:

- Co-packaged optics
- Complex CMOS sensors



# IV. STRATEGY

# Summary Strategy

# Strategy Update

| | |
|---|---|
| **Business** | • Contrasting assembly market order trends past 12 months<br>  • **Accelerating AI demand driven by 2.5/3D and photonics applications**<br>    • AI-related advanced packaging orders ~50% of total for past 12 months<br>  • **Slow recovery for mainstream assembly markets:**<br>    • Smartphones and automotive still weak<br>    • Although inventory levels reducing, pockets of excess capacity still exist |
| **Development** | • Expanded R&D investment continues. H1-24 spending up 24.3% vs. H1-23<br>• 29 hybrid bonding orders received in Q2-24 from two customers<br>  • Shipped first group of 100nm HB systems for HVM<br>• Received order for TCB Next system (TCB C2W) |
| **Operations** | • Effectively navigating extended downturn at high levels of profitability<br>• High gross margins maintained given favorable advanced packaging product mix<br>• Temporary Asian production HC being added to support Q2-24 order book growth |

# Progress Continues on Besi's ESG Agenda

| 2023 Highlights |
|---|
| ✓ Progress continues versus Besi's 2024 ESG targets |
| ✓ Completed 76% of ESG initiatives developed since 2020 |
| ✓ Energy from renewable sources increased to 71% versus 20% in 2021 |
| ✓ Scope 1 & 2 emissions intensity declined by 38% versus 2021 |
| ✓ Set objective of net zero greenhouse gas emissions by 2030 in operations |
| ✓ Launch of Design-to-X initiative to enhance sustainability and reduce cost |
| ✓ Conducted Double Materiality Assessment for European CSRD reporting in 2025 |
| ✓ Improved ratings with MSCI, Sustainalytics, ISS ESG and S&P Global |

# Enhanced ESG Targets

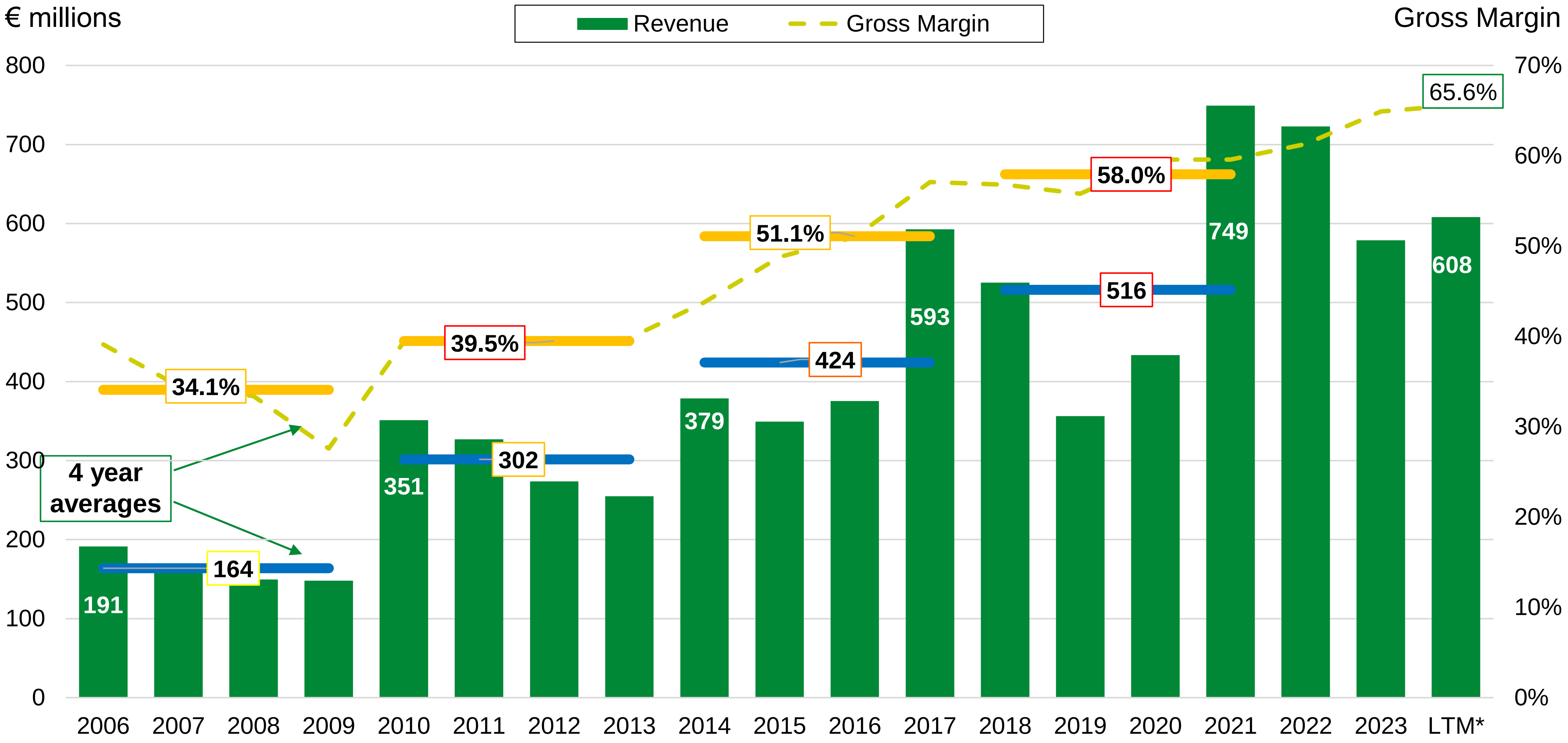
| 2024 | 2030 |
|---|---|
| 75% renewable sources for global energy needs | 100% renewable sources for global energy needs |
| 62% reduction in Scope 1 & 2 emissions* | Carbon neutral for Scope 1 & 2 emissions* |
| 12% reduction in Scope 3 emissions* | 20% reduction in Scope 3 emissions* |
| Above-benchmark employee engagement | Achieve revenue objectives with lower environmental impact |
| Compliance with CSRD | 80% vendor compliance with Conflict Free Sourcing Initiative |

Carbon Neutral By 2050

* As per Greenhouse Gas Protocol. Targets relative to 2021 baseline data

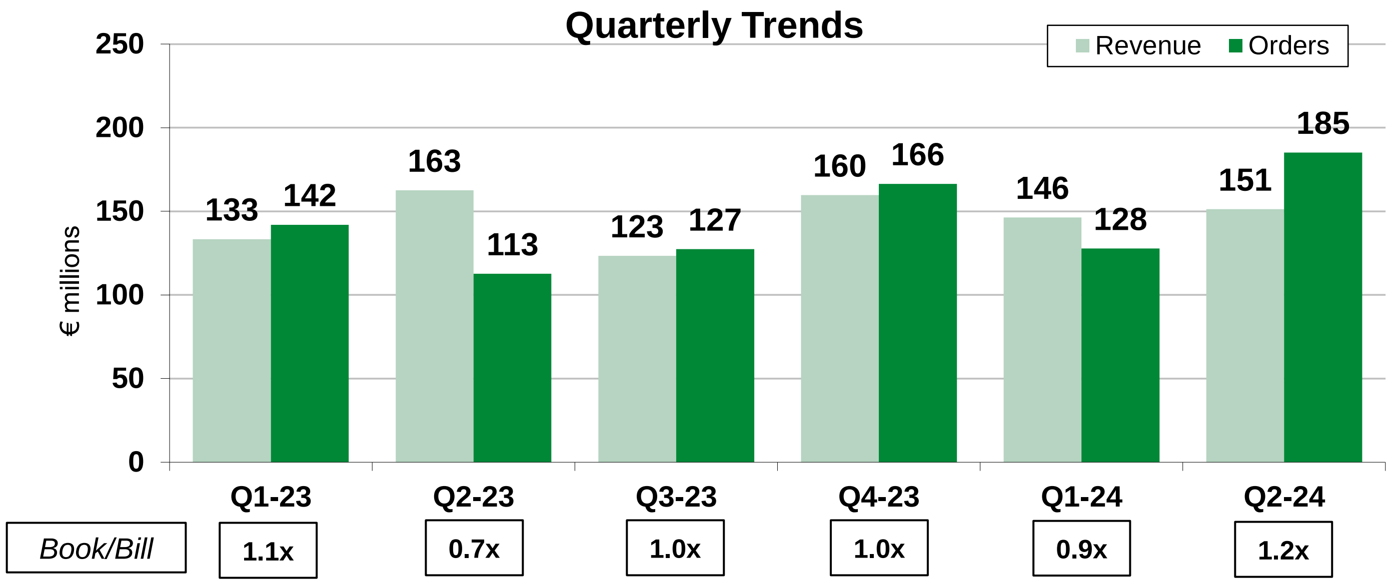

# V. FINANCIAL UPDATE AND SUMMARY

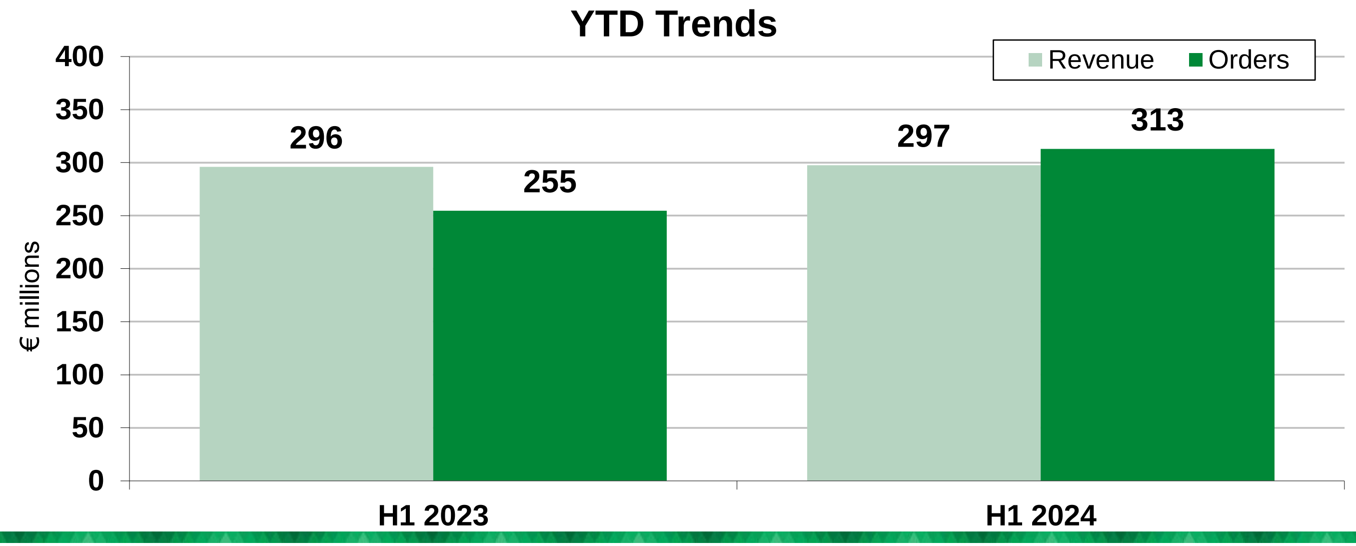
# Through Cycle Revenue and Gross Margin Trends




* LTM including midpoint of guidance for Q3-24

# Revenue/Order Trends




**<u>Q2-24 vs. Q1-24</u>**

- **Revenue: +€ 4.9 million (+3.3%)**
  - Above mid point of guidance
  - Higher shipments for photonics and 2.5D assembly
- **Orders: +€ 57.5 million (+45.0%)**
  - Hybrid bonding, photonics and 2.5D for AI applications
    - 29 HB orders from leading logic producers
  - Ongoing weakness in automotive

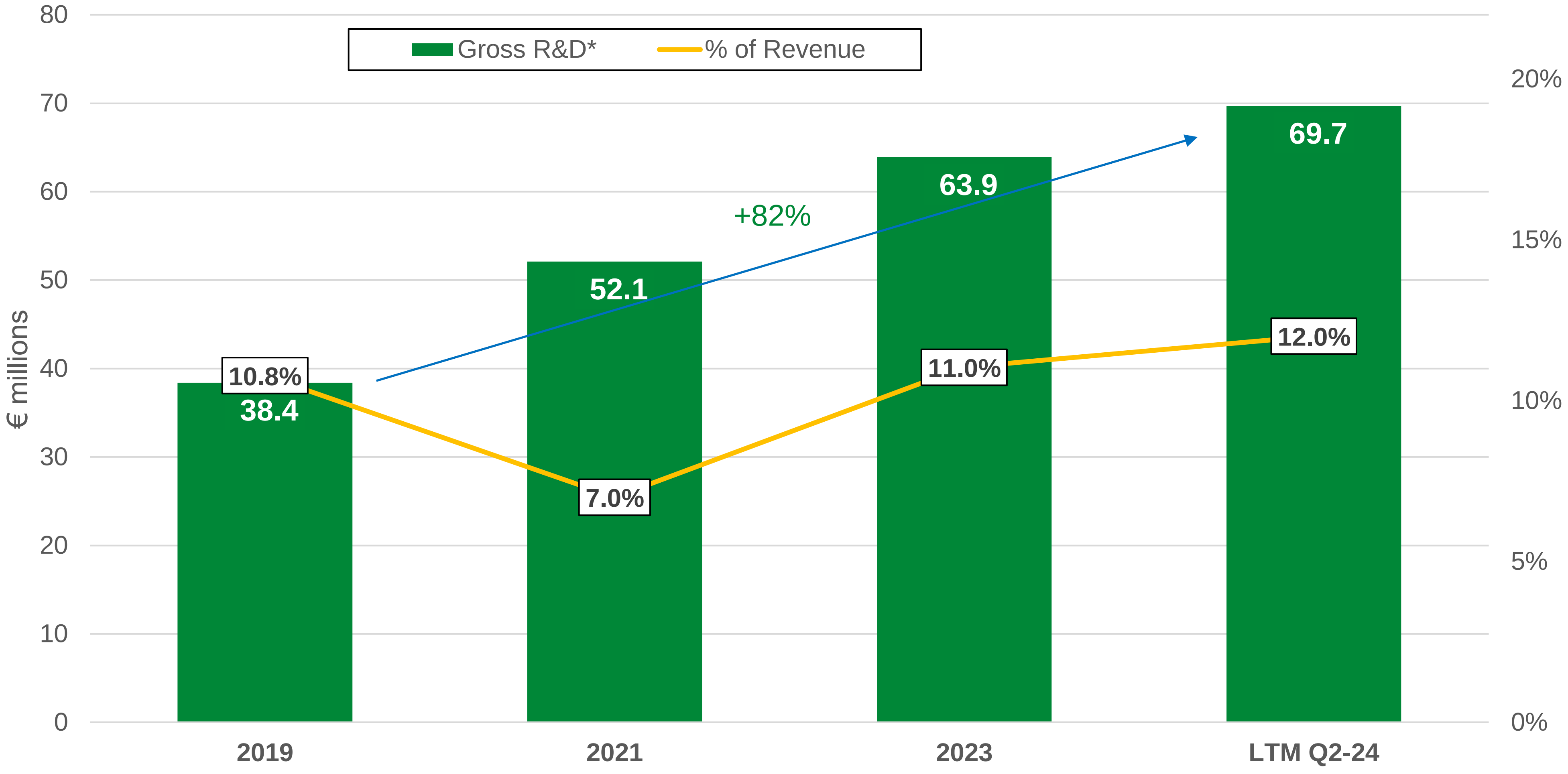
**<u>Q2-24 vs. Q2-23</u>**

- **Revenue: -€ 11.3 million (-7.0%)**
  - Continued weakness in mobile and automotive
  - Partial offset: AI related advanced packaging applications
- **Orders: +€ 72.6 million (+64.5%)**
  - Growth in HB, photonics and 2.5D assembly

**<u>H1-24 vs. H1-23</u>**

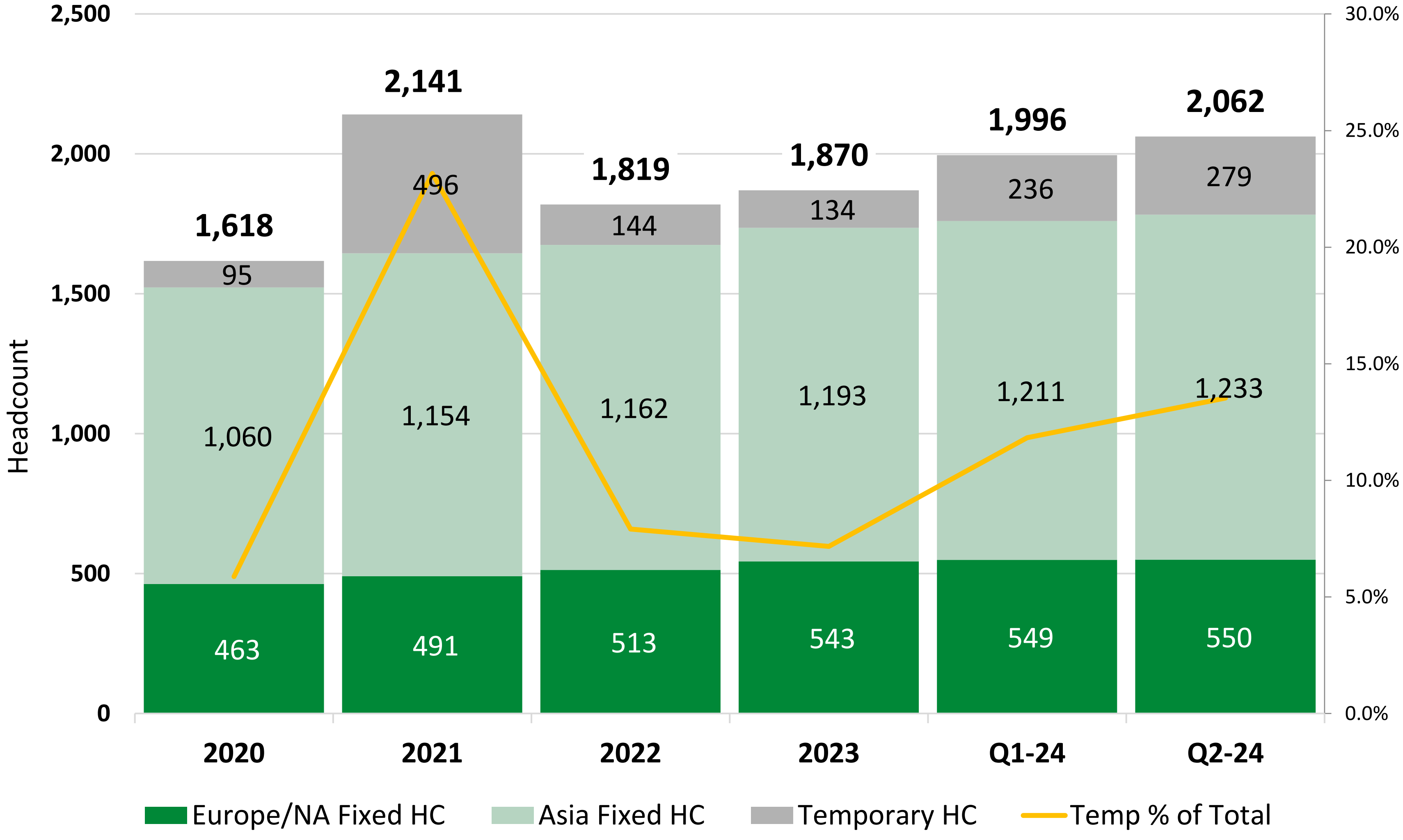
- **Revenue: +€ 1.6 million (+0.5%)**
  - Higher demand for AI related advanced packaging
  - Partial offset: Lower high-end mobile
- **Orders: +€ 58.4 million (+22.9%)**
  - Growth in HB, photonics and 2.5D
  - Continued weakness in mobile and automotive

# Significant Expansion of R&D Spending in Support of New Product Introductions



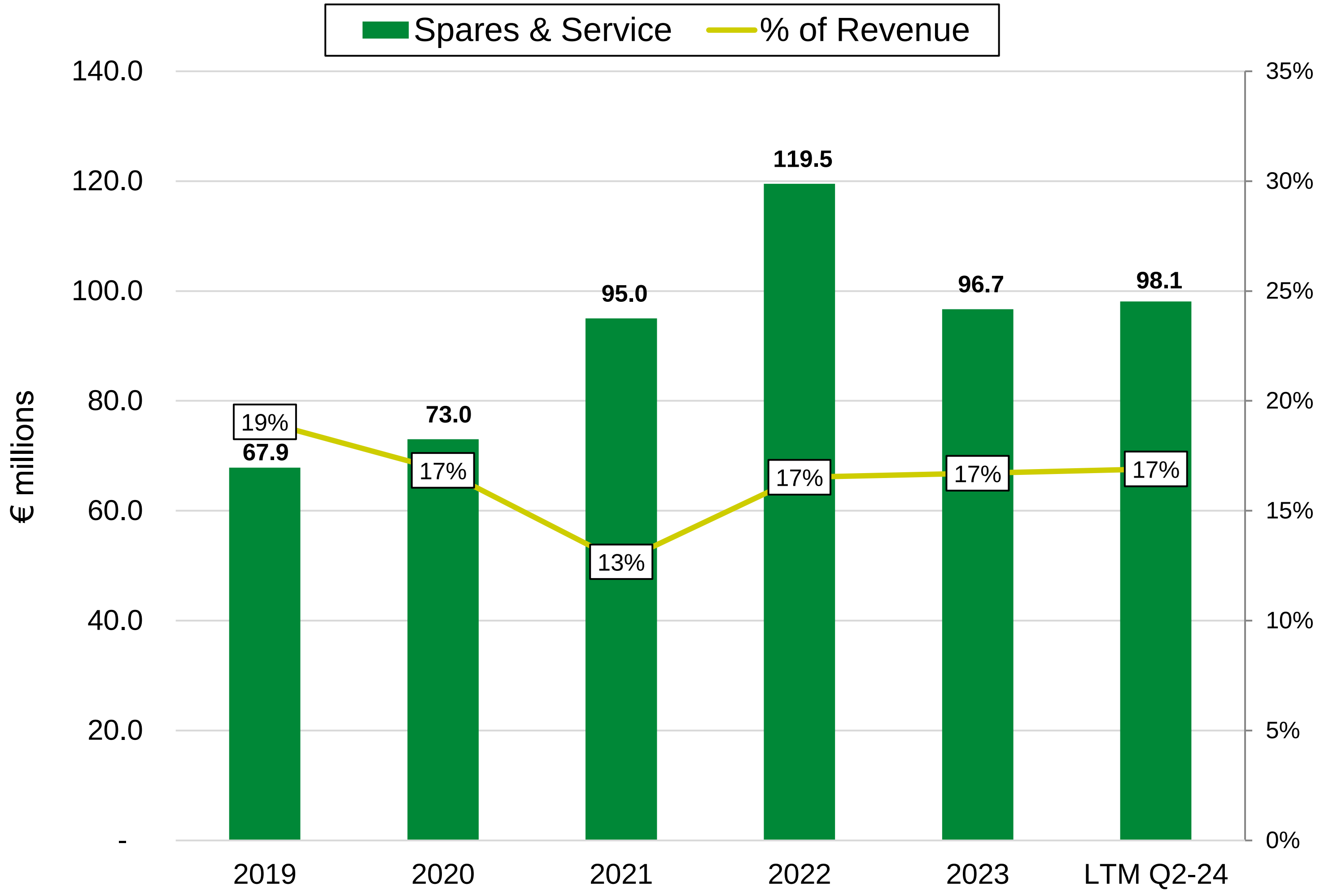

* Gross R&D spending excludes impact from capitalization/amortization of R&D costs

# Headcount Trends



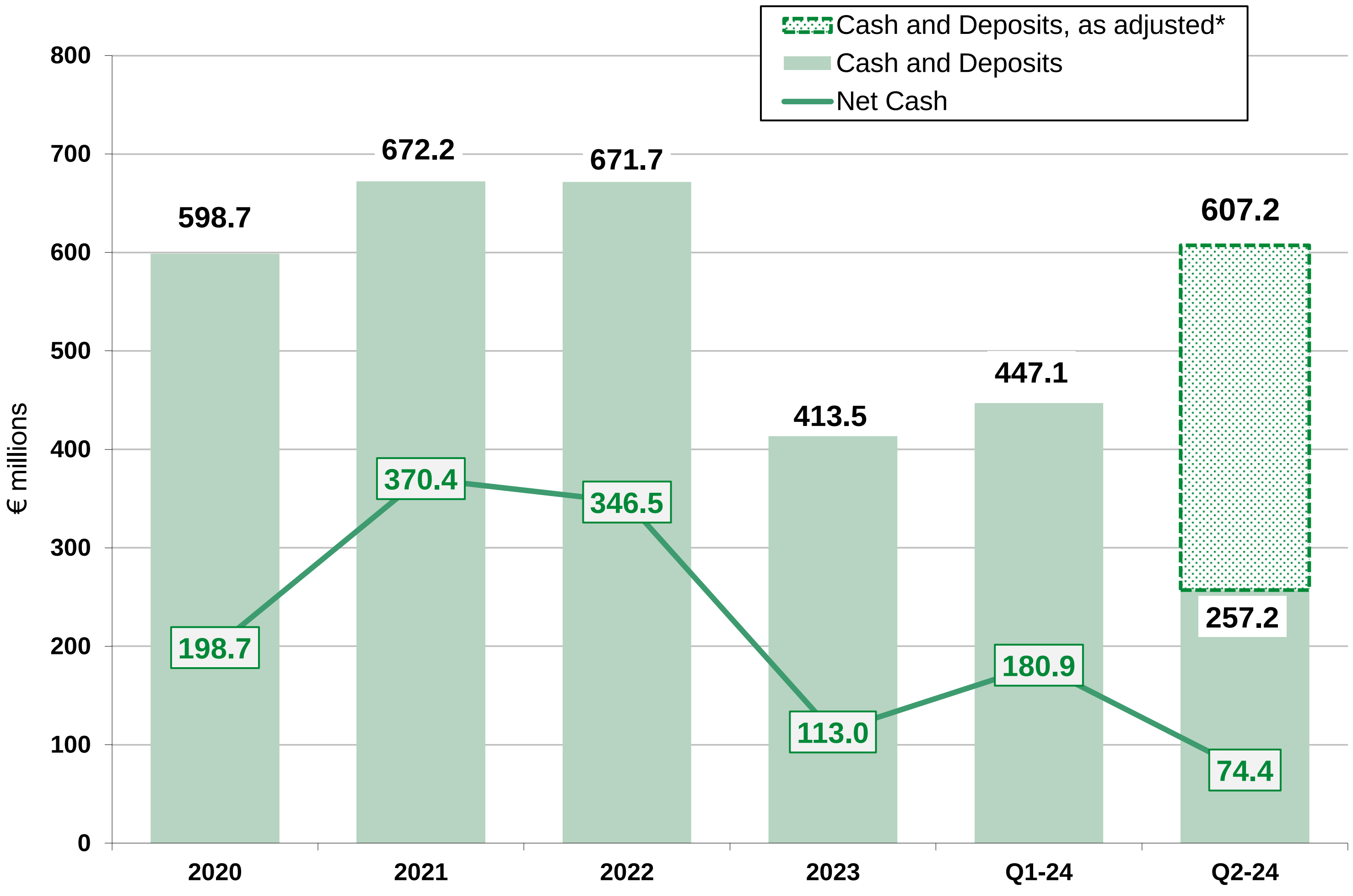

- Increasing European and Asian fixed headcount to support wafer level assembly expansion
- Temp Asian HC increase to support order growth

# Spares/Service Activities Represent Important Area of Growth




- **Increased to 15-20% of revenue since 2017**
  - Diverse customer base
  - Less cyclical part of business
  - Highly profitable
- **Revenue will increase as installed base grows, particularly wafer level**
- 44% growth from 2019 to 2023

# Strong Liquidity Position Maintained. Senior Note Offering Provides Funds for Next Decade of Growth




* As adjusted for the Senior Notes issued in July 2024

**Q2-24 vs. Q1-24**

- Cash and deposits of € 257.2 million
  - - € 189.9 million primarily due to:
    - - € 186.3 million capital allocation
    - + € 4.9 million cash flow from operations
    - - € 4.9 million capitalized R&D
    - - € 3.2 million capex
- Net cash of € 74.4 million = 13% of LTM revenue
  - Reflects € 171.5 million 2023 dividend and conversion of € 89.9 million of Convertible Notes

**Q2-24 vs. Q2-23**

- Comparable net cash levels

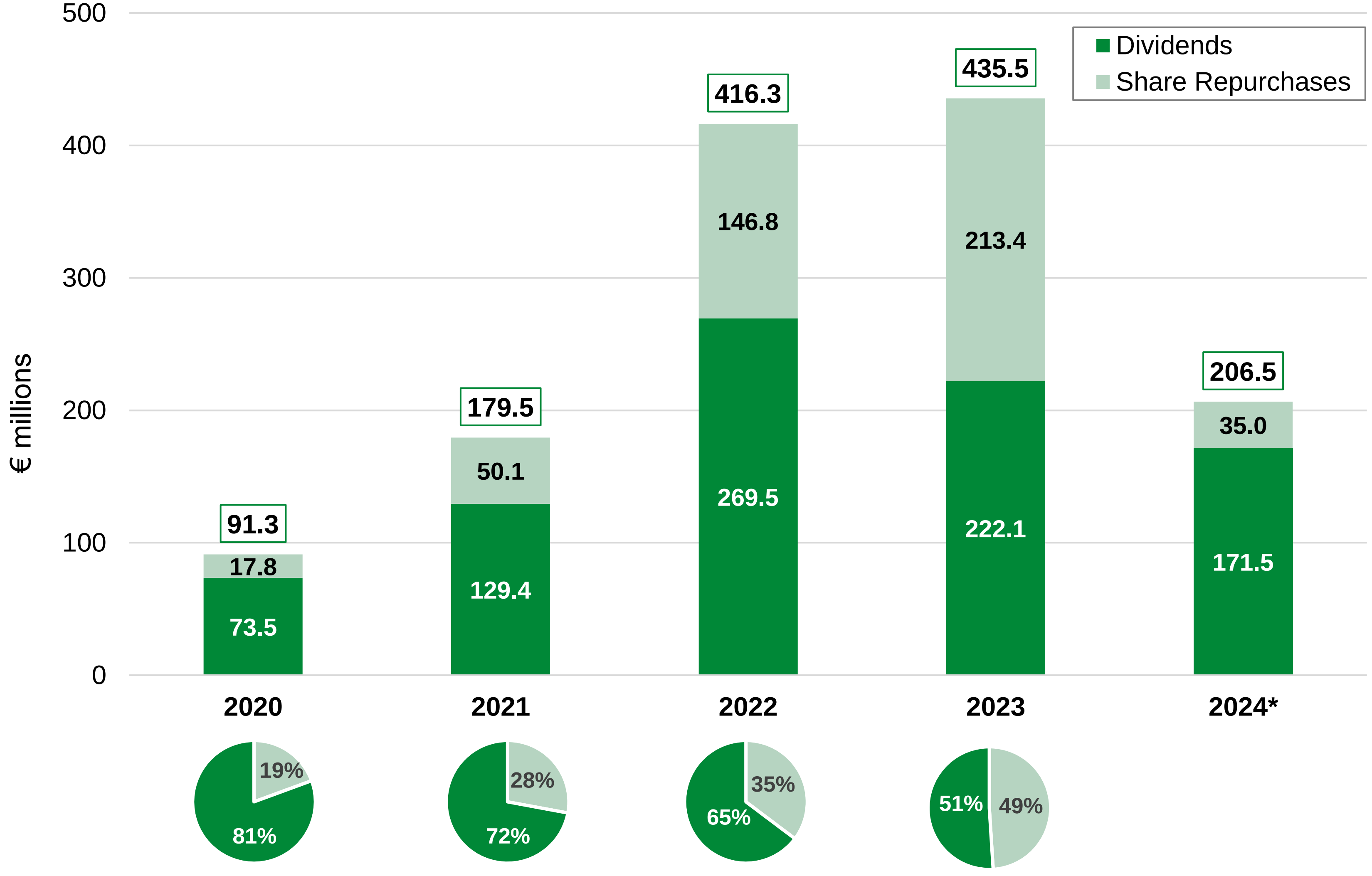
**Convertible Notes**

- € 200.1 million at June 30, 2024
  - € 128.1 million converted in H1-24

**Senior Notes**

- € 350 million 4.5% Senior Notes due 2031 issued in July 2024
- Net proceeds for general corporate purposes including potential acquisitions

# Attractive Capital Allocation Policy Continues



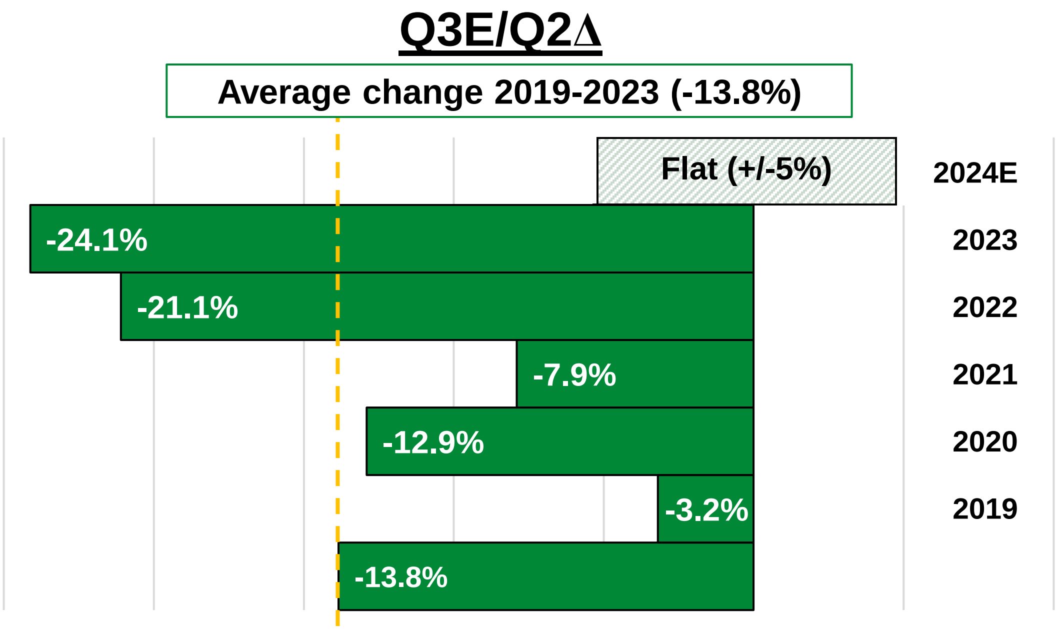

- **€ 2.0 billion distributions since 2011**
  - ~€ 200 million distributed in 2024 through July 31, 2024 including 2023 dividend
- **Current € 60 million share repurchase program:**
  - € 44.6 million purchased through July 31, 2024 at average price of € 139.42

* Includes share repurchases through July 31, 2024

# Guidance Q3-24

| € in millions | Q2-24 | Q3-24 |
| --- | --- | --- |
| **Revenue** | € 151.2 | +5 to -5% |
| **Gross Margin** | 65.0% | 64% - 66% |
| **Operating Expenses** | € 49.0 | 0 - -5% |

## Seasonal Revenue Trends



# Investment Considerations

- Assembly market ever more critical in semiconductor value chain
- Disciplined strategic focus has created an industry leader
- Long term secular trends favor advanced packaging growth
- Wafer level assembly new growth opportunity
- Market presence has grown via key IDMs, supply chains and partners
- Tech leadership and scalability result in superior financial returns
- Commitment to sustainable growth and combatting climate change
- Attractive capital allocation policy