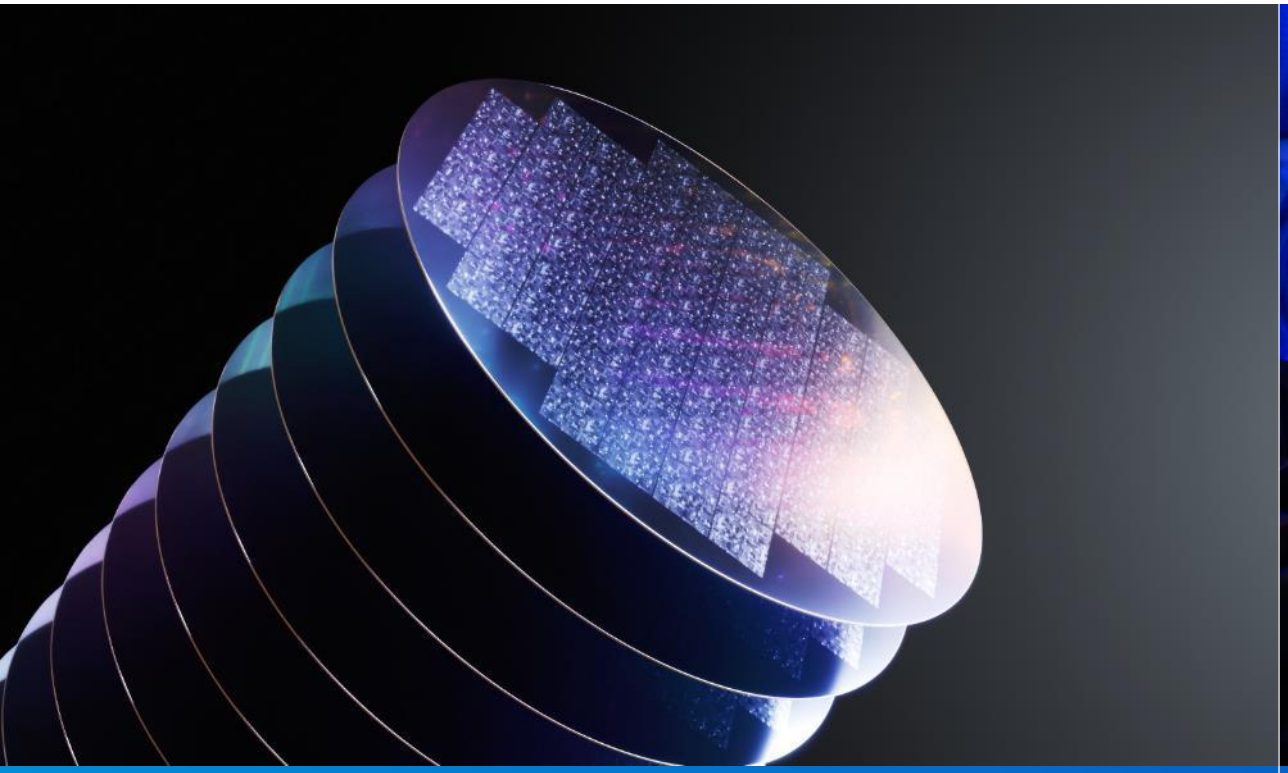
How to stay relevant in the AI era

Prepared for Brainport Industries jaarcongres

Herman Boom

ASML EVP Strategic Sourcing & Procurement (SS&P)

Outline



Semiconductor market outlook

The key to continued success: innovation and development

Semiconductor market outlook

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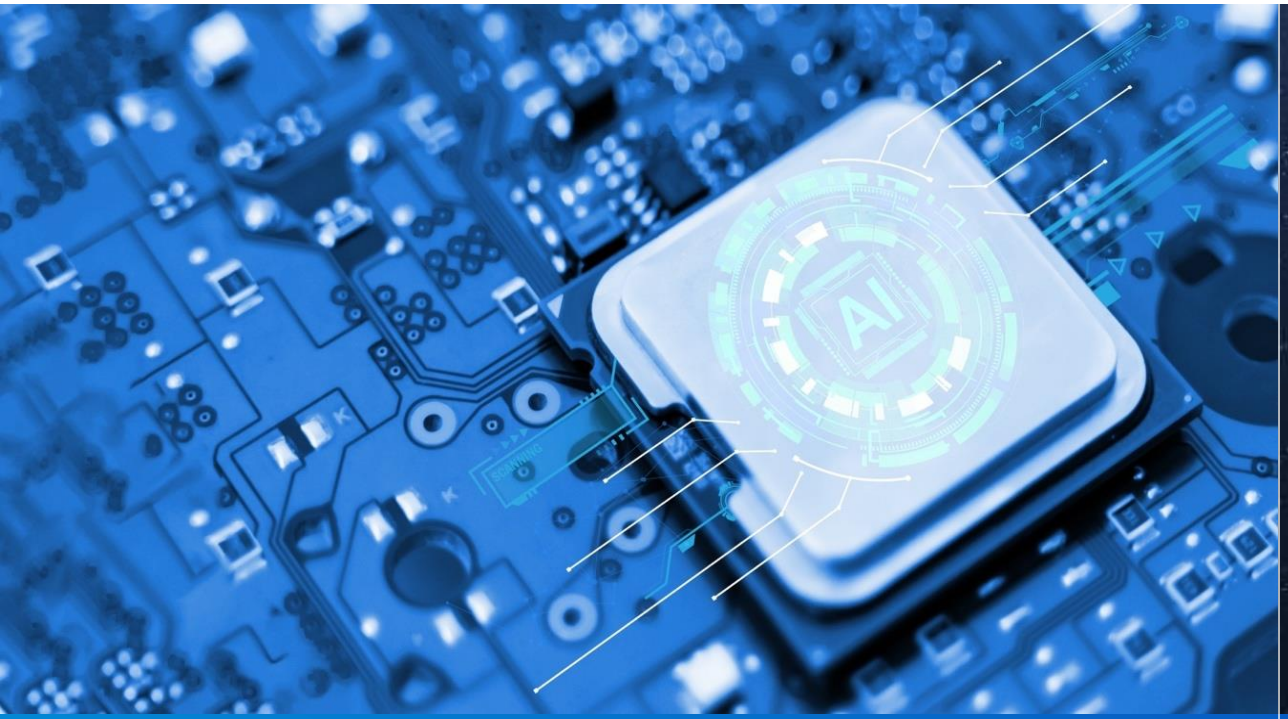
Trends

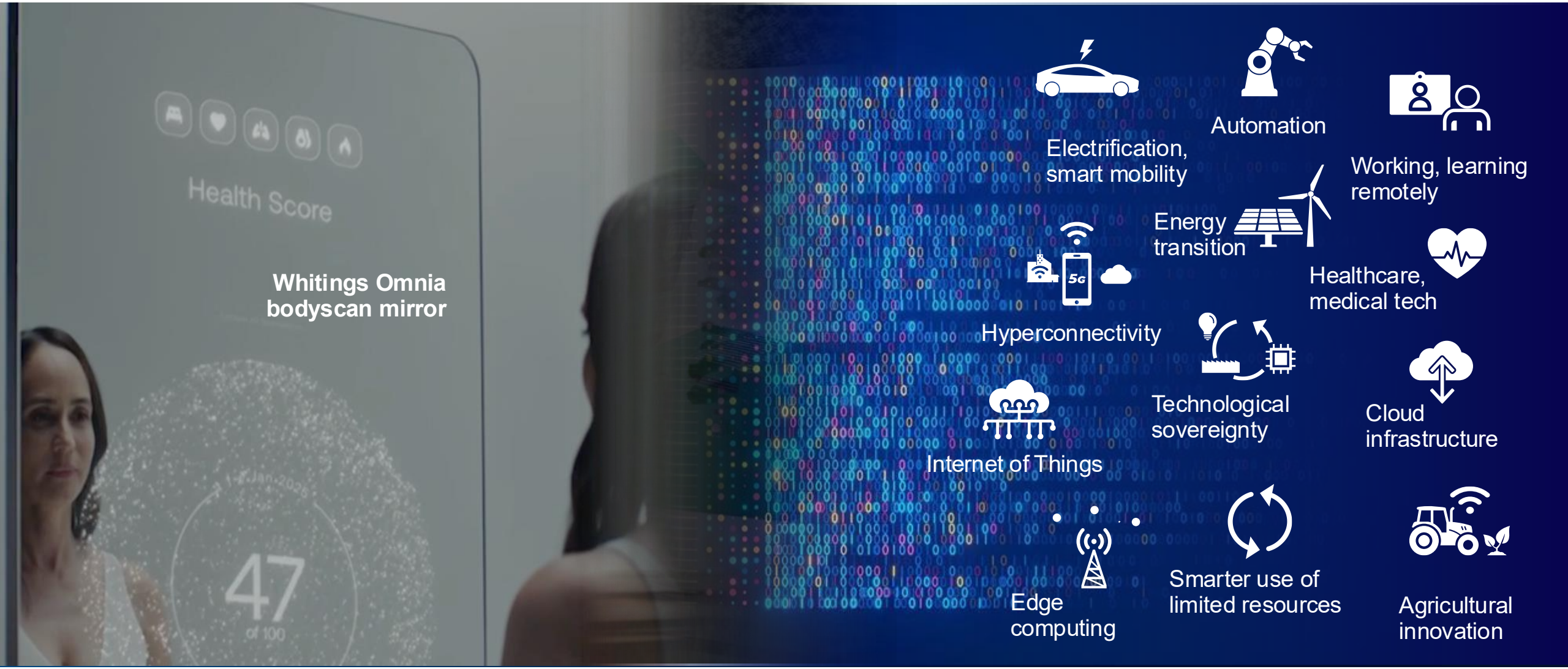


AI has become the main industry driver and creates new opportunities

Geopolitics and trade policy introduce volatility and uncertainty

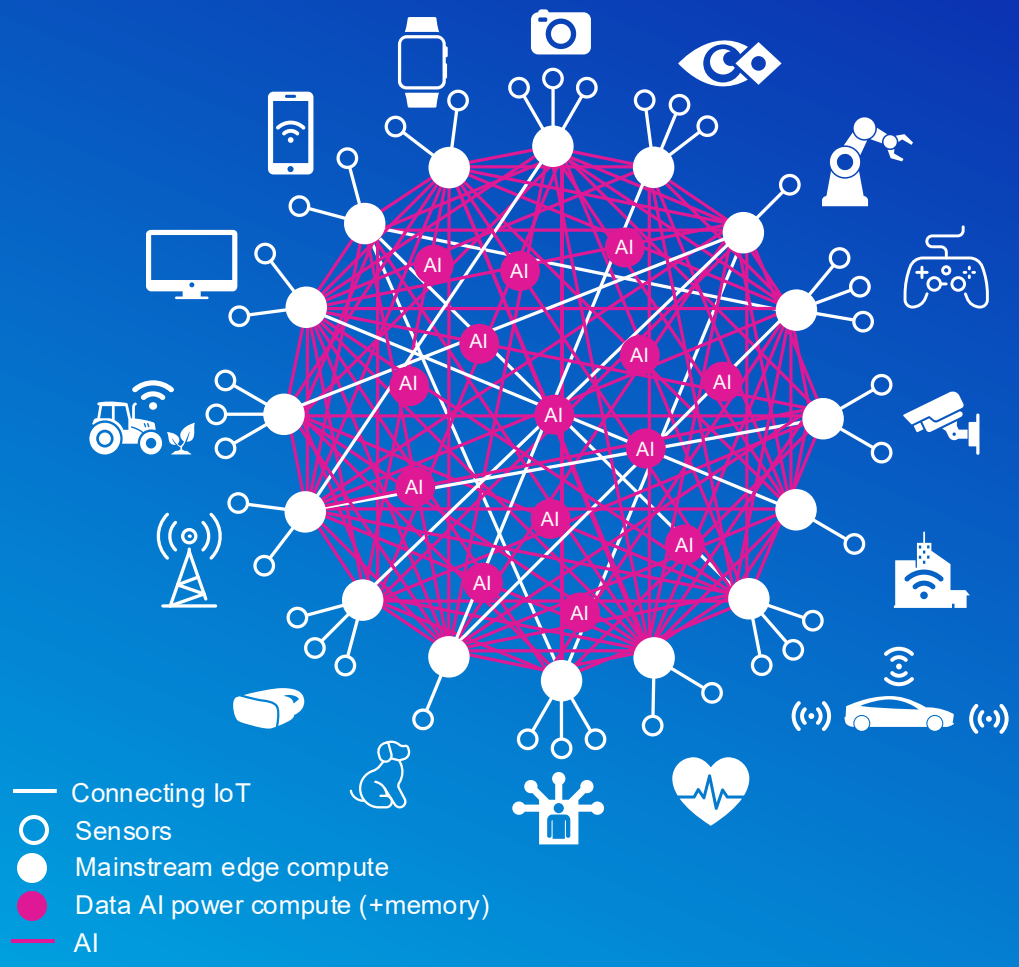
We see our society going from chips everywhere to AI chips everywhere

Generative AI opens endless opportunities

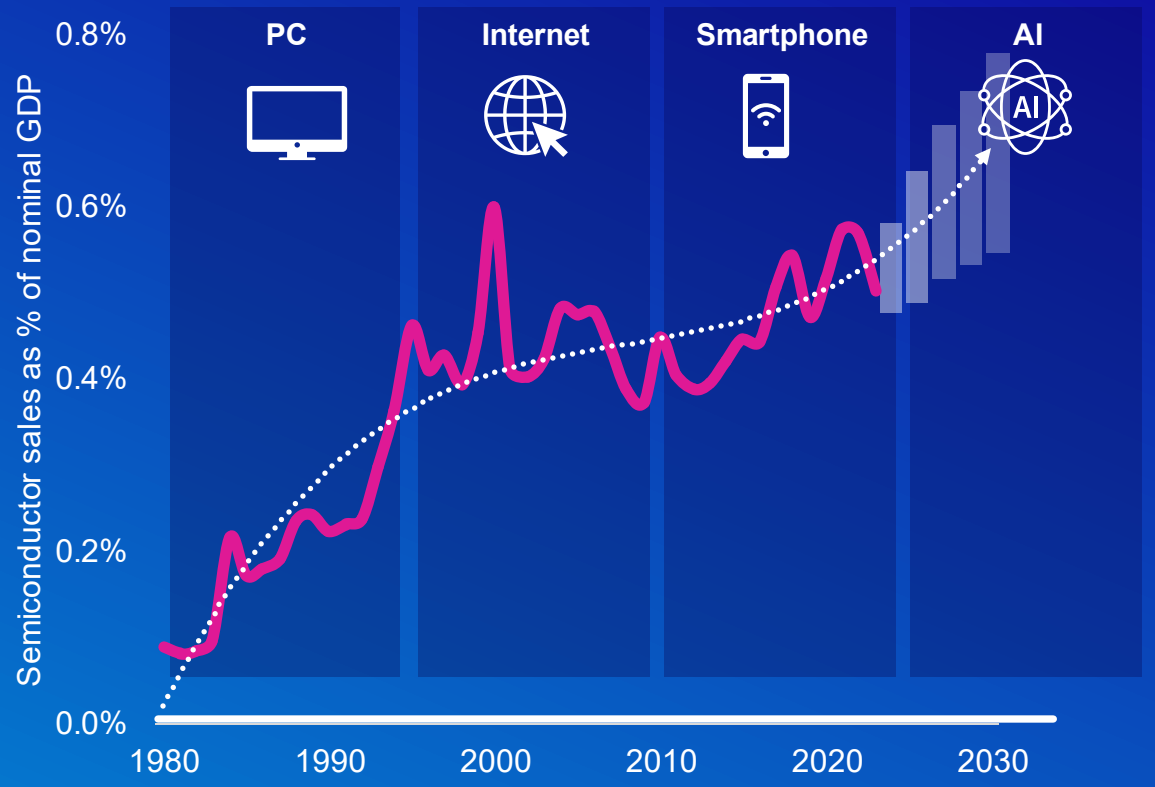


AI has a strong potential to drive the entire semiconductor industry forward

We will see AI penetrate all different segments of the semiconductor eco-system



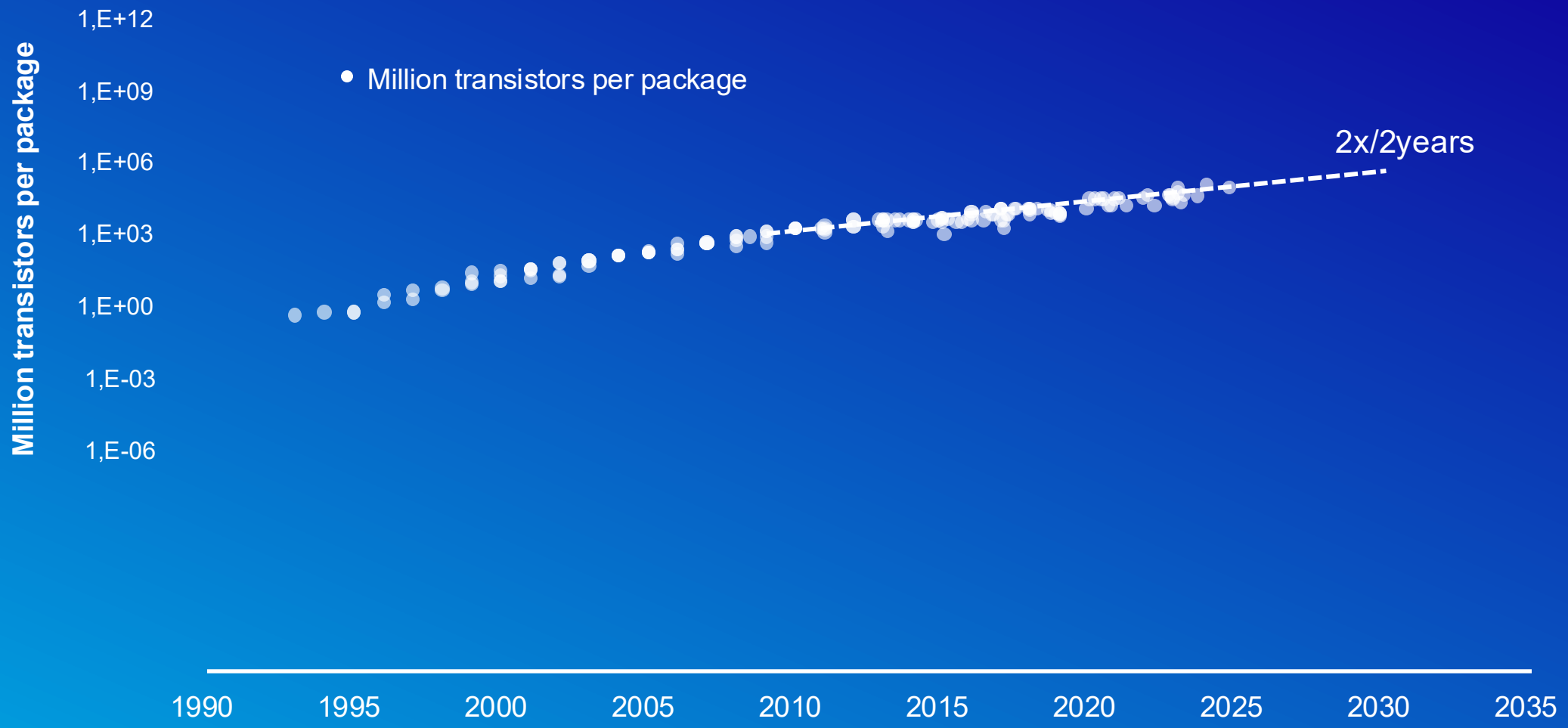
Semiconductor sales as % of global nominal GDP have steadily grown across the previous computing waves



Source: ASML analysis, International Monetary Fund (IMF), SEMI

Moore’s law in the AI era

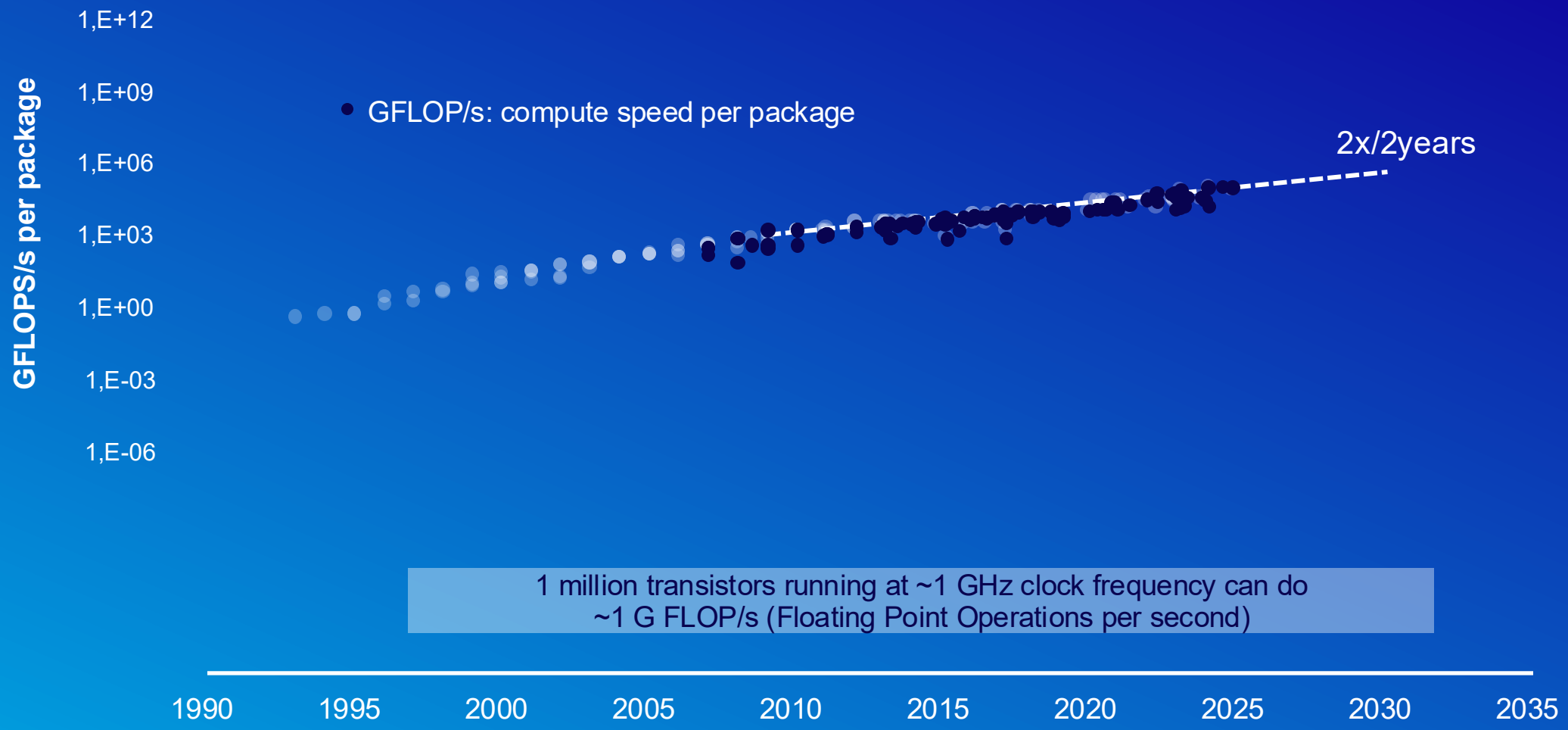
Device capability: transistors per package grow ~2x / 2 years



Sources: H.S.P Wong et.al. Stanford Technology Integration Trend, accessed 2,2, ‘25, Epoch AI “Data on Notable AI Models” & “Data on Machine Learning Hardware”

Moore's law in the AI era – computing power

Device capability: computing power also grows ~2x / 2 years



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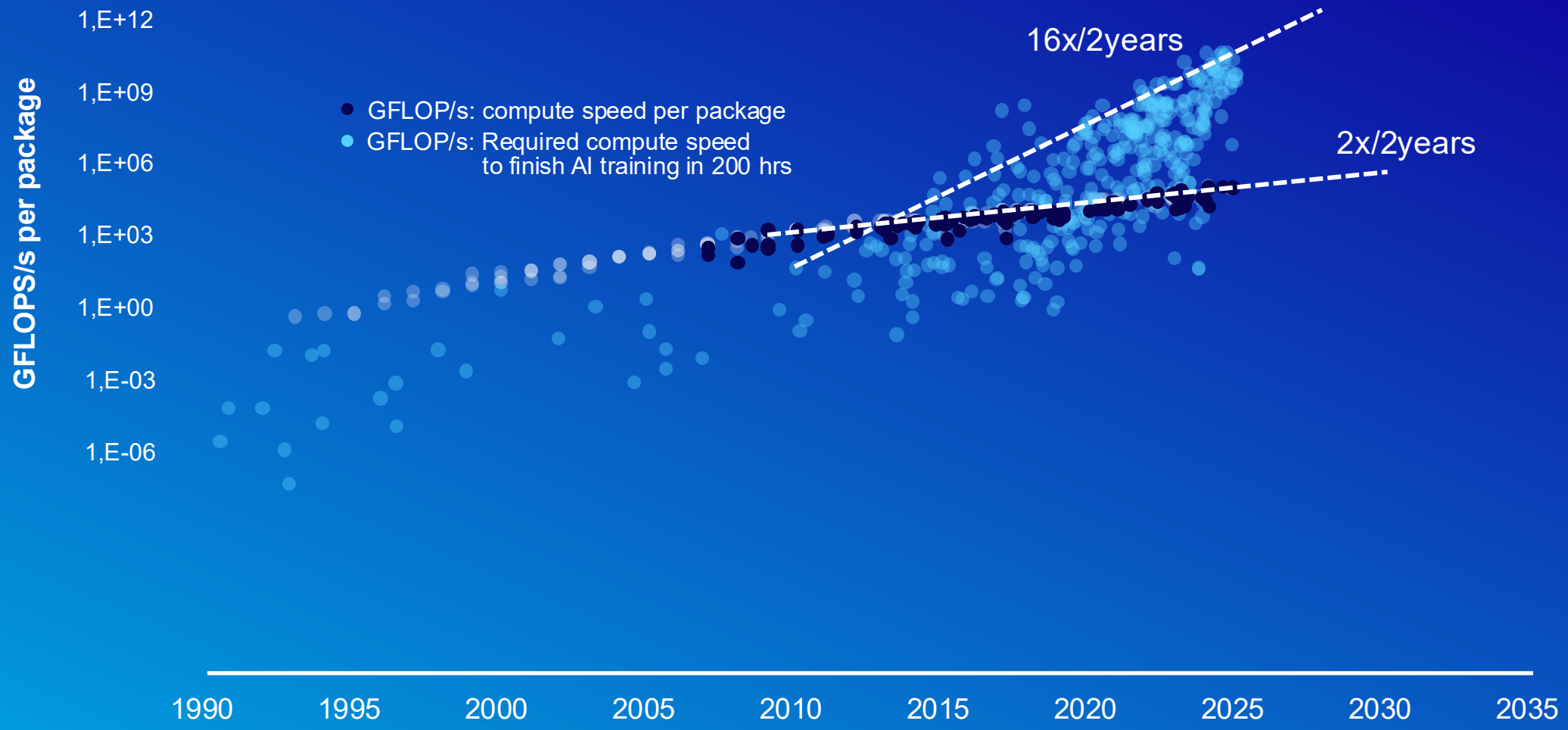
Sources: H.S.P Wong et.al. Stanford Technology Integration Trend, accessed 2,2, '25, Epoch AI "Data on Notable AI Models" & "Data on Machine Learning Hardware"

Compute demand from AI accelerated since 2010, outpacing Moore's law

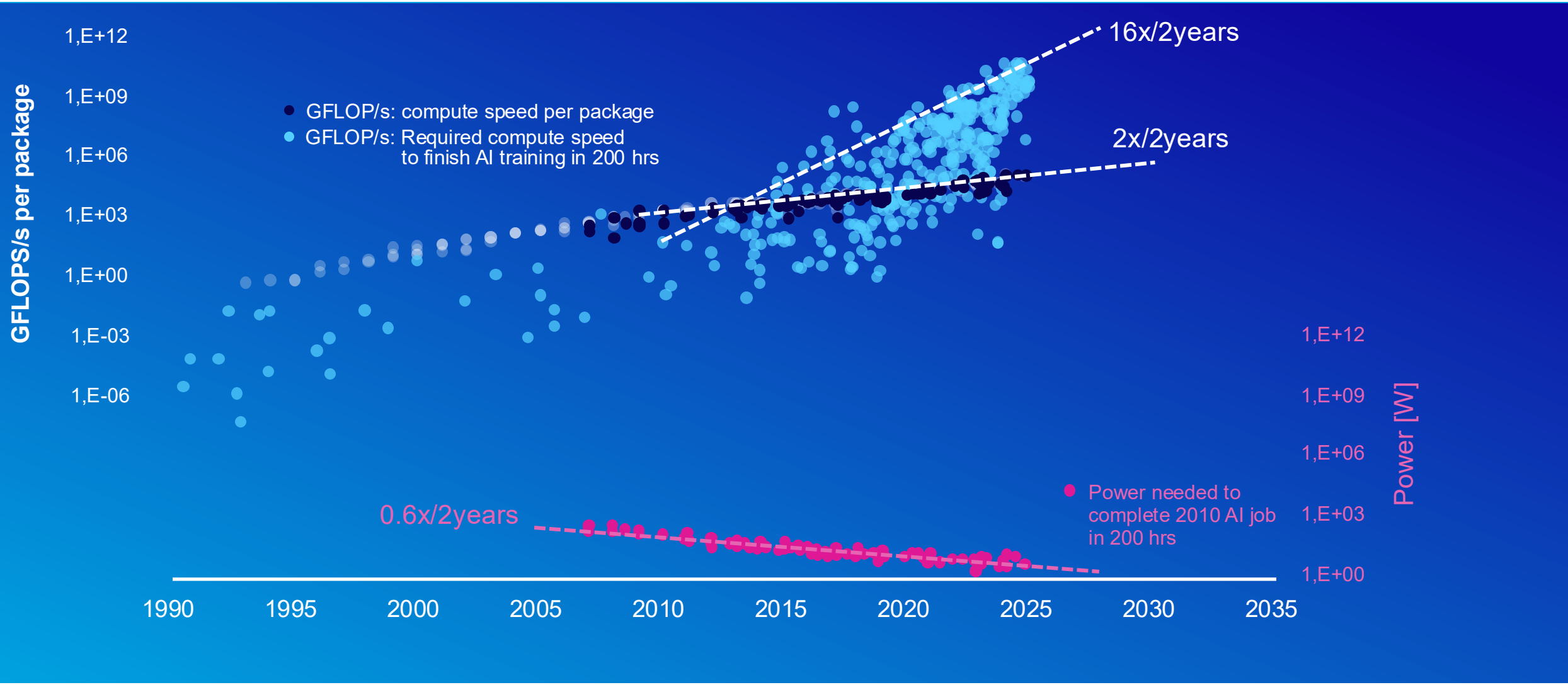
Moore's law alone is not sufficient to meet future training computing power requirements



Sources: H.S.P Wong et.al. Stanford Technology Integration Trend, accessed 2,2, '25, Epoch AI "Data on Notable AI Models" & "Data on Machine Learning Hardware"

Moore’s law in the AI era – power consumption

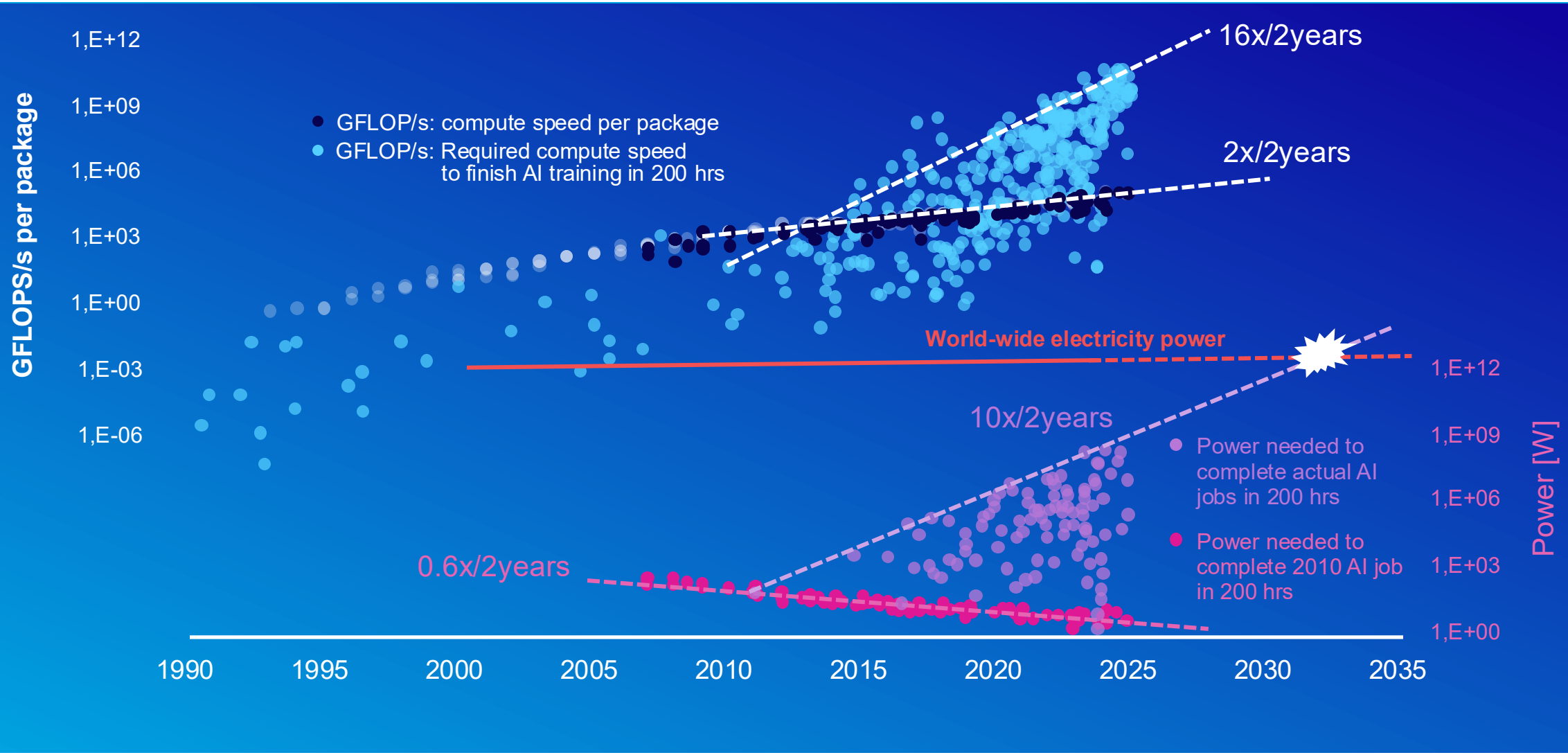
Moore’s law reduces power per computation by ~0.6 / 2 years



Sources: H.S.P Wong et.al. Stanford Technology Integration Trend, accessed 2,2, ‘25, Epoch AI “Data on Notable AI Models” & “Data on Machine Learning Hardware”

Power needed to train a leading-edge model also outpaces Moore's law

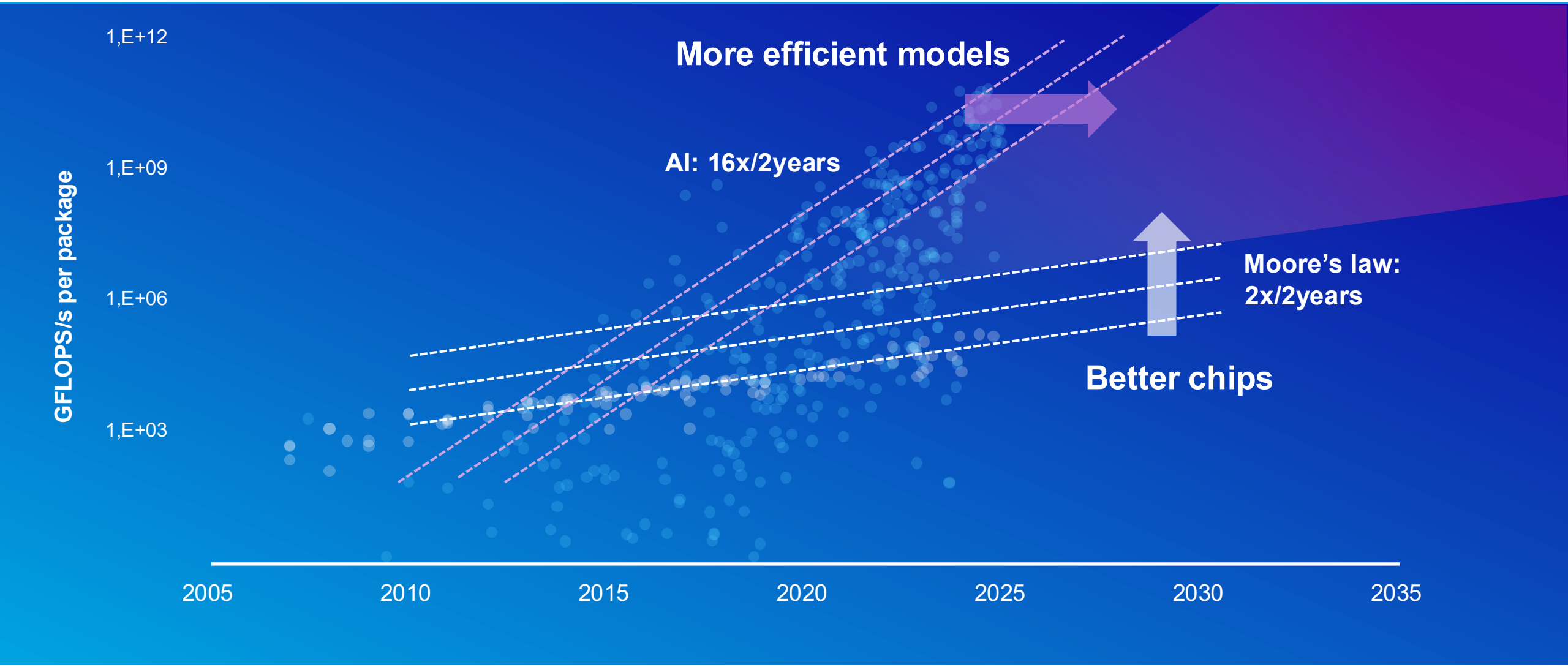
Extrapolating trend, training a leading model would use entire world-wide electricity supply by 2035



Sources: H.S.P Wong et.al. Stanford Technology Integration Trend, accessed 2,2, '25, Epoch AI "Data on Notable AI Models" & "Data on Machine Learning Hardware"

The gap between capability and demand for compute will be bridged

The industry has to provide solutions by improving both the chips and the AI models



AI demands innovation on many fronts

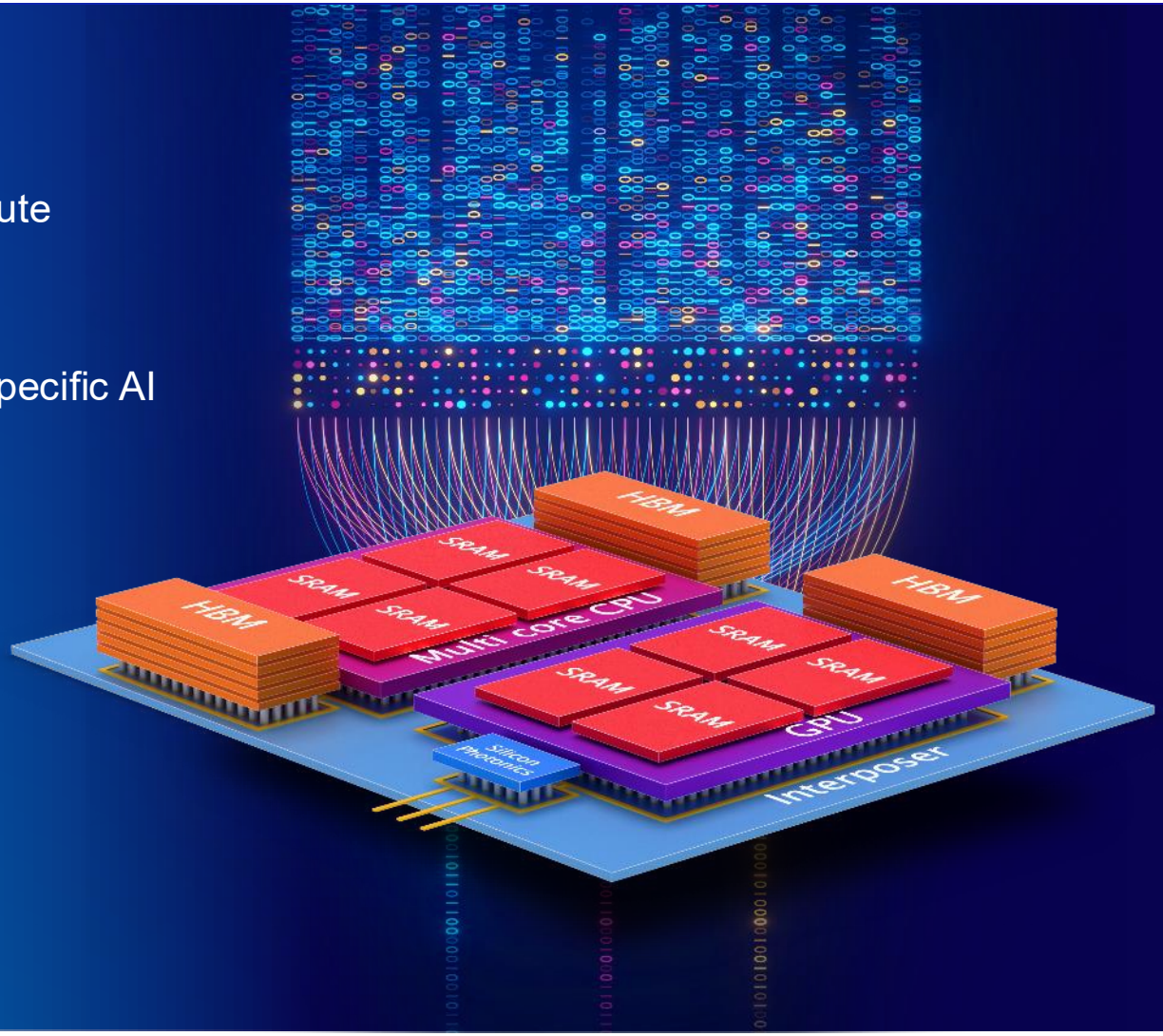
Model efficiency, chip technology, design and architecture as well as production equipment

Model

1. Efficient AI models: more parameters using less compute in training models

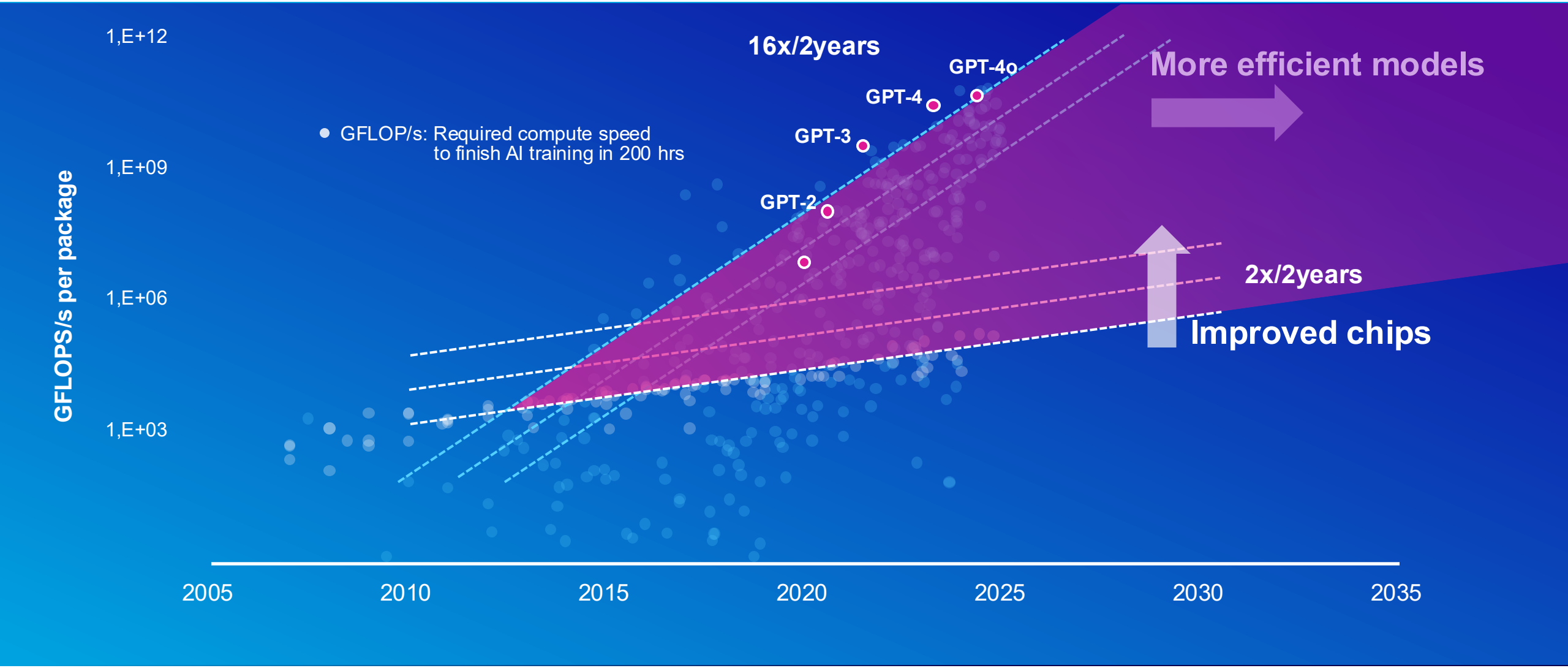
Moore's law

2. AI-efficient chip design and architecture, adapting to specific AI requirements, including efficiency within IC systems
3. Efficient chip technology: transistor scaling and energy efficiency
4. More effective and efficient IC production equipment and process



The gap between capability and demand for compute will be reduced

By making both the chips and AI algorithms more efficient



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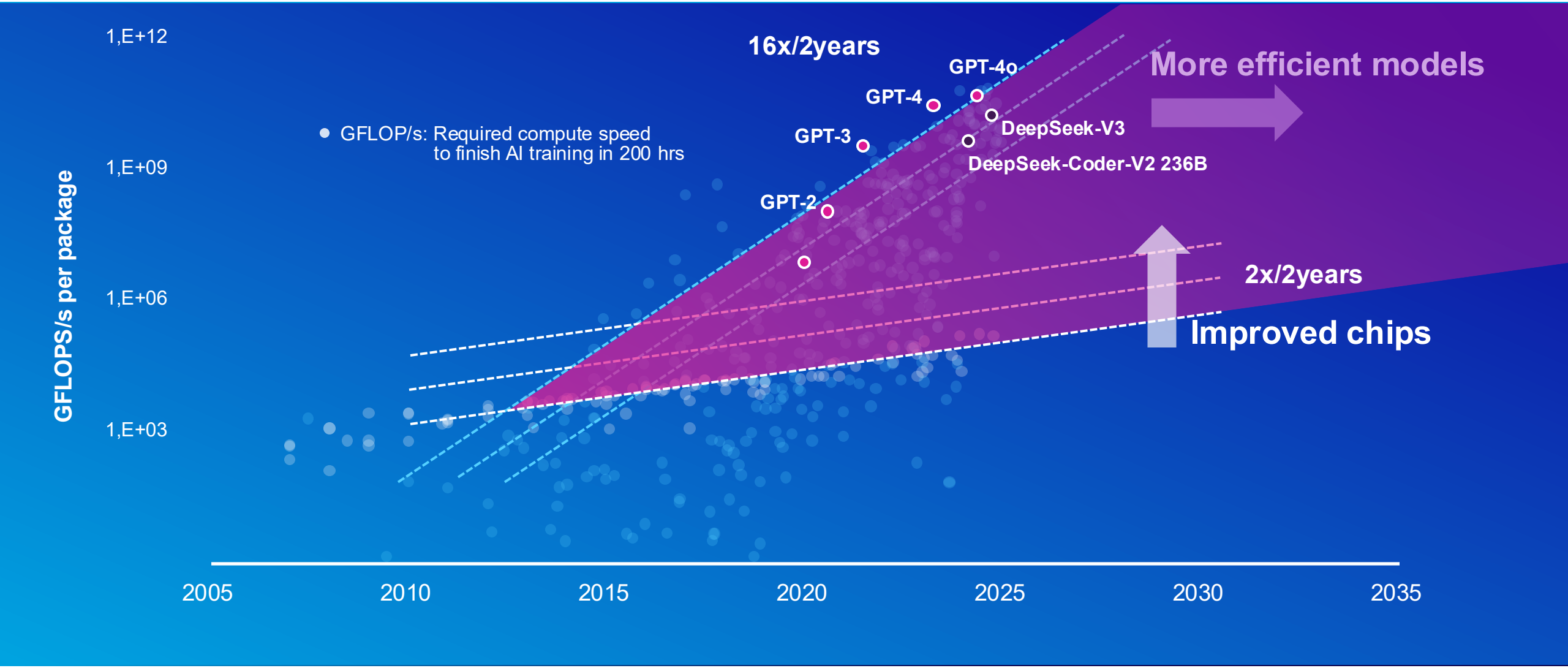

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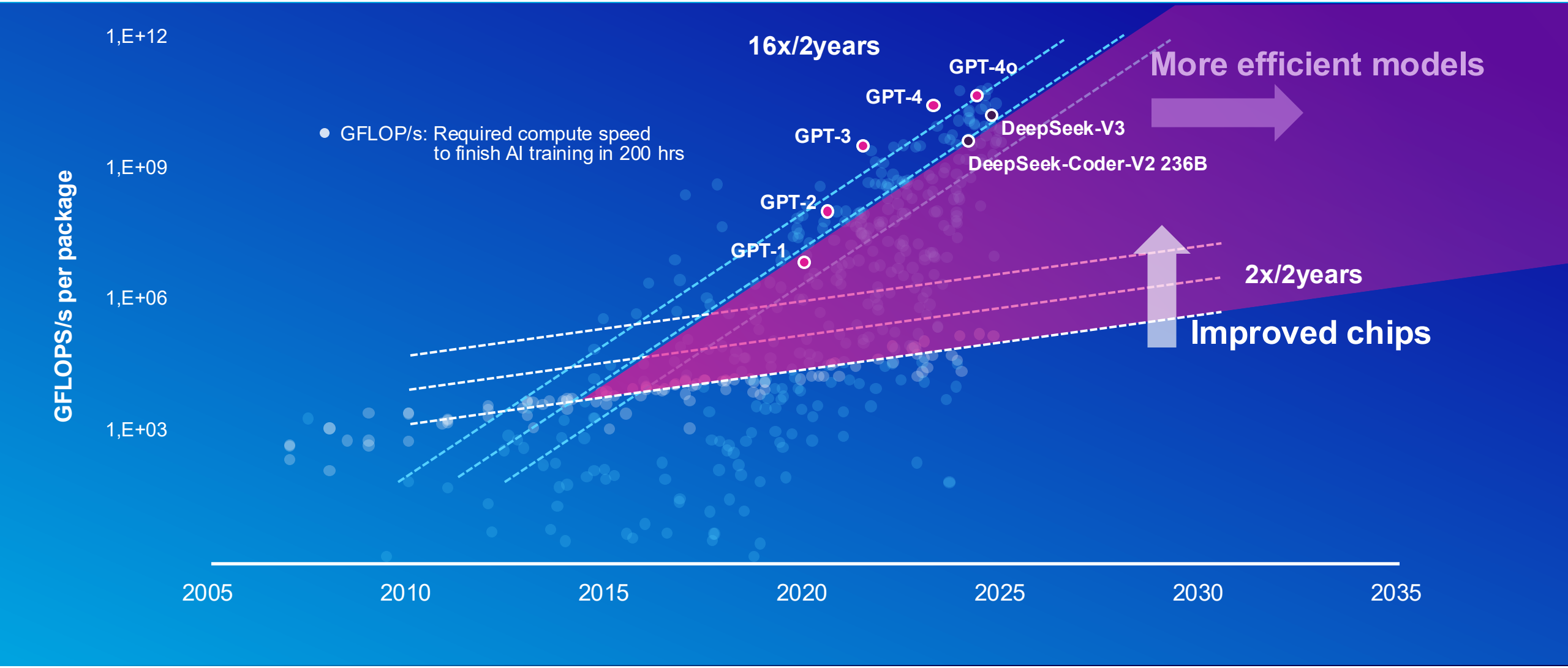
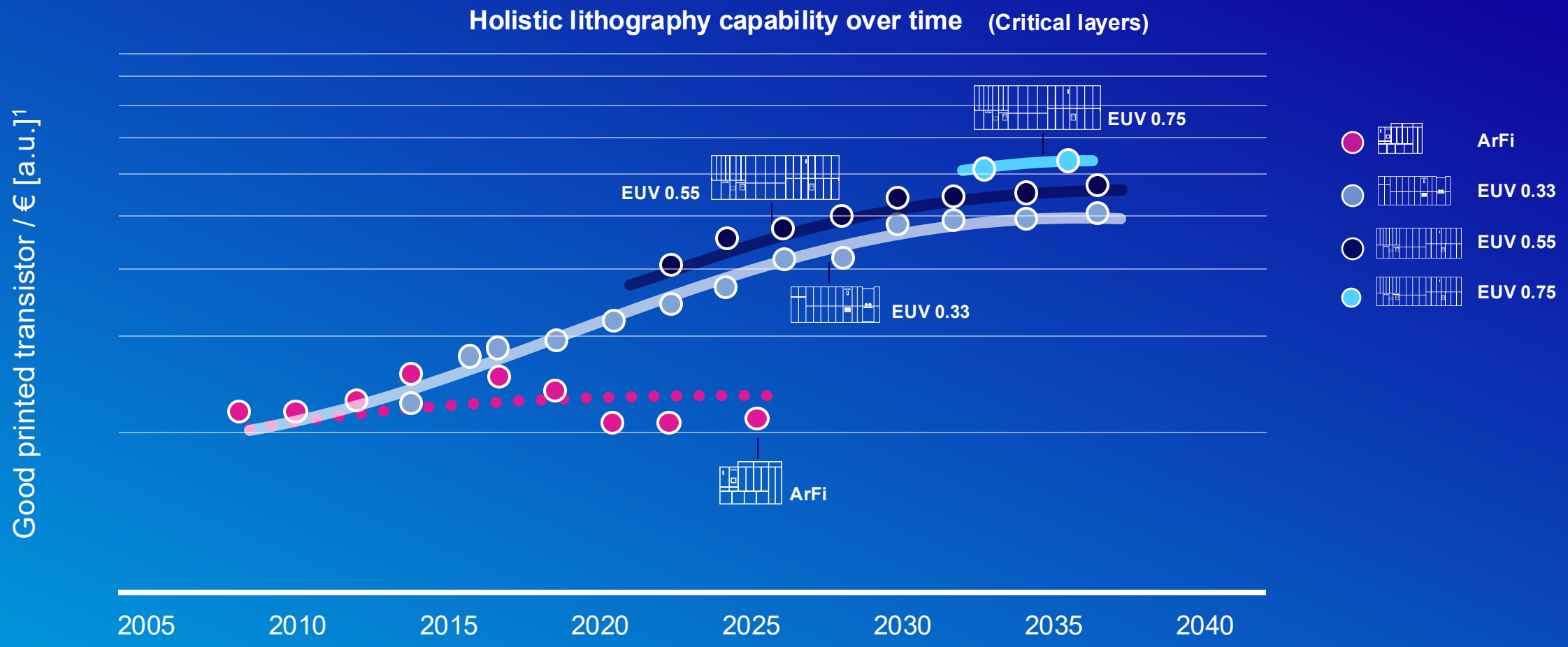


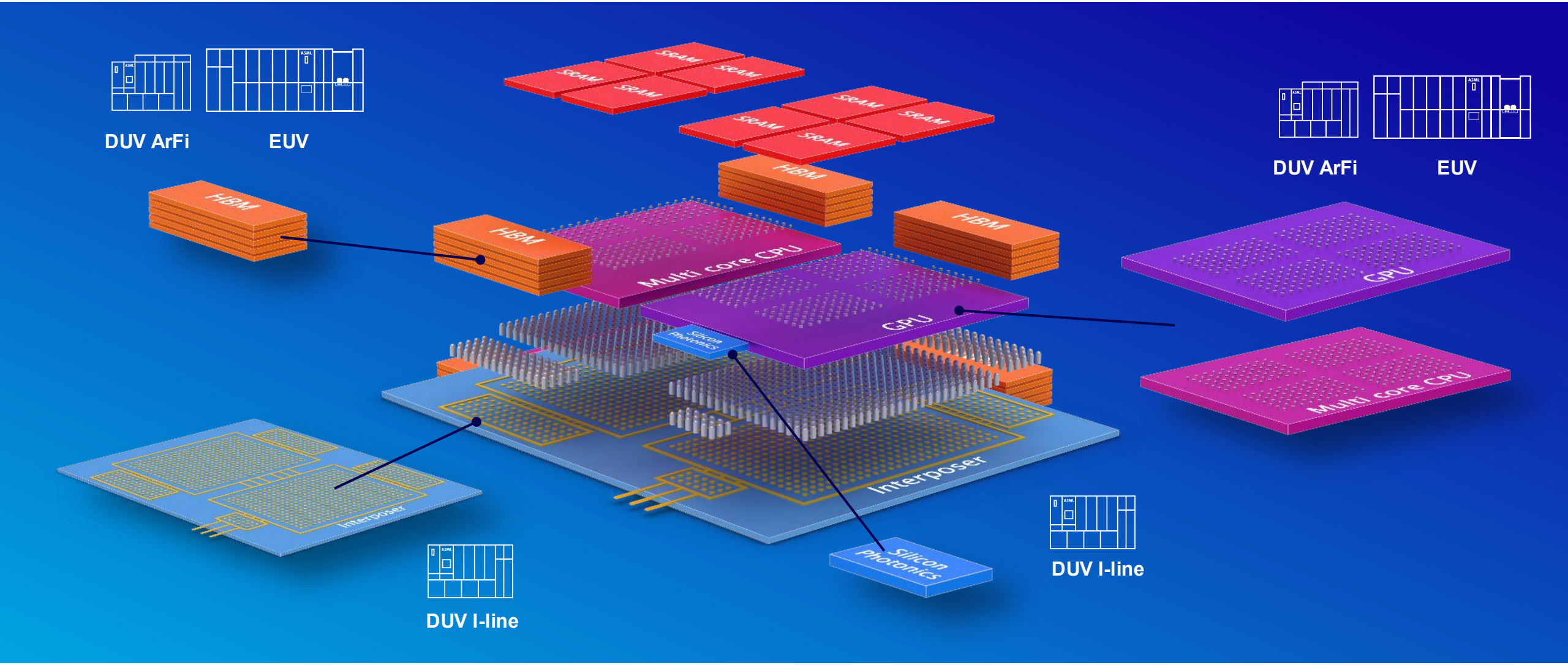
ASML has delivered higher transistor density at lower cost for several decades

We believe that EUV scalability and holistic lithography can extend our historical trend into the next decade



Packaging innovations in the ASML product portfolio to support 3D integration

Smaller functions, separately packaged and interconnected require different litho solutions



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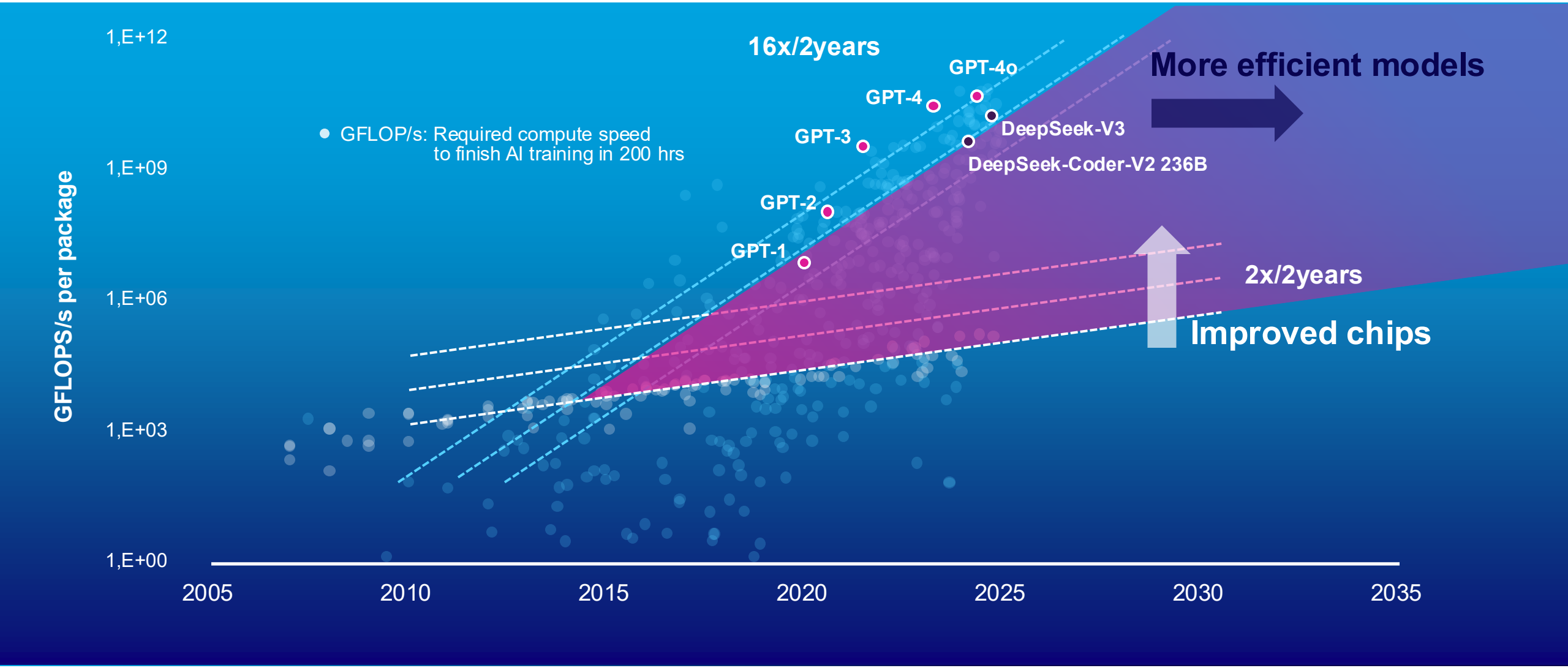

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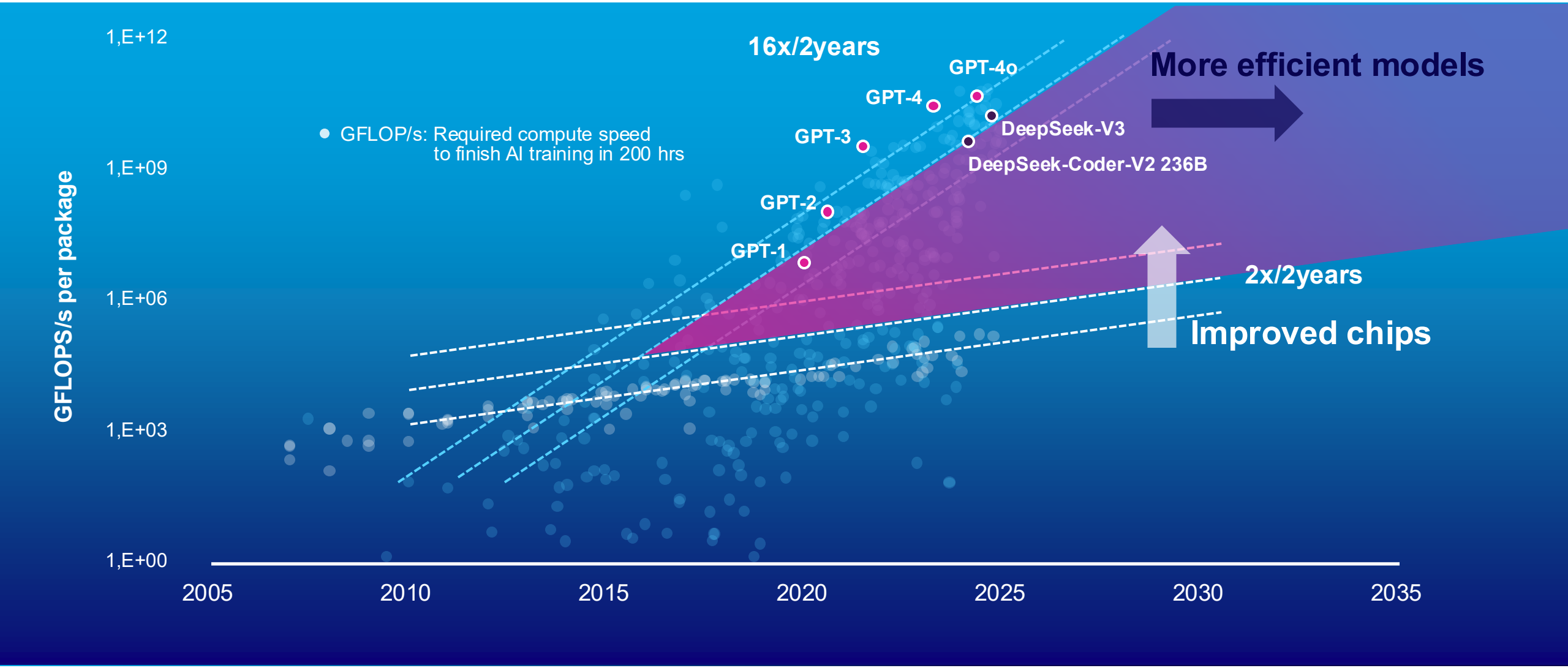
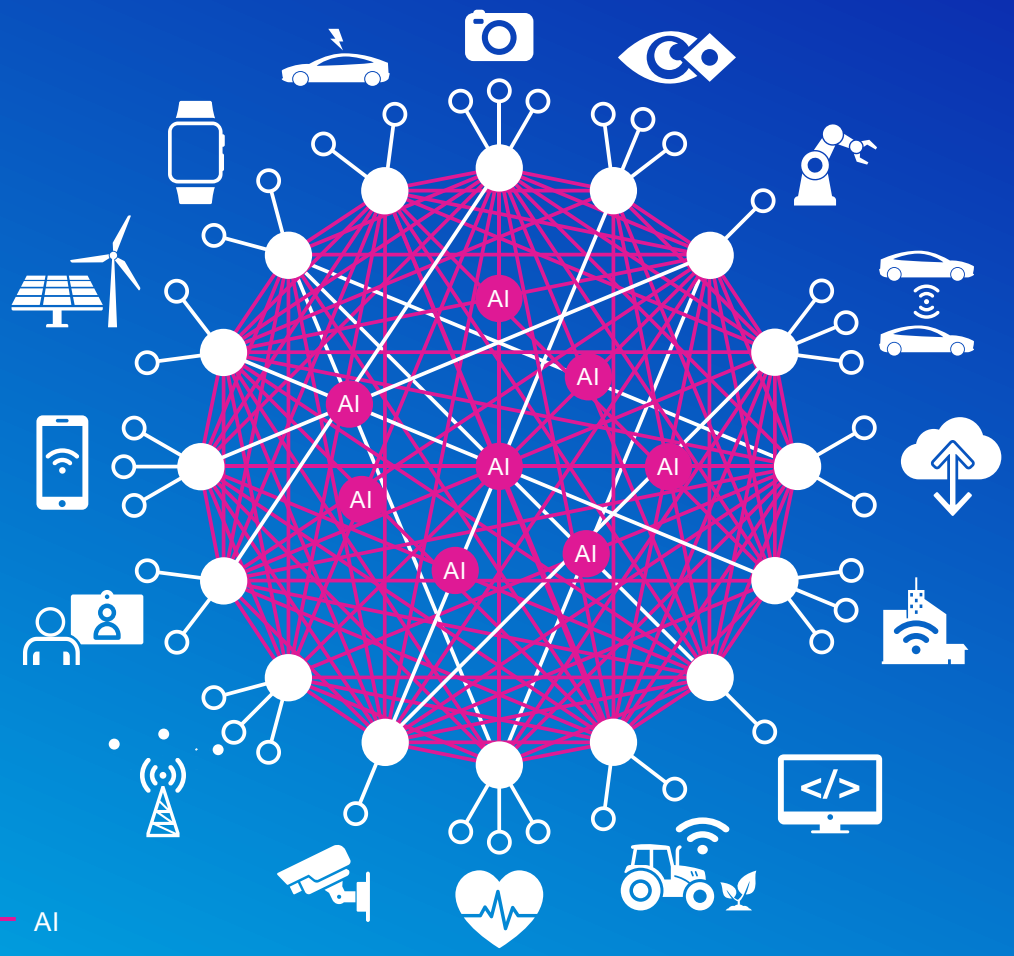
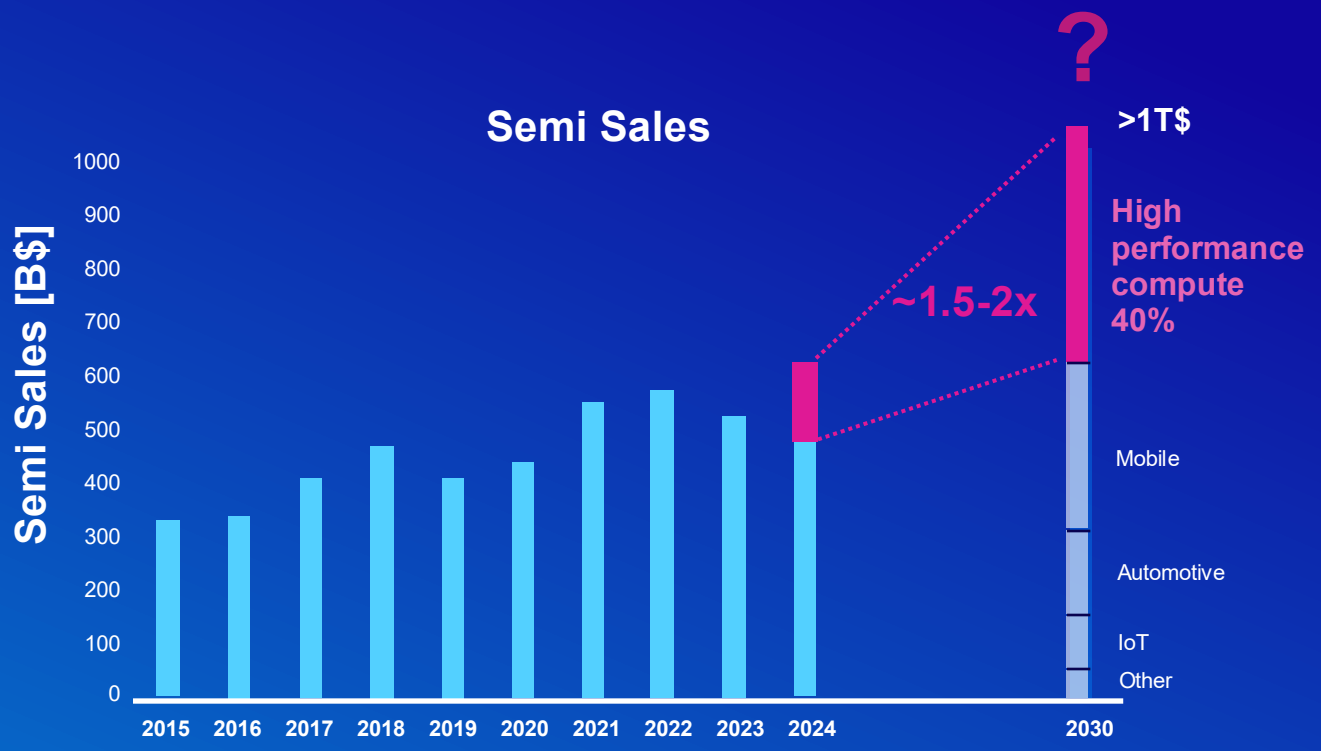


Major investments are ongoing in AI, and the exact pace is still unknown

Semiconductor sales will translate into business growth for wafer fab equipment



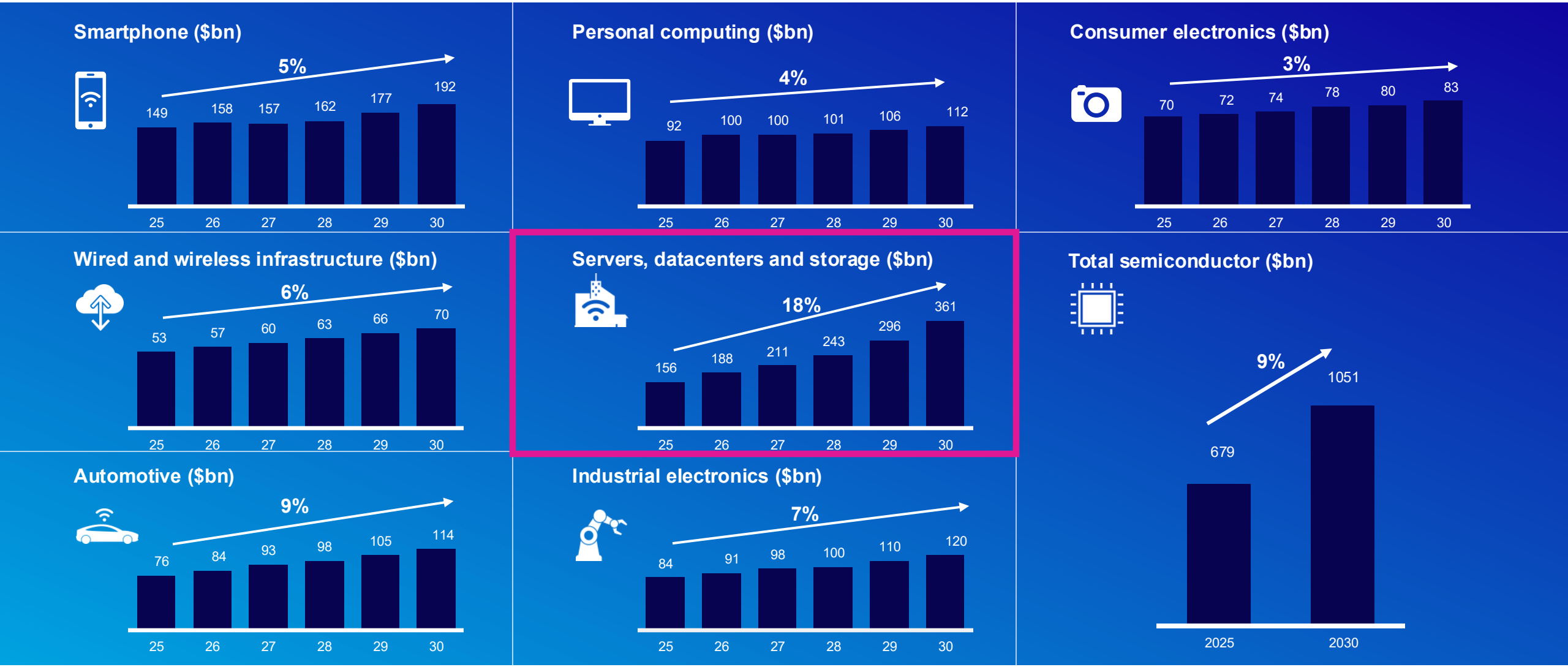


Global data center and edge AI demands are expected to grow significantly year on year to represent >40% of semi sales demand in 2030 and generate some upside for our industry

Source: Kevin Zhang, TSMC, Semiconductor Industry: Present and Future, IEEE solid state Circuit Conference, Feb 2024
Source: McKinsey and Company, GenAI: The next S-curve for the semiconductor industry? | March 2024
Source: WSTS and Gartner

Driven by AI, we foresee sharp growth for servers, datacenters and storage

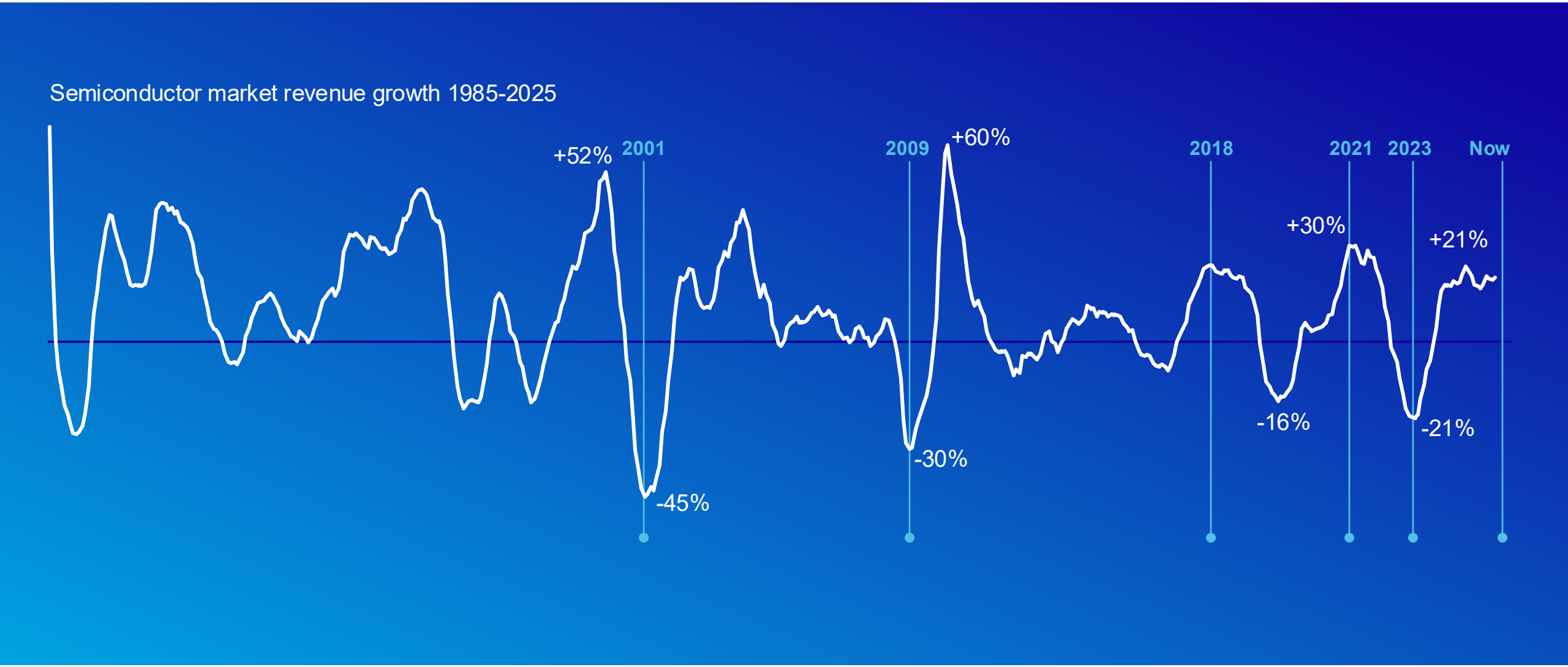
Which largely offsets the more modest growth in other sectors



Source: Corporate Marketing (CMKT) analysis

However, the semiconductor market is cyclical (+ or - 50% demand in 6 months)

The return to steep growth is unpredictable and requires us to be ready to serve the market



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Source: World Semiconductor trade statistics WSTS Home

Navigating cyclicality requires business resilience and ramp readiness

Be scalable and resilient

In an upturn:
Focus to meet market demand and harvest on our investments

In a downturn:
Preserve cash, make structural improvements, prepare for growth

Eliminate waste

Eliminate bad quality, manufacturing disturbances and downtime, low yield, scrap, etc

Be ready to ramp up when needed

Prepare for market recovery to be able to benefit from growth – as we have done in the past

The key to continued success: innovation and development

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The key to success is to deliver what our customers need

We pass on the same expectations to our suppliers

Q	L	T	C	S
Quality	**Logistics**	**Technology**	**Cost**	**Sustainability**
…with **perfect** quality	…always delivered **on time**	It starts with the right **product**	…**affordable** for customers	…considering **circularity and footprint**

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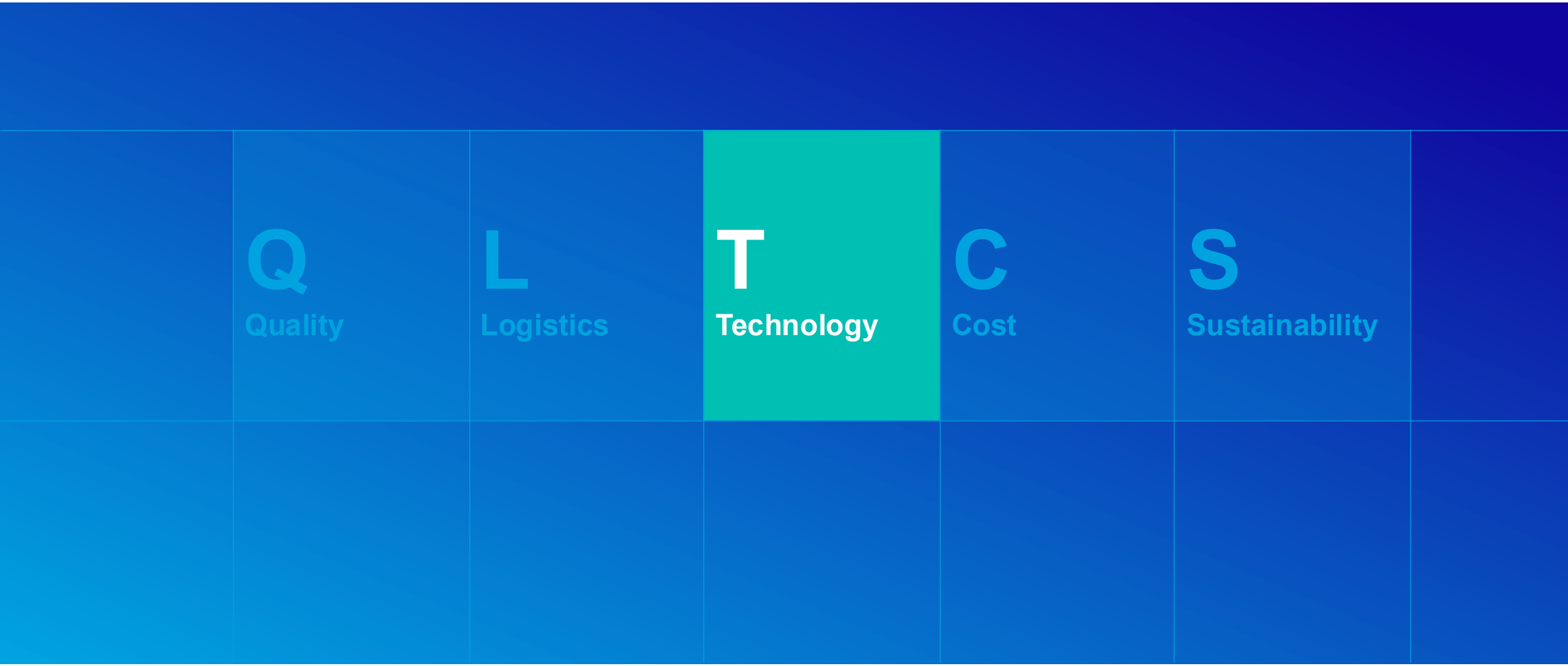
For ASML, technology has always been our strength and fuel for growth



However, great technology alone is not enough

Technology must be

High-quality | Scalable | Affordable | Sustainable

	Q Quality	L Logistics	T Technology	C Cost	S Sustainability
What our customers need from ASML →	**Reliable** litho tools that produce chips 24x7 – with no unplanned downtime	Shorter **order lead times** that enable our customers to respond to market cyclicality	The right product for our **customers**	**Affordable** litho products that keep chips affordable	Leveraging a **circular** supply chain with repair and reuse

The criticality of quality in lithography products

Q Quality

L Logistics

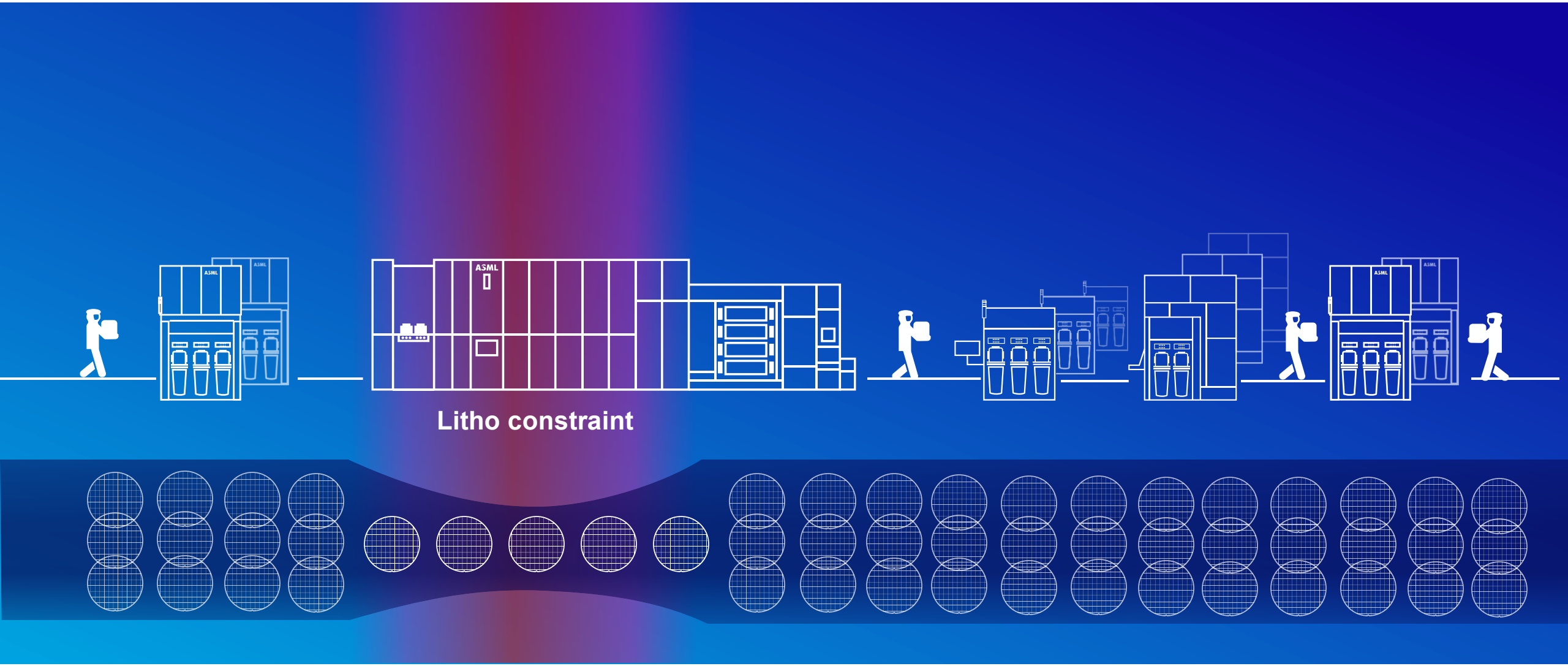
T Technology

C Cost

S Sustainability

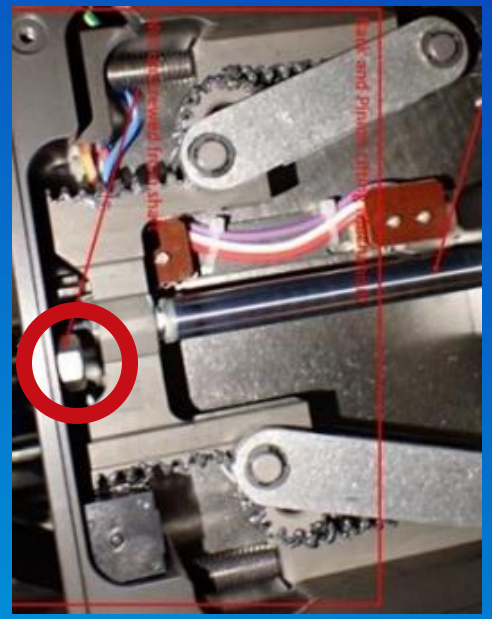
Lithography systems are the most expensive tools in a customer fab

So fabs are designed with lithography as *the* constraint



A supplier material worth thousands can bring down an ASML tool worth millions, which can halt an entire customer fab worth billions

Part malfunction
$ thousands

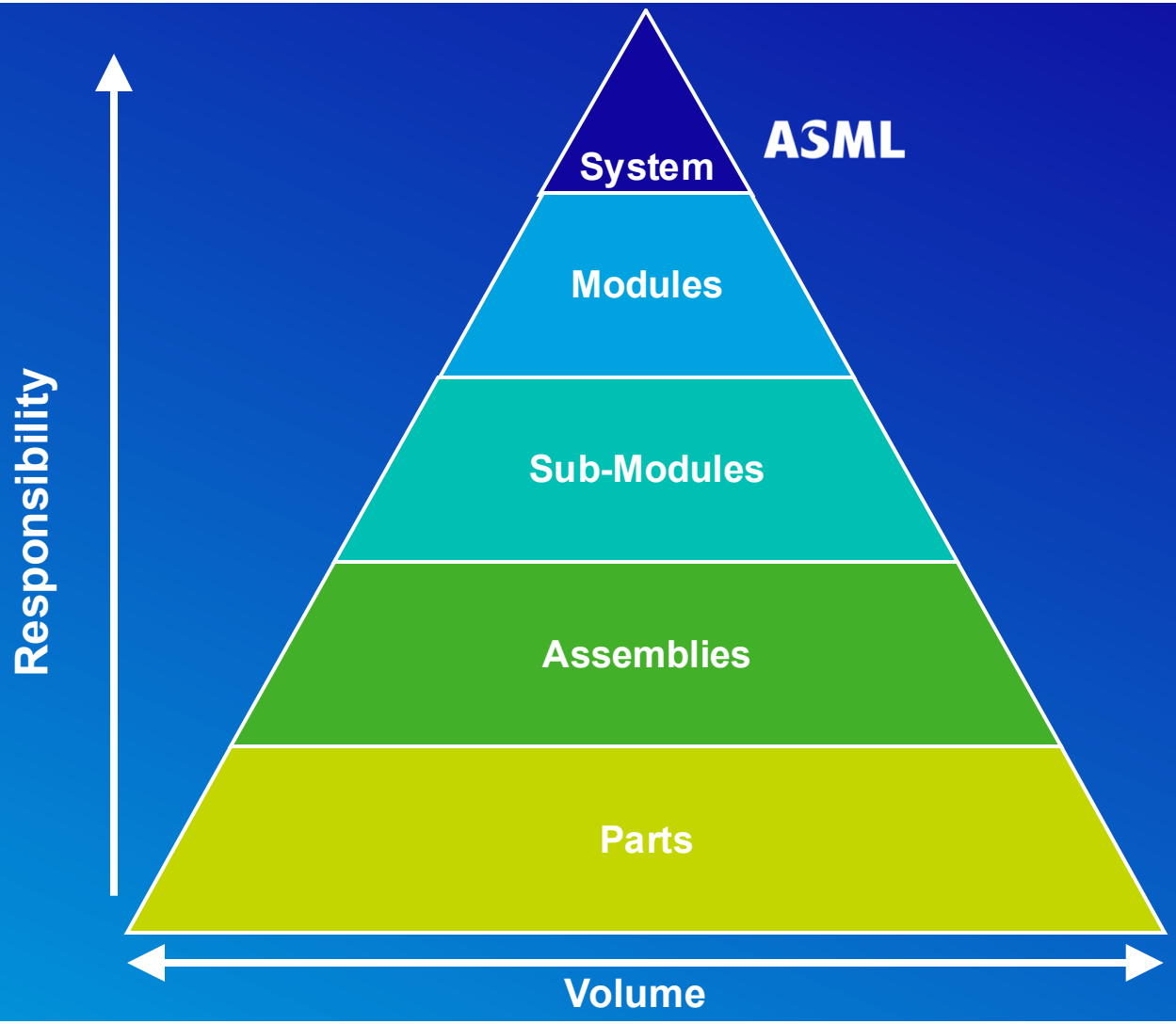


ASML scanner down
$ millions

Fab stops making chips
$ billions

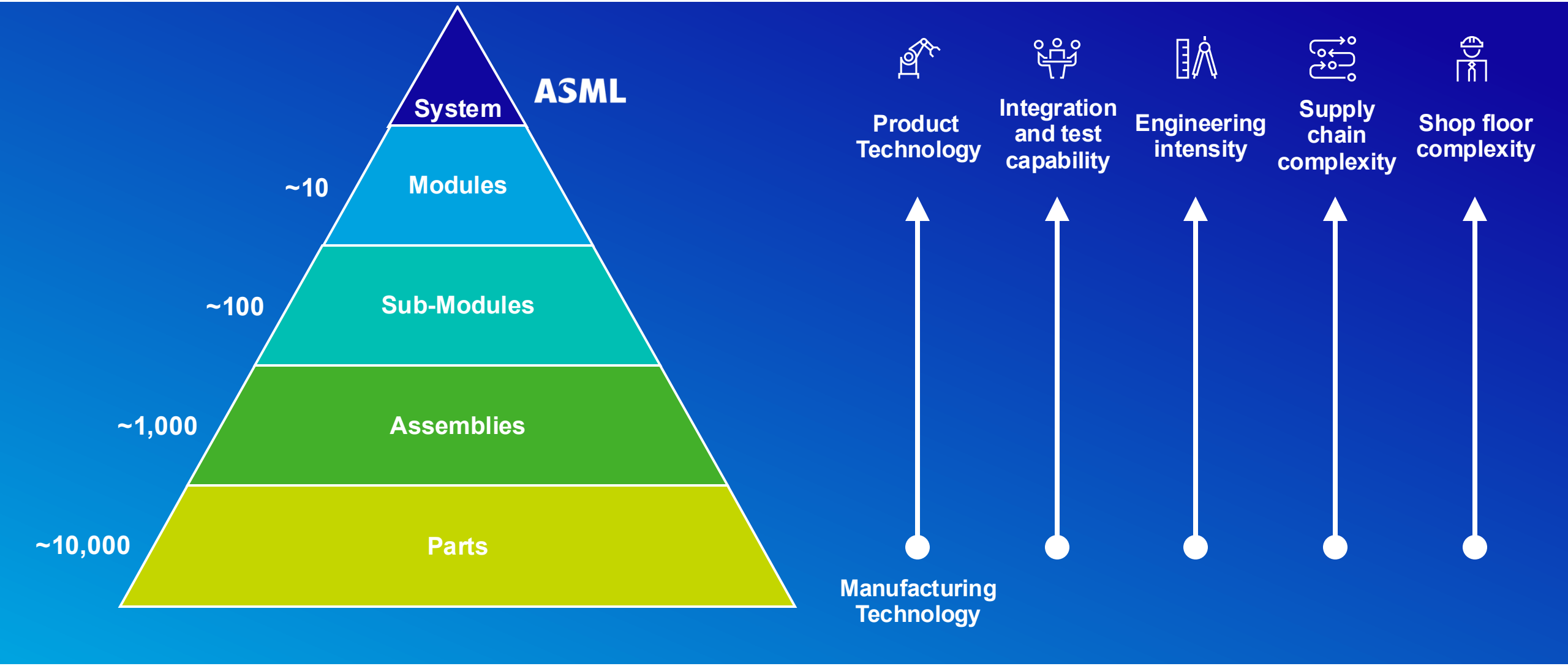
So we have a *huge* responsibility to deliver perfect quality!

With a growing product portfolio and growing business volume, ASML needs the supply chain to deliver more volume and take more responsibility



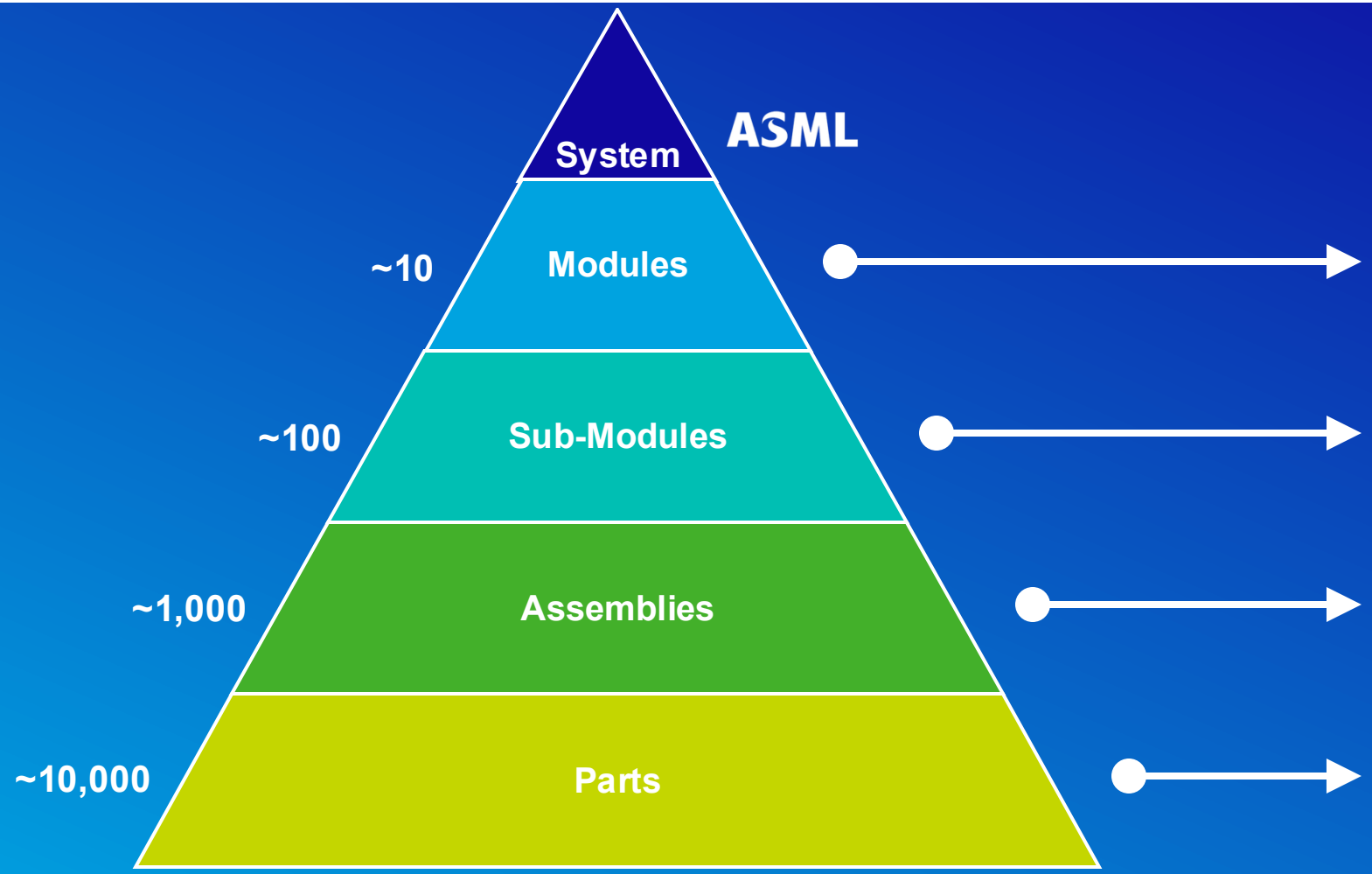
Climbing the value pyramid requires investments in capabilities

Pro-active growth in organizational capabilities is critical to success



Climbing the value pyramid is not the only strategy

At each layer, we need suppliers that innovate to be the best in class



Requires innovation in…

Module qualification and quality control. Diagnostic capabilities

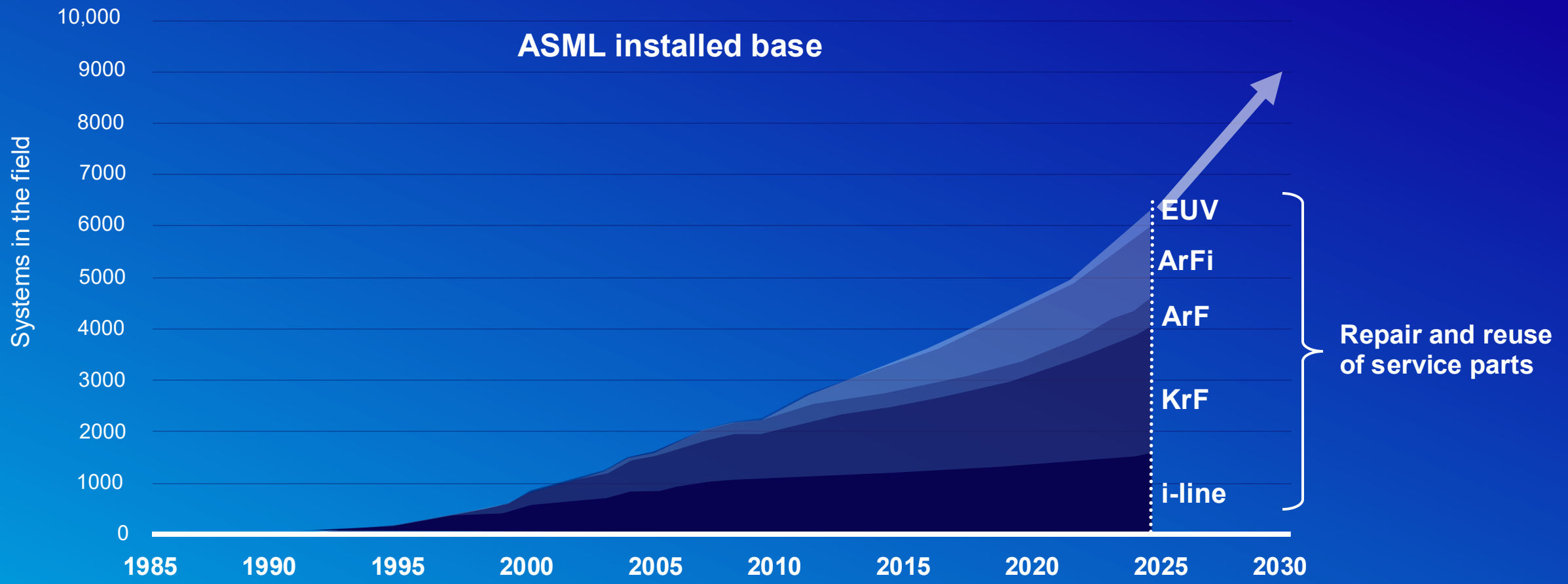
Cost effective qualification and testing strategies. Process and shop floor optimization for quality, yield and cost

Integration and testing technology. Parts traceability, supply chain controls

Manufacturing technology for yield, and cost; part/batch quality controls

ASML has shipped >6000 systems to customers since we started operations

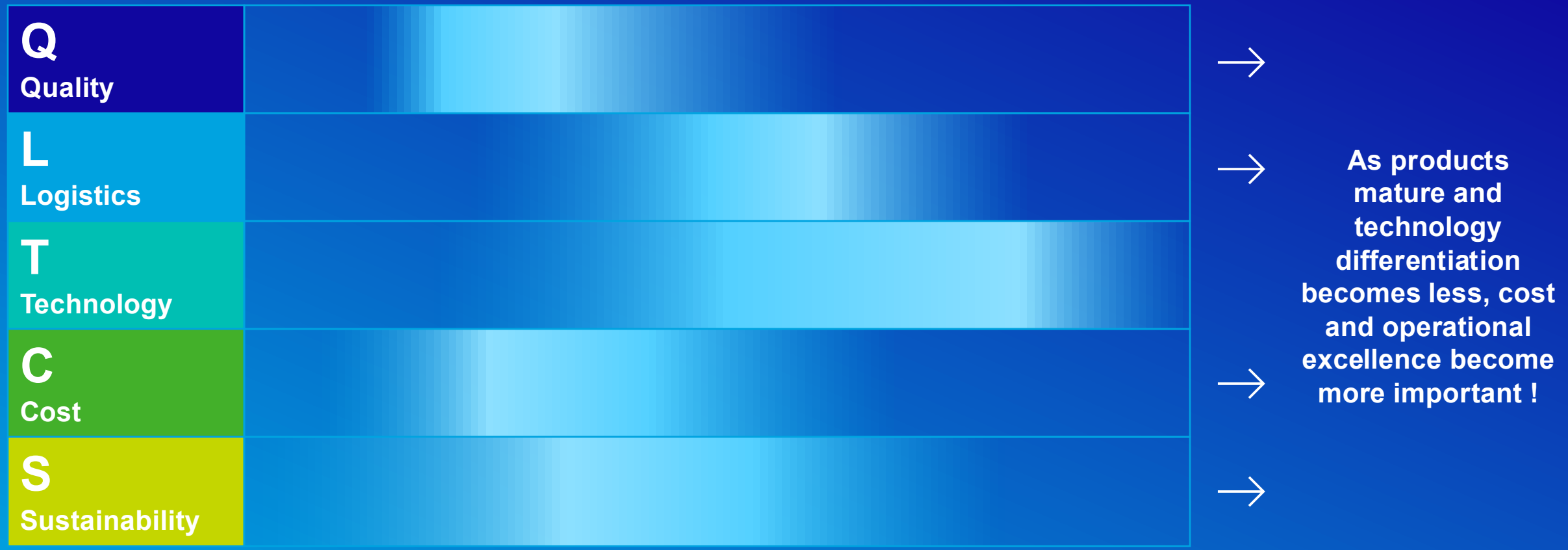
>95% of these systems are still being used and product life cycles are up to 20 years long



Throughout the product lifecycle, different business elements are important

Technology dominant	High	**Product differentiation**	Low	Cost dominant
Proximity to R&D	High	**Rate of learning**	Low	Location less dependent on R&D
Driven by learning	Low	**Configuration stability**	High	Driven by risk avoidance
Product-manufacturing co-optimization	High	**Co-design opportunity**	Low	Low, Often costly

Brainport region has always been strong at technology but needs to catch up on operational excellence



ASML is also actively shaping our supply chain (organization) for 2030

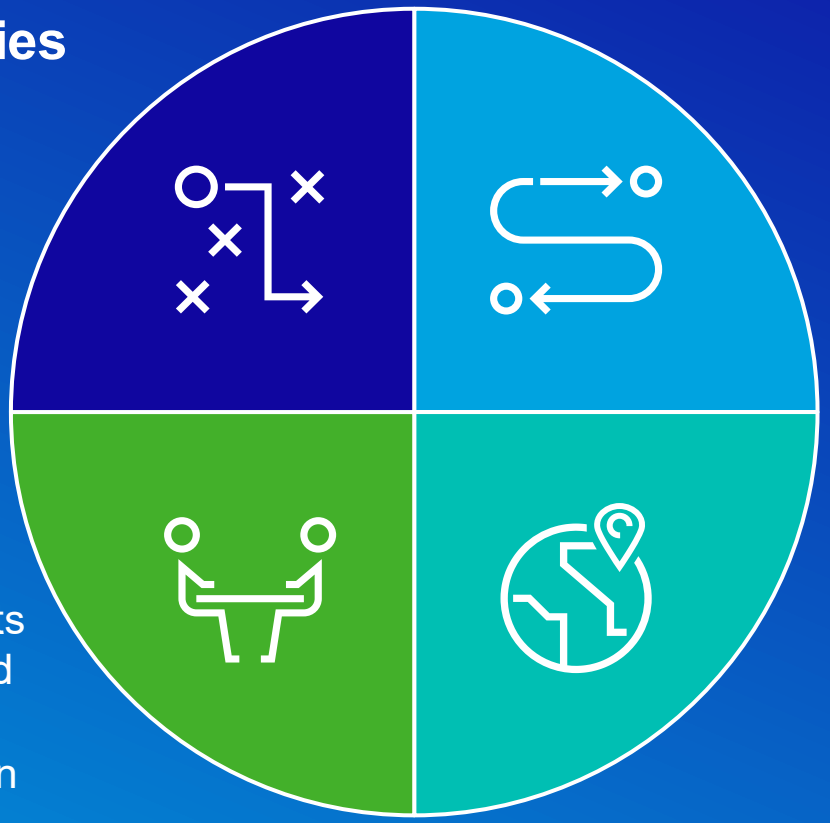
Building a great supply chain *by conscious design*

Category strategies

Created detailed strategies for each of our sourcing categories

Supplier transfers

Allocating business to suppliers based on their performance on quality and cost



Supplier engagements

Doing intensive projects on-site at suppliers and organizing for learning across the supply chain

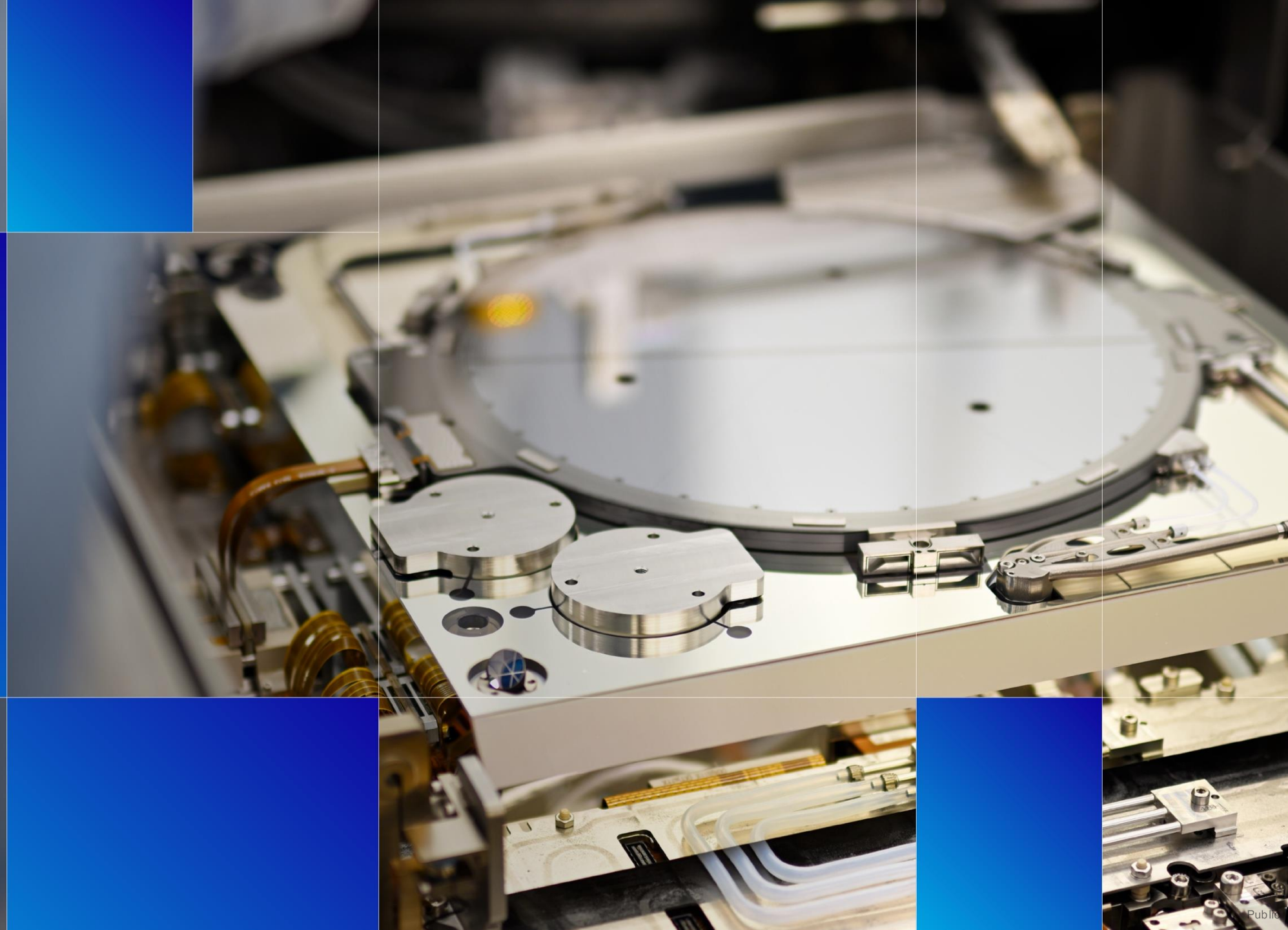
Global footprint

Growing our supply chain in Asia to free up capacity in Europe/US for technology and innovation, improve cost and be close to our customers

This requires teamwork across the value chain and over the product lifecycle

Our innovation network

Q&A



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