Strategic report

From ASML's Annual Report 2024

The separate downloads are an extract from the 2024 Annual Report based on US GAAP. You are urged to read carefully the 2024 Annual Report based on US GAAP in its entirety. We also publish an Annual Report based on EU-IFRS. Both Annual Reports can be found on our website. The 2024 Annual Report based on US GAAP is also available on the SEC's website at http://www.sec.gov. The 2024 Annual Report based on EU-IFRS is also available on the website of the AFM at http://www.afm.nl

Our technology drives faster, more powerful and energy-efficient microchips that help society tackle important challenges.

This continuous innovation can only be achieved through the strong partnerships we build with our various stakeholders, working together to create solutions for a more sustainable future for everyone.

Powering technology forward

with customers
See page 12 >

with our people
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with suppliers
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with partners
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with local communities
See page 16 >

Special note regarding forward-looking statements

General

This Annual Report contains statements relating to our business, expected results, business and industry trends, environmental targets, and other matters that are "forward-looking" within the meaning of the Private Securities Litigation Reform Act of 1995. You can generally identify these statements by the use of words like "may", "will", "opportunity", "potential", "could", "should", "project", "believe", "anticipate", "expect", "plan", "estimate", "forecast", "model", "aim", "seek", "intend", "continue", "commit", "target", "future", "progress", "goal" and variations of these words or comparable words. They appear in a number of places throughout this Annual Report and include statements with respect to: expected trends, plans, expectations, strategies, priorities, goals, and outlook, expected financial results, including expected results for Q1 and full year 2025, including expectations with respect to revenue, gross margin, estimated annualized effective tax rate, sales by market segment and net service and field option sales and expected drivers thereof, and other full year 2025 expectations and outlook, expectations with respect to expected revenue growth in 2026 and other statements with respect to outlook and expected drivers thereof, statements made at our 2024 Investor Day, including revenue and gross margin opportunity, model and potential for 2025 and 2030 and annual growth in sales 2025-2030 and expectations on growth in semiconductor end markets, statements made in the section entitled "Long-term growth opportunities", expected capital expenditures, and R&D spending targets and plans, expected business and industry trends and outlook, including expected semiconductor industry size and trends and trends in markets served by our customers, expected growth in the semiconductor industry and ecosystem and expectations of worldwide semiconductor sales by 2030, expected GDP growth, business environment trends, including expected demand, utilization, inventory levels, expected recovery in the semiconductor industry and expected timing thereof, expected growth in global wafer capacity, expectations about the emergence of AI and its expected impact on the semiconductor market and expected trends in AI, electrification and the energy transition, expected growth in semiconductor end markets and market opportunity for 2025 and 2030 and outlook CAGR from 2025 to 2030 and key drivers and global trends expected to fuel semiconductor growth in the longer term, statements made in the section entitled "Macroeconomic and geopolitical trends", plans to increase global semiconductor capacity and expected growth in semiconductor ecosystem, Moore's Law and continuation of shrink, including the expectation of lithography remaining one of the key drivers of Moore's law, expected trends in customer demand, export control policy and regulations and expected impact on us, our plans to increase capacity, and expected or planned production capacity, expectations with respect to systems being operational in customer factories, expectations about the use of our tools by customers including expected timing of high-volume production of systems, such as Twinscan EXE, product roadmaps and customer roadmaps, our expectation that lithography will continue to be at the heart of customer innovation, expected productivity and other attributes and benefits of our tools, our environmental, social, and governance (ESG) and sustainability strategy, plans, commitments and targets, including emissions and waste reduction aims, commitments and targets and our aim for SBTi approval of certain of our targets and our expectations about meeting or being on track to meet these targets and other ESG goals and targets, recycling and refurbishment initiatives, energy-saving and renewable energy use strategies and targets, including plans and targets to achieve greenhouse gas neutrality and emissions reductions targets, our target to achieve zero waste from operations to landfill and incineration and target dates to achieve those targets, assumptions underlying our projections related to ESG targets and reliance on suppliers to meet ESG goals to enable us to meet our ESG goals, plans to purchase renewable energy and carbon credits, potential for semiconductors to reduce greenhouse gas emissions, plans for our systems to use less energy and our energy savings plans, and diversity and other ESG targets and commitments, capital allocation policy and cash return and dividend policy and statements about our share buyback program and our proposed dividend for 2025 and other non-historical statements.

These forward-looking statements are not historical facts, but rather are based on current expectations, estimates, assumptions and projections about business and future financial results, and readers should not place undue reliance on them. Forward-looking statements do not guarantee future performance, and actual results may differ materially from projected results as a result of certain risks and uncertainties. These risks and uncertainties include, without limitation, those described under the section entitled "How we manage risk – Risk factors". These forward-looking statements are made only as of the date of this Annual Report. We do not undertake to update or revise the forward-looking statements, whether as a result of new information, future events or otherwise.

Regarding emission reduction targets

This Annual Report contains statements relating to our approach to and progress on achieving certain energy efficiency and greenhouse gas emissions reduction targets, including our ambition to achieve greenhouse gas neutrality.

References to "greenhouse gas neutral" means remaining emissions, after ASML's efforts to reach its GHG emission reduction targets, are compensated by the same amount of metric tons of carbon credits that are verified against recognized quality standards.

Unless otherwise indicated, information contained in this Annual Report concerning greenhouse gas emission reduction targets is based on our internal environmental management system implemented to monitor energy use and emissions, as well as publicly available information, including the guidance from the Greenhouse Gas Protocol for the calculation of the GHG emissions, the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) and certain conversion factors.

Given that such data in the Sustainability statements is derived from various sources, is processed differently across our operating subsidiaries and departments, and depends on certain estimates and assumptions, there is an inherent degree of uncertainty in the estimations of such data. You are cautioned not to give undue weight to such data.

Forward-looking information concerning greenhouse gas emissions and greenhouse gas neutrality are subject to qualifications and the uncertainties as set forth under "Special note regarding forward-looking statements" in this Annual Report.

We are a global innovator

As one of the leading innovators in the semiconductor industry, ASML has been helping chipmakers push technology to new limits and solve some of society's toughest challenges since 1984. Together, our hardware, software and services provide a holistic lithography approach to mass-producing the patterns of microchips.

We design and integrate lithography systems with computational tools, metrology and inspection systems, and process control software solutions – helping chipmakers achieve their highest yields and best performance.

ESG
Read more about how we embed ESG sustainability across our business.
Page 166 >

Why we exist – our purpose

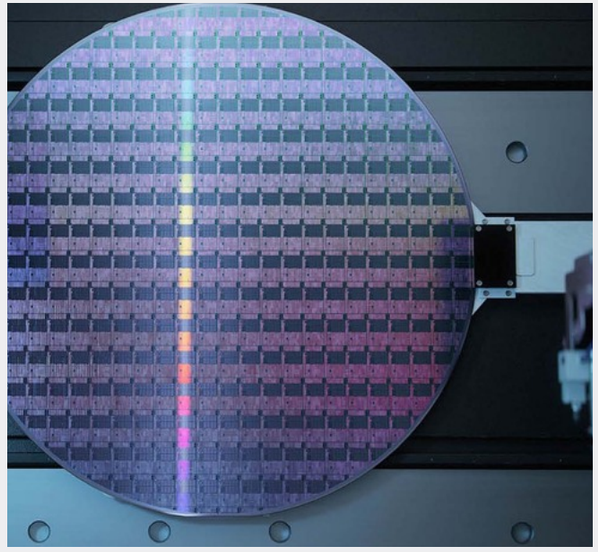
Unlocking the potential of people and society by pushing technology to new limits.

What we try to achieve – our vision

We enable groundbreaking technology to solve some of humanity's toughest challenges.

What we uniquely do – our mission

Together with our partners, we provide leading patterning solutions that drive the advancement of microchips.



We live by our values to drive success

We challenge
By questioning the status quo and pushing boundaries, keeping technology moving forward.

We collaborate
By tapping into the collective potential of our ecosystem of customers, suppliers, partners and stakeholders, creating better solutions.

We care
By acting with integrity and respect, and providing a safe, inclusive and trusting environment where our people can learn and grow.

Key facts and figures 2024

Rounding differences may occur.

Page 166>

€28.3bn
Total net sales
€22.4bn Asia
€4.5bn US
€1.3bn EMEA
Read more on page 55 >

€4.3bn
R&D costs
We innovate across our entire product portfolio through strong investment in R&D
Read more on page 296 >

32.8 kt
Scope 1 and 2 CO_2e emissions
Read more on page 194 >

51.3%
Gross margin
Read more on page 55 >

21%
Women in entire workforce (headcount)
Read more on page 258 >

583
Net system sales (in units)
Read more on page 340 >

44,027
Total employees (FTEs)
25,848 EMEA
9,699 Asia
8,480 US
Read more on page 258 >

12.0 Mt
Scope 3 CO_2e emissions
Read more on page 194 >

60+
Locations

3
Continents

148
Nationalities

86%
Customer satisfaction survey score
Read more on page 28 and page 46 >

5,150
Total suppliers
1,600 in the Netherlands
750 in EMEA (excl. NL)
1,400 in North America
1,400 in Asia
Read more on page 287 >

€3.0bn
Returned to shareholders
Read more on page 336 >

88%
Reuse rate of parts returned from field and factory
Read more on page 234 >

€1,084
Amount invested per employee, including employee giving
Read more on page 305 >

In conversation

With our President, Chief Executive Officer and Chair of the Board of Management

Christophe Fouquet

“We are committed to powering people and technology forward with you.”

Christophe Fouquet
President, Chief Executive Officer and Chair of the Board of Management

At the 2024 AGM, Christophe Fouquet was appointed President, Chief Executive Officer and Chair of the Board of Management of ASML, succeeding Peter Wennink and Martin van den Brink. In this Q&A session, Christophe outlines the key achievements of the last 12 months, his priorities as the company continues to grow rapidly, and his expectations for the years ahead.

Q Looking back at the year, what were the standout moments?

There were many! This was a period when we installed the industry’s first High NA extreme ultraviolet (EUV) lithography system, achieved financial performance in line with expectations, delivered on our environmental, social and governance (ESG) commitments and continued to lay down plans that will ensure that ASML maintains and extends its standing as one of the world’s great technology companies.

As many stakeholders have told me, the transition from Peter and Martin to me was as smooth as a Formula One pit stop, and I thank them both for their support. Great credit is due for their astonishing legacy of innovation which is helping the world rise to its biggest challenges, from climate change and the energy transition to unleashing the full benefits of artificial intelligence (AI).

Celebrating the 40th anniversary of ASML

In 2024, we celebrated the 40th anniversary of ASML, and while this was a moment for us to come together to reflect on the past, it was also an opportunity to look ahead. ASML was once a small, obscure company that nobody had heard of, but its role in our industry and in society has changed dramatically over the last four decades. Driven by our strong relationships with our customers, who are always our top priority, we have grown to become an undeniably important global company – but of course, ASML cannot and will not stand still. There is always more that can and must be done.

As we expected, 2024 was a year of transition – not only in terms of the leadership team, but also from a market point of view. The business again performed very well, as we explain in detail elsewhere in this report, growing sales to €28.3 billion, up by 2.6% over 2023. Our gross margin was 51.3%, similar to last year and we paid dividends totaling €2.5 billion, while our backlog stands at around a healthy €36 billion.

In conversation (continued)

With our President, Chief Executive Officer and Chair of the Board of Management
Christophe Fouquet

Q What were the major innovations that helped ASML push technology forward?

Innovation is the heartbeat of our company, and in 2024 it was very pleasing to finalize the first installation of our High NA EUV system (TWINSCAN EXE:5000) at one of our major customers. Ten years in the making, High NA EUV (EUV 0.55 NA) has been a huge investment for ASML and demanded seamless collaboration with partners and customers who have invested in the next generation of tools. We are very happy that High NA EUV is now operational and playing its part in moving Moore's Law forward.

> “We’ll continue to enable many of the solutions that are transforming our planet.”

Christophe Fouquet
President, Chief Executive Officer and Chair of the Board of Management

However, serving customers well requires more than just the latest and greatest products – it also means focusing on all the other essential yet less newsworthy innovations that are so important to our customers. It gave us real satisfaction to ship the first TWINSCAN NXE:3800E, increasing productivity by more than 35% as compared to its predecessor, the TWINSCAN NXE:3600D, and also to take a major step in deep ultraviolet (DUV) with the shipment of the first TWINSCAN NXT:870B, which delivers major progress on productivity, overlay and cost per exposure compared to its predecessor, the TWINSCAN NXT:870. There are many other examples of how our innovations are continuing to deliver demonstrable improvements for our customers – in areas from immersion lithography systems to metrology, control solutions and multibeam technology.

Q Where do you see future growth coming from?

As we shared at the 2024 Investor Day, during the last 12 months AI has come to life and proved itself to be a major force. It is going to drive new applications and growth in the next five to ten years – there’s no doubt about this, and a lot of our peers in the industry have also expressed similarly bullish views about the opportunity ahead. Today, its impact is mainly evident in the sales of very advanced servers and high-power computing. But we expect that there is a lot more to come – we don’t know exactly in what form, or when and how, but it will for sure be a very important factor for our industry, with transformational and positive consequences for ASML and for society.

TWINSCAN NXE:3800E

In conversation (continued)

With our President, Chief Executive Officer and Chair of the Board of Management
Christophe Fouquet

> **“The more diverse the people we welcome to ASML, the more opportunities we have to enrich what we do every day.”**

Christophe Fouquet
President, Chief Executive Officer and Chair of the Board of Management

If I look at the future growth of ASML, then of course lithography remains one of the key drivers of Moore’s Law, and we believe this will continue to be true for many, many years. At the same time, as we realized several years ago, 2D shrink is becoming more and more difficult. This is not necessarily because of limitations in lithography, but because we have almost reached the limitations of the transistors that our Logic and Memory customers are using. In order to continue to make progress on 2D shrink, we need architecture and device innovation. That means 3D front-end integration, which will in turn present a growth opportunity for us – because 3D integration depends on bonding and this requires holistic lithography. I think that 3D integration is set to be an increasingly important complementary technology, or set of technologies, to 2D shrink.

Q Stakeholders are integral to ASML’s success. How do you engage and collaborate with them?

Our stakeholder relationships – with customers, employees, suppliers, shareholders and society – are incredibly important to us and we work hard to create and maintain strong relationships with them. Trust is an essential part of partnership, and while we’ve successfully focused on building trust with our customers, we are now striving to extend that notion to all of our stakeholders. That means sharing our future vision, being transparent about what comes next and how a particular stakeholder can play a role.

Regular customer engagement helps us to understand our customers’ needs and can shape our technology development to meet them – fostering collaboration that not only enhances customer satisfaction but also supports our market position. We could not meet customer needs without the support of our suppliers, who provide essential components and materials, and help us maintain the high quality and reliability of our products. Strong partnerships with suppliers also promote innovation, enabling us to develop cutting-edge solutions together. Ultimately, the success of our customers and the strength of our supply chain are intertwined, making both groups absolutely central to our business strategy.

Engagement with broader society, including local communities and governments in the regions around the world we operate in, is equally important. For example, we are engaging and investing proactively in the region around our Veldhoven headquarters, working hand in hand with the community. In fact, there has been a significant discussion this year about strengthening the industry in the Brainport Eindhoven region and the Netherlands, through partnerships and funding from authorities and industry that are designed to create societal solutions and fuel future economic growth in a responsible way. By collaborating with the Brainport Eindhoven community, we can build a future that works for ASML as well as for the broader society.

We also want to partner with the government in order to address some of the complex geopolitical questions that we face. As a global company that is also a Dutch and European champion, we need to work alongside our government to help us move forward, to ensure our interests are represented and to shape an outcome that is good for Europe, for the Netherlands and for ASML.

In conversation (continued)

With our President, Chief Executive Officer and Chair of the Board of Management
Christophe Fouquet

Q Sustainability is an important topic for all stakeholders. How is ASML performing?

The technology sector can fundamentally support other industries and society to achieve critical ESG targets. For example, the industry will require major innovation to reduce cost and energy consumption related to AI – this will drive collaborative advancements that benefit the entire ecosystem. We have the chance to contribute in ways beyond what we do here at ASML. Some of these ways are showcased in case studies throughout this report, and they are a real source of pride and motivation for a lot of our people.

I'm pleased with the progress we have made on scope 1, 2 and 3 emissions. I believe our environmental programs are strong and meaningful, and put us and our industry well ahead of many other industries. For the first time, we shipped a DUV system and a metrology system via sea instead of air in 2024. This is a relatively minor example of how we're addressing ESG, but it shows how wide we cast the net when looking for ways to make a difference.

For us, ESG has never been a fad or a fleeting fashion. It is simply the right thing to do – not only for ASML, but for everybody else too. As you can see from the extensive Sustainability statements section in this Annual Report, the ASML team has done a tremendous job preparing for the newly announced ESRS (European Sustainability Reporting Standards) reporting requirements. We are reporting as of this year in accordance with those ESRS requirements – an extraordinary achievement.

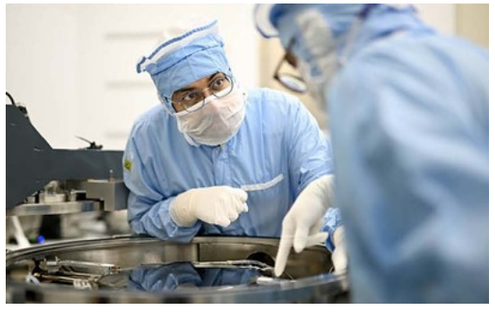
> **"The technology sector can fundamentally support other industries and society to achieve critical ESG targets."**
>
> **Christophe Fouquet**
> President, Chief Executive Officer and Chair of the Board of Management

Q What are your top priorities for 2025 and beyond?

A key priority is to continue to align with our customers' roadmaps. Our customers face a lot of difficult choices in the next few years – and they have to make sure that the technology they choose can deliver the outcomes they need. We're aware that the move to the next technology in our lithography systems could potentially come with very high costs for our customers.

Our task – and our opportunity – is to understand how we can help them, and to develop products and services that will enable them to achieve their quality goals at the lowest possible risk and the lowest possible cost. For me this is crucial, and it is a key priority on the technology side.

As always, we focus on our people, and specifically on how we can help them to take ASML to new levels. In recent months, I've stressed the importance of everybody at ASML taking ownership of what they do. I've also explained that to enable people to own their actions, we need greater simplification.



These two threads have become a crusade that will be increasingly evident in the months ahead. The combination of ownership and simplification is a powerful engine that will help our people innovate better and more.

Another important mission is to make sure that everybody feels that ASML is a place where they can realize their full potential. This has been a challenge in the last few years due to our rapid growth and the huge increases in headcount. But now we're redoubling our efforts – we're committed to making sure that ASML is somewhere that talented people have space to be creative, where they can collaborate with highly skilled colleagues and take us to the next level of innovation.

Q How can the ASML culture support you in achieving those aims?

Without doubt, it has a major role to play. A lot has changed over the last 40 years. The industry has moved on, customer expectations have ramped up, and the opportunities for technology have exploded. And while our culture and diverse workforce has been instrumental in getting us to where we are today, we need to constantly raise the bar and make sure it is totally aligned with the task ahead.

In conversation (continued)

With our President, Chief Executive Officer and Chair of the Board of Management
Christophe Fouquet

So our aim is not just to maintain this culture – we want to enrich it. By that I mean we have to be a lot better in every aspect of what we do, with the emphasis on flexibility, time to market, cost, quality, ownership and simplification. While it is the job of ASML's leadership to create and support this new enriched culture, it is also the responsibility of every single employee in the company. This must be an evolution, not a revolution, and it goes back to one of our core values: challenge. We need to challenge our own culture, retaining the best elements while adding in new ones in order to be an even better company. This becomes even more important as our headcount grows and new employees join ASML.

Diversity will continue to have a big part to play because it enables us to look at things from a range of different perspectives. This is something we've done with great success for many years.

The challenge is that sometimes inclusion does not come as naturally as diversity. Put simply, we need to do more to make everybody – regardless of background or culture – feel at home and welcome. ASML is a place that can turn any difference into an asset.

Q What's the business outlook for 2025?

Looking at the big picture, the long-term outlook for our industry is very strong despite the continuing geopolitical tensions, with semiconductors playing a major role as mission-critical enablers of multiple megatrends in society.

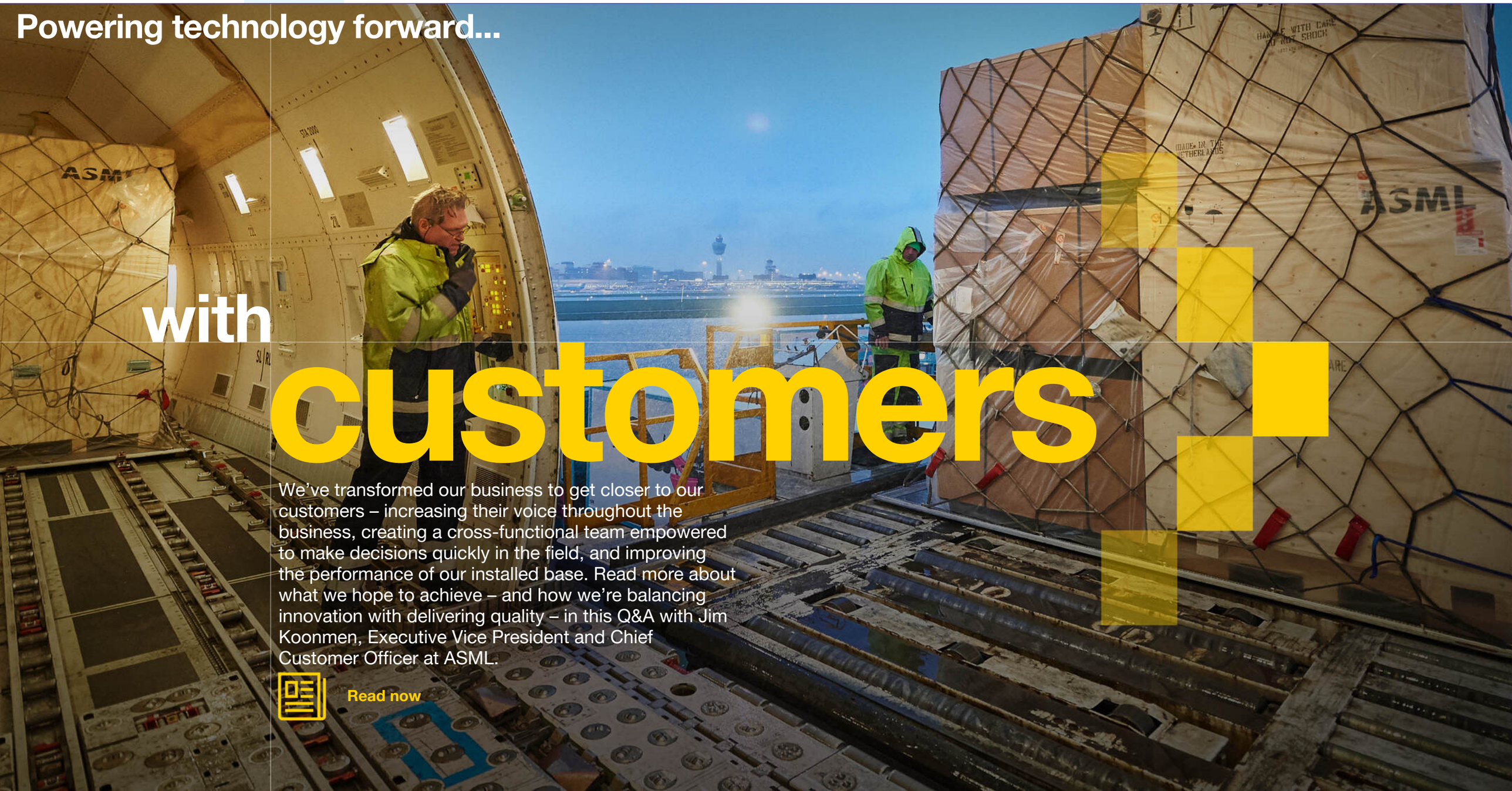
Although the rest of the market is recovering more slowly than anticipated, the emergence of AI is a significant opportunity. We expect that global semiconductor sales will grow by 9% compound annual growth rate over the period 2025 to 2030 and passing the $1 trillion mark in 2030. The industry will require major innovations to address the need to improve cost and energy consumption on AI, and this will require further boosting the industry roadmap.

As always, the period ahead will see our customers remaining at the center of ASML strategy – and we believe that lithography will continue to be at the heart of their innovation processes. Even for advanced chip manufacturing processes, lithography is still the best way to drive down costs and energy consumption.

ESG will also remain a key factor in everything we do. In recent years, we have worked very hard with our partners to make sure that our industry as a whole can lead the way on ESG. We have already taken huge strides, and we are committed to collaborating with our customers and our suppliers in order to make sure that we achieve the commitments we have made.

I would like to end by paying tribute to the skills and commitment of our people. Everything we have discussed here – all the innovation, growth and other achievements – is only possible because of our team. All our stakeholders recognize that our employees are our greatest strength. When we decide to do something, we get it done – and I want to thank everybody at ASML for getting it done, time and time again, not just over the past 12 months, but throughout the last 40 years. Together, we can look forward to achieving even more in 2025.

Powering technology forward...

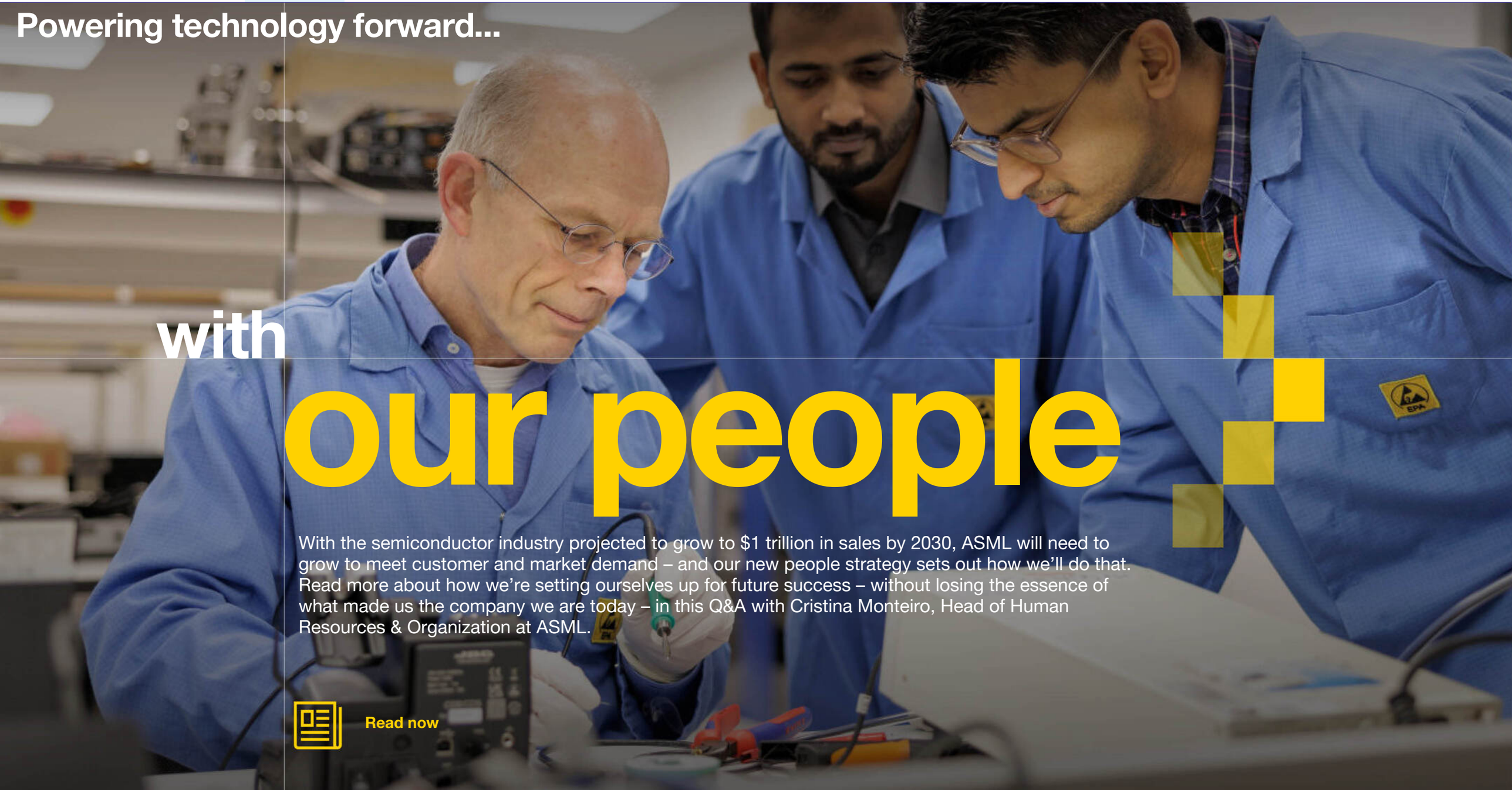


with customers

We've transformed our business to get closer to our customers – increasing their voice throughout the business, creating a cross-functional team empowered to make decisions quickly in the field, and improving the performance of our installed base. Read more about what we hope to achieve – and how we're balancing innovation with delivering quality – in this Q&A with Jim Koonmen, Executive Vice President and Chief Customer Officer at ASML.

Read now

Powering technology forward...



with our people

With the semiconductor industry projected to grow to $1 trillion in sales by 2030, ASML will need to grow to meet customer and market demand – and our new people strategy sets out how we'll do that. Read more about how we're setting ourselves up for future success – without losing the essence of what made us the company we are today – in this Q&A with Cristina Monteiro, Head of Human Resources & Organization at ASML.

Read now

Powering technology forward...

with suppliers

Our systems comprise thousands of parts, most of which come from our suppliers – they are an essential part of our innovation ecosystem. Read more about how we're better aligning with our suppliers – ensuring they can keep pace with our growth trajectory, while supporting their own – in this Q&A with Wayne Allan, Executive Vice President and Chief Strategic Sourcing & Procurement Officer at ASML.

Read now

Powering technology forward...

with partners

In 2024, imec, a world-leading research and innovation hub in nanoelectronics and digital technologies, and ASML opened the High NA EUV Lithography Lab in Veldhoven, the Netherlands, which is jointly run by ASML and imec. It marks a milestone in preparing High NA EUV lithography for accelerated adoption in mass manufacturing.

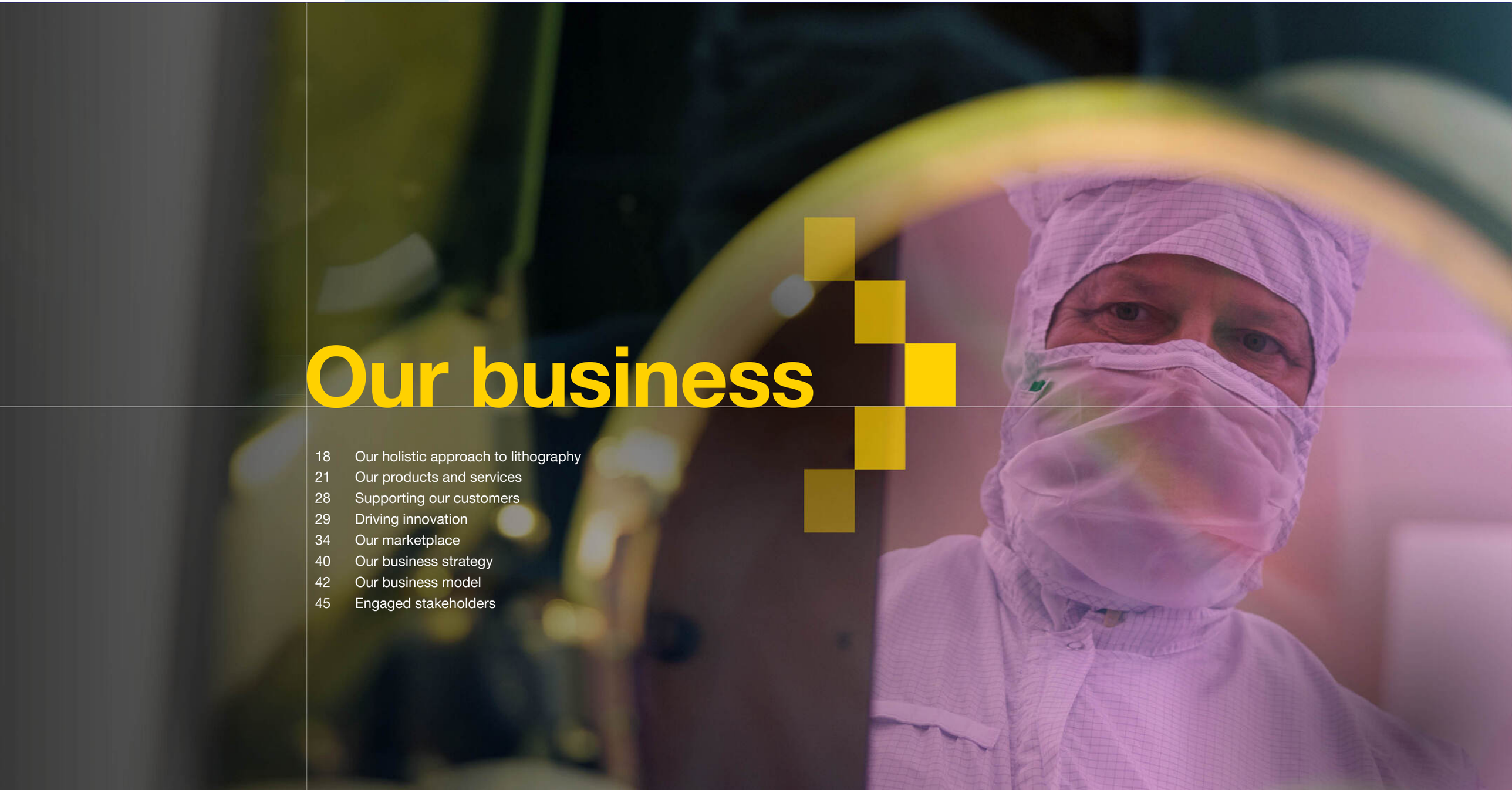
Read now

Powering technology forward...

with local communities

We value the support and contribution of the communities we're part of, and we feel a responsibility and a desire to give back to them. True to our mantra – Small acts. Big impact. Thrive together – ASML employees worldwide are playing a vital role in making an impact. Watch how we're providing technical training for people with refugee backgrounds in the Netherlands, supporting food banks in Taiwan, and mentoring young people in the US.

Watch now



Our business

Our holistic approach to lithography

Lithography technology – using light to print tiny patterns on silicon – is fundamental to the mass production of microchips. Our holistic approach is based on integrating our lithography systems with a set of products that optimize production of microchips and enable affordable shrink.

The semiconductor industry is driven by affordable shrink – the ability to make smaller, more energy-efficient transistors at the right cost. Reducing their size means more transistors can be packed into a given area of a microchip, increasing functionality and improving performance.

Microchips are made by building up complex, interconnected patterns of transistors, layer by layer, on a silicon wafer – a process ASML's lithography systems are central to. A lithography (more formally known as 'photolithography') system is essentially a projection system, with light projected through a blueprint of the pattern that will be printed (known as a 'mask' or 'reticle'). With the pattern encoded in the light, the system's optics shrink and focus the pattern onto a photosensitive silicon wafer. After the pattern is printed, the system moves the wafer slightly and prints another copy.

Lithography is a key driver for shrink. It determines the smallest feature sizes that can be printed on a chip, and therefore the number of transistors and the performance. To achieve shrink, lithography has to use shorter wavelengths of light and larger numerical apertures, as well as other advanced techniques such as immersion lithography – which allows chipmakers to print even smaller features with the same wavelength of light by projecting the light through a layer of water between the lens and the wafer – and multiple patterning.

As patterning gets smaller, our lithography systems become increasingly complex. And, as chipmakers print ever-smaller patterns, they face unprecedented engineering, material, constructional and manufacturing challenges. Many sources of variation and error can hinder the lithography process and must be controlled to ensure chips are produced with the required precision, in high volumes, as fast as possible and at the lowest cost.

To help our customers understand and correct for potential issues that could cause variations or errors, we provide them with support and solutions at every stage of the chipmaking process, from early design and development to high-volume production. We do this by taking a holistic, integrated approach to lithography that enables customers to optimize the system setup and process window for high-volume manufacturing – helping them achieve their highest yields and best chip performance.

Our holistic approach helps minimize any deviation between the intended and printed features of a microchip layout (so-called 'edge placement error' – see box), optimizing the lithography system's performance, stability and yield – including maximizing the number of good wafers per day – and enabling ever-smaller chip features.

What is edge placement error (EPE)?

Creating a microchip involves the patterning of tiny features in precise locations. EPE is the difference between the intended and the printed features of the layout of a microchip. Take, for example, a line with right and left edges – on a microchip, this line and its edges must be precise and placed in exact locations. Any deviation, no matter how slight, can result in misalignment, or an EPE. If one or more EPE issues crop up in the microchip production flow, the device is subject to shorts, which could cause the entire chip to fail.

Our holistic approach to lithography (continued)

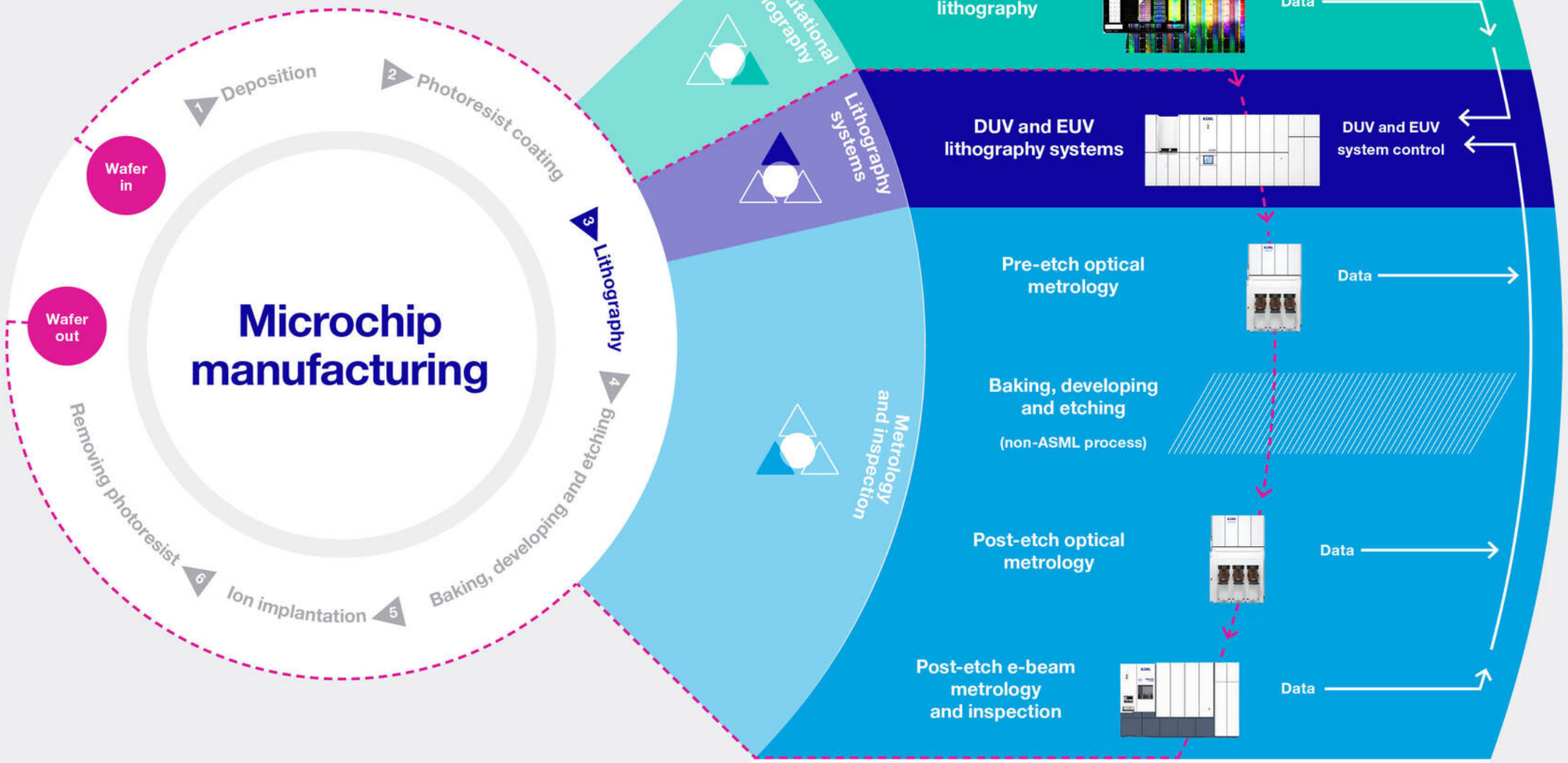
Creating value in our customers' fabs

Because lithography is a critical step in the chip manufacturing process where the wafer is processed die by die – and therefore has a greater impact on performance than any other – ASML's technology is pivotal in our customers' semiconductor fabrication plants (or 'fabs'). Our holistic approach helps increase lithography systems' availability, reduce overall costs, and optimize yield for our customers.

Steps in the microchip manufacturing process:

1. **Deposition** – The first step is typically to deposit different materials – such as metals/conductors, insulation films and semiconductors – onto a silicon wafer.
2. **Photoresist coating** – The wafer is then coated with a light-sensitive layer called a photoresist.
3. **Lithography** – Light is projected onto the wafer through a reticle. Optics shrink and focus the reticle pattern. This pattern is then printed onto the wafer when the resist layer is exposed to light.
4. **Baking, developing and etching** – The wafer is baked and developed to make the pattern permanent, with a pattern of open spaces. Reactive gases are used to etch away material from the open spaces, leaving a 3D version of the pattern.
5. **Ion implantation** – The wafer may be bombarded with positive or negative ions to tune the semiconductor properties.
6. **Removing photoresist** – After the layer is etched or ionized, the remainder of the photoresist coating that was protecting areas not to be etched is removed.

The entire microchip manufacturing process – from start to tested and packaged device, ready for shipment – can take half a year, depending on the complexity of the microchip.



Our holistic approach to lithography (continued)

Maximizing the process window

Our holistic approach to lithography integrates a set of products – enabling chipmakers to develop, optimize and control the semiconductor production process.

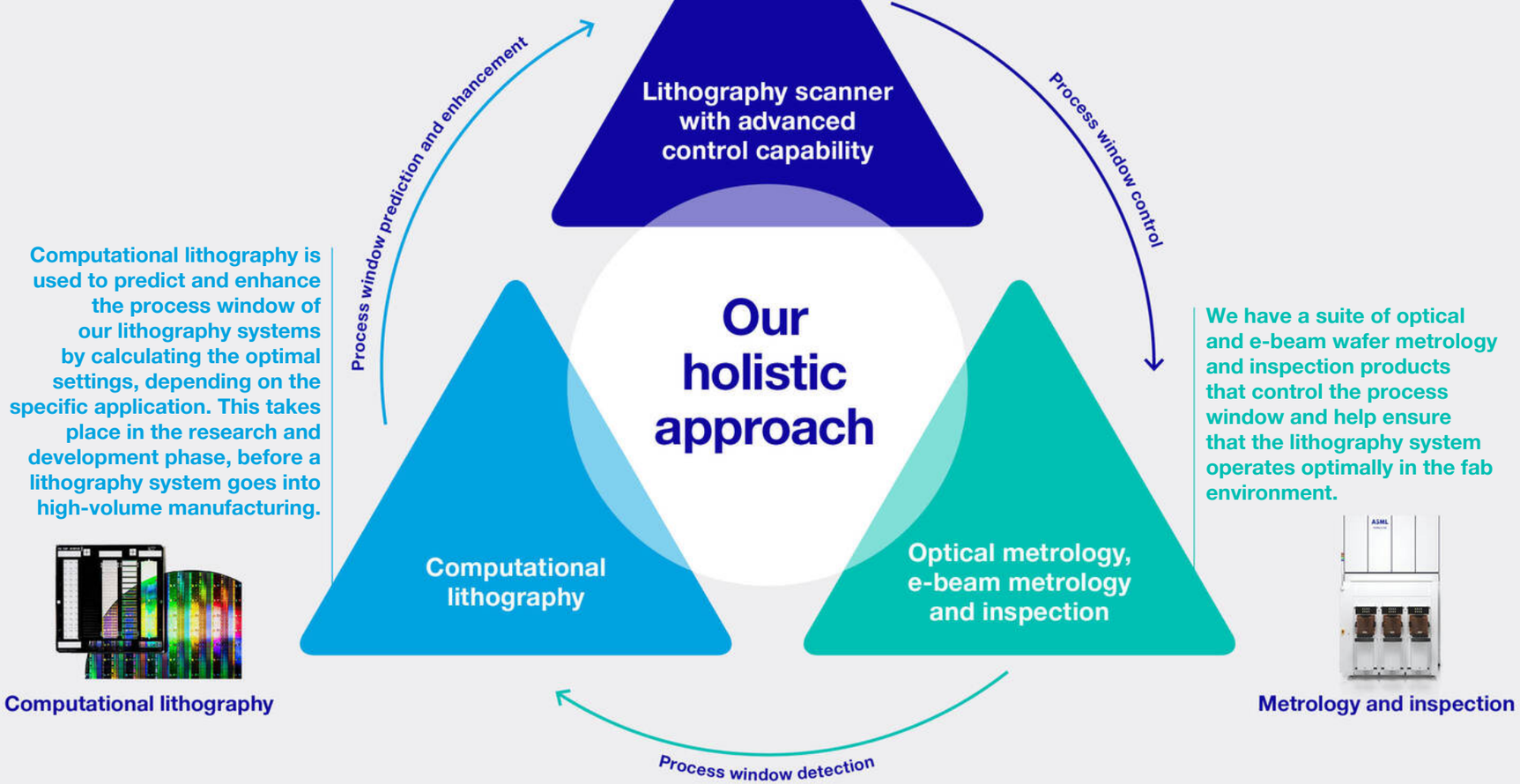
Lithography and all other stages in the microchip manufacturing process must be closely aligned for an optimal result. Within lithography, the process window is the collection of acceptable variations of process parameters that allow a microchip to be manufactured and to operate under desired specifications.

By incorporating computational lithography, metrology and inspection, ASML's holistic lithography portfolio enables customers to maximize the process window – keeping lithography systems stable in a high-volume manufacturing setting, which leads to a higher yield with more good wafers per day. Lithography is the only step in the microchip manufacturing process in which in-line adjustments can be made to optimize performance.

It would be impossible for our lithography systems to manufacture chips at such increasingly small dimensions without the software we develop. Our system and process control software products enable automated control loops to maintain optimal operation of lithography processes and therefore maximize yield. As a result, our lithography systems are a hybrid of high-tech hardware and advanced software. Our development teams work across a range of coding practices, providing innovative solutions to the intricate problems affecting the chipmaking systems at the heart of the semiconductor industry.

EUV: 0.55 NA / 0.33 NA

DUV: ArF immersion, ArF, KrF, i-line



Computational lithography is used to predict and enhance the process window of our lithography systems by calculating the optimal settings, depending on the specific application. This takes place in the research and development phase, before a lithography system goes into high-volume manufacturing.

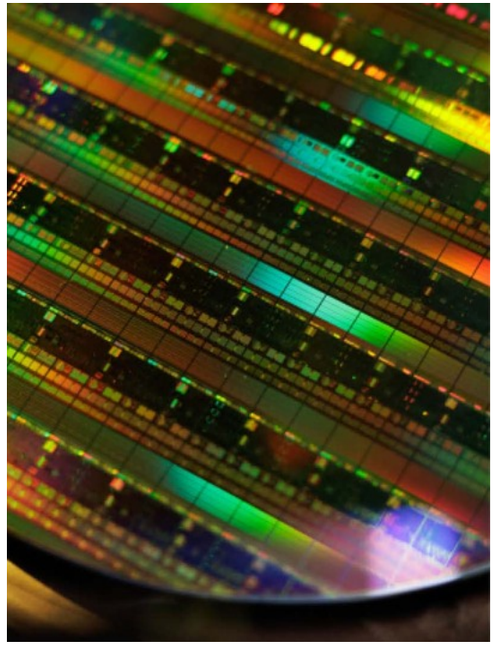
Computational lithography

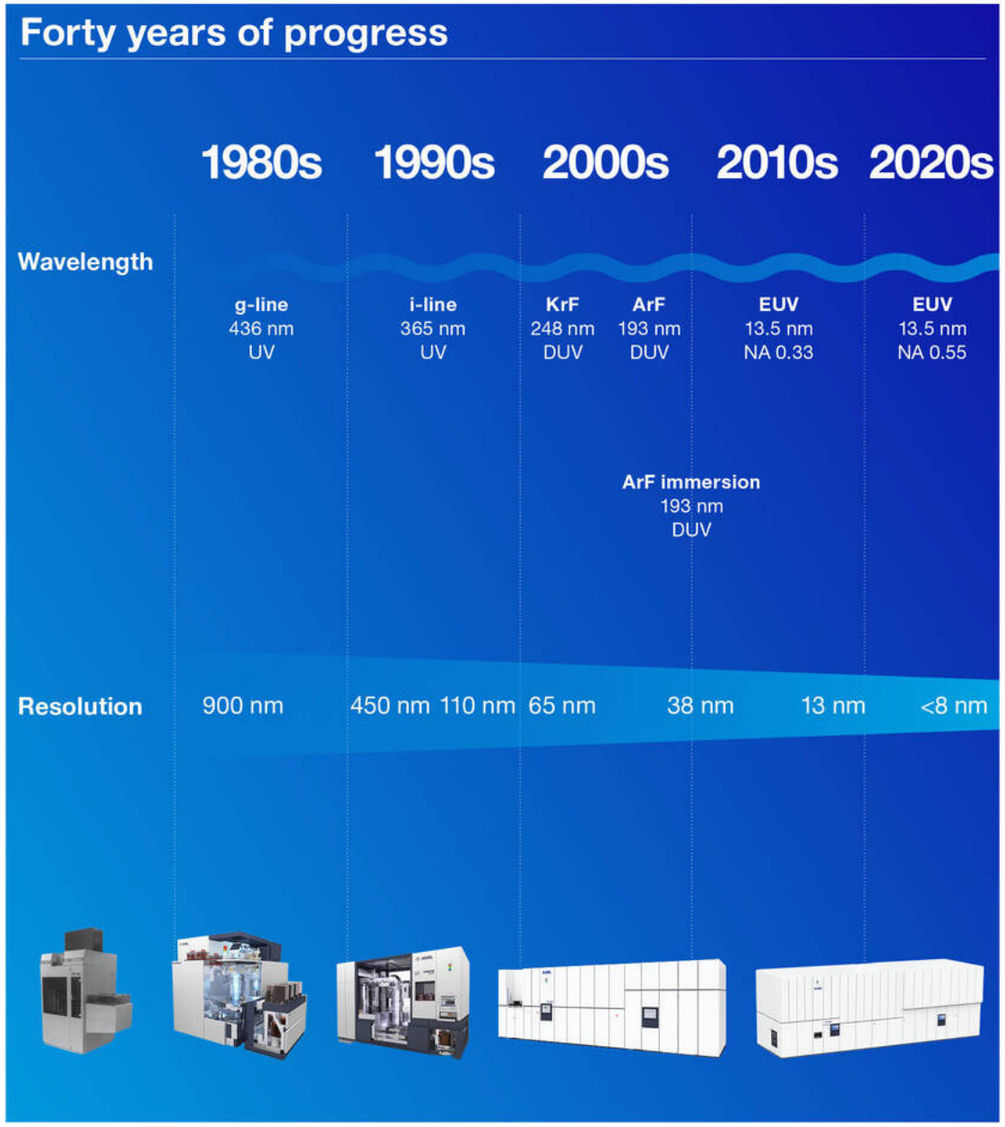
We have a suite of optical and e-beam wafer metrology and inspection products that control the process window and help ensure that the lithography system operates optimally in the fab environment.

Metrology and inspection

Our products and services

Our comprehensive product portfolio is aligned to our customers' roadmaps, delivering lithography solutions in support of all applications, from advanced to mainstream nodes.





Extreme ultraviolet (EUV) lithography systems

Using EUV light at a wavelength of 13.5 nm, our EUV lithography systems make it possible to print the smallest features on microchips at the highest density – they are used for the most intricate, critical layers on the most advanced microchips. They also help simplify our customers' manufacturing processes, compared to complex multiple-patterning strategies using deep ultraviolet (DUV) immersion systems. ASML is currently the world's only manufacturer of EUV lithography systems.

TWINSCAN NXE platform (EUV 0.33 NA)

Our TWINSCAN NXE platform, with a numerical aperture (NA) of 0.33, was first introduced to customers in 2013 and is now widely adopted in high-volume manufacturing by our major customers. It extends our customers' Logic and Memory roadmaps by delivering improvements in resolution, productivity and overlay (layer-to-layer alignment) performance, enabling year-on-year cost reductions. Our EUV product roadmap is intended to drive affordable scaling to 2030 and beyond.

New for 2024: Our new NXE:3800E system boosts productivity and reduces error

In 2024, we installed the first TWINSCAN NXE:3800E systems. This system is the successor to the TWINSCAN NXE:3600D and includes a higher-power light source, a new wafer handler and faster wafer stages.

It increases productivity by more than 35% – up to 220 wafers per hour (wph), compared to 160 wph using the NXE:3600D – while driving consistent overlay accuracy across different tools (matched machine overlay) down to 0.9 nm, compared to 1.1 nm with the NXE:3600D.

TWINSCAN NXE:3800E ▶

Our products and services (continued)

Extreme ultraviolet (EUV) lithography systems

TWINSCAN EXE platform (EUV 0.55 NA)

High NA EUV, with an NA of 0.55, is an evolutionary step in EUV technology, introducing a novel optics design and significantly faster reticle and wafer stages. Our new TWINSCAN EXE platform offers chipmakers a critical dimension (the smallest feature that can be printed) of 8 nm. When compared with the TWINSCAN NXE systems, this means they can print transistors 1.7 times smaller – and therefore achieve transistor densities 2.9 times higher.

These enhancements offer considerable benefits to our customers, enabling lithography simplification for future nodes, higher yields and decreased defect density for both Logic and DRAM. EUV 0.55 NA will help our customers extend their shrink roadmap and minimize double or triple patterning compared with 0.33 NA, leading to reduced patterning complexity, lower risk of defects and a shorter cycle time.

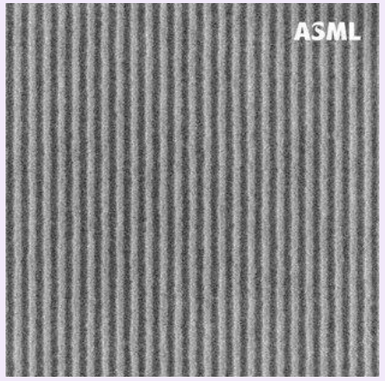
In addition, the EXE platform has been designed to maximize commonality with the NXE platform to drive cost reduction, speed up the development of new solutions and optimize future reuse. Currently, they have a common wafer stage and source module. Our future systems will further extend this commonality with the ultimate goal of having a common platform early next decade that will only differentiate between systems from an optics point of view.

We expect our TWINSCAN EXE platform to start supporting high-volume manufacturing in 2026 and have received purchase orders from all our major EUV customers for the delivery of the TWINSCAN EXE:5200B systems – high-volume EUV production systems with 0.55 NA and a higher number of wafers per hour.

New for 2024: High NA EUV success with our TWINSCAN EXE:5000

To prepare High NA EUV (0.55 NA) for high-volume manufacturing, the first operational prototype was made available to chipmakers in the new ASML-imec High NA EUV Lithography Lab at our Veldhoven campus (the Netherlands). Two more TWINSCAN EXE:5000 systems were assembled and installed at an Intel plant near Hillsboro, Oregon (US), and a fourth system was shipped to a customer in Asia. In April 2024, the High NA EUV system in Veldhoven printed the first-ever 10 nm dense lines, with imaging done after optics, sensors and stages completed coarse calibration (see image on the right). This important milestone showed the system is functioning, though not at full performance in a high-volume manufacturing environment yet.

The TWINSCAN EXE:5000 EUV system is the first in a new generation of machines that will provide 8 nm resolution to support advanced Logic and Memory chip production. It allows chipmakers to reduce process complexity in high-volume manufacturing by using single instead of multiple patterning. This increases wafer output in customer fabs by reducing production cycle time. The technology will enable multiple future chip architectures, starting at the 2 nm Logic node and followed by Memory nodes at a similar transistor density.



TWINSCAN EXE:5000 ▶

Our products and services (continued)

Deep ultraviolet (DUV) lithography systems

DUV lithography systems are the workhorses of the industry, producing the majority of layers in microchips. Supporting numerous market segments, we offer immersion as well as dry lithography systems, using a range of light sources to offer all wavelengths currently used in the semiconductor industry: argon fluoride (ArF) lasers for 193 nm wavelength, krypton fluoride (KrF) lasers for 248 nm and mercury vapor discharge lamps (i-line) for 365 nm. Our systems lead the industry in productivity, imaging and overlay performance to help manufacture a broad range of semiconductor nodes and technologies, and support the industry's cost- and energy-efficient scaling.

Immersion systems (NXTi platform)

ArF immersion lithography maintains a thin layer of water between the lens and the wafer. Using the refractive index of water to increase NA improves resolution to support further shrink. Our immersion systems are suitable for both single-exposure and multiple-patterning lithography, and can be used in seamless combination with EUV systems to print different layers of the same chip.

New in 2024

The TWINSCAN NXT:2150i is a dual-stage DUV immersion lithography system with a 193 nm ArF light source and a numerical aperture (NA) of 1.35 – the highest in the semiconductor industry right now. It offers better overlay and imaging performance at higher productivity (up to 310 wafers per hour) compared to the TWINSCAN NXT:2100, and with less process complexity.

TWINSCAN NXT 2150i ▼

Dry systems (TWINSCAN NXT and TWINSCAN XT platform)

Not every layer on a chip has to be produced by the most innovative immersion lithography systems. While some more complicated layers do require more advanced lithography systems, others can often be printed using 'older' technology such as dry lithography systems.

With our dry systems product portfolio, we aim to offer our customers more cost-effective solutions for all wavelengths.

Our products and services (continued)

Deep ultraviolet (DUV) lithography systems

New in 2024

The expected growth of the mainstream semiconductor market requires an increase in global lithography capacity – particularly in 200 mm (or 8-inch) wafer fabs, where approximately half of all mainstream node products are manufactured today. To help meet this need, we shipped our first TWINSCAN XT:400M – the successor to the TWINSCAN XT:400L – in April 2024. This dual-stage i-line dry lithography system prints 200 mm and 300 mm wafers with ≤ 20 nm overlay across the entire wafer, increasing productivity in mature-technology markets.

The TWINSCAN NXT:870B is our latest KrF system that not only aims to set new productivity records – 400 wph compared to the 330 wph of its predecessor, the TWINSCAN NXT:870 – but will also feature a significant improvement in overlay and cost per exposure.

We continue to innovate in productivity, cost of ownership and performance across our TWINSCAN NXT and TWINSCAN XT product lines (ArF, KrF and i-line) for 200 mm and 300 mm wafer sizes.

TWINSCAN XT:400M ▲

Refurbished systems

Our refurbished products business refurbishes and upgrades our older lithography systems to extend their lives, and offers associated services and support. We currently offer refurbished PAS 5500 and first-generation AT, XT and NXT systems.

ASML systems have a very long operational lifetime that often exceeds their role at the initial customer – remarkably, 95% of the systems we have sold in the last 30 years are still in use. Many customers are able to generate value by selling systems they no longer require. To support this sustainable product use and ensure used systems still deliver the quality ASML stands for, we are actively involved in the used-system market.

Read more in Sustainability statements – Environmental – Circular economy

PAS 5500 ▼

New in 2024: NXT refurbishment

In 2023, after years of refurbishing PAS and XT systems, we expanded our refurbished systems portfolio by adding NXT systems. We shipped the first refurbished NXT 1980Di system from our TWINSCAN factory to a customer in 2024, addressing a specific market segment that requires it.

While we continue to produce new NXT systems, the NXT 1980Di refurbishment represents an impressive enhancement to our portfolio, utilizing a new industrialized approach for volume, efficiency, quality and cost.

Our products and services (continued)

Metrology and inspection systems

Our metrology and inspection systems enable chipmakers to accurately measure the printed patterns on wafers, ensuring they align with the intended designs. Our comprehensive portfolio supports chipmakers in optimizing patterning throughout every stage of the manufacturing process, from research and development to mass production.

These systems are a key element of our holistic approach to lithography. They produce data at the speed and accuracy needed during high-volume manufacturing to enable our process control software solutions to create automated feedback control loops. This optimizes the lithography system settings for each exposure to reduce edge placement error (EPE), widening the process window to achieve the highest yield and best performance.

Optical metrology

Our YieldStar optical metrology systems allow chipmakers to assess the quality of patterns on the wafer in volume production, through fast, accurate overlay measurements. We offer two categories of YieldStar systems for use before and after 'etching' (the stage when the material in any open spaces is removed to reveal the 3D version of the patterns on the wafer). Pre-etch metrology measures the overlay and focus of the lithography system and the pattern printed on the photoresist. Post-etch metrology measures the overlay and critical dimension (CD) of the final patterns formed on the wafer.

YIELDSTAR 1390 ▶

New in 2024

In 2024, we shipped the first 'early access' YieldStar 1390 – our next-generation standalone in-device metrology system. It is used for post-etch overlay measurements, enabling the inspection of device structures with more accuracy and higher speeds than scanning electron microscope (SEM) solutions. This supports very high sampling densities, driving more advanced process window control loops that improve the overlay performance and yield of the whole semiconductor manufacturing process, while reducing the cost of ownership significantly for metrology.

In 2024, we shipped our 1,000th YieldStar system, marking a significant milestone since the first YieldStar (250D) was shipped to customers in 2008.

Our products and services (continued)

Metrology and inspection systems

E-beam metrology and inspection

Our HMI high-resolution electron beam (e-beam) systems provide critical dimension (CD) and edge placement error (EPE) metrology and defect detection, for chip development and production monitoring at high throughput. This capability enables our customers to identify and analyze individual chip defects among millions of printed patterns, significantly enhancing process control.

While e-beam solutions were historically too slow to monitor volume production processes, we have increased the throughput to now uniquely offer e-beam solutions for use in high-volume manufacturing (HVM) as well as the R&D phase, which involves extensive testing, validation and fine-tuning to optimize the complete microchip manufacturing process for reliable, high-yield mass production.

We offer two types of solutions to support R&D and HVM. E-beam metrology is used to monitor CD and EPE data at resolutions necessary for the implementation of EUV lithography, while e-beam inspection is used to monitor voltage contrast and physical defects for in-line process control.

Our groundbreaking multiple e-beam (multibeam) inspection systems leverage several of ASML's core technologies: advanced electron optics, advanced stages and computational technology. They operate at substantially higher throughput and lower cost of ownership, enabling broader adoption of multibeam voltage contrast and physical defect inspection for in-line monitoring in mass production.

We continue to extend technology leadership in voltage contrast inspection and physical defect inspection with the widely adopted single-beam platform. The HMI eScan 460 is our latest single-beam inspection system, delivering higher resolution and faster throughput to capture a wide range of voltage contrast defect types. The HMI eP5 XLE is our new high-resolution physical defect inspection system capable of a wide range of landing energies to detect buried and sub-surface defects in 3D devices.

Our single-beam metrology systems offer high-resolution and large field-of-view capabilities with metrology application software, enabling local and global CD and EPE measurements for EUV patterning process characterization and in-line monitoring and control.

New in 2024

In 2024, we shipped a number of HMI eScan 460 and HMI eP5 XLE single-beam inspection systems to customers worldwide to support their advanced node development and production.

Our first-generation multibeam system HMI eScan 1100 with 25 beams has demonstrated on average a 12x throughput advantage over single-beam systems in voltage contrast inspection use cases at Logic and DRAM customers. The higher throughput enables larger wafer area coverage for effective capturing of defect fingerprints, creating a strong customer pull for system shipments for in-line process monitoring in R&D and high-volume manufacturing.

We have released our next-generation high-resolution e-beam metrology system HMI eP6 for large-volume metrology applications and continued to ship eP6 systems to customers in 2024. eP6 has demonstrated metrology performance improvements over eP5 on customer wafers, with 50% improvement in precision, about 70% improvement in distortion (critical for EPE measurement) and 40% improvement in throughput.

HMI eSCAN 1100 SYSTEM ▶

Our products and services (continued)

System and process control software

Taking advantage of the flexibility of our lithography systems, our system and process control software products enable automated control loops to maintain optimal operation of lithography processes, thereby maximizing yield. Using powerful algorithms, they analyze metrology and inspection data and calculate necessary corrections for each individual exposure. This provides a feedback loop to the lithography system to minimize EPE in subsequent wafer lots.

Our roadmap aims to apply more powerful algorithms with higher-order corrections to enable our customers to continue improving EPE performance.

Our virtual computing platform (VCP) brings together all the data from lithography and metrology systems, enabling the latest ASML applications and enhancing transparency and collaboration. VCP manages peak loads and handles ever-increasing data speeds and volume with more computing power and storage in a modern and resilient software architecture.

Computational lithography

During lithography, diffraction of the light and physical and chemical effects in the photosensitive layer distort the image the machine is trying to print. Think of this like trying to draw a fine line with a broad watercolor paint brush – it smudges in many places.

By using computational lithography we can predict and enhance the process window of our lithography systems by calculating the optimal settings for each specific application. During the R&D phase, our customers rely on computational lithography to optimize the imaging conditions of our lithography system.

In addition, they develop the recipes to optimize reticle patterns to achieve the best pattern fidelity, which will be applied to each and every new reticle during high-volume manufacturing to ensure robust, manufacturable designs that deliver high yields. Insights from computational lithography solutions are also increasingly used to guide metrology and inspection, increasing throughput and enabling more precise process monitoring and control in high-volume manufacturing.

Our computational lithography solutions are based on accurate computer simulations of the lithography system and process, representing a wide variety of physical and chemical effects. With these simulations, we can predict how a designed pattern will appear when printed on a wafer.

We are increasingly using machine-learning techniques to further enhance the accuracy of models and reduce the computational time and cost. Our roadmap aims to apply more powerful algorithms with higher-order corrections, to enable our customers to continue improving EPE performance.

New in 2024

Computational lithography is advancing rapidly, focusing on enhancing the performance of lithography processes used in semiconductor manufacturing. Recent developments include improved algorithms for optical proximity correction (OPC) and source-mask optimization (SMO), which enhance pattern fidelity and resolution. Machine-learning techniques are increasingly being applied to predict and mitigate manufacturing variations, leading to better yield and efficiency.

Managing our installed base system

Our installed base continues to grow, comprising not only new systems but refurbished ones with new owners in new markets and applications as well. To provide our customers with the best value proposition, we offer an extensive installed base management portfolio, including a wide range of service and upgrade options.

We develop and sell product options and enhancements designed to improve throughput, patterning performance and overlay. Our field upgrade packages enable customers to optimize their cost of ownership over a system's lifetime by upgrading older systems to improved models.

Supporting our customers

We believe a strong relationship with our customers based on mutual trust is vitally important. We share the risks and rewards of what we do because our success is inextricably linked. We are one of the world's leading manufacturers of chipmaking equipment, while our customers are the world's leading microchip manufacturers. We enable them to create the patterns that define the electronic circuits on a chip.

That's why we collaborate with our customers to understand how our technology can best fit their needs and challenges: building partnerships, sharing knowledge and risks, aligning our investments in innovation, and increasingly focusing on the long-term challenges for the next five to ten years and beyond. The level and nature of collaboration varies from region to region and customer to customer depending on various factors.

We develop our solutions based on their input, help them achieve their technology and cost roadmaps, and work together – often literally in the same team – to ensure that what we build today is what they need tomorrow. Engaging fully with customers is also an important part of working toward securing the full product portfolio that will sustain our company into the future.

As our installed base continues to grow, we work very closely with our customers to develop and sell options and enhancements designed to improve throughput, patterning performance and overlay to optimize the cost of ownership over a system's lifetime.

Building on our customer relationships

We market and sell our products directly to customers. Our account managers, field and application engineers, and service and technical support specialists are located close to our customers' operations throughout Asia, the US, and Europe, the Middle East and Africa (EMEA).

Trust is the foundation for our customer relationships. Our customers expect us to have the right means to meet their needs and expectations, consistently deliver upon the promises we make, be transparent about what we are doing, and fairly share the risks and rewards with them.

How we provide customer support

We support our customers 24/7 with a broad range of applications, services and technical support products to maintain and enhance our systems' performance – such as next-day parts delivery and an easy-to-use, centralized customer portal.

Dedicated customer support teams across the world effectively prioritize our customers' needs and then attach solving power in central organizations to address them. We seek to ensure the systems in our customers' fabs run at the highest levels of predictability and availability.

We have well-trained customer support engineers in the regions where we operate. Together with our Global Support Center, they manage to solve more than 99% of issues in the field. We offer specialized training on an ongoing basis to extend the capabilities of our local customer service teams, and we continue to further enhance the technical expertise of local field engineers.

In 2024, we integrated our customer-facing roles into one Customer Solution & Support (CS&S) organization to further simplify our customers' interface to ASML. We also appointed a Chief Customer Officer on ASML's Board of Management. We believe these developments will help us continue to provide excellent support and keep on building customer trust as the business grows.

Read more in Strategic report – Our business – Engaged stakeholders – Customers

Where we operate – more than 60 locations across 3 continents

Asia

China
Japan
Malaysia
Singapore
South Korea
Taiwan

North America

Arizona
California
Colorado
Connecticut
Idaho
Massachusetts
New Mexico
New York
Oregon
Texas
Utah
Virginia

EMEA

Belgium
France
Germany
Ireland
Israel
Italy
Netherlands
United Kingdom

Driving innovation

Using the Rayleigh criterion to drive innovation

At ASML, we optimize the Rayleigh criterion equation to reduce the critical dimension so our lithography systems can print ever-smaller features.

Wavelength (lambda, λ)
Over the years, ASML's lithography systems have used shorter wavelengths of light to shrink chip features. We started with i-line systems using 365 nm ultraviolet (UV) light and added deep ultraviolet (DUV) systems with 248 nm light (KrF) and, later, 193 nm light (ArF). With the addition of our extreme ultraviolet (EUV) systems that use light with a wavelength of 13.5 nm – almost x-ray range – we enabled a significant leap in resolution.

Numerical aperture (NA)
One way that we increase NA – and therefore shrink chip features – is by using larger lenses and mirrors in our lithography systems. Another way is by using a technique called immersion. Our ArF immersion systems (DUV) leverage water's higher refractive index by maintaining a thin layer of water between the last lens element and the wafer to increase the system's NA.

k_1 factor
Together with our computational lithography and patterning control software solutions, we provide the control loops for our customers to optimize their mask designs and illumination conditions.

Over the past 40 years, we've improved the resolution (critical dimension) of our systems by two orders of magnitude by making improvements to wavelength, NA and k_1.

Read more in Strategic report – Our business – Our products and services

Moore's Law

Why are we so focused on using the Rayleigh criterion to shrink chip features? In 1965, Intel co-founder Gordon Moore predicted that the number of transistors in an integrated circuit (IC) would double every year for the next decade. In 1975, he revised the prediction to every two years. His prediction has proved to be true – or, as some argue, a self-fulfilling prophecy. In the years that followed, this exponential growth led to significant increases in computing power and reductions in cost, driving rapid advances in technology and innovation in the semiconductor industry.

Today, although physical limitations are making it more challenging to shrink transistors further, the semiconductor industry continues to boost performance using what Moore called 'circuit and device cleverness'. Innovative chip designs, new materials, advanced packaging and complex 3D structures are sustaining the industry's progress. ASML's lithography products play a crucial role in the affordable mass production of these advanced designs that are ensuring the continuation of Moore's Law and enabling future technological innovations.

Rayleigh criterion

The resolution of our lithography systems is crucial for shrinking the size of transistors on microchips. To be able to print sharper, finer details, we live by the Rayleigh criterion – the resolution equation that determines just how small the features that can be printed on a chip are.

Lambda (λ) is the wavelength of the light source. The smaller the wavelength, the smaller the structures that can be printed.

CD is the critical dimension, or resolution. It represents the smallest structures that the lithography system can print.

$$CD = k_1 \times \frac{\lambda}{NA}$$

NA is the numerical aperture, which describes how well a system's optics gather and focus light. Larger NA lenses or mirrors can print smaller structures.

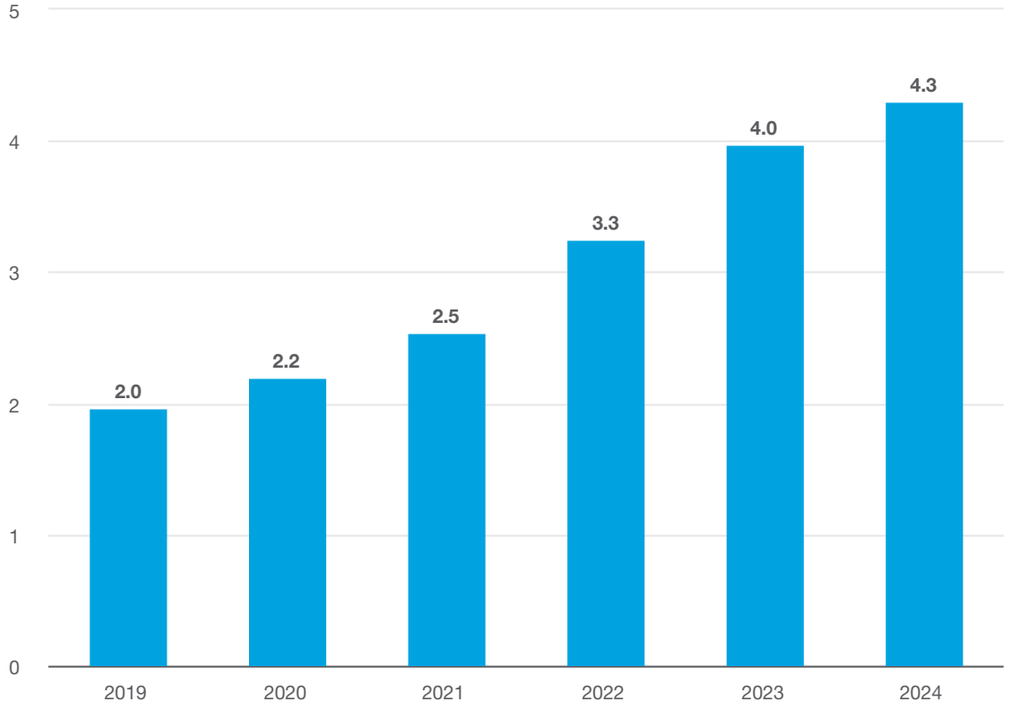
k_1 is a factor relating to optical and process optimizations.

How we innovate

As a crucial manufacturer of lithography equipment, ASML is a vital part of the semiconductor value chain. We don't innovate in isolation, but work as architects and integrators – collaborating closely with customers, our supply chain, and industry and research partners in a strong innovation ecosystem.

Innovation is fundamental to the continuing success of our business. Every day, around 16,000 R&D engineers take on the exciting challenge of innovating across our holistic lithography portfolio, which includes the most advanced lithography systems in the world. To stay ahead, we invest heavily in R&D – spending €4.3 billion in 2024, compared with €4.0 billion in 2023, and further building our capability to meet our customers' needs.

R&D investments (costs) in € billion



In the context of overall innovation – which includes ESG-related innovation – we have already exceeded our goal to invest more than €4.0 billion in global R&D by 2025.

Read more in Sustainability statements – Social – Innovation ecosystem – ESG innovation

A collaborative network at the cutting edge of our digital future

To drive the fast pace of innovation in our value chain and make progress together, we rely on our strong innovation ecosystem. We work hard to maintain it, developing long-term relationships with our customers, suppliers, research partners and peers, listening to and pushing each other to continuously innovate. We trust our supply chain to manufacture most system parts and modules, and many partners are deeply involved in developing our new technology.

Our innovation ecosystem consists of five groups of innovation partners that we have strong relationships with:

- **Customers**: We aim to innovate across our entire product portfolio at the same pace as our customers – through large and sustained investment in R&D. This so-called 'double-helix' approach is designed to accelerate innovation and provides access to a large, leading-edge knowledge base across a wide range of technologies.
- **Suppliers**: Our supply chain is a critical enabler of our ambition to grow our core business through innovation.
- **Co-solution partners**: We work closely with partners in the semiconductor value chain that deliver essential technologies to enable the efficient and cost-effective manufacturing of microchips.
- **Technology partners**: We co-develop knowledge and expertise within a wide network of technology partners and institutes to accelerate innovation in specific areas.
- **Academia**: Working together with universities provides us with access to knowledge and talent.

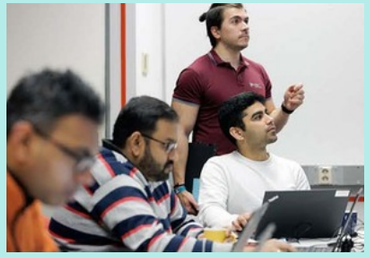
We also collaborate with both local and global industry platforms, such as with the Confederation of Netherlands Industry and Employers (VNO-NCW), SEMI's Sustainability Advisory Council and the Semiconductor Climate Consortium (SCC), to jointly tackle ESG challenges.

How we innovate (continued)

Filling the innovation funnel
We encourage our researchers to build wide networks in the broader technology space. This supports the constant stream of new ideas into the technology pipeline that flows through what we call our 'innovation funnel'. Based on our fundamental understanding of our markets and the needs of our customers, we select new ideas with the potential to advance our products and their customer application.

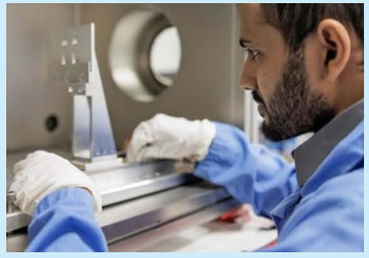
Research teams

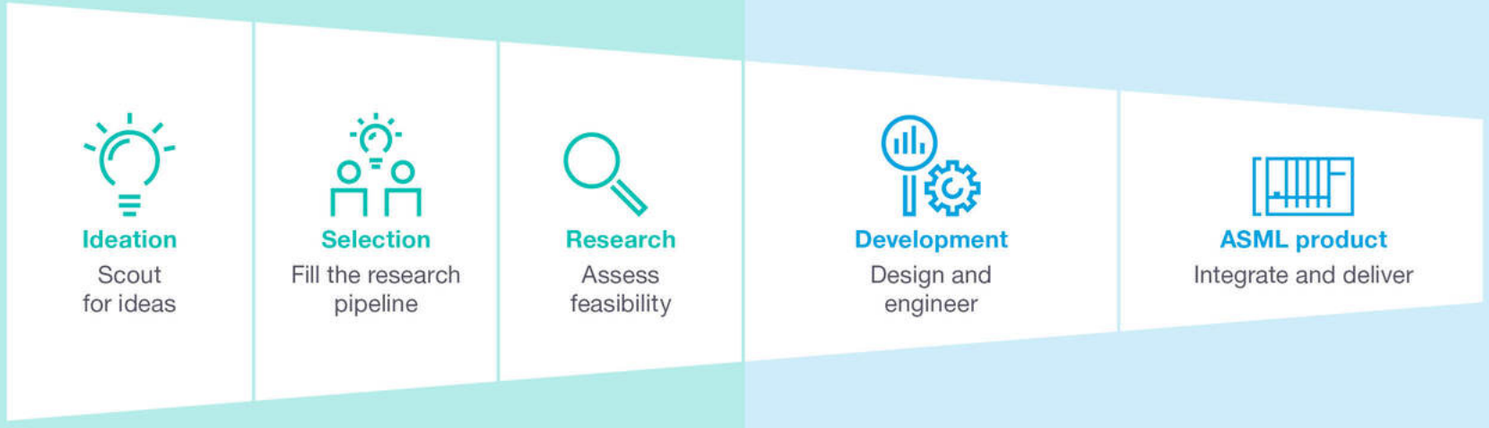
Our research teams focus on generating and exploring exciting new ideas and demonstrating their feasibility. They scout for new ideas, which are then taken through the proof-of-concept stage. Those that pass the feasibility assessment and have a favorable value proposition are transferred to our development and engineering teams.



Development and engineering teams

Guided by our product generation process, our engineers create new components, subsystems and applications, integrating them into a functional system, while ensuring we innovate with a strong focus on time to market.





Generating ideas and finding technological innovations and solutions

Our researchers continuously scout for ideas within the semiconductor industry and beyond to fill our innovation funnel, searching for potential solutions to the challenges we may face with products in development or production as well as new technologies. Our focus on R&D helps us support our customers while delivering on our ESG and sustainability commitments.

ASML's success depends on our ability to deliver complex products quickly and efficiently. Our decision-based product generation process (PGP) helps us minimize risk and uncertainty by describing how we define, develop and introduce products to market – and also how we phase them out. It allows us to make deliberate decisions at each step on whether to proceed with a product, revealing possible issues early on to avoid later disappointments.

Read more in Sustainability statements – Social – Innovation ecosystem

Defining our products and services roadmap

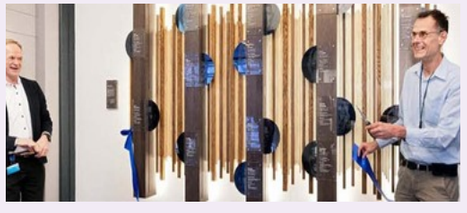
Product development in the semiconductor industry is managed through a series of roadmapping exercises – where 'roadmaps' define the plans for future product development.

At ASML, we first assess the roadmaps of our customers – sometimes called the 'device roadmaps' – from which we determine the requirements for our own development needs.

This starts with a holistic lithography solutions roadmap, which maps out the entire lithography product and services solutions space for the future. This in turn is broken down into product modules or technical building blocks, as well as service needs. For some of the building blocks, we need to pursue a technology feasibility study to ensure that the technology addresses our customers' demands in terms of performance, cost and timing.

ASML Fellowship Program

We recognize and honor our technical experts because we know that our company's success is built on technology leadership. One of the ways we do this is through the ASML Fellowship Program, which awards employees who make an outstanding technical contribution to ASML and are recognized both inside and outside the company as a top technical authority. In 2024, three new ASML Fellows were appointed and one of our current Fellows was promoted to the title of Senior Fellow. Former Chief Technology Officer Martin van den Brink was appointed Honorary Fellow, a special award honoring 40 years of his technical leadership.



How we innovate (continued)

Academia, industry and research institutes

We co-develop technical expertise with a broad network of technology partners, including universities and research institutions. Key partners include the technical universities in Delft, Eindhoven and Twente, the Advanced Research Center for Nanolithography (ARCNL) and research organization TNO in the Netherlands, and imec in Belgium.

In 2024, we intensified our collaboration with the Dutch academic ecosystem by adopting a more strategic approach to engaging Dutch universities. A central aspect of this strategy is to encourage collaboration on themes relevant to the Dutch economy, leveraging each university's strengths to avoid fragmentation and foster a cohesive innovation ecosystem. We have identified key focus areas for our partners to maximize impact and aim to initiate large national collaboration initiatives on selected topics, bringing together universities, companies, and research and technology organizations.

A longstanding relationship with Eindhoven University of Technology

Our partnership with Eindhoven University of Technology (TU/e) is evolving to leverage top science and engineering talent in the Brainport Eindhoven region. In May 2024, we signed a new agreement to expand our collaboration, building on a ten-year strategic research roadmap established earlier in 2023.

TU/e will enhance the joint research program and train more PhD students in plasma physics, mechatronics, optics and AI. ASML is investing €80 million over the next decade at TU/e, primarily for PhD programs and infrastructure. TU/e is also investing over €100 million in semiconductor technology, including a new cleanroom and additional PhD positions. To increase the impact of the collaboration with TU/e, we will aim to involve other companies and institutions in the region.

Academic collaboration at ARCNL

A key aspect of our academic collaboration is the ARCNL research institute in Amsterdam, a public–private partnership between ASML, NWO (Dutch Research Council) and three universities (Universiteit van Amsterdam, Vrije Universiteit Amsterdam and the Rijksuniversiteit Groningen). The collaboration focuses on fundamental research in physics and chemistry relevant to nanolithography and the semiconductor industry.

In recent years, we have developed a unique model allowing ARCNL scientists to pursue their research interests while creating value for ASML. Celebrating its ten-year anniversary in 2024, ARCNL has become a respected institute known for excellent research and close industry collaboration.

Our joint research is yielding results in areas such as EUV plasma generation and interferometric metrology techniques. These efforts aim to enhance patterning accuracy, sustainability and productivity for our customers.

How we innovated in 2024

Our strategy is to give customers the products and capabilities they need to deliver on technology's potential to make a positive contribution to society. As well as creating some of the most advanced machines in the world, this includes an increased focus on sustainability through parts commonality and reuse, and improvements in the performance and energy efficiency of our products to reduce costs and waste.

A number of innovation achievements over the last 12 months include significant improvements in metrology solutions, enhancing the accuracy and speed of measurements with reference to currently available metrology solutions (YieldStar). We are further increasing the EUV source power in order to accommodate our customers' dose requirements, while improving the conversion efficiency (energy used per photon output) and creating various options to increase the robustness and durability of our wafer tables.

High NA EUV lithography: Inspired by the film industry

The anamorphic optics in our High NA EUV (0.55 NA) lithography systems are a unique solution to an intriguing problem: delivering the highest-resolution imaging without compromising on productivity.

In lithography, light first hits a reticle with the blueprint of a chip layer. Projection optics then focus that light, now with the blueprint encoded in it, onto a photosensitive silicon wafer.

Our High NA EUV lithography system requires larger mirrors to achieve its 8 nm resolution – but the size of the mirrors was initially causing imaging issues. Increasing the image's demagnification from 4x to 8x could have solved the problem, but would have required chipmakers to switch to larger reticles if they wanted to avoid slowing down production.

Instead, we teamed up with our long-time strategic partner ZEISS Semiconductor Manufacturing Technology to find a way to minimize High NA EUV's impact on the semiconductor ecosystem. And we found our answer in the film industry.

In cinematography, anamorphic cameras squeeze recorded images in one direction, so they can capture widescreen images at full resolution on standard-sized film. Anamorphic projectors then stretch the image to display it properly on movie screens. Using this approach as inspiration, together with ZEISS we developed anamorphic optics for lithography – giving chipmakers fast, High NA EUV imaging while still using the industry-standard reticle size.

How we innovate (continued)

Public–private partnerships

We work closely with private partners to develop and deliver research and innovation projects subsidized by the EU and its member states. These collaborative projects aim to advance integrated circuit (IC) technology for the semiconductor industry while adhering to Moore's Law, focusing on enhancing performance and energy efficiency. The Horizon Europe program and the European Chips Act are designed to facilitate collaboration and amplify the impact of research and innovation in the EU.

ASML and its partners play an important role in enhancing Europe's sovereignty by driving fundamental research and groundbreaking innovation across Europe, the Middle East and Africa (EMEA). We believe this collaboration generates significant business value, fuels job creation and builds a robust knowledge base, as evidenced by the increasing number of patents each year from ASML and our partners.

Ongoing collaboration in EU-funded projects

In 2024, we continued coordinating four EU-funded projects, each with a scheduled duration of three years: Integration of processes and modules for the 2 nm node meeting power performance area and cost requirements (ID2PPAC); 14 angstrom CMOS IC technology (14ACMOS); 14 angstrom module integration (14AMI); and 10 angstrom CMOS exploration (10ACE). We kept our public partners up to date and organized consortium meetings for knowledge exchange.

ASML also participates in the Key Digital Technologies Joint Undertaking (KDTJU) project SC4EU, led by Infineon Technologies AG, to improve demand forecasting in the semiconductor supply chain. Additionally, we submitted a new project proposal, ACT10, for the Chips Joint Undertaking (Chips JU), targeting EU contributions to chip technology for the next decade at the 10 angstrom node. This consortium of 32 partners spans multiple countries and is valued at over €111 million in R&D costs, unlocking an estimated amount of €53 million in public funding. The project has been approved by the KDTJU and approval by national authorities is expected early 2025.

Furthermore, ASML is involved in the Chips JU project E2PackMan, also led by Infineon Technologies AG, which aims to accelerate innovations in electronic packaging manufacturing with 60 partners across Europe.

In 2024, our total contribution to R&D across active EU public–private partnerships was €18.9 million, with a total investment of €70.9 million over three years, contributing to a total project size of €418.9 million.

Our marketplace

Globally: the major election year 2024 did see easing inflation and the real GDP growth was above 3%*. A strong US GDP growth was partly offset by lower growth in Europe and Japan. Geopolitical tensions continued to be high, while AI dominated the headlines in the semiconductor ecosystem.

The semiconductor market recovered from the 2023 downturn, but significant differences emerged among end markets and product groups. While the Memory market rebounded, industrial and automotive semiconductors faced corrections in 2024 and high inventory levels. The lithography market remained strong, with lower demand from key customers offset by increased shipments to China, supported by a high backlog built over previous years. After fulfilling this backlog, we anticipate a shift to more normalized sales levels to China moving forward.

We have strong confidence that the semiconductor ecosystem will continue to innovate and grow at a high single-digit compound annual growth rate. Factors that may impact our business – as explained in more detail over the next few pages – include:

1. **Macroeconomic and geopolitical trends**
2. **Megatrends**
3. **Semiconductor industry market**

*Source: IMF World Economic Outlook, October 2024

1. Macroeconomic and geopolitical trends

Economic outlook

Description

Analysts expect GDP growth to continue to stay above 3% for 2025 and 2026 with a recovery in Europe and Japan and a slight slowdown of growth in the US and China compared to 2024. This typically offers a good foundation for a positive semiconductor market trend. The 2024 market growth was dominated by AI which led to a surge in demand for AI-related Memory – both DDR (double data rate) and HBM (high-bandwidth memory) – and specific advanced Logic chips. This trend is expected to continue in 2025. The PC and smartphone markets are expected to continue to stay on the gradual growth trajectory while industrial and automotive semi markets, which did see a correction in 2024, are expected to pick up in the course of 2025.

What it means for ASML

Our EUV business saw shifts in demand timing, predominantly driven by a lack of end-market demand and readiness of fabs. After the inventory correction in 2023, our customers started ramping up fabs again. The digestion of all inventory took longer than initially anticipated, delaying the need for new equipment – and meaning ASML saw a slight shift in demand timing.

For DUV, demand was higher than we could deliver, particularly in China and for specific models. We are working closely with our customers and suppliers to optimize our output capability, ride out the uncertainty and manage the risks.

Global geopolitics – technological sovereignty

Description

With the strategic importance of the semiconductor industry only likely to grow, semiconductors are crucial to the economic and strategic development of countries and regions. Many are pushing for ‘technological sovereignty’ to ensure security of supply, resilience and technological leadership in semiconductor technologies and applications – fueling capital expenditure in new regions.

What it means for ASML

As governments increasingly see semiconductor manufacturing as strategically significant, chips acts are incentivizing our customers to build manufacturing facilities in the US, Europe and Asia. As well as sharing our views with governments on semiconductor manufacturing, we work closely with our customers to build the semiconductor manufacturing ecosystem in these new regions, while retaining our focus on supporting incumbent regions. External factors such as the timing of subsidies and the risk of restrictions make forecasting market demand less predictable.

Our marketplace (continued)

1. Macroeconomic and geopolitical trends (continued)

Global geopolitics – export controls

Description

On June 24, 2024, the EU Council adopted the 14th package of restrictive measures against Russia – aiming to maximize the impact of existing sanctions by closing loopholes and emphasizing the EU's goal to stop dual-use technology flowing to Russia. The regulation entered into force on June 25, 2024, with some measures focused on circumvention of the sanctions as well as the prohibition on transferring intellectual property rights with respect to dual-use goods taking effect on December 26, 2024. ASML is not involved in export to Russia or Belarus but undertakes continuous efforts to strengthen its robust risk assessment and due diligence processes as well as its policies, controls and procedures to mitigate and manage effectively the risks of indirect exportation to Russia and Belarus.

On September 6, 2024, the Dutch government published an updated license requirement regarding the export of immersion DUV semiconductor equipment. As a result of the updated license requirements, and in line with US Export Administration Regulation, ASML needs to apply for export licenses with the Dutch government rather than the US government for shipments of its TWINSCAN NXT:1970i and 1980i DUV immersion lithography systems.

The Dutch export license requirement is already in place for the TWINSCAN NXT:2000i and subsequent DUV immersion systems. Sales of ASML's EUV systems are also subject to license requirements. The updated license requirement published by the Dutch government came into effect from September 7, 2024. The Japanese regulations were also brought in line with the US and Dutch regulations on September 8, 2024.

On December 2, 2024, the US authorities published an updated version of the advanced computing and semiconductor manufacturing equipment rule, imposing additional restrictions on suppliers for the export of chip manufacturing technology. These regulations became effective immediately with a delayed compliance date of December 31, 2024 for some of the changes.The updated export control regulations contain additions to the list of restricted technologies including metrology and software. In addition, further fab locations, mainly in China, were added to the US list of restrictions.

What it means for ASML

ASML is fully committed to complying with all applicable laws and regulations including export control legislation in the countries in which we operate, while we continue to develop our technology and serve our customers to the best of our ability. ASML will continue to work with its worldwide customers to deliver lithography and metrology systems not impacted by the global export control restrictions and/or sanctions. We continue to educate governments on the semiconductor manufacturing process and ecosystem to foster understanding of the potential impacts of current and future regulatory measures.

2. Megatrends

Connected world

- Internet of things
- Hyperconnectivity
- Cloud infrastructure
- Edge computing

Climate change and resource scarcity

- Energy transition
- Electrification, smart mobility
- Agricultural innovation
- Smarter use of limited resources

Social and economic shifts

- Working, learning remotely
- Healthcare medical tech
- Technological sovereignty
- Automation

The world is changing fast and semiconductors are a key enabler to help solve some of society's toughest challenges. In 2024, we have seen a strong growth in artificial intelligence (AI) technology, enabled by leading-edge semiconductor solutions, both in Advanced Logic as well as AI-related DRAM. AI is expected to further stimulate semiconductor solutions to tackle these big challenges and increase overall GDP growth.

The continuing convergence of wireless communication, telecoms, media and cloud technology via connected devices is driving demand for advanced semiconductors across the globe. Growing populations, urbanization, the energy transition and electrification to support smart mobility are increasing demand for advanced electronic devices.

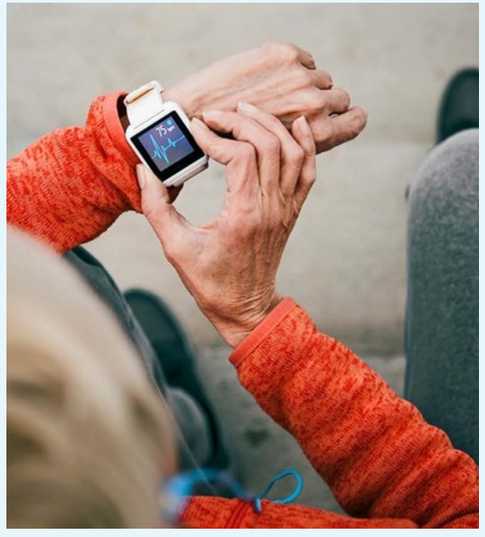
AI requires leading-edge high-performance processor chips and a significant increase in DRAM memory chips compared to traditional compute architectures. It also stimulates the mainstream market, as AI requires large amounts of data collected via sensors which can be used to further drive robotics and workflow automation.

Our marketplace (continued)

2. Megatrends (continued)

Connected world

With the IoT, smart, connected networks of more energy-efficient devices seamlessly communicate over powerful 5G networks – unleashing the power of unprecedented data volumes better and faster than ever. In combination with AI, this provides people with more innovative functionalities and applications, improves human-to-machine interactions, and enhances data management and analytics.



Internet of things

Semiconductors are increasingly present in the world around us. Many of the products with semiconductors are directly or indirectly connected to the internet to maximize the benefits offered with the added silicon. AI further reinforces the value offered by these internet-connected devices as it allows them to capture data and use it to enhance the value of the device itself and also of other internet-connected devices.

Hyperconnectivity

5G enables a new kind of network designed to connect almost everyone and everything around the world – including machines, objects and devices. Person-to-person, person-to-machine and machine-to-machine communication are fueling large increases in bandwidth demand and changes in communications because of the complexity, diversity and integration of new applications and devices using the network.

Cloud infrastructure

To enable cloud computing – the on-demand availability of computer system resources, especially data storage and computing power – a cloud infrastructure is required. This includes hardware, software, storage and network resources.

Edge computing

We are moving fast toward edge computing, which focuses on processing data closer to its source rather than in centralized data centers. The current era of mobile computing – where you bring the computer with you – is moving us into an immersive world of ubiquitous computing, with computing power available everywhere, driven by AI.

What it means for ASML

Moore's Law is the guiding principle for the semiconductor industry and the motor behind its transition from mobile to ubiquitous computing. This transition continues to expand, driving the three main elements in computing – applications, data and algorithms – that feed each other in a virtuous cycle: applications generate data, which fuels new algorithms, which again leads to new applications that generate new data. The vast amounts of data and insights people can access are expected to fuel semiconductor business growth and the digital transformation.

Climate change and resource scarcity

With an urgent collective response needed to limit global warming to 1.5°C, climate change is a crucial matter for governments, companies and individuals worldwide.

Energy transition

The shift to renewables is helping deliver the clean, affordable energy the world needs to counter climate change. Semiconductors are harnessing, converting, transferring and storing energy from sources such as solar and wind as electricity – and ensuring national power grids are both responsive and robust. They are at the core of smart (home) devices and play an important role in reducing overall energy consumption.

Electrification and smart mobility

Automotive is one of the fastest-growing market segments – driven by electrification, autonomy and other megatrends. Integrated automotive systems consist of a full range of scalable, flexible computing solutions that require advanced and mature semiconductor devices. Advanced driver-assistance systems enabled by electronics and semiconductors – considered 'supercomputers on wheels' – are also expected to contribute to the growth of the automotive segment in the semiconductor industry.

In addition, across the world, people are changing their views about personal transport. Instead of owning expensive and environmentally harmful vehicles, they're seeking car-sharing, ride-sharing, ride-hailing, micro-mobility (using small, low-speed, human- or electric-powered transportation devices) and micro-transit (on-demand shared private or semi-public transport). The technologies underpinning this move to smart mobility, such as mobile apps, are all enabled by semiconductors.

Our marketplace (continued)

2. Megatrends (continued)

Climate change and resource scarcity (continued)

Agricultural innovation

Farmland in remote locations, particularly those with emerging economies, can be vulnerable to climate change. With access to mobile devices increasing, local farmers are using their smartphones in combination with smart sensors to improve agricultural knowledge and decision-making. The results are better crops and greater, more sustainable food security – enabled by smaller, more affordable microchips.

Smarter use of limited resources

The semiconductor industry can also play an important role by reducing its own climate impacts. The semiconductor manufacturing process consumes large volumes of energy and water, and driving Moore's Law to enable shrink and improve computing power and storage capacity fuels demand for these vital resources. Innovative architectures and a new way of looking at the entire ecosystem will be required to enhance the industry's energy and water resource efficiency.

What it means for ASML

Semiconductors play an important role in addressing climate change across various sectors. In the automotive industry, a shift toward electric vehicles and autonomous driving is expected to significantly increase the number of semiconductor components in cars. Additionally, the integration of digital technologies to support the energy transition and agricultural innovations relies on semiconductor solutions to enable smart grids and enhance agricultural practices. By advancing our EUV productivity roadmap, we help customers simplify complex multiple-patterning layers into a single exposure, thereby reducing resource consumption in the semiconductor manufacturing process.

Read more in Sustainability statements – Environmental

Social and economic shifts

Digital technologies are driving transformative change. They create new opportunities for a more prosperous future, but at the same time pose new challenges.

Working and learning remotely

Since the emergence of the COVID-19 pandemic, remote and hybrid working and learning have become increasingly prevalent.

Healthcare and medical tech

Predictive analysis of health data from multiple sources, combined with machine learning and AI, is being harnessed to improve healthcare services and patient outcomes. Semiconductor technology has allowed the creation of innovative products that can effectively detect, diagnose and treat various medical conditions.

Automation

A new generation of lightweight robots connected to a wide network and fitted with smart sensors enable humans and machines to safely and efficiently work side by side, supported by AI. In addition, smart industry devices use real-time data analytics and machine-to-machine sensors to optimize processes, predict bottlenecks, and prevent errors and injuries.

What it means for ASML

The ongoing digitalization of various sectors such as healthcare and manufacturing keeps on driving the need for semiconductors. The integration of digital technologies in these industries requires robust semiconductor solutions to enable efficient data processing, real-time analytics and connectivity.

Our marketplace (continued)

3. Semiconductor industry market

Semiconductor technology plays a crucial role in shaping the interconnected and intelligent network future – and we believe end markets will continue to grow.

The industry's historical market compound annual growth rate (CAGR) from 2013 to 2023 was 6%. In 2023, almost 1 trillion chips were shipped around the world, feeding a $527 billion industry. In 2024, the semiconductor market recovered, led by strong demand for AI servers and overall recovery of memory chip pricing. The PC and smartphone market did see a recovery, though not as strong as initially expected, while the industrial and automotive chip markets were still in the middle of a correction.

We expect that the microchip market will continue to grow in line with a 9% CAGR from 2025 to 2030 and surpass $1 trillion by 2030. The global annual wafer capacity is expected to be 780,000 wafer starts per month per year in this five-year time frame. Compared to the expectations set at the 2022 Investor Day, we now expect more weighting to advanced Logic (≤7 nm and below nodes) and advanced DRAM, required to support AI-related applications, and less weighting on NAND and mainstream wafers. We believe this mix change can be favorable for ASML, given that advanced Logic and DRAM are more lithography-intensive than NAND and mainstream.

Logic and Memory markets explained

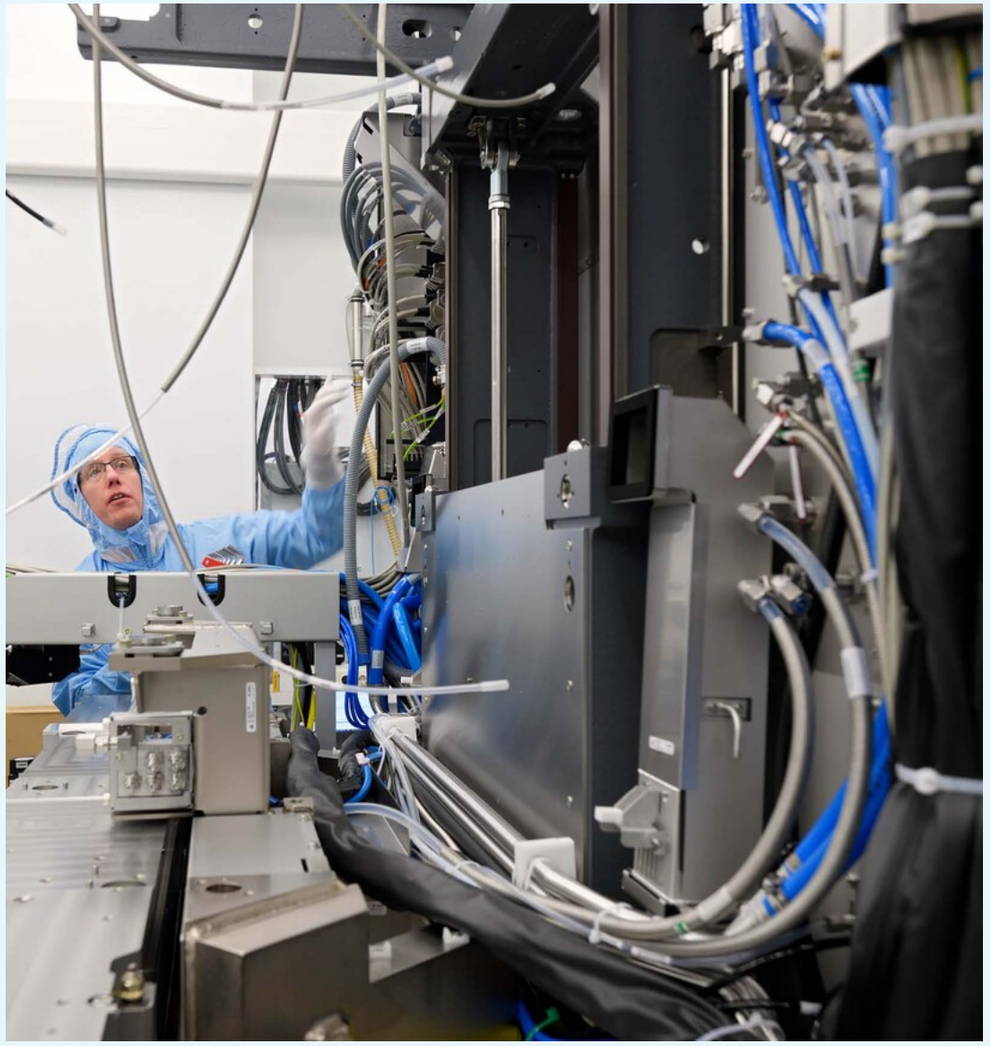
The semiconductor market can be broadly divided into two segments based on the types of chips they produce: the Logic market and the Memory market. The largest semiconductor manufacturers serve both markets, producing chips in dedicated Logic or Memory fabrication plants (fabs).

Logic chips are processors, such as CPUs (central processing units) and GPUs (graphics processing units). They are the 'brains' of electronic devices, processing input and output results. They are produced by two groups of manufacturers: integrated device manufacturers (IDMs), which design and manufacture Logic chips; and contract manufacturers, known as foundries. Foundry manufacturers produce chips for 'fab-less' companies that focus on chip design and distribution, but do not manufacture microchips themselves.

Memory chips can store large amounts of data in a very small area. There are two main types: volatile memory chips such as DRAM, which efficiently provide data to the processor and only save data when the device is turned on; and non-volatile Memory chips such as NAND Flash, which save data even after the device is turned off.

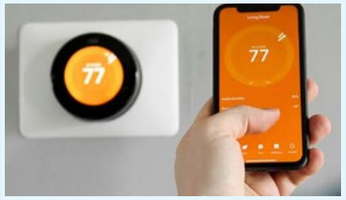
Microchips vary in complexity depending on the task they need to fulfill. For example, the most advanced chips power leading-edge technology such as AI, big data and automotive technology, while simpler, low-cost chips such as sensors integrate sensing capabilities into everyday technology – creating the vast network of connected devices known as the internet of things (IoT). The simplest types of chips can be made with more mature lithography technology, whereas manufacturers of the most complex chips need to use the latest EUV lithography systems.

Generative AI gained a lot of traction during 2024, resulting in strong demand for GPU chips (Logic) and high-bandwidth memory (HBM) among our customers. Both products are still a small portion of the overall Logic and Memory market, but this is expected to grow fast in the coming years. At our 2024 Investor Day, we presented our expectations on the semiconductor end markets (as shown on the next page).



Our marketplace (continued)

3. Semiconductor industry market (continued)

Smartphone	Personal computing	Consumer electronics	Automotive	Industrial electronics	Wired and wireless infrastructure	Servers, data centers and storage	
							
Key driver Continued refresh of all semiconductor content including image sensors and edge AI processors	High-end compute and Memory, fast conversion to solid-state drive (SSD), edge AI processors	Both low-power and high-bandwidth connectivity, sensors	High-end processors for autonomous driving and power electronics for engine electrification	Connectivity, edge processors, sensors, power (control) electronics for the energy transition, and high-end processing for robotics	Continued innovation to increase bandwidth and reduce latency, requiring high-end processing	AI requiring high-end processing and DRAM, and cloud processing requiring advanced processing, NAND and DRAM	
2025 estimated market size ($bn)							**Total**
149	92	70	76	84	53	156	679
2030 estimated market size ($bn)							
192	112	83	114	120	70	361	1,051
Outlook CAGR 2025–2030 (%)							
5%	4%	3%	9%	7%	6%	18%	9%

Source: Based on ASML analysis

Our business strategy

Our purpose is to unlock the potential of people and society by pushing technology to new limits. Our vision is that we enable groundbreaking technology to solve some of humanity's toughest challenges.

Our market opportunity

Based on different market scenarios shared during our 2024 Investor Day, we presented an opportunity to achieve the following:

2030

€44–60bn

Annual revenue

56–60%

Gross margin

Our business strategy consists of six priorities that will drive long-term growth

1 Deepen customer trust

- Deepen customer trust and satisfaction through increased value creation, focused on innovation, cost, quality, sustainability and response time
- Strengthen partnerships with customers based on even deeper understanding and anticipation of their needs and product roadmaps
- Increase the bandwidth, responsibility and accountability of our customer teams to deliver on customer requirements and carry the customer voice throughout the entire organization

2 Extend our technology and holistic product leadership

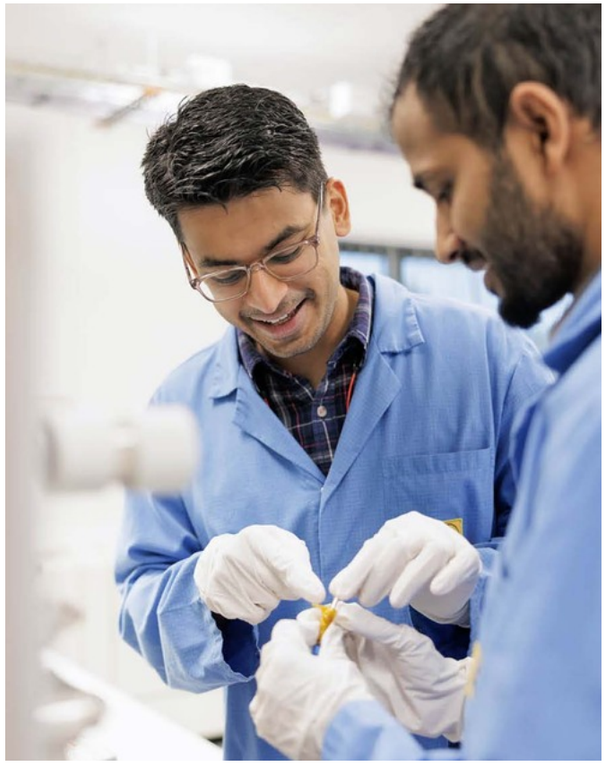
- Innovate on our entire portfolio to continue to provide critical, differentiated and cost-effective solutions to our customers
- Enable chipmakers in their pursuit of more powerful, smaller, cheaper, more integrated and more energy-efficient chips, with an affordable and holistic lithography roadmap across the entire ASML portfolio
- Place cost and energy consumption reduction at the core of value creation for customers by continuing to simplify process flows, ensuring the highest transistor density at all process steps, and promoting technologies that scale improved productivity, lower costs of technology for customers and reduce emissions
- Maximize good printed transistors from lithography by:
  a. Maximizing yield with AI-based process control, metrology and inspection
  b. Optimizing resolution with our DUV and EUV portfolio
  c. Enhancing productivity with system throughput and efficiency improvements
  d. Improving accuracy with solutions for overlay, critical dimension uniformity and EPE
  e. Support our customers' front end 3D integration with holistic lithography

- Simultaneously optimize total lithography cost by:
  a. Improving system cost with increased platform commonality
  b. Increasing system extendibility and improve lifetimes
  c. Reducing service and utility costs

Our business strategy (continued)

3 Strengthen ecosystem relationships

- Foster even closer relationships with our suppliers and broader ecosystem, based on shared goals and responsibility for cost, quality and sustainability outcomes



4 Create an exceptional workplace

- Build a workplace that works for everyone: Fostering inclusion, diversity and belonging
- Invest in people effectiveness and development
- Strengthen our leadership: Accelerating development and building our future pipeline as of today

5 Drive operational excellence

- Create a learning organization that drives a culture of continuous improvement with fast feedback loops and a sustainable impact on our safety, quality, cost and delivery performance
- Drive cross-company business performance improvements to reduce cost, cycle times, improve quality and secure on-time delivery
- Optimize our industrial footprint to have market, talent and technology access while protecting our know-how and our business
- Secure a successful ERP migration to enable scaling and drive improvements in cost, quality and compliance
- Protect and defend ASML interests and reputation by driving a culture of integrity and compliance, including for products, information security, cyber resilience and export controls

6 Deliver on our ESG sustainability mission and responsibilities

Environmental

Continue to expand computing power but with minimal waste, energy use and emissions

Social

Ensure that responsible growth benefits all our stakeholders

Governance

Act on our responsibilities and aim to fully anchor them in the way we do business through our focus on integrated governance, engaged stakeholders and transparent reporting

Our business model: What we need to create sustainable long-term value

1 2 3

The depth and breadth of our resources and the relationships we build are key to our continued success in growing a sustainable business and a holistic approach to lithography.

People and culture

We depend on more than **44,000** talented, dedicated and motivated employees who live our values of challenge, collaborate and care. Every day, our colleagues in R&D, manufacturing, customer support, sourcing and supply chain, and support functions take on the exciting challenge of building and maintaining the most advanced lithography, metrology and inspection systems in the world.

Read more on page 258 >

Manufacturing facilities

We have **eight factories** in Europe, the US and Asia that provide high-precision, highly controlled environments where we assemble, test and deliver our complex lithography and metrology and inspection portfolio, from prototype to final product.

Read more on page 21 >

Capital

We have strong capital reserves, underpinned by a robust balance sheet. Total shareholder equity at the end of 2024 amounts to **€18.5 billion** on a consolidated balance sheet total of **€48.6 billion** and net cash provided by operating activities of **€11.2 billion** in 2024.

Read more on pages 335, 338 >

Innovation

In 2024, we spent a total of **€4.3 billion** in R&D. But we do not innovate alone – our almost **16,000 R&D employees** collaborate closely within an innovation ecosystem of key partners in the value chain.

Our lithography solutions are the result of strong partnerships based on trust, respect, and shared risks and incentives to compete and drive innovation.

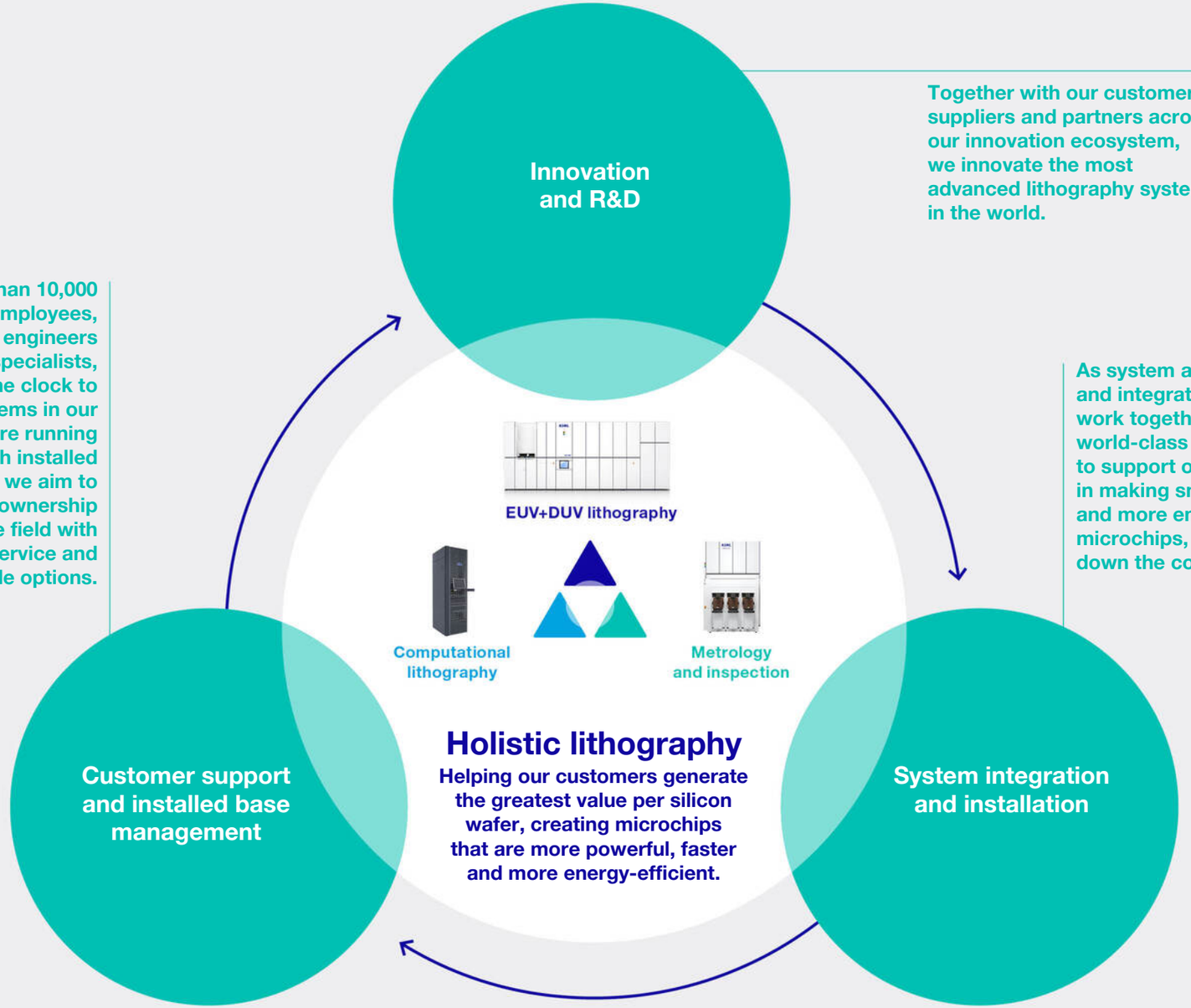
Read more on page 30 >

Our business model: How we create sustainable long-term value

1 2 3

Our position as a leading supplier of holistic lithography enables us to create value across the entire value chain. Our holistic lithography portfolio – based on the intelligent integration of lithography systems, computational lithography, metrology and inspection, and process control software solutions – keeps the scaling of microchips affordable for our customers.

At ASML the customer always comes first – and our solutions are based on their input. We help our customers generate the greatest value per silicon wafer, creating microchips that are more powerful, faster and more energy-efficient.



Our business model: The sustainable long-term value we created in 2024

Our success depends on strong, sustainable relationships with all stakeholders in the value chain.
We aim to create sustainable long-term value for them, and to use their input to develop our strategy, products and services.

Customers

Our world-leading lithographic systems enable our customers to develop ever-more powerful and energy-efficient chips for new applications and devices. At the same time, we help our customers reduce costs and their environmental footprint.

€28.3bn
Total net sales

583
Net system sales (in units)

86%
Customer satisfaction survey score

Employees

ASML is a growth business providing employment opportunities around the world. We invest in people's career development and well-being, and aim to provide a diverse and inclusive environment where they can achieve their full potential.

78.9%
Employee engagement score (three-year rolling average)

21%
Women in entire workforce (headcount)

3.8%
Attrition rate

Suppliers

Our suppliers help deliver our innovations and are critical to our value chain and our ambition to be a sustainable leader in the semiconductor industry. Long-term relationships, close collaboration, transparency and a commitment to sustainability with our suppliers are key to our success.

5,150
Number of suppliers

91%
Responsible Business Alliance (RBA) self-assessment completed (in %)

100%
Suppliers with overall high risk evaluated and follow-up agreed (in %)

Shareholders

The effective and disciplined investment of cash flow drives the profitable growth of our company, and delivers solid financial performance and a healthy financial position. This underpins our ability to return cash to shareholders through growing dividends and share buybacks.

€11.2bn
Net cash provided by operating activities

€6.40
Proposed annualized dividend per share

€0.5bn
Share buyback

Society

We play an active role in the communities where we operate – recognizing that, when the community thrives, so do we.

We believe our collaborative ecosystem nurtures innovation and benefits society. For example, we share our expertise with universities and research institutes, support young tech companies and promote science, technology, engineering and mathematics (STEM) education worldwide. We are also committed to creating sustainable value by reducing our environmental footprint – both from our operations and during the use of our products and services.

€1,084
Amount invested per employee, including employee giving

€18.9m
Contribution to EU research projects

12.0 Mt
Indirect emissions from total value chain (scope 3)

88%
Reuse rate of parts returned from field and factory

32.8 kt
Emissions from manufacturing and building (scopes 1 and 2)

Engaged stakeholders

We listen to our stakeholders – customers, employees, suppliers, shareholders and society – and work with them to make the right decisions.

Our stakeholders – and our interaction with them – is fundamental to the long-term success of our business.
By regularly engaging with them, we can better understand our impact on them, and their respective needs and expectations.

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Engaged stakeholders (continued)

Customers

At each stage of the customer relationship we aim to foster trust, advocacy and continuous engagement – with the goal of achieving high customer satisfaction and loyalty. As customer requirements become more complex, it takes longer to align with a shared vision, so we seek to start earlier in the process. By placing our customer relationship at the center of our work, we can leverage our innovations and develop even more sophisticated solutions alongside them.

What's happening in their world

As described in the Our marketplace section earlier in this report, macroeconomic uncertainty – including technological sovereignty and export controls – led certain customers to remain cautious and control capital expenditure and cash flow more carefully in 2024.

How we respond

We're working closely with our customers to optimize our output capability, navigate through the uncertainty and manage the risks. We're engaging with them to mutually understand the affordability of different technologies and, through regular meetings and reviews, we're aligning on their current and future needs to adjust our demand plans while staying flexible for the expected coming upturn. We're also continuing our capacity investment plans to meet our customers' long-term growth targets and, in compliance with export control regulations, we've been working to deliver the non-advanced lithography systems not impacted by the new restrictions. We continue to guide governments on the semiconductor manufacturing process and ecosystem to foster understanding of the potential impacts of current and future regulatory measures.

We've deployed improvement actions identified in our 2023 customer survey, focusing on truly understanding what customers need from us, and validating that we are on the right track. We update our customers regularly on the progress we are making with respect to the improvement actions.

In September 2024, we sent out our latest survey – to measure customer satisfaction, loyalty and trust and to identify improvement areas to enable us to better serve our customers.

Survey results showed stable high levels of trust in ASML, mainly driven by our transparency and commitment to fairness and mutual success. Customers ask us to listen closely to their feedback, resolve issues in a timely manner, provide them with shorter delivery times for good-quality products and continue pushing the technology forward to meet their current and future needs.

How we engage

- Regular meetings with customers, including:
  - Technology review meetings, where our senior technology experts, our Chief Executive Officer (CEO) and our Chief Customer Officer (CCO) discuss technology roadmaps and requirements with customers
  - Executive review meetings, where members of our senior management and Board of Management discuss business and strategies with customers
  - Operational review meetings, where we review topics related to our customers' operational activities
- Annual customer feedback survey
- Voice of the Customer program, which provides firsthand feedback about our customers' needs and challenges for employees without direct access to them
- Various technology symposia and special events

Read more in Strategic report – 2024 stories – Powering technology forward with customers

At ASML, we focus on our customers' needs

There are thousands of ASML systems installed in customer fabs across the globe. Our customers want to keep these machines running 24 hours a day, seven days a week, 365 days a year.

With around 10,000 customer support employees, including service engineers and applications specialists, we work round the clock to make sure our systems in our customers' fabs are running smoothly.

86%
Customer satisfaction score

"Our customers are why we exist. We collaborate with customers at all levels of the organization – from CEO-to-CEO interaction right through to on-the-ground support at individual fabs – to help them achieve their goals and ensure our solutions perfectly fit their requirements."

Jim Koonmen
Executive Vice President and Chief Customer Officer

Engaged stakeholders (continued)

Employees

We strive for engaged employees who are proud to work for ASML and committed to our vision and ambitions. Innovation thrives in an environment where everyone is empowered to contribute. By creating an exceptional workplace that fosters inclusivity, we aim to enable everyone to unlock their full potential and drive our collective success.

What's happening in their world

We have grown rapidly in recent years and anticipate continued expansion in our workforce to meet industry demand. At the same time, there is a global talent shortage, particularly in our industry, alongside rising employee expectations about work-life balance and the need for a sense of purpose and belonging at work.

In 2024, we introduced a new leadership and governance structure, requiring further focus on strategic alignment and providing employees with clear direction and insight into future goals. Our annual employee engagement survey provided insights into the themes our employees want us to focus on: inclusion, well-being and career development, as well as work processes, collaboration and alignment of the strategic topics.

How we respond

Just as our technological ambitions continue at pace, so do our aspirations for building an exceptional workplace that works for all. We are building on a solid foundation of recent improvements and the strength of our culture and values to scale up ASML, aiming to create the best place for our people to innovate, make an impact and grow. We have a new people strategy that answers the challenges and opportunities of our growth and the evolving nature of global work, as well as the themes raised by the engagement survey.

Read more in Strategic report – 2024 stories – Powering technology forward with our people

How we engage

Direct engagement:

- Employee engagement survey (annually)
- Develop and perform cycle including employee feedback and performance reviews (annually)
- Learning programs (on occurrence)
- ASML's Speak Up Service (on occurrence)
- ASML's EHS incident management (on occurrence)
- Employee networks, such as Women, Seniors, Atypical, early career, multicultural and workers of all national origins, LGBTQIA+, Parents and Veterans (on occurrence)
- ASML ambassador communities, aiming to attract and inspire talent, promote well-being and engage colleagues (on occurrence)
- Internal communication and awareness, for example, through the intranet, our ethics program and myEHS (daily)
- Onboarding program for new employees (upon joining)
- All-employee meeting and senior management meetings, department employee meetings and interactive lunch sessions with Board members (on occurrence)
- Employee Relations (on occurrence)

Engagement via representation:

- Works Council/unions (on occurrence)

"We have exceptional talent and need an exceptional workplace where our talent can achieve great things, to move ASML to our next success."

Cristina Monteiro
Head of Human Resources & Organization

87%
of new colleagues starting in 2024 indicated they had a positive onboarding experience

54%
of our employees have been in the company less than five years

29%
of our employees today are not nationals of the country they work in

Engaged stakeholders (continued)

Suppliers

We engage with our suppliers to help deliver our innovations. They are critical to our value chain and our ambition to be a sustainable leader in the semiconductor industry.

What's happening in their world

Over recent years, the world of our suppliers has been turbulent. Geopolitical uncertainties have disrupted our supply chain due to reduced material availability and rising prices. Additionally, inflationary pressures have affected our suppliers in raw materials, energy and wages. Despite market uncertainties, suppliers are required to build up further capacity for future growth while putting pressure on cost, quality and ESG performance. Our future growth – and that of our customers – can only be met if our suppliers are capable and willing to keep up.

How we respond

We want to build and maintain strong business relationships with our suppliers, based on mutual trust. We listen to our suppliers when they openly share their pain points and challenges, and are implementing improvements relating to quality issues, early supplier involvement during the industrialization phase of new product introductions, reducing cycle time and cost, planning with our suppliers and ESG sustainability.

Read more in Strategic report – 2024 stories – Powering technology forward with suppliers

How we engage

- ASML Suppliers' Day
- Direct interactions via supplier account teams/ sourcing account leaders
- Supplier audits
- Site visits
- Supplier newsletter
- Responsible Business Alliance (RBA) self-assessment questionnaire (SAQ)
- ASML's Speak Up Service
- Knowledge sessions on ESG sustainability
- ASML's Supplier Collaboration Day

Working with our suppliers

By partnering closely with and supporting our suppliers, we aim to ensure that they're prepared to work with us for years to come – and to weather the changes that the chip industry is known for, including periods of rapid growth and business-cycle fluctuations.

> **"Enabling our supply chain to grow with us toward our 2030 targets calls for an evolution in how we work with our suppliers."**
>
> **Wayne Allan**
> Executive Vice President and Chief Strategic Sourcing & Procurement Officer

The top 35 of our 5,150 suppliers make up 80% of our total sourcing spend

Engaged stakeholders (continued)

Shareholders

We aim to help shareholders – as well as financial and ESG sustainability analysts – understand our long-term investment strategy. We communicate with them about our financial growth strategies and opportunities, our financial and ESG sustainability performance, our outlook and our shareholder returns.

What's happening in their world

For investors in the semiconductor industry, 2024 was a dynamic year and it was expected to be a transition year in preparation for anticipated strong growth in 2025. There were quite some dynamics that took place over the course of the year. However, the growth in AI is still a key driver for growth in the semiconductor industry. It has created a shift in the market dynamics that is not benefiting all of our customers equally, which creates both opportunities and risks. Geopolitical announcements regarding export control restrictions and customer capital expenditure cuts created volatility in the investment community.

How we respond

During the year, ASML's management and Investor Relations team actively engaged with our investor community to discuss specific topics relevant to our equity story. We actively engage with the investor community via a large number of (ESG-related) conferences, roadshows and conference calls.
On November 14, 2024 we hosted an Investor Day to update the financial market on our company's growth opportunities. We also encourage investors to visit our Veldhoven (NL) or Wilton (US) facilities in person to discuss and see our capacity expansion plans, as well as our technology challenges and opportunities in our ASML Experience Centers.

How we engage

- AGM
- Investor and analyst calls, and Investor Days
- Company quarterly results presentations and press releases
- Various (ESG) investor conferences and roadshows
- Various sustainability questionnaires, assessments and survey feedback tasks
- Direct personal interactions in line with our Bilateral Contacts Policy, as published on our website
- Engagement meetings with investors associations (e.g. VEB, Eumedion, VBDO)

Positioned for significant growth

Expected growth in semiconductor end markets and increasing lithography spending on future nodes fuel demand for our products and services.

We will continue to invest in our business and expect to return significant amounts of cash to our shareholders through growing dividends and share buybacks.

Our continued investments in technology leadership have created significant shareholder value.

€3.0 billion

Returned to shareholders through dividends and share buybacks.

Engaged stakeholders (continued)

Society

We know that our actions and activities have an impact beyond ASML – on the environment, for example, and on the world around us in its broadest sense, which is how we define society. We engage with organizations, communities and other bodies in society on a wide range of issues – from reducing our environmental footprint to regulatory matters and fulfilling our commitment to playing an active role in the communities where we operate.

What's happening in their world

Increasingly, the local community feels the impact of the rapid development of our headquarters in the Brainport Eindhoven region – home to around half of ASML's employees. Our community stakeholders expect us to take on our fair share in keeping the region attractive and inclusive for all community members, with sufficient affordable housing, sustainable transportation, a strong (technology) education system for all and opportunities for the underserved. In addition to this, we want to help newcomers integrate and feel at home in our region. Meanwhile, our headquarter campus expansion should take into account the interests of our close neighbors.

How we respond

Our Community Partnership Program focuses globally on four areas: boosting the attractiveness of local communities; aiming to keep these communities inclusive; supporting science and technology education; and supporting ESG innovation. Within these areas, ASML and our stakeholders have identified and formed 17 program strategies that we began to execute during 2023.

Read more in Sustainability statements – Social – Valued partner in our communities

We operate in an international industry with a global value chain, where strong incentives to compete and drive innovation are key. We work with and collaborate with governments on all levels (national, regional and local) to ensure our growth and objectives are clear and can be supported.

Read more in our ASML Government & External Affairs Report at asml.com

How we engage

Direct engagement:

- External survey of Brainport Eindhoven (quarterly)
- Online via social media and websites (global and local such as ASML Dichtbij) (daily)
- Dedicated phone lines, online forms and email addresses including directly with our 'omgevingsmanager' (on occurrence)
- Events, open-house, town halls and local information sessions (on occurrence)
- Newsletters, community relations and ongoing community outreach programs (on occurrence)
- ASML's Speak Up Service (on occurrence)

Engagement via representation or credible proxies with industry unions and associations (on occurrence):

- Member conferences and technical forums
- Member consultation on standards
- Brainport Eindhoven (six-week intervals)

Engagement with governments and authorities (on occurrence):

- Dialogue with tax authorities
- Relevant EU roundtable discussions
- Compliance reporting
- Proactive dialogue with government and municipalities

Read more in Strategic report – 2024 stories – Powering technology forward with local communities

Building community connections

At our first community conference (ASML Maatschappelijke Conferentie 2024), we strengthened ties with the local community in the Brainport Eindhoven region.

Around 200 representatives from local government and social organizations in the field of education, sports, arts and culture joined us to discuss key issues, such as inequality, labor shortages and housing, as well as the ambition and coherence of our society investment programs. The insights gained will guide our future agenda and approach.

Performance and risk

A year of transition and preparation, ahead of the upturn to come

Message from our Executive Vice President and Chief Financial Officer

Roger Dassen

“We delivered on our expectations in spite of the challenges.”

Dear Stakeholder,

Our results for 2024 were in line with the previous year, consistent with guidance. As we forecasted, this was a period of transition where we continued to make significant investments in technology and ramping up capacity to ensure that we are ready to support our customers through the industry upturn. As we have seen in 2024, artificial intelligence is clearly the key driver of growth in the semiconductor industry. However, we believe it is creating a shift in the market, with some of our customers benefiting more than others, which creates both opportunities and risks leading to some customer cautiousness.

Total net sales rose by €0.7 billion, or 2.6%, reflecting a decrease in net system sales of 0.8%, and an increase in net service and field option sales of 15.6% compared to 2023. The decrease in net system sales was primarily due to lower NXE (EUV 0.33 NA) sales. This was partially offset by the introduction of our latest NXE value proposition, the TWINSCAN NXE:3800E, which we successfully delivered to multiple customers in 2024. Furthermore, lower NXE system sales were partially offset by the successful delivery of the first High NA EUV (EUV 0.55 NA) lithography system and greater demand for DUV immersion systems.

Regarding net service and field option sales, the rise was largely due to improved net service sales, which continue to scale as a result of a growing installed base of systems and higher system utilization levels at certain customers.

Our gross margin remained stable in 2024 compared to 2023. Gross margin was affected by a dilutive impact of the first High NA EUV lithography system deliveries, but offset by growth in our installed base business.

A year of transition and preparation, ahead of the upturn to come (continued)

Message from our Executive Vice President and Chief Financial Officer
Roger Dassen

Managing the cycles of our industry

The semiconductor industry has always been cyclical, with the peaks and troughs driving a sharp focus on cost and cash management in the short term while preparing the ground for the growth opportunities throughout the entire ecosystem in the longer term.

While artificial intelligence (AI) continues to be a growth driver for the semiconductor industry, this is not benefiting all customers equally in the short term.

This, combined with competitive foundry dynamics, has led to several fab push-outs and consequent changes in lithography demand timing, in particular for EUV.
In terms of our Memory business, customers have limited their capacity additions, with greater emphasis on the technology transition supporting high-bandwidth memory (HBM) and DDR5 (double data rate 5) AI-related demand.

However, ASML is very much a business focused on the long term. Led by AI together with the energy transition and electrification, the industry growth drivers will continue to expand the application space for both advanced and mature nodes. Therefore, we remain confident about growth opportunities in the long term.

€28.3bn
Total net sales

51.3%
Gross margin

€3.0bn
Returned to shareholders

Realizing the potential of AI

AI has the potential to be the next big driver of productivity and innovation for the wider society. Today, we see industries across the board preparing to incorporate AI capabilities in their upcoming critical applications. This in turn is translating into major investments in the field of high-performance computing.

This emergence of AI represents a significant growth opportunity for semiconductors, similar to what we saw across previous computing waves (PC, internet and smartphone). However, the AI-led demand for computing power is increasing faster than that supported by Moore’s Law, which in turn gives rise to power consumption and cost challenges. Unleashing the full potential of AI will require us to overcome these challenges – which, from a semiconductor viewpoint, implies an acceleration of the advanced Logic roadmap as well as improved performance and energy efficiency of the DRAM Memory architecture.

Therefore, on balance, we anticipate a steady pace of AI adoption in the coming years, contributing toward our expectation of overall worldwide semiconductor sales crossing $1 trillion by 2030. In terms of end markets, we see servers, data centers and storage as the key initial beneficiary of this emergence of AI, with associated semiconductor sales for this end market expected to exceed $350 billion by 2030.

Transforming our business processes

AI is not only driving our markets – it is also transforming how we work internally, in line with our goal of leading AI innovation in the semiconductor equipment industry.

We are developing a comprehensive strategy that aims to harness the potential of both predictive and generative AI across various domains – driving innovation, improving efficiency and seizing competitive advantage. This strategy, supported by the appointment of our – first – Head of AI Program & Strategy in June 2024, focuses on capturing key opportunities in four areas: speed and quality in R&D; excellence in product leadership and support; speed and quality in operations; and enabling capability and efficiency.

Among its most notable achievements of the last 12 months, the AI program prioritized over 40 opportunities where AI could help us work better and faster.

Our responsible AI program will now concentrate on developing the overarching strategy, building an integrated roadmap, and providing governance through oversight and coordination.

A year of transition and preparation, ahead of the upturn to come (continued)

Message from our Executive Vice President and Chief Financial Officer
Roger Dassen

Supporting our ESG commitments

For our finance team, one of the year's most demanding workstreams centered on preparing for the European Sustainability Reporting Standards (ESRS), and required a substantial investment in resources. Thanks to the commitment and expertise of our people in meeting an extremely demanding deadline, I am pleased to say that this Annual Report is in accordance with ESRS requirements.

We took ESRS very seriously right from the time it was first announced, beginning with focusing on a gap assessment and organizational readiness check in 2022. This was followed by a robust, well-governed project based on collaboration by teams across the entire breadth of ASML.

While ESRS compliance necessitated a great deal of hard work and skill from our team, it has brought new rigor to how we manage ESG and enabled us to accelerate our ESG sustainability strategy. With improved and expanded data, processes and disclosures in place, ESRS has given us greater insight into how we can contribute to the sustainability of our supply chain and customers as well as within our own organization.

Engaging with our communities

I believe that when we invest in our communities, we not only contribute to their well-being, but also create a positive environment where our employees can thrive. We want to create a shared future where everyone benefits.

As a major employer, we have a significant impact on the regions where we operate. In addition to recognizing our responsibility to act as good and supportive neighbors, we also know that we have the resources and influence to make a real difference to the lives of people well beyond the boundaries of our organization.

We aim to balance our growth with social responsibility, ensuring that we share our success while addressing the challenges that come with it. Our activities are organized through our Community Partnership Program with a focus on four key areas: boosting the attractiveness of local communities; aiming to keep these communities inclusive; supporting science and technology education; and supporting ESG innovation.

During 2024, we invested €45.2 million in community projects, including a collaboration with local partners that aims to add affordable homes to the Brainport Eindhoven area, alleviating some of the pressure that our growth puts on the housing market.

Looking ahead

Our customers are fundamental to our strategy, and we believe that lithography will continue to play a crucial role in driving their innovation forward. Our flexible and versatile portfolio is well positioned to meet all our customers' needs. We're expanding holistic lithography to support 3D front-end integration, enhance DUV and EUV performance and cost-effectiveness, and scale EUV technology well into the next decade.

Looking ahead to 2025, we anticipate total net sales between €30 billion and €35 billion, consistent with previous guidance. The expected gross margin is between 51% and 53%, which would be an increase compared to prior years, alongside an annualized effective tax rate of around 17%.

We continue to invest heavily in R&D, positioning ourselves to capitalize on the anticipated growth in the semiconductor market, which could exceed $1 trillion by 2030, driven largely by AI advancements. We aim to capture significant opportunities in this expanding market, as we anticipate that an increased number of critical lithography exposures for advanced logic and memory processes will be required.

Regarding our net service and field option sales business, we anticipate revenue growth compared to 2024, fueled by increased service and upgrade activities linked to our expanding installed base. EUV technology in particular is playing an increasingly significant role in driving this growth.

Toward 2030, we see growth scenarios leading to an opportunity to achieve 2030 annual revenue between approximately €44 billion and €60 billion, with a gross margin between 56% and 60%. We will maintain a consistent and disciplined capital allocation policy prioritizing growth and other necessary investments, then growing dividends and then share buybacks. Overall, our long-term outlook remains bright, supported by strong market dynamics and a robust products and services roadmap.

Roger Dassen
Executive Vice President and Chief Financial Officer

> **“We aim to balance our growth with social responsibility, ensuring that we share our success while addressing the challenges that come with it.”**
>
> **Roger Dassen**
> Executive Vice President
> and Chief Financial Officer

Performance KPIs

Sales

Total net sales
€28.3bn
2023: €27.6bn

Net system sales
€21.8bn
2023: €21.9bn

Net service and field option sales
€6.5bn
2023: €5.6bn

Sales of lithography systems (in units)[1]
418
2023: 449

EUV systems recognized (in units)
44
2023: 53

Profitability

Gross profit
€14.5bn
2023: €14.1bn

% of total net sales
51.3%
2023: 51.3%

Income from operations
€9.0bn
2023: €9.0bn

31.9%
2023: 32.8%

Net income
€7.6bn
2023: €7.8bn

26.8%
2023: 28.4%

Earnings per share
€19.25
2023: €19.91

Liquidity

Cash and cash equivalents and short-term investments (year end)
€12.7bn
2023: €7.0bn

Net cash provided by operating activities
€11.2bn
2023: €5.4bn

Free cash flow[2]
€9.1bn
2023: €3.2bn

1. Lithography systems do not include metrology and inspection systems.
2. Free cash flow is a non-GAAP (generally accepted accounting principles) measure and is defined as net cash provided by operating activities (2024: €11,166.2 million and 2023: €5,443.4 million) minus purchase of property, plant and equipment (2024: €2,067.2 million and 2023: €2,155.6 million) and purchase of intangible assets (2024: €15.9 million and 2023: €40.6 million). We believe that free cash flow is an important liquidity metric for our investors, reflecting cash that is available for acquisitions, to repay debt and to return money to our shareholders by means of dividends and share buybacks. Purchase of property, plant and equipment and purchase of intangible assets are deducted from net cash provided by operating activities in calculating free cash flow because these payments are necessary to support the maintenance and investments in our assets to maintain the current asset base.

Performance KPIs (continued)

Operating results of 2024 compared to 2023

Year ended December 31 (€, in millions)	2023	%[1]	2024	%[1]	% Change
Net system sales	21,938.6	79.6	**21,768.7**	77.0	(0.8)
Net service and field option sales	5,619.9	20.4	**6,494.2**	23.0	15.6
Total net sales	27,558.5	100.0	**28,262.9**	100.0	2.6
Cost of system sales	(10,151.0)	(36.8)	**(10,406.9)**	(36.8)	2.5
Cost of service and field option sales	(3,271.4)	(11.9)	**(3,364.0)**	(11.9)	2.8
Total cost of sales	(13,422.4)	(48.7)	**(13,770.9)**	(48.7)	2.6
Gross profit	14,136.1	51.3	**14,492.0**	51.3	2.5
Research and development (R&D) costs	(3,980.6)	(14.4)	**(4,303.7)**	(15.2)	8.1
Selling, general and administrative (SG&A) costs	(1,113.2)	(4.0)	**(1,165.7)**	(4.1)	4.7
Income from operations	9,042.3	32.8	**9,022.6**	31.9	(0.2)
Interest and other, net	41.2	0.1	**19.8**	0.1	(51.9)
Income before income taxes	9,083.5	33.0	**9,042.4**	32.0	(0.5)
Income tax expense	(1,435.8)	(5.2)	**(1,680.6)**	(5.9)	17.0
Income after income taxes	7,647.7	27.8	**7,361.8**	26.0	(3.7)
Profit from equity method investments	191.3	0.7	**209.8**	0.7	9.7
Net income	7,839.0	28.4	**7,571.6**	26.8	(3.4)

1. As a percentage of total net sales.

For a comparison of ASML's operating results for the year ended December 31, 2023, with the year ended December 31, 2022, please see Financial performance – Performance KPIs – Operating results of 2023 compared with 2022 of ASML's Annual Report on Form 20-F for the year ended December 31, 2023.

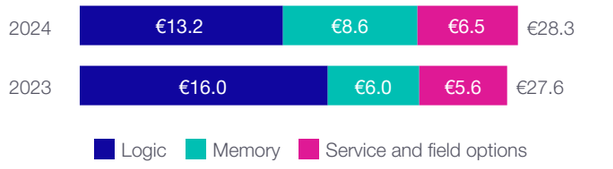
The preparation of our Consolidated financial statements in conformity with US Generally accepted accounting principles (GAAP) requires management to make estimates and assumptions. See Note 1 General information / summary of general accounting policies to the Consolidated financial statements for detailed information on critical accounting estimates.

Total net sales

In 2024, our total net sales further increased by €0.7 billion, or 2.6%, reflecting a decrease in net system sales of 0.8%, and an increase in net service and field option sales of 15.6% compared to 2023.

Net sales growth

(in billions)



Regarding Logic, net sales decreased by €2.8 billion, mainly driven by competitive foundry dynamics which have resulted in a slower ramp of new nodes among certain customers, leading to several fab push-outs, affecting the timing of EUV shipments in particular.

In Memory, net sales increased by €2.6 billion, mainly driven by technology transitions, especially related to high-bandwidth Memory and DDR5, which is primarily the result of AI-related Memory demand.

Net service and field options sales increased mainly due to the growing installed base of systems and higher lithography tool utilization levels at certain customers.

Increase (decrease) on previous year

2.6%
Net sales

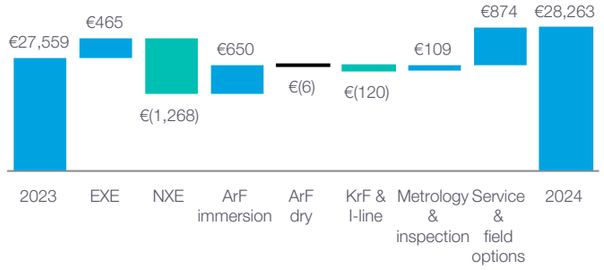
(0.8)%
Net system sales

15.6%
Net service and field option sales

Performance KPIs (continued)

Net sales

(in millions)

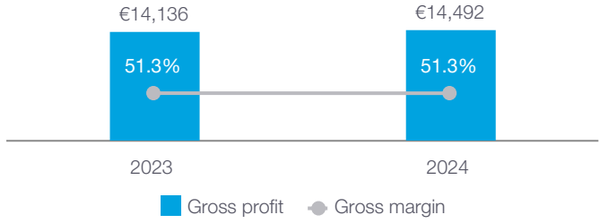


The increase in total net sales was primarily driven by higher net service and field option sales, increased DUV immersion system shipments and the first EXE systems (EUV 0.55 NA) being successfully installed in the field. NXE (EUV 0.33 NA) sales volumes were lower due to a shift in the market dynamics, driven by AI. This was partially offset by our customers' transition to the NXE:3800E, our latest NXE value proposition introduced in 2024. We recognized 2 EXE and 42 NXE systems in sales in 2024 compared with 0 EXE and 53 NXE systems in 2023. Our system sales units across our DUV technologies decreased from 396 in 2023 to 374 units in 2024.

The increase in net service and field option sales was primarily due to higher service sales, as a result of the growing customers' systems installed base and higher lithography tool utilization levels at certain customers.

Gross profit and gross margin

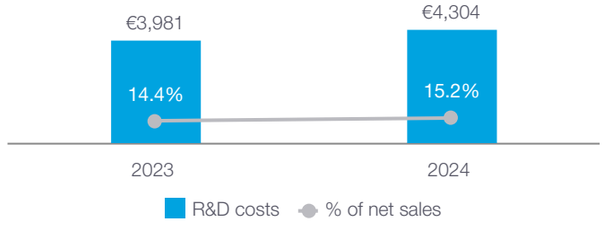
(in millions)



Gross profit increased mainly as a result of higher service sales. The gross margin remained stable compared to previous year. The gross margin benefited from an improved net service and field options sales margin, which was offset by a lower share of NXE sales and the dilutive impact of the first EXE systems recognized as sales.

Research and development costs

(in millions)



R&D costs were €4,303.7 million in 2024 compared with €3,980.6 million in 2023. The increase in R&D costs across each of our NXE, EXE, DUV and Applications programs all support our holistic lithography solutions. In 2024, R&D costs mainly related to:

- Investments in the development of the NXE:3800E and NXE:4000 systems and further improving availability and productivity of our EUV installed base systems.
- Investments in the development of our EXE systems to support future nodes for both Logic and DRAM customers.
- Continued investment in the next-generation lithography systems, which will increase productivity and overlay in critical DUV layers (NXT:2150i), increase productivity in KrF layers (NXT:870B) and make a next step in cost effectiveness for our customers in i-line (XT:260).
- Continued investment in e-beam inspection, e-beam metrology and YieldStar optical metrology. In addition, securing our multibeam inspection roadmap and continuously expanding our investment in the holistic software applications space.

€4.3 billion

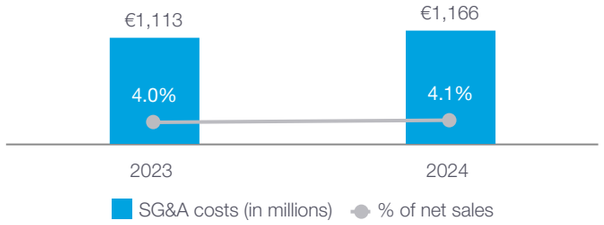
R&D costs

8.1%

Increase in R&D costs on previous year

Performance KPIs (continued)

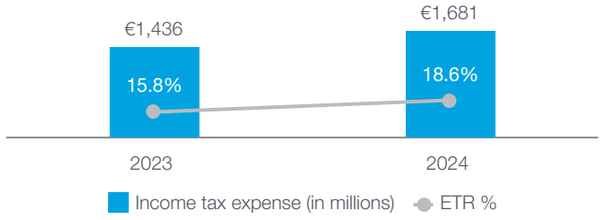
Selling, general and administrative costs
(in millions)



SG&A costs increased by 4.7% from 2023 to 2024, largely due to increases in the number of full-time equivalents (FTEs), in the salary per FTE and in the investments in our Community Partnership Program.

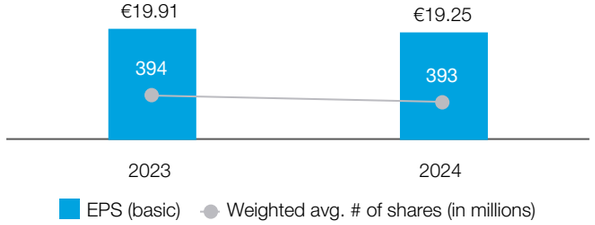
Read more in Sustainability statements – Social – Valued partner in our communities

Income taxes
(in millions)



The effective tax rate (ETR) increased to 18.6% in 2024, compared with 15.8% in 2023. The higher rate is mainly driven by the new 'innovation box' agreement that has become effective as of 2024 as well as by the recognition of a tax expense in relation to a historic tax position.

Net income and earnings per share
(in millions)



Net income in 2024 amounted to €7,571.6 million, or 26.8% of total net sales, representing €19.25 basic net income per ordinary share, compared with net income in 2023 of €7,839.0 million, or 28.4% of total net sales, representing €19.91 basic net income per ordinary share. The slight decrease in basic net income per ordinary share is mainly due to a slightly lower net income.

Performance KPIs (continued)

Cash flow analysis

We continue to invest heavily in our next-generation technologies in order to secure future growth opportunities which require a significant cash investment in net working capital, capital expenditures and R&D.

We also continue our efforts to return cash to our shareholders through our dividends and share buyback program.

Year ended December 31 (€, in millions)	2023	2024
Cash and cash equivalents, beginning of period	7,268.3	**7,004.7**
Net cash provided by (used in) operating activities	5,443.4	**11,166.2**
Net cash provided by (used in) investing activities	(2,689.3)	**(2,609.3)**
Net cash provided by (used in) financing activities	(3,003.9)	**(2,832.1)**
Effect of changes in exchange rates on cash	(13.8)	**6.4**
Net increase (decrease) in cash and cash equivalents	(263.6)	**5,731.2**
Cash and cash equivalents, end of period	7,004.7	**12,735.9**
Short-term investments, end of period	5.4	**5.4**
Cash and cash equivalents and short-term investments	7,010.1	**12,741.3**
Purchases of property, plant and equipment and intangible assets	(2,196.2)	**(2,083.1)**
Free cash flow[1]	3,247.2	**9,083.1**

1. Free cash flow is a non-GAAP measure and is defined as net cash provided by operating activities (2024: €11,166.2 million and 2023: €5,443.4 million) minus purchase of property, plant and equipment (2024: €2,067.2 million and 2023: €2,155.6 million) and purchase of intangible assets (2024: €15.9 million and 2023: €40.6 million).

Net cash provided by (used in) operating activities

The increase in net cash provided by operating activities of €5,722.8 million compared to 2023 is mainly due to the cash received from down payments and the timing of cash payments to our suppliers. This is partially offset by a decrease in net income of €267.4 million.

Net cash provided by (used in) investing activities

The decrease in net cash used in investing activities of €80.0 million compared to 2023 is mainly due to a decrease in capital expenditures by €113.1 million, a decrease in our loans issued of €31.9 million. Additionally, in 2024, we did not acquire any entities (2023: €33.6 million). This is partially offset by the higher net cash outflow from the purchase and maturity of short-term investments of €102.0 million.

Net cash provided by (used in) financing activities

The net cash used in financing activities decreased by €171.8 million compared to 2023. While our total dividends paid increased by €104.6 million, the total value of shares purchased through our share buyback program decreased by €500.0 million. Additionally, in 2024, we had limited net proceeds from issuances of notes (2023: €997.8 million) and no repayment of previously issued notes that became due (2023: €752.8 million).

As of December 31, 2024, ASML has sufficient capital for the company's present obligations.

Long-term growth opportunities

Trend information

Looking to 2025, we expect full-year revenue between €30 billion and €35 billion and gross margin between 51% and 53%.

Consistent with our view from last quarter, the growth in AI is the key driver for growth in our industry, however as we have noticed already in 2024 it has created a shift in the market dynamics that is not benefiting all of our customers equally.

If AI demand continues to be strong and customers are successful in bringing on additional capacity to support that demand, there is potential opportunity towards the upper end of our revenue range. On the other hand, there are also risks related to customers and geopolitics that could drive results towards the lower end of the range.

Looking at market segments we currently expect Logic to be up versus 2024 with the ramp of leading-edge nodes while we expect Memory to remain strong, similar to 2024.

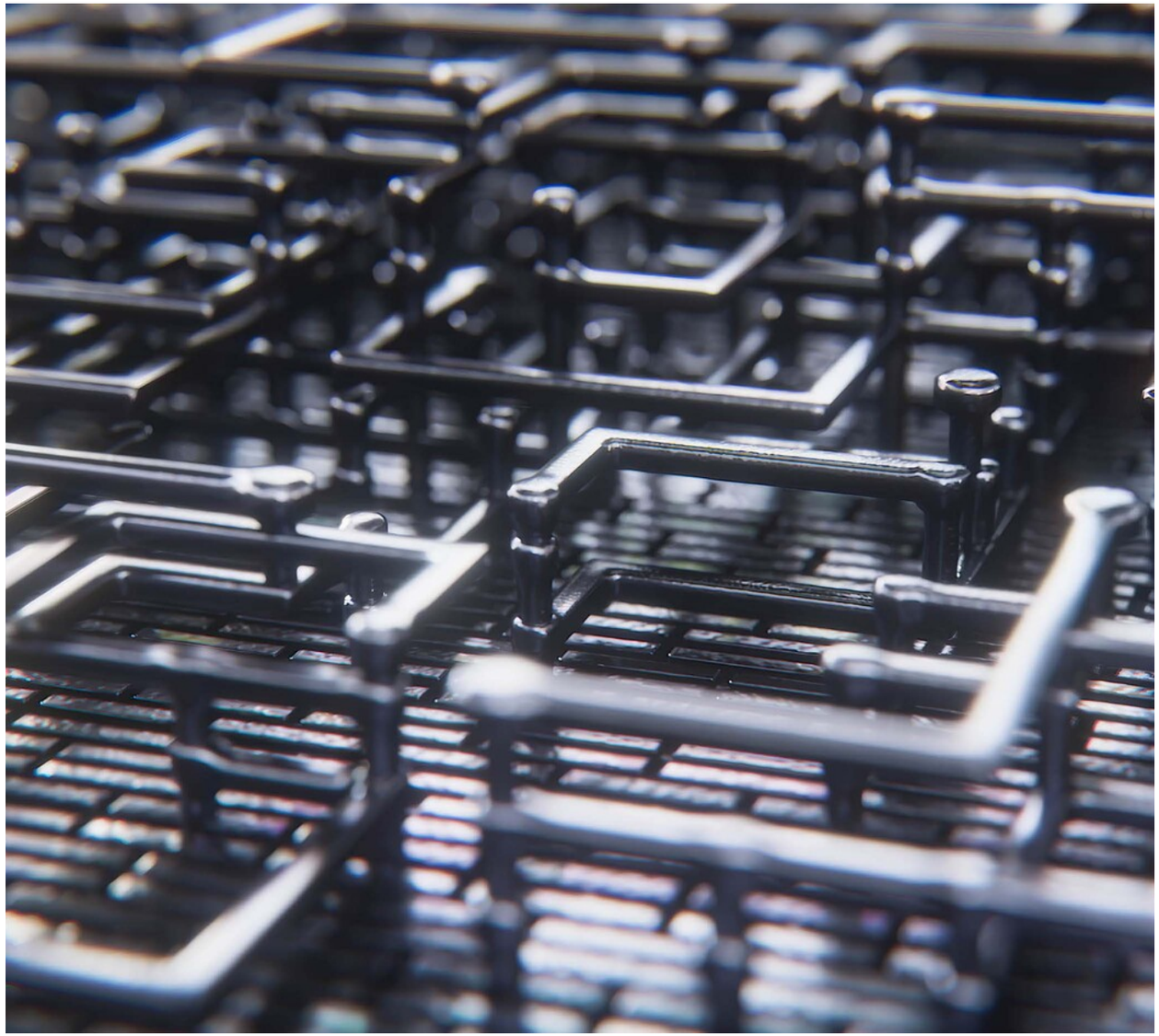
With respect to our net service and field option sales, we expect revenue to grow versus 2024 driven by both service and upgrades as part of a growing installed base, in which EUV is having a growing contribution to the business.

Our expectations and guidance for the first quarter of 2025 can be summarized as follows:

- Total net sales between €7.5 billion and €8.0 billion
- Gross margin between 52% and 53%
- R&D costs of around €1.140 billion
- SG&A costs of around €290 million

The trends, expectations and guidance discussed above are subject to risks and uncertainties.

Read more in Strategic report – Forward-looking statements



Long-term growth opportunities (continued)

Long-term growth opportunity for 2030

At our November 2024 Investor Day, we provided an update on our long-term growth opportunity for 2030.

The semiconductor industry remains strong and AI is expected to create further opportunity.

Our industry will require major innovations to address the anticipated cost and power consumption challenges of AI and this will further boost the industry roadmap in a product mix shifting toward advanced Logic and DRAM.

Our customers remain at the core of our strategy, and we believe that lithography will remain at the heart of their innovation. We also anticipate that an increased number of critical lithography exposures for advanced Logic and Memory processes will continue to support our customers in addressing their challenges.

We expect that our ability to 1) scale our EUV technology well into the next decade, 2) extend holistic lithography into supporting 3D front end integration and 3) improve the performance and cost effectiveness of our EUV and DUV products will continue to address all our customers' needs with a flexible and versatile portfolio.

ASML values the strong industry partnerships which are critical to our success and our collective commitment to a leadership position in ESG.

Based on our modelling of the different scenarios we expect global semi sales to grow at 9% CAGR (2025-2030) and surpass $1 trillion by 2030.

This translates into an overall wafer demand growth of 780K wafer starts per month per year (2025-2030). The rise of AI as a leading end driver also implies a positive mix-shift in the wafer demand profile from litho spending perspective. We expect Advanced Logic and DRAM to drive further EUV litho exposures and spending.

For the period from 2025 to 2030, for Advanced Logic, we expect an EUV litho spending CAGR of 10-20% and for DRAM, we expect an EUV litho spending CAGR of 15-25%.

This expected growth in semiconductor end markets and increasing lithography spending on future nodes are expected to fuel demand for our products and services.

Based on different market and lithography intensity scenarios, we see an opportunity to achieve 2030 annual revenue between approximately €44 billion and €60 billion with gross margin between approximately 56% and 60%.

We expect to continue to return significant amounts of cash to our shareholders through a combination of growing dividends and share buybacks.

Read more in Strategic report – Our business strategy

Long-term models as presented at 2024 Investor Day

Total sales opportunity (in €bn)

	2022 Investor Day Sales 2030	2024 Investor Day Sales 2030
High scenario		
EUV sales	32	32
Non-EUV sales (litho and M&I*)	15	15
Installed base management**	13	13
Total	**60**	**60**
Moderate scenario		
EUV sales	Not reported at 2022 Investor Day	26
Non-EUV sales (litho and M&I*)		14
Installed base management**		12
Total		**52**
Low scenario		
EUV sales	22	22
Non-EUV sales (litho and M&I*)	11	11
Installed base management**	11	11
Total	**44**	**44**

* M&I: Metrology and inspection.
** Installed base management equals our net service and field option sales.

How we manage risk

ASML manages risks through an enterprise risk management (ERM) framework that integrates risk management into our daily business activities and strategic planning.

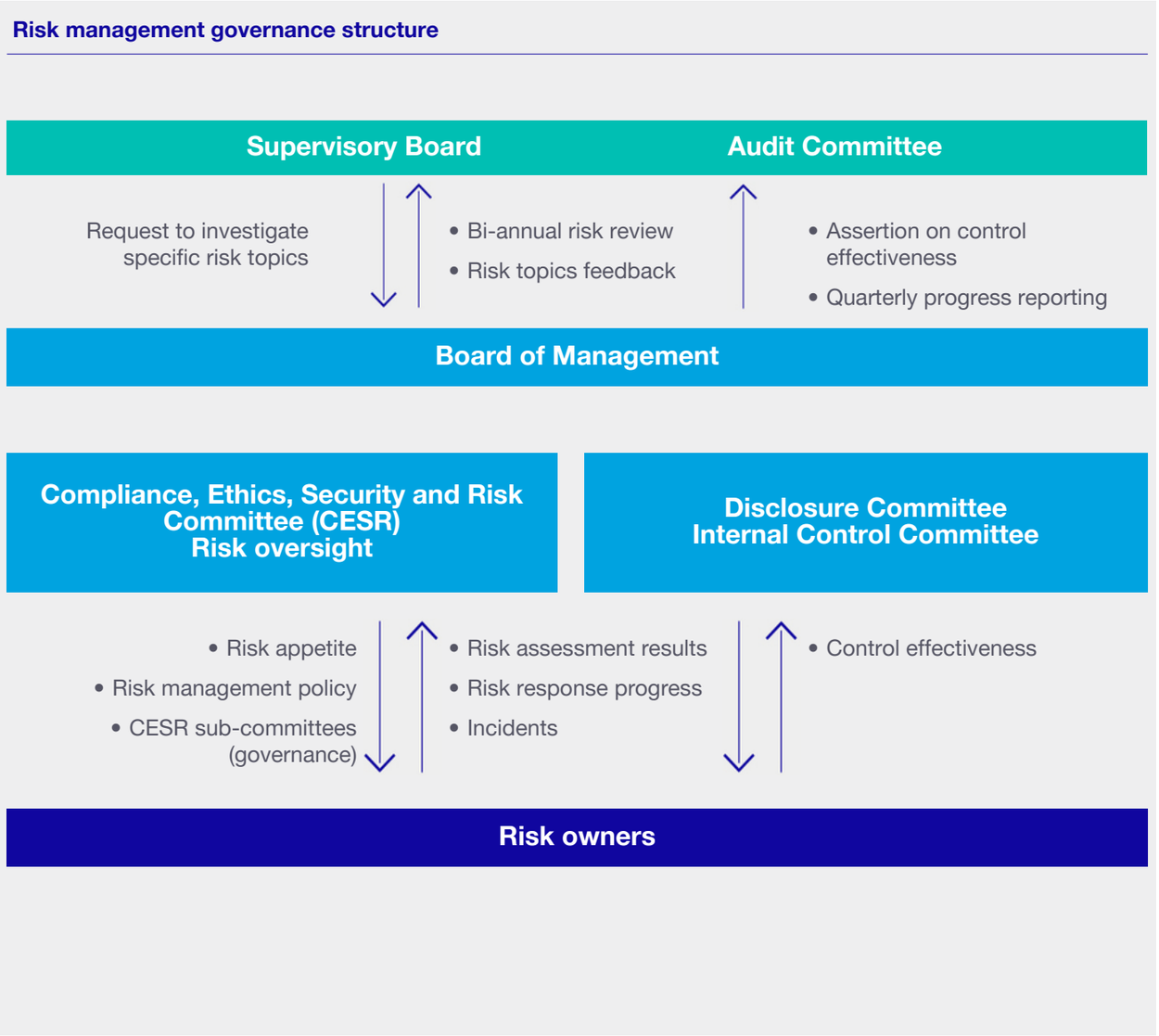
Enterprise risk management

ASML's ERM framework is designed to enable a well-defined governance structure and a robust ERM process. The Risk and Business Assurance function drives the ERM process and associated activities across ASML. We follow a systematic approach to identify, manage and monitor risks in pursuit of our business objectives by setting standards and enabling management to maintain and continuously improve our governance, risk management, internal control and compliance. The framework enables us to identify opportunities to achieve our objectives and ensure sustainable long-term value creation.

ERM is a continuous process. Its related activities are periodically repeated to identify and address risks in a timely fashion, and ensure outcomes are relevant for effective decision-making. Our Head of Risk and Business Assurance reports to the CFO and Audit Committee and is responsible for leading the development and maintenance of the ERM framework and the implementation of the ERM process. We have adopted the International Organization for Standardization (ISO) 31000:2018 standard as the basis for our ERM activities. In addition, the Head of Risk and Business Assurance is responsible for leading the security function and for developing and maintaining the compliance process.

The purpose of risk management is to maximize the probability of achieving business objectives responsibly.

Risk management governance structure



How we manage risk (continued)

Supervisory Board and Audit Committee

The Supervisory Board (SB) provides independent oversight of management's response on critical risk areas. The SB's Audit Committee provides independent oversight of the ERM process and timely follow-up of priority actions based on quarterly progress updates.

Board of Management

The Board of Management (BoM) is responsible for managing internal and external risks related to our business activities and for ensuring we comply with applicable laws and regulations.

Compliance, Ethics, Security and Risk Committee

The Compliance, Ethics, Security and Risk Committee (CESR) is the central risk oversight body that reviews, manages and controls risks in the ASML risk universe. It also approves the risk appetite, risk management policies and risk mitigation strategies. The CESR is chaired by the CFO and comprises senior management representatives across ASML, including the COO and CSPO (Chief Strategic Sourcing & Procurement Officer).

Disclosure Committee

The Disclosure Committee is chaired by the head of Finance and advises the BoM in overseeing ASML's disclosure activities and compliance with applicable disclosure requirements arising under Dutch and US law, applicable stock exchange regulations and other regulatory requirements.

Internal Control Committee

The Internal Control Committee is chaired by the Corporate Chief Accountant and advises the Disclosure Committee, CEO and CFO in their assessment of our internal control over financial reporting and related disclosures, under section 404 of the Sarbanes-Oxley Act. The Chair of the Internal Control Committee updates the CEO and CFO on the progress of this assessment. The Chair also includes this update in the Internal Control Committee's report to the Audit Committee.

Risk owners

Risk owners monitor the development of risks across the ASML risk universe and drive risk response across ASML according to requirements defined by the CESR.

ASML risk universe

The ASML risk universe is a consolidated overview of the risks that may have a material adverse impact on our ability to achieve our business objectives. The risk universe was updated in 2024 and consists of 31 risk categories grouped into six risk types. The risk universe allows us to have a consistent approach to risk assessments across ASML.

We take into account a broad range of internal and external information sources such as macroeconomic and industry trends, relevant guidelines and legislation, and stakeholders' needs and expectations in all areas. The risk universe is reviewed, updated and approved annually, or more frequently when there are significant internal and/or relevant external developments.

ASML risk universe

Strategy and products

- Industry cycle risk
- Geopolitical risk
- ESG expectations risk
- Business model risk
- Merger and acquisition risk
- Competition risk
- Innovation risk
- Product stewardship risk
- Product roadmap execution risk
- Intellectual property rights risk

Finance and reporting

- Business planning risk
- Financial risk
- Shareholder activism risk
- Disclosure/external reporting risk
- Tax and customs risk

Partners

- Customer dependency risk
- Product/service quality risk
- Supplier strategy and performance risk
- Supply chain disruption risk

People

- Knowledge management risk
- Organizational effectiveness risk
- Human resource risk

Operations

- Product industrialization risk
- Process effectiveness and efficiency risk
- Environment, health and safety risk
- Continuity of own operation risk
- Security risk
- Information technology risk
- Manufacturing and install risk

Legal and compliance

- Contractual liability risk
- Violation of laws and regulations risk

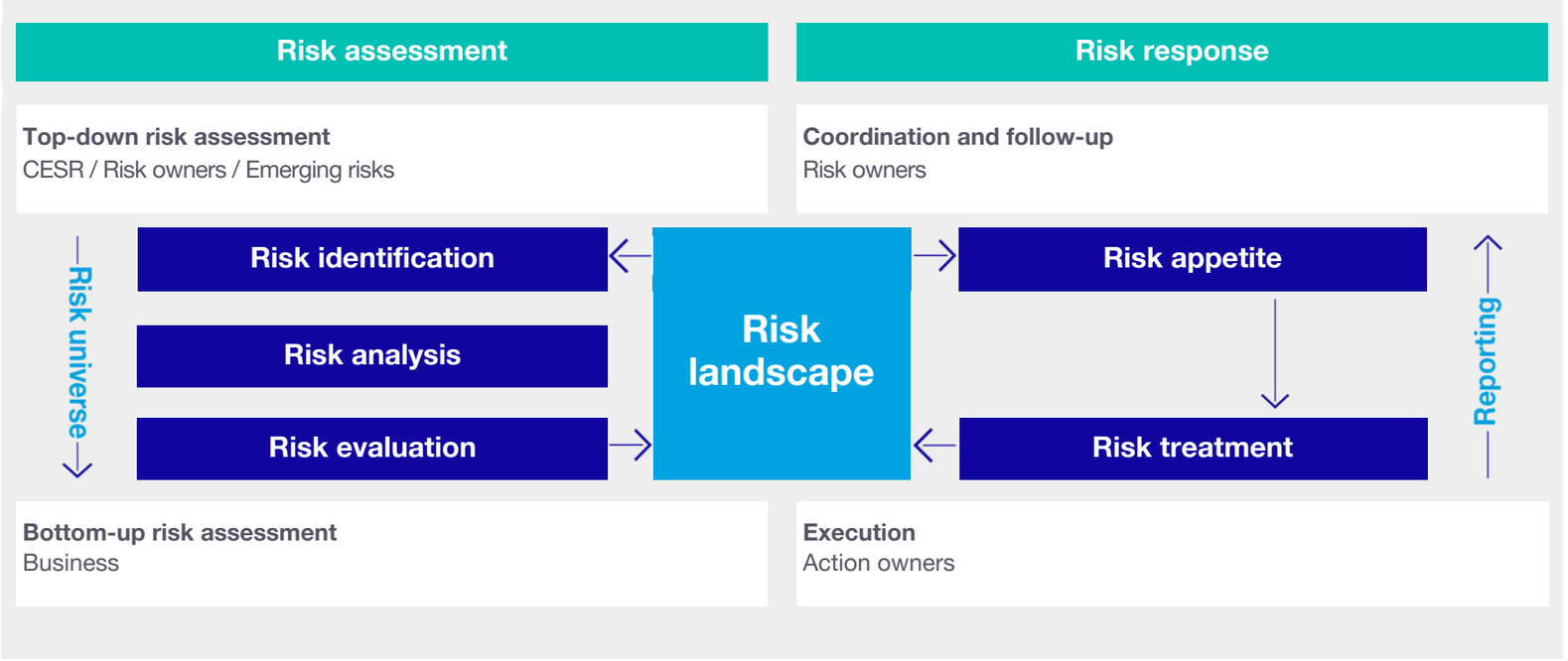
How we manage risk (continued)

ERM process

The ERM process provides a holistic approach combining both top-down (company-level) and bottom-up (organization- and process-level) perspectives. This helps us identify, evaluate and manage risks at the right level. We continuously seek to improve our ERM process based on learnings, developments and best practices.

The results of periodic risk assessments and the potential impact of external trends and emerging risks are captured in the ASML risk landscape. As we operate in a dynamic environment, risk exposures are subject to change. The ASML risk landscape is reviewed and updated by the CESR each quarter. Risk assessments are carried out to assess all risk events in ASML's risk universe. We define strategies to address relevant risks and take these into account when we set our corporate priorities. Our risk responses aim to mitigate risks to the level defined by the risk appetite.

Risk management process



How we manage risk (continued)

There are several developments in the context of our strategy that have an impact on the risk categories in our risk universe. The table below shows the key developments and includes examples of our responses:

Development	Risk trend	Risk universe reference	Risk response
Geopolitical tensions Geopolitical tensions and the strive for technological sovereignty may lead to a decoupled ecosystem. There is a risk that future trade restrictions (e.g. raw materials, technology, systems, investments) further limit our ability to source parts and/or sell systems to, or service them for, certain customers. With the increasing complexity of regulations, ensuring compliance has become more challenging.	↑	• Geopolitical • Competition • Supply chain disruption • Continuity of own operation • Business model • Violation of laws and regulations • Security • IP rights • Human resource	• Active engagement with authorities and governments • Scenario planning • Collaborate with peers in global advocacy • Optimize industrial footprint • Apply for export licenses • Comply with applicable regulations
Uncertain global economy Global economic conditions lead to uncertainty for semiconductor demand and therefore demand for our products. We have experienced order push-outs. The macroeconomic weakness continues and its duration is uncertain.	=	• Industry cycle • Business model • Financial • Competition • Supply chain disruption	• Cost control • Maintain flexibility • Scenario planning
Pressure on know-how and intellectual property (IP) protection in ecosystem ASML's strengths are based on the innovation power in our ecosystem and the ability to protect our IP. There is significant pressure on know-how and IP protection for ASML and its open innovation partners. We and our partners experience cyber- and other security threats.	↑	• Security • Supply chain disruption • Competition • IP rights	• Intellectual property portfolio management • Patents and relevant technical publications monitoring • Substantial investments in security • Awareness and training programs • Cyber defense capabilities
Growth challenges Although there is uncertainty and volatility in the industry, we expect substantial growth opportunities in this decade. That brings challenges. We are continuing to increase production capacity in our end-to-end supply chain to meet future demand, but we may still face challenges in increasing capacity. Such challenges can be amplified by supply chain constraints. In addition, hiring, onboarding and retaining our workforce in the competitive market is a long-term challenge.	=	• Manufacturing and install • Supplier strategy and performance • Human resource • Product industrialization • Process effectiveness • Product/service quality	• Increase of manufacturing and supply chain capabilities • Remain flexible in our operating model • Drive operational excellence • Strengthen ecosystem relationships • Create an exceptional workplace • Shorten time to knowledge

Risk factors

Many risks have the potential to impact our business and it is important to understand their nature. We assess risks using the ASML risk universe, which comprises six risk types (Strategy and products, Finance and reporting, Partners, People, Operations, Legal and compliance).

The risk factors in this section are classified under these six risk types.

Any of these risks and the related events or circumstances described therein may have a material adverse effect on our business, financial condition, results of operations and reputation.

These risks are not the only ones that we face. Some risks may not yet be known to us, and certain risks that we do not currently believe to be material could become material in the future.

Many risks may be intensified by global events, such as wars and other conflicts, geopolitical tensions, inflation, industry downturn, global measures (including new regulations) taken in response to these events and/or any adverse global business and economic conditions.

1. Strategy and products

Our future success depends on our ability to respond timely to commercial and technological developments in the semiconductor industry

Risk category:
Business model, Innovation

Our success in developing new and enhancing existing technologies, products and services, depends on a variety of factors. These include the success of our and our suppliers' R&D programs and the timely, cost-effective and successful completion of product development and design relative to competitors.

Our business will suffer if the technologies we pursue to assist our customers in producing smaller and more energy-efficient chips are not as effective as, or are more costly than, those developed by competitors. Our business will also suffer if our customers do not adopt technologies that we develop, or if they adopt new technological architectures that are less focused on lithography products. For example, the success of our EUV 0.55 NA (High NA) technology, which we believe is critical for keeping pace with Moore's Law, depends on continuing technical advances by us and our suppliers.

We invest considerable financial resources in developing and introducing new and enhanced technologies, products and service offerings. If we are unsuccessful in developing (or if our customers do not adopt) these technologies, products and service offerings, such as EUV 0.55 NA and multibeam inspection, or if alternative technologies or processes are successfully introduced by others, our competitive position and business may suffer, and we may be unable to recoup some or all of these investments.

In addition, we may incur impairment charges on capitalized technology including prototypes or incur costs related to inventory obsolescence, as a result of technological changes. Such charges and costs may increase as the complexity of technology increases.

Also, due to the highly complex nature and costs of our systems, including newer technologies, our customers may purchase existing technology systems rather than new leading-edge systems, or they may delay their investment in new technology systems to the extent that such investment is not economical or required, given their product cycles.

Global economic conditions in general and semiconductor market conditions specifically affect our customers' investment decisions and lead to uncertainties in the timing around the introduction of and demand for new leading-edge systems. This increases the risk of slowing down the overall transition period (or cadence) for the introduction of new nodes and, therefore, new systems.

We also depend on our suppliers to maintain their development roadmaps to enable us to introduce new technologies in a timely manner. Delays by suppliers in keeping pace with their roadmaps, whether due to technological factors, lack of financial resources or otherwise, impact our ability to meet our development roadmaps.

The success of new product introductions is uncertain and depends on our ability to successfully execute our R&D programs

Risk category:
Product roadmap execution, Innovation

As our lithography systems and applications have become increasingly complex, the cost and time to develop new products and technologies have increased, and we expect this trend to continue. In particular, developing new technology, such as EUV 0.55 NA (High NA) and multibeam, requires significant R&D investments by us and our suppliers.

Our suppliers may not be able or willing to invest the resources necessary to continue the (co-)development of new technologies to the extent that such investments are necessary. This has resulted and may result in ASML contributing funds to such R&D programs or limiting the R&D investments that we can undertake.

Furthermore, if our R&D programs are not successful in developing the desired new technology on time or at all, we may be unsuccessful in introducing new products, services and technologies and unable to recoup our R&D investments.
In case of high levels of customer demand, we may prioritize our resources on production over R&D programs.

Risk factors (continued)

1. Strategy and products (continued)

We face intense competition

Risk category:
Competition

The semiconductor equipment industry is highly competitive. Our competitiveness depends on our ability to develop new and enhanced lithography equipment, and related applications and services that bring value to our customers and are competitively priced and introduced on a timely basis – as well as our ability to protect and defend our intellectual property, trade secrets or other proprietary information.

We compete primarily with Canon and Nikon in respect of DUV systems. Both have substantial financial resources and broad patent portfolios. Each continues to offer products that compete directly with our DUV systems, which may impact our sales or business. In addition, adverse market conditions, long-term overcapacity or a decrease in the value of the Japanese yen in relation to the euro could increase price-based competition, resulting in lower prices and lower sales and margins.

We also face competition from new competitors with substantial financial resources, as well as from competitors driven by the ambition of self-sufficiency in the geopolitical context. Furthermore, we face competition from alternative technological solutions or semiconductor manufacturing processes.

We also compete with providers of applications that support or enhance complex patterning solutions, such as Applied Materials Inc. and KLA-Tencor Corporation. These applications compete with our applications offering, which is a significant part of our business.

The semiconductor industry can be cyclical and we may be adversely affected by any downturn

Risk category:
Industry cycle risk

The semiconductor industry has historically been cyclical. As a supplier to the global semiconductor industry, we are subject to the industry's business cycles. The timing, duration and volatility are difficult to predict and can have a significant impact on semiconductor equipment manufacturers including ASML. Newer entrants to the industry, including Chinese semiconductor manufacturers, could increase the risk of cyclicality in the future. Certain key end-market customers – Logic and Memory – exhibit different levels of cyclicality and different business cycles. Cyclicality may be worsened by the geopolitical situation – for example, if countries increase semiconductor capacity for higher levels of self-sufficiency, thereby creating global overcapacity.

Sales of our lithography systems, services and other holistic lithography products depend in large part on the level of capital expenditures by semiconductor manufacturers. These in turn are influenced by industry cycles, the drive for technological sovereignty and a range of competitive and other factors, including semiconductor industry conditions and prospects. The timing and magnitude of capital expenditures of our customers also impact the available production capacity of the industry to produce chips, which can lead to imbalances in the supply and demand of chips. Reductions or delays in capital expenditures by our customers, or incorrect assumptions by us about our customers' capital expenditures, could adversely impact our business.

We make various assumptions about future demand in our financial models and our capital expenditures and planning for production capacity. To the extent that actual results prove to be materially different from our assumptions, we may have overcapacity or may have allocated capital expenditure and resources to make products that are not in demand by customers (at the expense of products that are in demand) and our actual results could differ substantially from those implied by our financial models.

Capital expenditures by our customers may not continue at current levels and may decline. Capital expenditures by some customers have declined recently compared to prior years and we have experienced changes in timing of orders from certain customers, and we are subject to uncertainty in future customer demand. The current global economic environment, including inflation, interest rates and geopolitical events, contributes to this uncertainty.

An uncertain global economy frequently leads to reduced consumer and business spending, and could cause our customers to decrease, cancel or delay their orders and we have experienced customers scaling back their capacity additions. High interest rates and volatility in financial markets could make it more difficult for our customers to raise capital, whether debt or equity, to finance their purchases of equipment, including the products we sell. The foregoing could lead to reduced demand, which may adversely affect our product sales and revenues and may harm our business and operating results.

As we have significantly increased our organization in terms of employees, infrastructure, manufacturing capacity and other areas, we may not be able to adjust our costs adequately in a timely manner in the event of an industry downturn.

If we are unable to adapt appropriately and in a timely manner to changes resulting from macroeconomic conditions, our business, financial conditions or results of operations may be materially and adversely affected.

We derive most of our revenues from the sale of a relatively small number of products

Risk category:
Business model

We derive most of our revenues from the sale of a relatively small number of lithography systems (418 units in 2024, 449 units in 2023 and 345 units in 2022). As a result, the timing of shipments and recognition of system sales for a particular reporting period, as a result of shipment delays or other factors, may have a material impact on our results of operations in that period, and this impact is greater as prices for our systems increase. In recent years, we have used fast shipments for some customers, which allows us to deliver systems more quickly to customers by having some final testing and formal acceptance carried out on customer sites instead of at our own facilities. This typically leads to a delay of revenue recognition for those shipments until formal customer acceptance, which can impact comparability of our results of operations from period to period.

In addition, our installed base revenues are impacted by the number of systems we sell and other factors; for example, customers may perform more of these services themselves, find other third-party suppliers to provide them or we may be limited by export control restrictions.

Risk factors (continued)

1. Strategy and products (continued)

Failure to adequately protect intellectual property could harm our business

Risk category:
Intellectual property rights

We rely on intellectual property (IP) rights such as patents, copyrights and trade secrets to protect our proprietary technology. However, we face the risk of such protective measures proving inadequate and we could suffer material harm because, among other matters:

1. IP laws may not sufficiently support our proprietary rights or may change adversely in the future.
2. Our agreements (e.g. confidentiality, licensing) with our customers, employees and technology development partners and others to protect our IP may not be sufficient or may be breached or terminated.
3. Patent rights may not be granted or interpreted as we expect.
4. Patent rights will expire, which may result in key technology becoming widely available, which may harm our competitive position.
5. The steps we take to prevent misappropriation or infringement of our proprietary rights may not be successful.
6. IP rights can be difficult to enforce in countries where the application and enforcement of the laws governing such rights may not have reached the same level compared with other jurisdictions where we operate.
7. Third parties may be able to develop or obtain patents for our own or for similar competing technology.

Legal proceedings may be necessary to enforce our IP rights and the validity and scope may be challenged by others. Any such proceedings may result in substantial costs and diversion of management resources, and, in the event of decisions unfavorable to us in proceedings, could result in significant costs or have a significant impact on our business.

We have experienced and may in the future experience misappropriation attacks by third parties or our employees, including theft of IP. Such incidents may result in third parties or others, without authorization, obtaining, copying, using or disclosing our IP, despite our efforts to protect our IP rights.

Our suppliers face similar risks which could have a consequential impact on us.

Defending against intellectual property claims brought by others could harm our business

Risk category:
Intellectual property rights

In the course of our business, we have been and may be subject to claims by third parties alleging that our products or processes infringe upon their IP rights. If successful, such claims could limit or prohibit us from developing our technology, and manufacturing and selling our products.

Our customers may also be subject to claims of infringement from third parties, including patent holder companies, alleging that our products used by such customers in the manufacturing of semiconductor products and/or the processes relating to the use of our products infringe on one or more patents issued to such third parties. If such claims are successful, we could be required to indemnify our customers for losses incurred by or damages assessed against them as a result of such infringement.

We may incur substantial licensing or settlement costs to settle claims or limit our exposure to the IP claims of third parties.

Patent litigation is complex and may extend for a protracted period of time, giving rise to the potential for substantial costs and diverting the attention of key management and technical personnel. Potential adverse outcomes from patent litigation may include payment of significant monetary damages, injunctive relief prohibiting our manufacturing, exporting or selling of products, reputational damage and/or settlement involving significant costs to be paid by us.

Risk factors (continued)

1. Strategy and products (continued)

We are exposed to economic, geopolitical and other developments in our international operations

Risk category:
Geopolitical

Our business is subject to export control restrictions, sanctions, tariffs and, more generally, international trade regulations which impact our ability to deliver our systems, technology and services, and geopolitical tensions have led, and may lead to, an increase in such restrictions and regulations. Our ability to deliver systems and services in certain countries such as China has been the subject of increased export regulations or policies and continues to be impacted by our ability to obtain required licenses and approvals. We are required under Dutch and other applicable regulations and legislation to obtain licenses for the export of certain technologies. As a result of the Dutch regulations, EUV, certain DUV immersion and other products are subject to license requirements. The US government has also enacted trade measures, including license requirements on conducting business with certain Chinese entities, restricting our ability to provide certain products and services to such entities without a license. The list of Chinese entities impacted by export control restrictions has increased over the years, with restrictions including export controls on semiconductor manufacturing items which impose license requirements on the sale/transfer of US origin items as well as on the support by US persons on non-US origin items destined for certain fabs in China working on advanced node ICs. The list of restricted customers and the scope of the restrictions are subject to change and may be expanded to include additional entities. ASML is also subject to export control regulations in countries outside the EU and US. These developments in multilateral and bilateral treaties, national regulation, and trade, national security and investment policies and practices have affected and may further affect our business, and the businesses of our suppliers and customers. For example, the ability to obtain US licenses to authorize employees with foreign nationalities to work in programs that include controlled US items has been reduced over the last couple of years.

Such developments, including the drive for technological sovereignty, could also lead to long-term changes in global trade, competition and technology supply chains, which could adversely affect our business and growth prospects. Customers in China represented 36.1% of our 2024 total net sales. Countries impacted by export control restriction can also introduce measures to counteract the impact of other countries, actions or regulations, which may result in conflicting regulations and legal liabilities.

The semiconductor industry makes use of (raw) materials that are controlled by certain countries. In the current geopolitical context, we see an increasing risk that these materials may become unavailable or restricted, which could impact our suppliers, our customers and ASML.

Interstate conflicts and/or nationalization of ASML assets can also impact our business. For example, some of our facilities and supply chain and customers are located in Taiwan. Customers in Taiwan represented 15.4% of our 2024 total net sales and 29.3% of our 2023 total net sales. Taiwan has a unique international political status. Changes in relations between Taiwan and China, Taiwanese government policies and other factors affecting Taiwan's political, economic or social environment could, for example, impact our ability to service our customers in Taiwan. Furthermore, some of our facilities as well as our supply chain and customers are located in South Korea. Customers in South Korea represented 22.7% of our 2024 total net sales and 25.2% of our 2023 total net sales. In addition, there are tensions between South Korea and North Korea. A worsening of relations between those countries or the outbreak of war on the Korean Peninsula could impact our ability to service customers. A small percentage of our suppliers and customers as well as a customer support organization are based in Israel. The tensions in this region have resulted and may continue to result in violence and/or the outbreak of war, which could impact our business.

We may be unable to make desirable acquisitions or to integrate successfully any businesses we acquire

Risk category:
Merger and acquisition

From time to time, we may acquire businesses or technologies to complement, enhance or expand our current business or products or to seize growth opportunities. Any such acquisitions could fail to achieve our financial or strategic objectives or impact our ability to perform as we plan, or disrupt our ongoing business and adversely impact our results of operations. Our ability to complete any such transactions may be hindered by a number of factors, including potential difficulties in obtaining government approvals.

Any acquisition could pose risks related to the integration of the new business or technology with our existing business and organization. We may not be able to achieve the benefits we expect from an acquisition. Acquisitions may also strain our managerial and operational resources and the challenge of managing new operations may divert our management from day-to-day operations. Furthermore, we may be unable to retain key personnel from acquired businesses or we may have difficulty integrating employees, business systems and technology. The controls, processes and procedures of acquired businesses also may not adequately ensure compliance with laws and regulations, and we may fail to identify compliance issues or liabilities.

In connection with acquisitions, antitrust and national security regulators have imposed and may in the future impose conditions, including requirements to divest assets or other conditions that could make it difficult for us to integrate the businesses that we acquire. Furthermore, we may have difficulty in obtaining, or be unable to obtain, antitrust and national security clearances, which could inhibit future desired acquisitions.

As a result of acquisitions, we have recorded a significant amount of goodwill and a number of intangible assets. Accounting standards require periodic review of these assets for indicators of impairment. If one or more indicators of impairment are found to exist, then valuation of the related asset could change and may incur impairment charges.

Risk factors (continued)

1. Strategy and products (continued)

We may not be able to achieve our ESG objectives or adapt and respond in a timely manner to emerging ESG expectations and regulations

Risk category:
ESG expectations, Product stewardship

Companies across all industries are facing increasing scrutiny of their ESG policies and practices. Investors, capital providers, shareholder advocacy groups, market participants, customers and other stakeholders are increasingly focused on ESG practices and ESG matters. In particular, within the semiconductor industry, there is a focus on contribution to society and minimizing environmental and social impacts of products throughout all life-cycle stages. Some stakeholders, however, may disagree with our ESG goals and initiatives, and their focus may evolve over time. Stakeholders, including regulators or governments in the various jurisdictions in which we operate, may also have conflicting views on ESG practices. Failure to achieve our ESG objectives, meet the emerging or conflicting ESG expectations of our stakeholders and/or respond in a timely way to changing or conflicting regulations, laws and reporting and disclosure obligations could negatively affect our brand and reputation and impede our ability to recruit or retain employees, and may ultimately adversely affect our operations. In addition, laws, regulations and standards for calculating and disclosing emissions and other sustainability metrics continue to evolve, which can result in inconsistencies or other changes to data over time, revisions to our strategies and targets, or our ability to achieve them, subjecting us to additional scrutiny.

Climate change contributes to increasing severity and frequency of extreme weather events, rising sea levels and droughts, which can impact continuity of our operations and/or our supply chain. Climate change concerns and the potential environmental impacts of climate change have resulted, and may result, in new laws and regulations that affect us, our suppliers and our customers. Such laws or regulations could cause us to incur additional direct costs for compliance, as well as increased indirect costs from our value chain. Furthermore, the ability to improve our product-related environmental performance (such as energy efficiency) may be affected by the complexity of our technology and products. In order to meet our ESG goals and requirements, we are dependent on our suppliers and their ability to reduce their ecological footprints, and we may be unable to meet our ESG goals if our suppliers do not meet our expectations in this regard. In addition, we are dependent on our customers and/or our customers may not be satisfied with our progress, which could impact demand.

A global trend of transitioning to a lower-carbon economy has resulted in increased regulations that could lead to technology restrictions, modification of product designs, an increase in energy prices and energy or carbon taxes, restrictions on pollution, remediation measures, or other requirements that could impact our business and increase our costs. A variety of regulatory developments have been introduced that focus on restricting or managing carbon and greenhouse gas (GHG) emissions. This could result in a need to redesign products and/or to purchase at higher costs new equipment or materials with lower carbon footprints. We publish disclosures on ESG matters relating to our business and our partners as required by applicable regulations and guidance and other data which may not be required but which we nonetheless elect to disclose.

Such disclosures include our ESG goals, expectations and assumptions and related statements, including targets, commitments, goals, plans, expectations and forecasts about future circumstances, which may prove to be incorrect or which we may not meet. In addition, our ESG sustainability strategy may not deliver the intended results, and our estimates concerning feasibility, timing and cost of meeting stated goals are subject to risks and uncertainties. In addition, we may use offsets to help us meet some of our emissions targets. We have not undertaken any commitment to purchase offsets, and we do not intend to use offsets in connection with our scope 3 emissions goals. As a result, we may not meet our goals on expected timing or at all.

ESG disclosure requirements are increasing and authorities have proposed disclosure requirements on ESG matters which differ from the requirements that we are currently subject to. We face risks in complying with such regulations, including the risk of complying with requirements in different jurisdictions, the costs associated with such compliance and the risk that our ESG disclosures prove incorrect.

Risk factors (continued)

2. Finance and reporting

We are exposed to financial risks including liquidity risk, interest rate risk, counterparty credit risk, foreign exchange risk and inflation risk

Risk category:
Financial

As a global company, we are exposed to a variety of financial risks, including those related to liquidity, interest rates, counterparty credit, currencies and inflation.

Liquidity risk

Negative developments in our business or global capital markets could affect our ability to meet our financial obligations or to raise or refinance debt in the capital or loan markets. In addition, we might be unable to repatriate cash from a country when needed for use elsewhere due to legal restrictions or required formalities.

Currency risk

Our Financial statements are expressed in euros. Accordingly, our results of operations are exposed to fluctuations in exchange rates between the euro and other currencies. Changes in currency exchange rates can result in losses in our Financial statements. We are particularly exposed to fluctuations in the exchange rates between the US dollar and the euro, and to a lesser extent to the Japanese yen, the South Korean won, the Taiwanese dollar and the Chinese yuan, in relation to the euro. We incur costs of sales predominantly in euros, with portions also denominated in US and Taiwanese dollars. A small portion of our operating results are driven by movements in currencies other than the euro, US dollar, Japanese yen, South Korean won, Taiwanese dollar or Chinese yuan.

Inflation risk

We are exposed to increases in costs due to inflation for costs of goods, transportation and wages. We have experienced and experience higher-than-normal inflation, which impacts our costs and margins in case we are not able to pass on increased costs in our prices.

Interest rate risk

Our Eurobonds bear interest at fixed rates. Our cash, investments, Euro Commercial Paper program and credit facilities bear interest at a floating rate. Failure to effectively hedge this risk could impact our financial condition and results of operation. In addition, we could experience an increase in borrowing costs due to a ratings downgrade (or the expectation of a downgrade), developments in capital and lending markets or developments in our businesses.

Counterparty credit risk

We are exposed to credit risk, particularly with respect to (financial) counterparties with whom we hold our cash and investments as well as our customers. As a result of our limited number of customers, counterparty credit risk on our receivables is concentrated. Our three largest customers (based on total net sales) accounted for €2,641.9 million, or 54.1% of accounts receivable and finance receivables, at December 31, 2024, compared with €3,718.8 million, or 64.4%, at December 31, 2023. Accordingly, business failure or insolvency of one of our main customers could result in significant credit losses.

Changes in taxation could affect our future profitability

Risk category:
Tax and customs

We are subject to income taxes in the Netherlands and other countries in which we operate. Our effective tax rate has fluctuated in the past and may fluctuate in the future.

Our effective tax rate can be affected by changes in our business environment, changes in tax legislation in the countries where we operate, developments driven by global organizations such as the Organisation for Economic Co-operation and Development (OECD), as well as any change in approach to tax by tax authorities. Initiatives like the BEPS and Global Minimum Tax rules have already resulted in and may result in further increased compliance obligations for ASML. This may result in an increase in our effective tax rate in future years.

Changes in tax legislation may adversely impact our tax position and consequently our net income. Our worldwide effective tax rate is heavily impacted by R&D incentives included in tax laws and regulations in the countries where we operate, such as the so-called innovation box in the Netherlands and the R&D credits we obtain in the US. If relevant jurisdictions alter their tax policies/laws in this respect, it may have an adverse effect on our worldwide effective tax rate. In addition, jurisdictions levy corporate income tax at different rates. The mix of our sales over the various jurisdictions in which we operate may vary from year to year, resulting in a different mix of corporate income tax rates applicable to our profits. This can also affect our worldwide effective tax rate and impact our net income.

Risk factors (continued)

3. Partners

Our success is highly dependent on the performance of a limited number of critical suppliers of single-source key components

Risk category:
Supply chain disruption, Supplier strategy and performance

We rely on third-party vendors for components and subassemblies used in our systems, including the design thereof. These components and subassemblies are obtained from a single supplier or a limited number of suppliers. As our business has grown, our dependence on single suppliers or a limited number of suppliers has grown. The highly specialized nature of many of our components, particularly for EUV systems, means it is not economical to source from more than one supplier. In many cases, our sourcing strategy prescribes 'single sourcing, dual competence'. Our reliance on a limited group of suppliers involves several risks, including a potential inability to obtain an adequate supply of required components or subassemblies in time and at acceptable costs, and reduced control over pricing and quality. Delays in supply of these components and subassemblies could occur due to disruptions experienced by our suppliers for reasons including work stoppages, fire, energy shortages and access issues, pandemic outbreaks, flooding, cyberattacks, blockades, sabotage or other disasters, natural or otherwise. This could lead to delays in delivery of parts, components or subassemblies and therefore delays in delivery of our products to customers, which could impact our business. For example, some of our suppliers have experienced disruptions in their operations as a result of material shortages and cyberattacks. Consistent delays or prolonged inability to obtain adequate deliveries of components or subassemblies, or any other circumstance that requires us to seek alternative sources of supply, could significantly hinder our ability to deliver our products in a timely manner. This could damage relationships with our customers and materially impact our business.

The number of lithography systems we are able to produce is limited by the production capacity of one of our key suppliers, Carl Zeiss SMT, our sole supplier of lenses, mirrors, illuminators, collectors and other critical optical components (which we refer to as optics). We have an exclusive arrangement with Carl Zeiss SMT. If this supplier became unable to maintain and increase production levels, we could be unable to fulfill orders. This could have a material impact on our business and damage relationships with our customers. Furthermore, if Carl Zeiss SMT were to terminate its supply relationship with us or be unable to maintain production of optics over a prolonged period, we would effectively cease to be able to conduct our business.

From time to time, we experience supply constraints which can impact our production. We and our suppliers have and are continuing to invest in additional capacity to increase our production capacity. However, we may be unable to meet the full demand of our customers. We also face the risk that demand may decrease or may not be sufficient for full utilization of our increased production capacity, which could result in overcapacity in our and our suppliers' operations and consequently higher costs and loss of investment in increasing capacity. In addition, most of our key suppliers, including Carl Zeiss SMT, have a limited number of manufacturing facilities, the disruption of which may significantly and adversely affect our production capacity.

Lead times in obtaining components have increased as our products have become more complex. A failure by us to adequately predict demand for our systems, or any delays in the shipment of components, can result in insufficient supply of components. This could lead to delays in delivery of our systems and could limit our ability to react quickly to changing market conditions. Conversely, a failure to predict demand could lead to excess supply of components and obsolete inventory.

We are also dependent on suppliers to develop new models and products to meet our development roadmaps. If our suppliers do not meet our requirements or timetable in product development, our business could suffer.

We have historically shipped our systems by airplane, but have recently started to ship some systems by ocean freight. We face risks in connection with using alternative means of transportation (for example delays, defects, damages).

Risk factors (continued)

3. Partners (continued)

A high percentage of net sales is derived from a few customers

Risk category:
Customer dependency

We sell our lithography systems to a limited number of customers, and therefore the loss of any customer could have a significant impact on our business. Customer concentration, and the risks associated with a limited number of customers, can increase because of continuing consolidation in the semiconductor manufacturing industry. In addition, although the applications part of our holistic lithography solutions constitutes an increasing portion of our revenue, a significant portion of those customers are the same customers as those for our systems. Consequently, while the order of our largest customers may vary from year to year, sales generally remain concentrated among relatively few customers in any particular year.

Total net sales to our largest customer amounted to €4,682.4 million, or 16.6% of total net sales in 2024, compared with €8,772.9 million, or 31.8% of total net sales in 2023. In 2024, 30.5% of total net sales were made to our two largest customers. The loss of any significant customer or any significant reduction or delay in orders by such a customer may have a material adverse effect on our business, financial condition and results of operations.

4. People

Our business and future success depend on our ability to manage the growth of our organization and attract and retain a sufficient number of adequately educated and skilled employees

Risk category:
Human resources, Knowledge management, Organizational effectiveness

Our business depends significantly on our ability to attract and retain employees in the long term, including a large number of highly qualified professionals. Competition for talent is intense. Continuing to attract sufficient numbers of qualified employees to meet our long-term growing needs remains a challenge. Our business has grown significantly and the risk of not being able to attract, onboard and retain sufficient numbers of qualified personnel increases as our business grows.

Our R&D programs require a large number of qualified employees. If we are unable to attract sufficient numbers of such employees, this could affect our ability to conduct R&D effectively and on a timely basis.

As a result of the uniqueness and complexity of our technology, qualified engineers capable of working on our systems are scarce and generally not available from other industries or companies. We invest a significant amount in educating and training our employees to work on our systems, and their retention is a critical success factor for us.

The increasing complexity of our products results in a longer learning curve for new and existing employees. Our suppliers face similar risks in attracting and retaining qualified employees, including those in connection with programs that will support our R&D programs and technology developments. If our suppliers are unable to attract and retain qualified employees, this could impact their technology roadmaps and therefore our R&D programs or delivery of components to us.

Our organization has grown significantly in recent years. Our rapid growth driven by strong customer demand has put pressure on our organization and we face challenges in effectively managing, monitoring and controlling our employees, facilities, operations and other resources and complying with applicable laws and regulations. If we are not able to successfully deal with such challenges, this may negatively impact our operations and our reputation as an employer.

Risk factors (continued)

5. Operations

We may face challenges in managing the industrialization of our products and bringing them to high-volume production

Risk category:
Product industrialization

Bringing new products to high-volume production at a value-based price and in a cost-effective manner depends on our ability to manage the industrialization of our products and to manage costs. Customer adoption of new products depends on the performance of our products in the field. As our products become more complex, we face an increasing risk that products may not meet development milestones or specifications and may not perform according to specifications, including quality standards. If our products do not perform according to specifications and performance criteria such as customers' planned wafer capacity, or if quality or performance issues arise, this may result in reduced demand for our products and additional costs.

Transitioning newly developed products to full-scale production requires the expansion of infrastructure, including enhancing manufacturing capabilities, increasing the supply of components and training qualified personnel. It may also require our suppliers to adjust or expand their infrastructure capabilities. If we or our suppliers are unable to adjust or expand infrastructure as necessary, we may be unable to introduce new technologies, products or product enhancements, or to reach high-volume production of newly developed products on a timely basis or at all.

When we are successful in industrializing new products, it can take years to reach profitable margins. New technologies might not have the same margins as existing technologies, and we might not be able to adjust value-based pricing and/or cost in an effective manner. In addition, the introduction of new technologies, products or product enhancements also impacts ASML's liquidity. New products may have higher cycle times, resulting in increased working capital needs. As our products become more complex, the investments needed before new product introduction and the timing of revenue recognition of these products may have a significant negative effect on our cost structure and margins.

The capability, capacity and costs associated with providing the required customer support to cover the increasing number of shipments and service a growing number of EUV systems that are operational in the field could affect the timing of shipments. It could also impact the efficient execution of maintenance, servicing and upgrades, which are key to our systems continuing to achieve the required productivity.

We are dependent on the continued operation of a limited number of manufacturing facilities

Risk category:
Continuity of own operations

All of our manufacturing activities, including subassembly, final assembly and system testing, take place in (cleanroom) facilities in Veldhoven, Eindhoven, Oirschot (the Netherlands), Berlin (Germany), Wilton, San Diego (US), Pyeongtaek (South Korea) and Linkou and Tainan (Taiwan). These facilities may be subject to disruption for various reasons, including work stoppages, fire, energy shortages and access issues, pandemic outbreaks, flooding, cyberattacks, blockages, sabotage or other disasters, natural or otherwise. Alternative production capacity may not be available if a major disruption were to occur.

We are not able to or otherwise may not fully insure our risk exposure, and not all disasters, other potential disruptions and risks are insurable. As a result, we may be subject to the financial impact of uninsured losses, which could have an adverse impact on our financial condition and results of operations.

Risk factors (continued)

5. Operations (continued)

We face challenges to meet expected demand

Risk category:
Manufacturing and install, Human resources, Supplier strategy and performance

We are continuing to increase production capacity in our end-to-end supply chain to meet expected demand, but we face challenges in increasing capacity. For example, we depend on our suppliers increasing their capacity and their ability to invest, and it takes time to build the production space and equipment required for expansion. We and our supply chain also need to obtain permits to make expansion possible, and the time it takes for these to be granted may cause delays.

It is a challenge for ASML and its suppliers to hire and retain employees to support expansion. Our processes and systems and those of our supply chain may also not be able to adequately support our growth. If we are not successful in increasing our capacity to meet expected demand, this could impact our relationships with customers and our competitive position.

We and our suppliers have invested significantly in increasing capacity, and we face various risks in connection with this, including risks relating to system quality, the risk that we have not accurately predicted demand, and risks associated with maintaining a much larger production infrastructure and supplier ecosystem, including higher costs and challenges in controlling the enlarged production process.

We also face the risk that our increase in capacity could result in capacity that exceeds demand (overcapacity).

Our operations expose us to health, safety and environment risks

Risk category:
Environment, health and safety

Hazardous substances are used in the production and operation of our products and systems. Their use subjects us to a variety of governmental regulations relating to environmental protection and employee and product health and safety. This includes the transport, use, storage, discharge, handling, emission, generation and disposal of toxic or other hazardous substances. In addition, operating our systems (which use lasers and other potentially hazardous components) can be dangerous and can result in injury. Failure to comply with regulations could result in harm to people and the environment. Substantial fines could be imposed on us, as well as suspension of production, alteration of our manufacturing and assembly and test processes, damage to our reputation and/or restrictions on our operations or sales, or other adverse consequences.

Additionally, our products have become increasingly complex. This requires us to invest in ongoing risk assessments and development of appropriate preventative and protective measures for health and safety for both our employees (in connection with the production and installation of our systems and field options and performance of our services) and our customers' employees (in connection with the operation of our systems). Our health and safety practices may not be effective in mitigating all health and safety risks. A failure to comply with applicable regulations, or the failure of our implemented practices to ensure customer and employee health and safety, could expose us to significant liabilities.

Risk factors (continued)

5. Operations (continued)

Cybersecurity and other security incidents, or disruptions in our processes or information technology systems, could materially adversely affect our business operations

Risk category:
Security, Information technology, Process effectiveness and efficiency

We rely on the accuracy, availability and security of our information technology (IT) systems. Despite the measures that we have implemented, including those related to cybersecurity, our systems could be breached or damaged by malware and systems attacks, natural or man-made incidents, disasters, or unauthorized physical or electronic access. We have experienced some of these incidents in the past.

We experience an increasing number of cyberattacks on our IT systems as well as the IT systems of our customers and suppliers and other service providers, which systems we do not control. These attacks include malicious software (malware), attempts and acts to gain unauthorized access to data, and other electronic and physical security breaches of our IT systems, as well as the IT systems of our customers and suppliers and other service providers that have led and could lead to disruptions in critical systems, unauthorized release, misappropriation, corruption, or loss of data or confidential information (including confidential information relating to our customers, employees and suppliers). As technology like AI and quantum computing continues to evolve, these technologies could also be used for sophisticated cyber attempts or bypassing security measures.

We depend on our employees and the employees of our suppliers to appropriately handle confidential and sensitive data and deploy our IT resources in a safe and secure manner. Inadvertent disclosure, actions or malfeasance by our employees, those of our suppliers or other third parties have resulted and may in the future result in a loss or misappropriation of data or a breach or interruption of our IT systems. This could result in competitive harm or violate export controls and other laws and regulations, which could result in fines and penalties, business disruption, reputational harm and additional regulatory scrutiny or export control measures. Any system failure, accident or security breach or any other of the foregoing risks could result in business disruption, theft of our IP or trade secrets, unauthorized access to, or disclosure of, customer, personnel, supplier or other confidential information, corruption of our data or of our systems, reputational damage or litigation and violation of applicable laws.

Furthermore, malware may harm our systems and software and could be inadvertently transmitted to our customers' systems and operations. This could result in loss of customers, litigation, regulatory investigation and proceedings that could expose us to civil or criminal liabilities and diversion of significant management attention and resources. We may also incur significant costs to protect against or repair the damage caused by these disruptions or security breaches, including, for example, rebuilding internal systems, implementing additional threat protection measures, providing modifications to our products and services, defending against litigation, responding to regulatory inquiries or actions, paying damages or taking other remedial steps with respect to third parties. Further, remediation efforts may not be successful and could result in interruptions, delays or cessation of service, unfavorable publicity, damage to our reputation, customer complaints, possible litigation and loss of existing or potential customers, which may impede our sales or other critical functions.

Cybersecurity threats are constantly evolving. We remain potentially vulnerable to additional known or as yet unknown threats, as in some instances, we and our customers, partners and suppliers may be unaware of an incident or its magnitude and effects.

We also face the risk that we could unintentionally expose our customers to cybersecurity attacks through the systems we deliver to them, including in the form of malware or other types of attacks, which could harm our customers.

ASML's visibility and importance for the semiconductor industry continues to increase, which may lead to increased risks of ASML or its employees being targeted in a cybersecurity attack.

In addition, processes and systems may not be able to adequately support the growth that we have experienced in recent years and continue to experience. From time to time, we implement updates to our IT systems and software which can disrupt or shut down our IT systems. We may not be able to successfully launch and integrate IT systems as planned without disruption to our operations – for example, our ERP migration. We may not be successful in our AI initiatives and using AI could lead to unintended outcomes.

Read more in Strategic report – Performance and risk – Risk – How we manage risk and Strategic report – Corporate conduct

Risk factors (continued)

6. Legal and compliance

We are subject to regulatory and compliance obligations in the various countries where we operate and the complexity of compliance requirements increases

Risk category:
Violation of laws and regulations

We are subject to a variety of laws and regulations across the jurisdictions where we operate, including but not limited to those relating to trade, national security, tax, export controls, reporting, product compliance, anti-corruption, antitrust, ESG, human rights, data protection, AI technologies, spatial planning, environmental matters, securities laws and stock exchange rules. With the significant growth of our business in recent years, ensuring compliance with laws and regulations and our internal policies across our continually expanding organization has become more challenging. We face the risk that, despite our significant efforts and proactive approach to compliance, we may fail to comply with such laws, regulations or policies.

We operate in a significant and growing number of countries in the world, and we are therefore subject to numerous and differing, and sometimes conflicting, regulatory frameworks, which can impact how we operate our business. In particular, the regulatory environment regarding export and sanctions has become increasingly restrictive, and as a result, our ability to sell some of our products and services to certain customers is subject to restrictions and requires government authorization, which can lead to delays in or a prohibition on shipments of products to certain customers.

Laws and regulations that impact our business are regularly amended and we are subject to new laws and regulations. We are also subject to the changing interpretations by and positioning of regulators, including in the granting of required licenses to ship products as well as in investigations and enforcement. Additional or amended regulations or changes in policies of governments and regulators could increase compliance costs and risks associated with non-compliance or further limit our ability to sell our products and services in certain jurisdictions.

We are subject to investigations, audits and reviews by regulatory authorities in the various jurisdictions where we operate regarding compliance with laws and regulations, including tax laws. These may arise due to misunderstandings, disputes, or suspicions of non-compliance or otherwise, and can be resource-intensive and have reputational and financial implications for us. Despite our efforts and proactive compliance program, we may be found to be non-compliant with applicable regulations.

Compliance with existing and new regulations can result in compliance costs, increased risk of non-compliance and limitations on our business which can impact our results of operations. The consequences of non-compliance include fines, penalties and litigation, business disruption, the loss of trade or export privileges, reputational harm, additional regulatory scrutiny measures and the erosion of stakeholder trust, any of which could have a material adverse effect on our business and results of operations.

7. Other risk factors

Restrictions on shareholder rights may dilute voting power

ASML's Articles of Association provide that it is subject to the provisions of Dutch law applicable to large corporations, called 'structuurregime'. These provisions concentrate control of certain corporate decisions and transactions in the hands of the Supervisory Board (SB). As a result, holders of ordinary shares may have more difficulty in protecting their interests in the face of actions by members of the SB than if we were not subject to the 'structuurregime'.

Our authorized share capital includes a class of cumulative preference shares. We have granted our preference shares foundation (Stichting Preferente Aandelen ASML) an option to acquire, at the nominal value of €0.09 per share, such cumulative preference shares. Exercise of the preference share option would effectively dilute the voting power of our outstanding ordinary shares by one-half, which may discourage or significantly impede a third party from acquiring a majority of our voting shares.

We may not declare cash dividends, conduct share buyback programs or cancel shares at all or in any particular amounts in any given year

We aim to pay a quarterly dividend that is growing (on an annualized basis) over time, and we conduct share buybacks from time to time. The dividend proposal, amount of share buybacks and cancellation of shares in any given year are subject to, among other factors, the availability of distributable profits, retained earnings and cash, the BoM's views on our potential future liquidity requirements, including for investments in production capacity and working capital requirements, the funding of our R&D programs and acquisition opportunities that may arise from time to time, and future changes in applicable tax and corporate laws.

The BoM may decide not to pay a dividend or to pay a lower dividend than is contemplated by our aim or dividend policy. In addition, we may suspend, adjust the amount of or discontinue share buyback programs, we may not enter into new share buyback programs, and we may otherwise fail to complete buyback programs.

Corporate conduct

Corporate conduct at ASML

At ASML, we are committed to ethical corporate conduct, emphasizing human rights, compliance, transparency, information security and sustainable practices in all operations.

We respect human rights by promoting a diverse and inclusive workplace, ensuring fair labor practices, and adhering to ethical standards throughout our supply chain. We actively engage in initiatives that support employee well-being and community development, fostering a culture of respect.

We rely heavily on the skills, commitment and behavior of employees across our organization. It is only through their actions that we can build the trust and respect we need to make our sustainability transition a success and make a positive contribution to society.

Our approach to tax reflects our dedication to transparency and ethical practices, ensuring that our financial dealings reflect our values. Our strict adherence to competition laws promotes fair market practices, fostering a level playing field for all stakeholders.

Information security is a top priority – due to the growth of both our company and geopolitical tensions, ASML is increasingly targeted by threat actors. Moreover, as we grow, so too does the complexity of our products, supply chain and global footprint. We therefore seek to invest in robust security protocols and ensure all our operations comply with the most stringent safety regulations. We emphasize the importance of privacy and the protection of personal data for our employees, customers, and partners.

Furthermore, we comply with export controls and sanctions to protect our operations and uphold our reputation in the global market. Intellectual property protection is essential to our innovation strategy, allowing us to safeguard our technological advancements and maintain a competitive edge.

Product safety is also a critical focus, as we strive to ensure that our technologies meet the highest industry standards.

By embedding these principles into our corporate conduct, we aim to build trust with our stakeholders and fulfill our responsibilities to society and the environment. Our commitment to ethical practices not only enhances our reputation but also contributes to sustainable development and positive societal impact.

Respecting human rights

Respecting universal human rights is both an organizational and an individual responsibility – from the boardroom to the factory floor.

We remain passionately committed to respecting fundamental human rights and have sought to enshrine the basic Human Rights due diligence principles applying to businesses via our Code of Conduct, our Human Rights Policy and the RBA Code of Conduct. Through these codes and policies, we actively support the principles laid down in international instruments such as the UN Guiding Principles on Business and Human Rights (UNGPs), the OECD Guidelines for Multinational Enterprises on Responsible Business Conduct (OECD Guidelines) and the International Labor Organization (ILO) core conventions.

In the area of ESG sustainability, companies are experiencing an important paradigm shift, not only in relation to new disclosure requirements but also in terms of developing an understanding of what it means in practice to respect the environment and human rights.

In addition to embracing many other regulatory developments regarding climate and the environment, we implemented the German Supply Chain Due Diligence Act as of January 1, 2024, for our German operations in scope and are already preparing for the implementation of the EU Corporate Sustainability Due Diligence Directive (CSDDD), which was approved by the Member States in May 2024. We will continue to monitor (legislative) developments in this area.

How we manage human rights

To both support and help drive our human rights program, we are taking steps to deliver on our ESG sustainability framework, which encompasses themes such as Responsible value chain and Attractive workplace for all. These themes inspire multiple agendas across our value chain as well as our own internal human rights program, several diversity and inclusion initiatives and employee well-being programs. Alongside efforts to further embed integrity across our culture, these initiatives are designed to contribute to the advocacy and promotion of human rights within our own operations and across our value chain.

Respecting human rights (continued)

Program governance

The human rights program is driven by the Human Rights Committee, which is chaired by the Head of Ethics & Business Integrity and Human Rights, a team within the Legal & Compliance department. The Committee consists of representatives from various departments within our company, namely Legal & Compliance, Strategic Sourcing & Procurement, ESG Sustainability, ESG Reporting and Human Resources (HR). The Committee members liaise with other functions across the organization on an ad hoc basis. The Committee acts in the first instance as a task force, driving the implementation of the human rights program. It also explores and reviews response measures to human rights impacts, and coordinates human rights related issues.

Human rights is one of the risk areas overseen by the Compliance, Ethics, Security and Risk Committee (CESR). The CESR meets regularly and is chaired by the CFO. The CESR sub-committee (CESR Ethics Committee), which is facilitated by the Head of Ethics & Business Integrity and Human Rights and chaired by the Chief Legal Officer, oversees the investigation of ethics cases and reports into the CESR.

Read more in Sustainability statements – Governance – ESG integrated governance - Business ethics and Code of Conduct

Various teams collaborate to develop human rights and related policies for our employees, as well as developing program initiatives and leading due diligence programs, including third-party Responsible Business Alliance audits.

Certain human rights topics, such as privacy and EHS, are managed by various expert teams. Diversity and inclusion is managed within the Human Resources department, along with several other labor and employment topics having relevance to human rights such as equality, training and development. Other topics are managed across the business, such as forced labor (including bonded or indentured labor) – a broad, overarching topic requiring input from many perspectives such as Human Resources, Strategic Sourcing & Procurement, Legal & Compliance, Export Control, and Tax and Customs.

The Investor Relations team, the Legal & Compliance department and the ESG Sustainability team communicate global legislative developments and stakeholder expectations, including those of investors, across the organization.

Employee communication takes place via multiple channels and platforms. In addition to formal means of worker representation such as works councils and trade union representation, a global Employee Relations function has been established to provide additional support in addressing employee needs and concerns regarding HR-related topics. Employee feedback is obtained via numerous means including surveys. Various employee platforms and processes enable employee groups to express their needs and provide input and feedback.

Read more in Sustainability statements – Social – Attractive workplace for all - How we're managing – Process for engaging and Sustainability statements – Governance – ESG integrated governance - Business ethics and Code of Conduct

Remediation and grievance mechanism

We are committed to conducting due diligence in order to prevent our activities from causing or contributing to adverse impacts on human rights, and to ensure we do not engage in human rights abuses in any way. We aim to provide effective remedies to affected rights holders where an impact has been identified and confirmed. Our global Speak Up Service is available for our own employees, on-site external workers, workers across our value chain and people in affected communities.

Read more in Sustainability statements – Governance – ESG integrated governance - Business ethics and Code of Conduct

Continuously evolving our approach to human rights

2024 saw the substantial development of our human rights program. Following the completion of our Saliency Assessment, which you can read more about on the following page, we carried out a management gap analysis to identify areas where we need to focus on building capacity to strengthen our program. In order to validate the results of our Saliency Assessment, we also conducted an external stakeholder engagement with more than 20 organizations representing the interests of rights holders in our supply chain and downstream value chain, including NGOs, civil society organizations, trade union federations, investors, suppliers and customers.

In 2023, ASML became a member of the United Nations Global Compact (UNGC) and we submitted our first Communication on Progress in July 2024. As part of our Human Rights roadmap for the coming years, we established a number of distinct programs aimed at further prioritizing our supply chain, enhancing our human rights due diligence program and developing a systematic approach to supply chain due diligence.

Read more in Sustainability statements – Social – Responsible value chain

Respecting human rights (continued)

Human Rights Saliency Assessment

A Human Rights Saliency Assessment forms an integral part of human rights due diligence, focusing on potential human rights impacts. This type of assessment helps companies identify where to prioritize and focus their resources.

In 2023-2024 we conducted a Saliency Assessment to identify the most salient potential negative impacts on our employees, workers across our value chain and affected communities. This Saliency Assessment allows us to prioritize potential negative impacts based on:

- severity (i.e. the scope, scale and irremediability of impacts)
- the likelihood of harm

In determining appropriate preventative and mitigating measures, we consider the nature of our involvement (i.e. whether we caused or contributed to the impact) as well as the extent to which we can effect change in the wrongful practices of another party that is causing or contributing to the negative impact.

Not all salient negative impacts to people (employees, workers across our value chain and affected communities) result in risks to our company. The purpose of the Saliency Assessment is to help us prioritize our prevention and mitigation initiatives towards the identified potential risks towards people. The outcomes of our Saliency Assessment will be reflected in the next update of our double materiality assessment. Through harmonization of prioritization criteria between saliency and impact materiality, salient issues can be integrated in our double materiality assessment. In addition, double materiality includes topics reflecting environmental impacts, risks and opportunities to ASML.

Saliency Assessment – Own operations

The most salient potential negative impacts with regard to all groups of workers we identified are as explained below. For those impacts identified as salient, we have various existing programs and controls in place, are further enhancing these and are developing our approaches to mitigation.

- Risk of unequal treatment and harassment: Although we have several measures in place to mitigate this risk within the company, the risk of unequal treatment and harassment remains, as we operate globally with a diverse population.
- Risk of excessive working hours: We have strict policies in place regarding maximum working hours, but commercial and operational urgencies can nevertheless create a risk of excessive working hours.
- Risks linked to occupational health and safety: While we consider this risk well managed, the impact can be severe and all workers can be impacted.

We also assessed the rights of vulnerable groups across our own operations and identified additional salient potential negative impacts. To address the rights and needs of these vulnerable groups, we developed and enhanced a number of programs, introduced controls and established improvement targets.

- On-site external workers: Bonded or indentured labor; social security, living wage; access to grievance mechanism and freedom of expression.

In alignment with Responsible Business Alliance (RBA) guidance on the prohibition of forced labor, we have implemented additional controls to prevent the payment of improper recruitment fees (to seek and retain employment) by workers, especially migrant workers, to or through labor agents.

- Women: Unequal pay (gender pay gap); enhanced risk of harassment and unequal treatment.

Our global employee network for women provides women with an opportunity to share and raise common issues, including salient topics of inequality and harassment. We introduced programs designed around development, skills and visibility for female talents. We continuously work to address the risk of harassment by ensuring that the topic is included in our awareness program and clearly addressing this in our Code of Conduct and associated training.

- Young workers: Freedom of expression.

Our global employee network Next (early career) provides young workers with a space in which they can share, develop and find channels to express their needs and opinions.

Read more in Sustainability statements – Social – Attractive workplace for all - Diversity and inclusion

We have identified potential negative impacts on affected communities in several areas. Affected communities may not always have the right to a fair trial. In such cases, the risk of not being able to have their human rights concerns addressed is increased where they also do not have access to, or face barriers in accessing the company's grievance mechanism. Health and environmental impacts, while medium to low in likelihood, pose a high inherent risk due to the potential severity and number of people affected.

Read more in Sustainability statements – Social – Valued partner in our communities

Saliency Assessment – Supply chain

We conducted the Saliency Assessment with regard to product-related goods as well as non-product-related goods and services. In addition, we conducted an assessment of the main materials that we source.

Deeper supply chain

As expected, with regard to the provision of goods/products, we see very high potential negative impacts at the mining and extraction stages, particularly in relation to environmental impacts, land rights, abuse of force by security forces toward communities, and health and safety. We also see a (very) high risk of child and forced labor in the mining of conflict minerals, sand, oil and gas extraction, and in the agricultural sector (e.g. inputs for adhesives and sealings). The Saliency Assessment is the first step we have taken to identify potential impacts, and the deeper supply chain assessment therefore only considered industry risks. All potential impacts identified are therefore very high and further prioritization will require a deeper assessment.

Processing stage of the supply chain

In the materials processing stage, we see potential (medium to high) impacts in respect of forced labor, freedom of association, excessive working hours, and health and safety.

Respecting human rights (continued)

Manufacturing stages of the supply chain

In the manufacturing stages (typically our direct suppliers and the first tiers beyond Tier 1), we see higher risks in two key areas:

Electronic components and boards: Due to the fact that the electronics manufacturing industry is extremely dynamic, requiring the industry to be flexible. This tends to result in lower value-adding, labor-intensive, less advanced economies, low-skilled workforces and lower labor cost, all adding up to an increased risk of labor exploitation. Specifically, we identified the following salient topics:

- Occupational health and safety, excessive overtime and lack of freedom of association
- Child and student labor, particularly in the electronics industry
- Forced labor in electronics manufacturing in certain countries.

Structural metal products: Specifically, we identified the following salient topics:

- Occupational health and safety risks are higher in basic metal production (e.g. hazards such as molten metal)
- Environmental impacts to communities due to toxic emissions (e.g. toxic metals, mercury, CO_2) to water and air.

With regard to the provision of services, we identified the following potential negative impacts:

- Transport and warehousing: Low-skilled workforces. This is a result of the often-intensive use of labor agents. We identified risks relating to the living wage and a lower degree of worker organization, both of which can lead to forced labor. Migrant workers are especially vulnerable.
- Temporary labor: We identified risks of health and safety, freedom of association, unequal treatment and the living wage, where fragmented and discontinuous work relations increase vulnerability.
- Site services / facility management / building maintenance: We see increased risk for workers providing on-site cleaning security and catering services, for example. Here we see a lower-skilled workforce (compared to, for example, installation services) which is typically more vulnerable.
- Waste collection and treatment: This is linked to the recycling industry. There is often intensive use of low-skilled, temporary workers, heightening, for example, the risk of forced labor. This sector uses potentially dangerous equipment, so we also see an increased risk to workers' health and safety.

The abovementioned potential impacts are myriad and require further prioritization in order for us to manage them effectively. We already have considerable controls and measures in place to manage the mentioned risks and will continue to tailor these to meet our objective of preventing and mitigating negative impacts.

Read more in Sustainability statements – Social – Responsible value chain

Saliency Assessment – Downstream value chain

With regard to potential negative impacts in our downstream value chain, we conducted the Saliency Assessment in line with the UNGPs and OECD Guidelines, taking into account the reporting requirements of the CSRD and ESRS. We therefore considered a broad range of potential impacts to workers in the downstream value chain, end users and consumers, and affected communities. At the time of conducting the Saliency Assessment, the CSDDD was not yet published. Accordingly, we are in the process of considering the application of this legislation to our approach to downstream impacts.

The Saliency Assessment is an element of our overarching human rights and environmental due diligence process, which forms a cornerstone for assessing the material risks, impacts and opportunities associated with our business operations.

What's next: Human Rights roadmap

Our Human Rights roadmap will be based on the outcomes of the Saliency Assessment and our management gap analysis. It is designed to enable us to meet our objective: a robust Human Rights framework that ensures that we have the capabilities to prevent or mitigate risks appropriately, monitor and evaluate our processes and the effectiveness of measures taken, and report and communicate meaningfully on our progress.

The roadmap is intended to help us focus on gaining an enhanced understanding of Human Rights impacts in our own operations as well as with regard to affected communities. It steers us toward developing global guidance on salient labor topics, such as harassment, improving ways of obtaining meaningful internal rights holder feedback, identifying the needs of vulnerable groups, and developing tailored training, communication and awareness campaigns.

The roadmap will guide us toward integrating human rights further into our ERM and other related risk management processes. It will also support us in moving toward a deeper understanding of the impact of business strategies on human rights across our value chain. Key topics revolve around building supply chain due diligence processes and enhancing our existing grievance mechanism – our Speak Up system – to meet the effectiveness criteria for 'non-judicial grievance mechanisms' described in Article 31 of the UNGPs – in particular, providing greater accessibility to workers across our value chain and affected communities.

In 2025, we plan to update our Human Rights Policy to describe our evolving approach to Human Rights due diligence.

In alignment with the Human Rights Policy, we also plan to update our Speak Up and Non-retaliation Policy.

Read more in our Human Rights Policy at asml.com

We received no grievances about breaches of Human Rights in 2024.

Our approach to tax

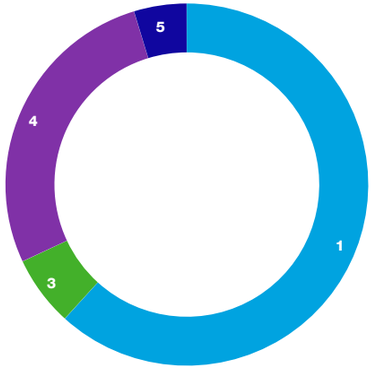
Openness, honesty and transparency are central to our sustainability strategy – and apply as equally to our tax approach as to our ESG initiatives.

€1.1bn
Income tax paid 2024[1]
(2023: €2.6bn)

18.6%
Effective tax rate 2024
((2023: 15.8%)

The taxes ASML pays make a valuable contribution to the communities in which we operate and are an integral part of our responsibility for social value creation. We remain firmly committed to complying with all applicable tax laws and regulations in a prompt, timely manner.

Income tax paid (received) in our most significant countries of operation



1. Netherlands	€762m
2. United States[1]	€(209)m
3. Taiwan	€78m
4. South Korea	€336m
5. China	€58m

1. In the United States the income tax paid was offset with a refund of excess prepayments made in 2023 and earlier years.

How we manage tax

Our Approach to Tax Report provides the most relevant, up-to-date information relating to our operating model, tax principles and tax strategy – including how we interact with our stakeholders. It also includes financial information from a country-by-country reporting perspective and our overall tax contribution to society.

We have signed up to the Tax Governance Code as drafted by the VNO-NCW.

Our guiding principle is that our tax position should reflect our business operations, which we define as the sale of lithography systems and related products and services, supported by manufacturing and R&D activities. ASML has a straightforward operating model, with our campus in Veldhoven, the Netherlands, at the heart of our global operations, and a Board of Management accountable for our tax strategy, tax principles and overall tax risk management. These are subsequently reviewed by the Audit Committee. The ASML Tax and Customs department is responsible for the execution of the tax strategy set by the Board of Management.

Read more in our Tax Report at asml.com

Our tax principles

The following principles guide us in how we report and pay tax in the countries where we operate.

Compliance

- We respect the tax laws applicable in each country. We are committed to acting in accordance with the letter, intent and spirit of tax laws and regulations.
- We make tax disclosures in accordance with reporting requirements, US GAAP and International financial reporting standards (IFRS), where applicable.
- ASML's profit allocation methods are based on internationally accepted standards as published by the OECD. We apply these consistently across our business, contingent on the relevant local rules and regulations in the local jurisdictions where we operate.

Support tax systems

- We report taxable income in a jurisdiction commensurate with the added value of the business activities in that jurisdiction.
- We do not use so-called 'tax havens' (as defined by the European Commission's 'blacklist') for tax avoidance.

Relationships with authorities

- As appropriate, we pursue an open and constructive dialogue with tax authorities and relevant other authorities in the jurisdictions where we operate, based on mutual respect, transparency and trust, disclosing all relevant facts and circumstances. We do not use tax structures intended for tax avoidance, nor will we engage in the artificial transfer of profits to low tax jurisdictions.

Our approach to tax (continued)

Our tax strategy

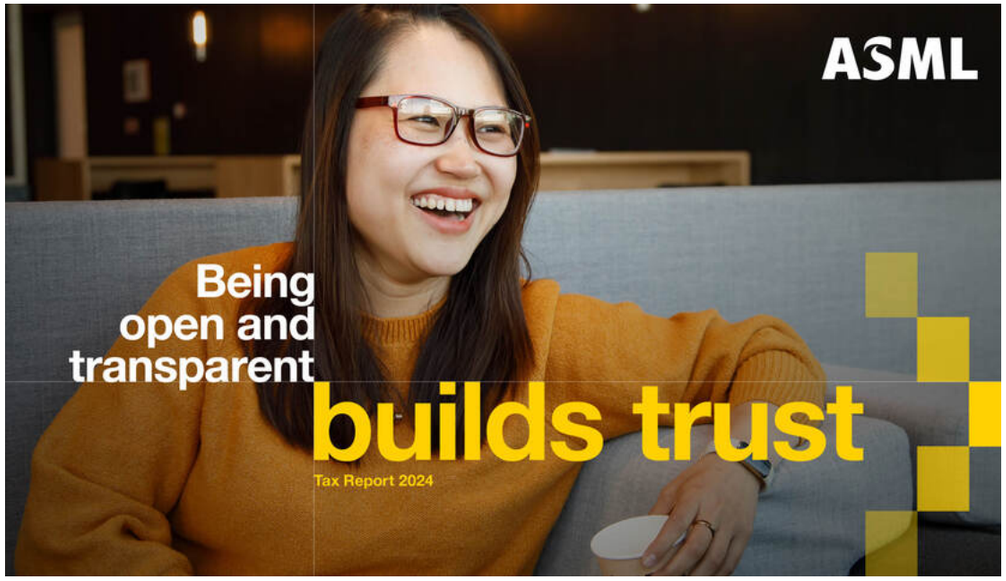
ASML's tax strategy is based on our principles and closely aligned with our business strategy and our sustainability goals. It is approved by the Board of Management and, like our tax principles and overall tax risk management, applies to all group entities.

1 Stakeholder management

Externally, we communicate on a regular basis with tax authorities, regulators and investors. Internally, we support our business in managing risks, staying in control, remaining efficient in both our administrative procedures and way of working, and working in an integrated way with other experts.

2 The future of taxation

We closely monitor global developments in tax transparency, ESG related taxes, tax technology and continuously translate these into potential requirements or implications for ASML.



3 Compliance and control

We develop, implement and monitor processes or controls for tax risk management and reporting purposes. We strive for the timely and accurate fulfillment of compliance obligations in line with applicable tax laws and regulations, including the timely payment of taxes due.

4 Tax and customs organization

In a fast-changing world, it's important to have a diverse team comprising more than just competent tax and customs experts. Communication, digital and project management skills are increasingly important, so we strive to work and develop together in line with ASML's core values: challenge, collaborate and care.

5 Projects

Our business and the regulatory environments in which we operate change constantly. We are always working on projects to deal with these changes and ensure the solutions implemented are compliant and efficient. Likewise, we continuously strive for simplification and review of existing business models to ensure we remain tax and customs compliant.

Competition law compliance

We know that staying compliant with competition law is essential for ensuring the proper function of the market.

Competition law impacts a number of areas in our day-to-day business and has consequences for our interactions with customers, suppliers, co-developers and other partners. We are committed to the principles of fair competition and do not condone any form of conduct that is illegal under applicable competition laws or our own Code of Conduct. We expect our partners (customers, suppliers, consultants, contractors and intermediaries) to demonstrate high standards of ethical behavior consistent with our own.

ASML did not incur any fines for breaches of competition law in 2024.

Read more in ASML's public Competition Law Compliance Policy

How we manage competition law compliance

We have a number of general and specific control measures in place to prevent, detect and disclose potential competition law issues.

These include:

1 Competition law compliance risk assessment

We regularly perform risk assessments of relevant competition law focus areas. These help identify any risks that may be present, improve existing controls, and provide strategies on any remaining risks and measures to mitigate them.

2 Policy review

Our Competition Law Compliance Policy demonstrates our commitment to ensuring company-wide compliance. Any act of an employee or business partner contrary to this policy is considered a significant breach of our Code of Conduct, and may lead to disciplinary measures up to and including dismissal. We made a version of the policy publicly available in 2020, which is reviewed periodically, and published an updated version in 2021.

3 Training and awareness

Competition law training is a mix of computer-based and in-person sessions, with the latter provided by the Global Legal Expertise team for Competition & Foreign Direct Investment and tailored to relevant stakeholders. We also promote awareness of competition law through channels such as presentations, intranet articles and email communications. Training topics are based on their relevance to the semiconductor industry, current legal developments and wider trends.

4 Reporting/resolving issues, violations or complaints

We support every employee or partner who refuses to engage in anticompetitive conduct and reports potential violations as stated in our Speak Up and Non-retaliation Policy. We do not tolerate any form of retaliation against those who adhere to competition law rules or who speak up, even if we lose business as a result.

Information security

ASML's competitive edge is based on knowledge and intellectual property (IP) developed over decades. This knowledge sits in the minds of our employees and many other people within our thriving ecosystem of suppliers, partners, customers and knowledge institutions.

This ecosystem is largely based on the exchange of ideas and insights, which makes the protection of knowledge a challenge, but also makes it difficult for others to replicate our work. This knowledge is captured in our information management infrastructure.

Our prime objective is to protect the integrity and confidentiality of our critical information and data while ensuring continuity of our operations. This should be embedded in our processes, people and infrastructure.

However, as we innovate and collaborate together, our partners will inevitably need access to some parts of our systems' infrastructure. We must ensure that this is enabled in a secure way, with best-in-class security functions deployed across our infrastructure to manage security threats and risks.

We are also confronted with new EU regulations such as NIS2 and the Cyber Resilience Act (CRA) and in the US with Cyber Incident Reporting for Critical Infrastructure (Cybersecurity and Infrastructure Security Agency), which highlight regulators seeking to ensure that critical infrastructure organizations are securing themselves effectively.

As perpetrators make use of more advanced methods, implementing adequate responses becomes more complex – so we continue to take steps to try to deal with this effectively. In the event of a security incident involving the loss of information assets, the materiality of the incident is jointly assessed by technology leaders and subject matter experts with support from Corporate Intellectual Property and Legal and Compliance.

In 2024, as far as we are aware, ASML had zero incidents with a material impact.

Read more in Strategic report – Performance and risk – Risk – Risk factors – Cybersecurity and other security incidents, or disruptions in our processes or information technology systems, could materially adversely affect our business operations

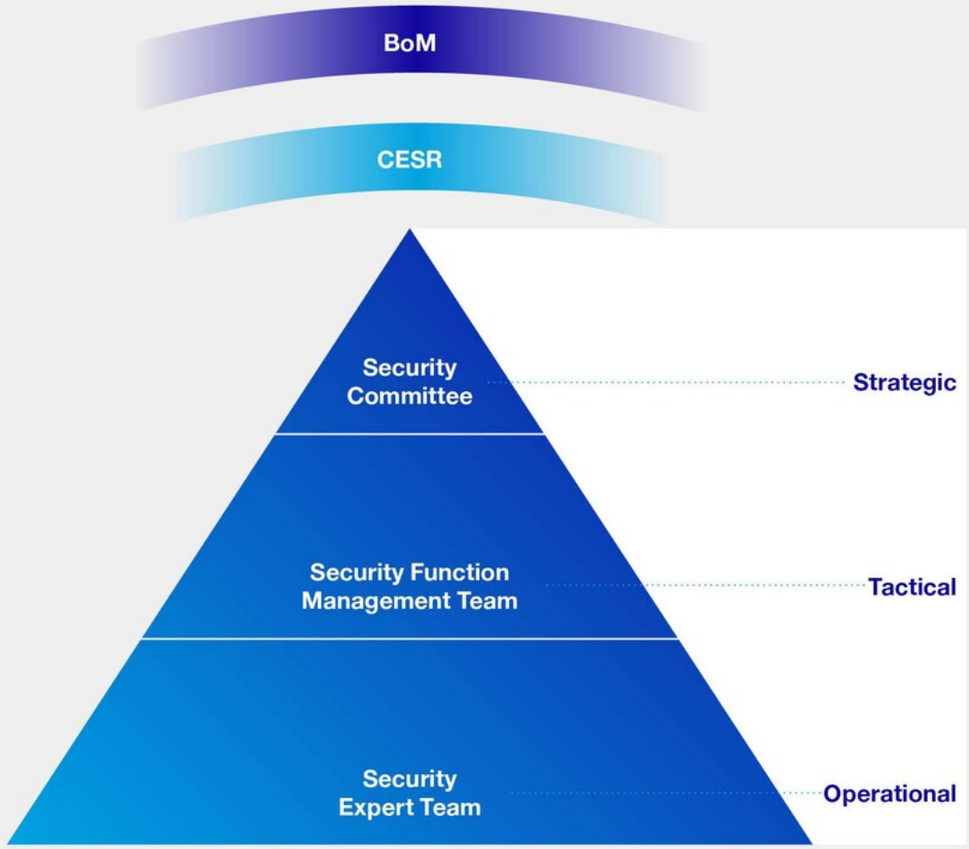
How we manage information security

We have a dedicated Security function to ensure we properly manage all security risks. The security risk assessment process, which includes cybersecurity, sits within our ERM process and follows our governance structure, with the Security Committee as a sub-committee of the Compliance, Ethics, Security and Risk Committee (CESR), which acts as the oversight committee mandated by the Board of Management (BoM).

The three layers of our security governance framework are:

1. **The Security Committee:** Ensures and promotes the integration of security risk management methodologies and related controls in ASML's business processes. The Security Committee reports into the CESR.
2. **The Security Function Management team:** Ensures the implementation and execution of security risk management methodologies and related controls in ASML's business processes.
3. **The Security Expert team:** Determines the risk and control strategies and generates input for tactical plans by providing content expertise and setting requirements.

An integrated approach to security governance



This governance framework enables cross-disciplinary alignment through structured meetings and ensures integration throughout our broader risk management profile. Alongside evaluation by our Internal Audit department, we have engaged several third parties to evaluate security capability and maturity and provide both expertise and resources to assist in identifying and managing material cybersecurity risks. Some examples of these engagements include external validation of security management systems, capability assessments, red-teaming, penetration testing and tabletop exercises.

The Security function led by the CISO monitors risk prevention, detection, mitigation and remediation processes related to cybersecurity, and regularly reports to the Security Governance and to the Audit Committee. We believe each member of the Supervisory Board is qualified to advise on the oversight of cybersecurity risks through their employment experience and/or educational background in risk management. We have implemented processes to identify and respond to cybersecurity threats intended to comply with standards set by the International Organization for Standardization (ISO 27002), International Society of Automation (ISA/IEC 62443) and US National Institute of Standards and Technology (NIST Cybersecurity Framework). We have a dedicated team that works to increase our strength and maturity and minimize exploitable vulnerabilities by monitoring threats, assessing our vulnerability and defining incident responses.

Information security (continued)

The central security organization was set up to define the policies, procedures and the adherence to these policies in a second line role, coordinated closely with the security representatives in the business.

In addition, the central security organization delivers operational services to the ASML organization via the Security Operations Center (SOC). In case of incidents, the SOC is to be the central point for dealing with these incidents effectively.

In the event of a possible material cybersecurity incident, the Corporate Crisis Management team (CCMT) verifies the assessment, proposed response and disclosure requirements. The CCMT is chaired by the Chief Operations Officer, who reports to the Board of Management on our proposed response and then takes the decision to the Supervisory Board. A dedicated governance structure is in place to deal with a crisis situation effectively. The Chief Information Security Officer (CISO) coordinates the response as a second line of responsibility, along with the security teams in the business.

Third-party cybersecurity risks

In order to both oversee and identify risks from cybersecurity threats associated with our use of third parties, all providers are required to comply with our ASML Security Controls (part of the Supplier Security Policy). We assess and monitor providers using a risk-based approach based on standards set by the International organization for Standardization (ISO 27002), the International Society of Automation (ISA/IEC 62443) and the US National Institute of Standards and Technology (NIST Cybersecurity Framework). We also have a dedicated team to deploy procedures to increase our resistance strength and minimize vulnerabilities by monitoring threats, assessing our vulnerability through testing and defining responses.

Privacy and personal data protection

In an increasingly interconnected world, safeguarding personal information is not only a regulatory requirement but a cornerstone of trust with our employees, customers and partners.

How we manage privacy protection

We continue to enhance our privacy program with the aim of ensuring compliance with applicable laws and regulations across the jurisdictions in which we operate. Our approach is guided by the principles of accountability, transparency and respect for the rights of individuals. We prioritize the responsible handling of personal data and are dedicated to implementing best practices.

Our privacy program consists of the various approaches, processes and tools established by ASML to manage privacy matters in a responsible manner and process personal information in compliance with relevant privacy laws. Our global privacy policy is an essential building block in complying with applicable privacy and data protection legislation relating to the processing of personal data. Furthermore, we have three separate privacy notices for our employees, business partners and visitors, and job applicants respectively – describing how we collect, use, retain and disclose personal data, and for which purposes.

Key initiatives undertaken during 2024 include:

Strategy

The Privacy Office's strategic objectives and initiatives are captured in an annual plan that serves as a roadmap for our privacy efforts. One of the strategic pillars is centered on the ability to leverage the infrastructure present at ASML. By formalizing our approach, we aim to enhance accountability and drive continuous improvement in our privacy practices.

Optimizing privacy processes

In the spirit of continuous improvement, we regularly review our existing privacy processes, with the use of technology and automation to optimize efficiency. This optimization not only reduces operational risks but also enables us to respond more effectively to the evolving privacy landscape.

Training and awareness

We conduct comprehensive training programs for our employees to foster a culture of privacy awareness.

As we move forward, we remain committed to continuously improving our privacy practices and adapting to the evolving regulatory landscape. We recognize that maintaining the trust of our stakeholders is paramount, and we will continue to prioritize the protection of personal information in our business activities.

Export controls and sanctions

We are subject to export controls and sanctions that impact our business.

How we manage export controls and sanctions

Every ASML employee is required to follow all of our policies and procedures, which have been designed to promote compliance and prevent unauthorized transactions. We have implemented controls and other measures to protect against breaches of export control and sanctions requirements, and we remain focused on strengthening and enhancing the key pillars of our export control and sanctions compliance framework. These include:

- **Governance:** At a senior management level, the Compliance, Ethics, Security and Risk Committee (CESR), supported by the Export Control Council, oversees the efficiency and effectiveness of our export control and sanctions compliance framework. The global Export Control and Sanctions team, reporting to the Chief Compliance Officer, also manages the framework and provides assistance and guidance where needed. Each employee is responsible for reading and understanding the content and implications of the Export Control and Sanctions Policy.
- **Compliance organization:** We keep our Export Control and Sanctions compliance organization sufficiently staffed and trained. This ensures that our growing business – and the increasingly complex and challenging regulatory landscape in which we operate – is supported with adequate expertise and experience.
- **Policies and procedures:** We embed export control and sanctions controls in all of our relevant business processes. We regularly assess the effectiveness of our policies, procedures, systems and controls and update them as necessary.
- **Training:** Building awareness around the importance of export control and sanctions compliance is a top priority. We do this through continual updates and briefings.
- **Audit:** Export control and sanctions compliance are included in our internal audit program. The Internal Audit team periodically audits key export control and sanctions risk areas as a matter of course.

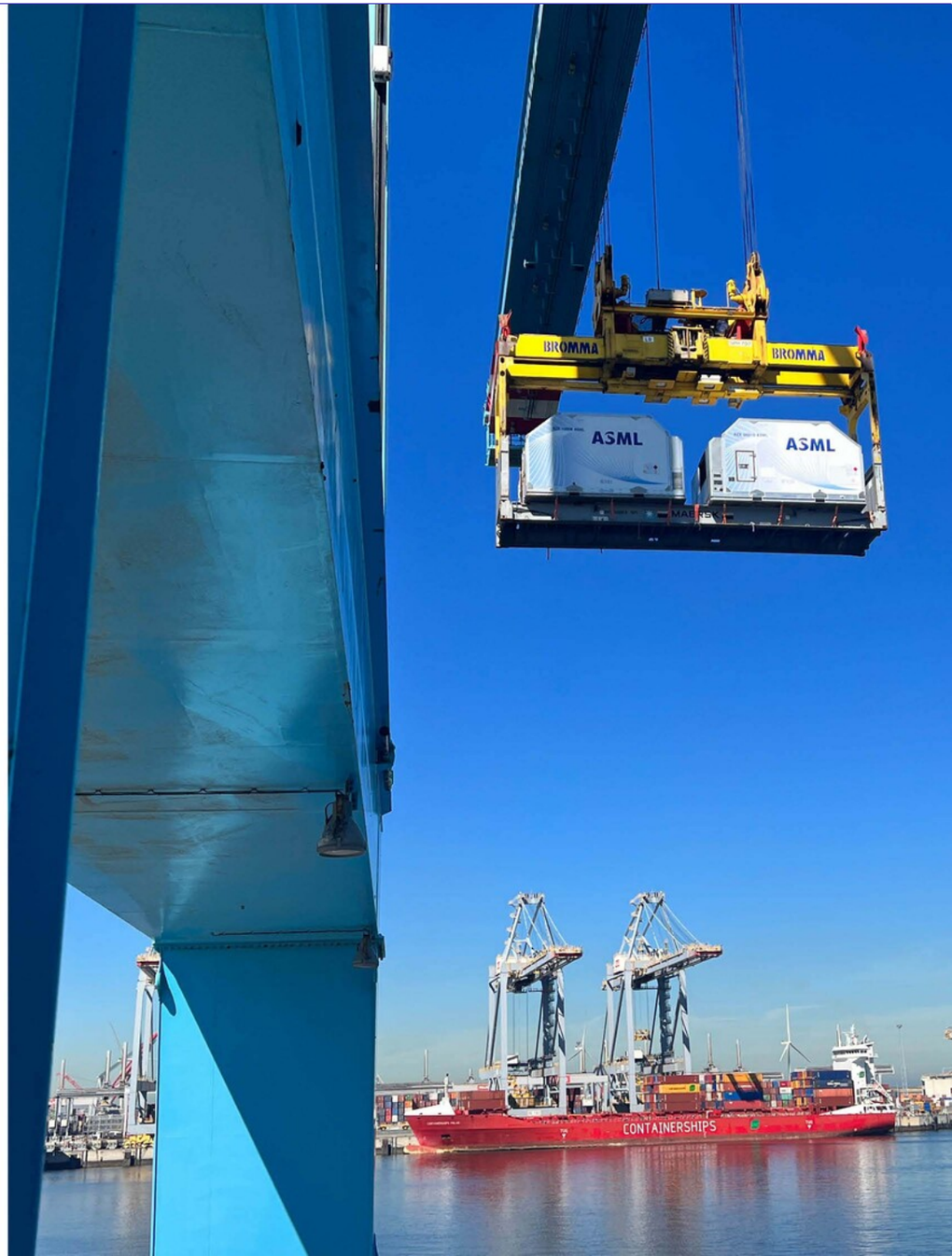
New export control restrictions

On September 6, 2024, the Dutch government imposed new export license requirements on the export of TWINSCAN NXT:1970i and 1980i DUV immersion lithography systems, as well as on the export and transfer of specially designed parts, software or technology for these systems outside of the EU. This is a technical change that ensures that the Dutch government is the sole licensing authority for the shipment of these systems from the Netherlands to other countries. ASML has updated its processes and systems to comply with these new export license requirements.

On December 2, 2024, the US authorities published an updated version of the advanced computing and semiconductor manufacturing equipment rule, imposing additional restrictions on suppliers for the export of chip manufacturing technology. These regulations became effective immediately with a delayed compliance date of December 31, 2024 for some of the changes.

The updated export control regulations contain additions to the list of restricted technologies including metrology and software. In addition, further fab locations, mainly in China, were added to the US list of restrictions. ASML is fully committed to complying with all applicable laws and regulations including export control legislation in the countries in which we operate, while we continue to develop our technology and serve our customers to the best of our ability.

Read more in Strategic report – Performance and risk – Risk – Risk factors – We are subject to regulatory and compliance obligations in the various countries where we operate and as our business grows ensuring compliance becomes more challenging



Intellectual property protection

Our company is based on people and knowledge. Our specific knowledge gives us a leading edge and a head start over competitors.

It is key that we protect our own knowledge as well as the information entrusted to ASML by our customers and business partners.

How we manage intellectual property

Patents are a way to protect ASML's R&D investments from unauthorized use by third parties, including exploitation by our competitors, customers, suppliers and co-developers. We innovate and develop our technology with our ecosystem partners, which comprise many different companies and institutions, each of which requires a dedicated way of dealing with IP matters.

ASML's general IP strategy has three objectives:

1. Build and maintain a solid IP portfolio by protecting ASML's inventions.
2. Prevent situations where ASML infringes on the IP rights of third parties.
3. Prevent the unauthorized disclosure of confidential information, including know-how and trade secrets, to the outside world.

Processes are in place to address these objectives. The objective of preventing unauthorized disclosure is addressed by, among others, a dedicated knowledge protection program, restricted access to engineering top secrets, an information security program, mandatory information classification, and a training and awareness program.

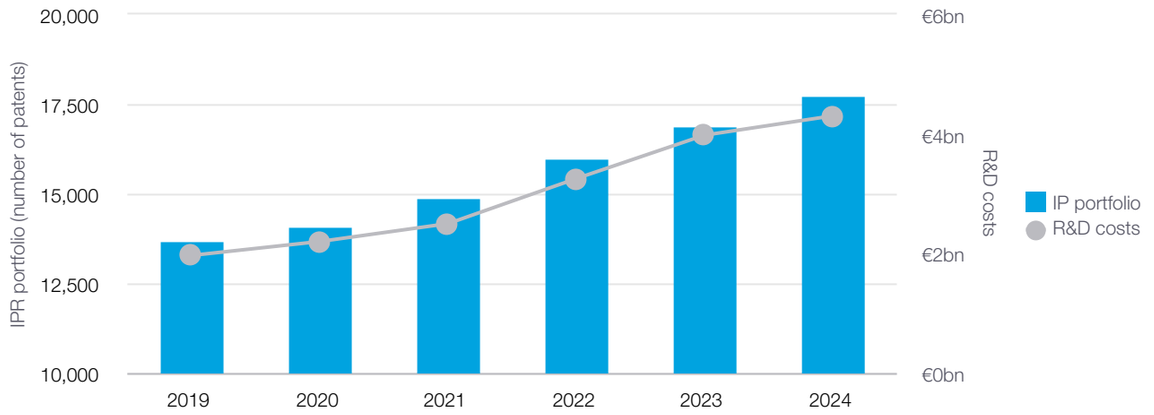
Our Corporate Intellectual Property department is tasked with strengthening our global IP position. The department's mission is to maximize ASML's IP value, to execute and support ASML's overall objectives and to preserve ASML's freedom of operation.

To protect our technology leadership and our R&D in leading-edge technology, the department is involved in the product generation process and assesses new products to determine whether they would potentially infringe any relevant third-party IP rights.

We have adopted controls, policies and procedures intended to safeguard the protection of our trade secrets, proprietary customer data and other information.

Read more in Strategic report – Corporate conduct – Information security and Strategic report – Performance and risk – Risk – Risk factors

Patent portfolio trend



Product safety

We innovate with safety in mind. As a considerate and conscientious manufacturer, it is our ongoing duty to provide safe, secure and well-designed products.

As our company has grown, so too have the challenges we face. Our products are increasingly complex and we operate in more geographical locations than ever, making it difficult to assess which safety legislation, regulations or compliance procedures apply.

In fact, some of our technology is so cutting-edge that current safety standards simply haven't caught up. Existing standards are often unable to provide guidance on safe designs – for example, for high-power drive laser and high-pressure equipment – meaning we must either define our own protections or work hand in hand with regulatory authorities.

Another challenge is consistency. Safety is tricky when there are so many people working on the design of a product, or when that design is outsourced to a supplier. Our fast shipment process also means we sometimes skip some of the testing in the factory and conduct final testing and formal acceptance at a customer's site – meaning we have to adapt our ways of working regarding product safety. And, with fast-changing legislation on chemicals such as PFAS (per- and polyfluoroalkyl substances) and RoHS (Restriction of Hazardous Substances), it can be a challenge to keep track.

How we manage product safety

To help to ensure both our products and tools comply with the most stringent regulations, we focus on safety at every stage of the product life cycle: research, design, development, production, transport, installation, maintenance, upgrades and decommissioning.

Our Global Product Safety and Regulatory organization is part of Quality and Excellence, which coordinates our overall product safety approach. To support ASML products, each product line has dedicated safety engineers who make a first-level system risk assessment. To support safe design, we've also defined and implemented 12 key risk areas and associated product safety competencies in line with the ISO 12100 standard in the design of machinery, with risk experts supporting individual projects. We are further extending our global expertise by hiring country safety and regulatory experts.

Our Safety and Regulatory Office is tasked with tracking new product safety legislation and standards and ensuring our products are compliant. The Regulatory Board is responsible for decision-making on product safety compliance, the strategy to eliminate non-compliance, monitoring compliance status and risk mitigation. It discusses possible non-compliance cases and makes decisions based on the mitigation plan presented.

Ensuring safety compliance

Every product shipped and every tool developed by ASML complies with SEMI S2 – the Environmental, Health, and Safety Guideline for Semiconductor Manufacturing Equipment. These guidelines are incorporated into the Safety System Performance Specification.

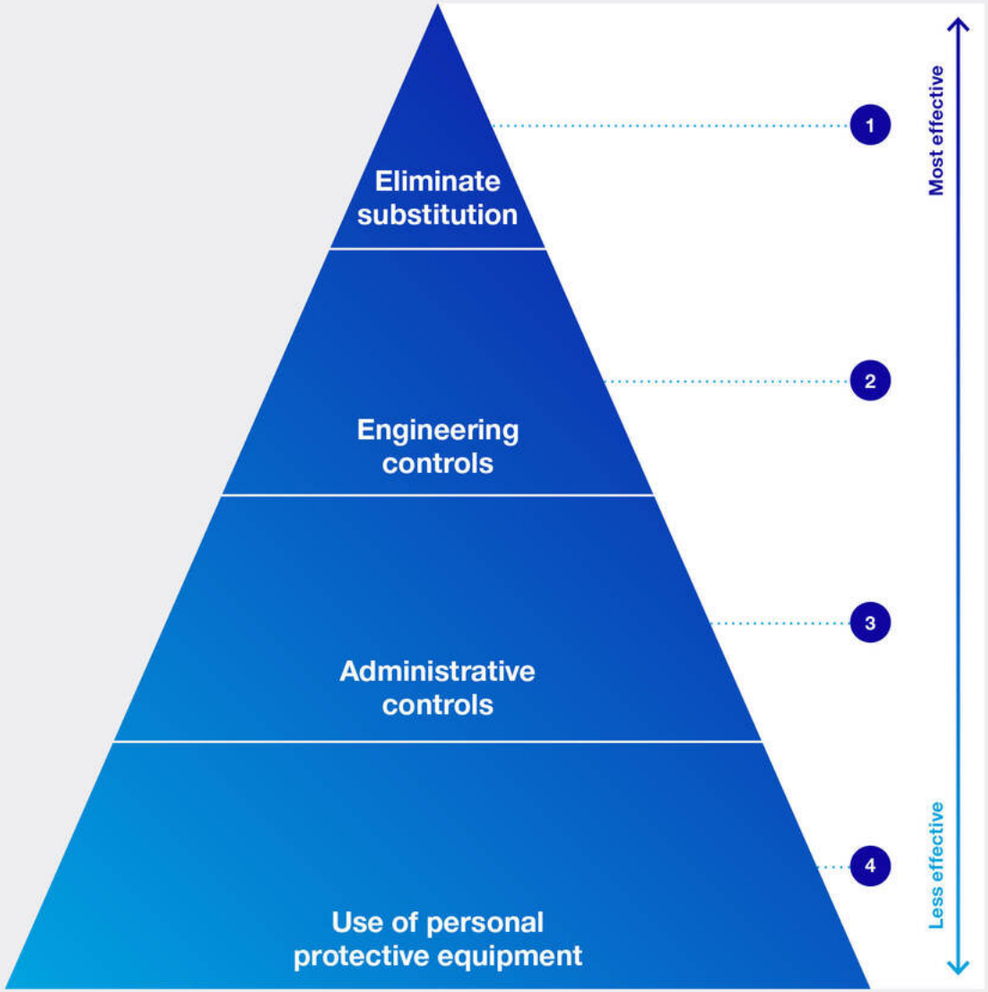
Product safety (continued)

Our product safety competencies

The role of our development and engineering (D&E) safety competence leads is to provide in-depth knowledge on any background legislation and standards applicable in their area, as well as defining design rules, providing training and acting as consultants to mitigate specific safety hazards in our products. This includes areas such as:

- **Electrical:** Making electrical design safe and protecting people from electrical shock. This involves making conductors carrying hazardous voltages inaccessible, ensuring accessible conductors don't carry hazardous voltages and ensuring inaccessible conductors are sufficiently insulated from accessible ones.
- **Pressure:** Interpreting and explaining local legislation and standards, advising on testing and documentation, and maintaining the manufacturing record book.
- **Human factor engineering (including ergonomics):** Incorporating a human-centered design approach to maintain access for maintenance and servicing by laying down rules for issues such as accessibility, posture, forces and lifting parts.
- **Mechanical:** Keeping track of safety factors and seismic requirements for our machines.
- **Lifting:** Advising on special requirements such as the certification and training of crane operators in countries where we use lifting tools, and when certification is needed. For example, in South Korea, certification is required for weights of 500 kg or more.
- **Working at height:** A new area of expertise required during the design of our EXE:5000 – our first EUV 0.55 NA (High NA) system – to guarantee good access to the various system areas and components.
- **Radiation:** Focusing mainly on lasers with intensities that go beyond standard, as well as considering the impacts of standard and special lamps and LEDs.
- **Functional safety:** Our complex machines contain many active protective functions to protect the user against hazards. Examples are sensors which monitor currents, pressure or temperatures and independently put the system into a safe position when needed (e.g. Lockout Tagout procedure).
- **Safety in procedures:** Supporting the creation of written safety procedures for complex operations.
- **Thermal:** The use of tin at high temperatures requires special precautions.
- **Dangerous gases:** The use of gases requires safety systems and procedures to protect machines and people. For example, nitrogen is an asphyxiation hazard and the use of hydrogen in EUV has additional applicable legislations and standards.
- **Materials and substances:** Monitoring worldwide legislation to check the legal status of all materials used in our products and ensuring that we do not use or introduce hazardous materials.

Product safety in design



Designing in safety

Prevention is key. We focus first on safety by design in hardware, and then safety by procedure. Safe products start with a well-thought-out design and safety requirements built in from the very start of the design process. Since human factors play an important role in the safe operation of a product, our first step is always to guard against them becoming a risk. This helps prevent workplace activities from turning into potential accidents. If there are no safety precautions available to address potential hazards, we develop our own.

When we start designing our systems, our engineers conduct an initial safety risk assessment (SRA). Our product designers are trained to identify safety issues early on in the design process, and the SRA is evaluated throughout the entire product development process. We evaluate product safety at each stage of the product life cycle and track reported product-related incidents through our incident-reporting system.

Product safety (continued)

EUV 0.55 NA (High NA) safety compliance

Our latest product, EUV 0.55 NA (High NA), is the next generation of EUV machines. The development of the system presented challenges for product safety due to its larger overall size, height and weight of modules, and more complex accessibility.

Having started the third-party safety design review in 2022, we continued with hardware reviews in 2023, leading up to a full review report in 2024. The first shipment to customers conforms to the requirements.

Increasing product safety in the supply chain

Product safety does not end at our own facilities. We work to spread this out across our partners' operations by promoting product safety in the supply chain – with the aim that all the products we ship comply with the most stringent legislation, including designs made or supplied by our suppliers in the value chain. A large proportion of our innovation and development takes place at our suppliers' sites, so our goal is for suppliers to have the capability to deliver safe and compliant products to avoid accidents or incidents, safety-related non-compliance issues and delayed shipments. We have defined an end-to-end process in close cooperation with our suppliers, ensuring deliveries meet our safety requirements.

Dangerous goods management

Following the successful completion of our dangerous goods program, dangerous goods management is now structurally embedded across our organization.

Policies, processes, guidelines and IT infrastructure are now in place to enable dedicated specialists to manage dangerous goods as part of our competence groups. Hazardous properties are identified at an early stage in the design process to ensure measures are taken for the safe handling, transport and storage of our products – on time and with greater efficiency. Activities are overseen by the safety and compliance organization to safeguard the active control of regulations and legislation impacting ASML products.

Materials and substance compliance

We follow stringent regulations in each of the markets in which we operate. This currently includes RoHS, REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) and the Batteries Directive in the EU, K-REACH (Act on the Registration and Evaluation of Chemicals) in South Korea and TSCA (Toxic Substances Control Act) in the US.

We've implemented multiple initiatives to overcome compliance challenges. These help address an increasing number of regulatory changes, the number of unique parts used in our products (>50,000), the number of regulated substances we use (>100) and the extensive reach of our global supply chain.

Activities in 2024 include:

- A multidisciplinary program embedding processes throughout our organization – improving our IT solutions, enabling automated supply chain communication and delivering flexible reporting capabilities.
- Strengthening regulatory presence in key markets for timely implementation of new regulations in our product design.
- A proactive approach toward upcoming regulations such as PFAS, TSCA, F-Gas and the REACH directive by taking part in semiconductor industry working groups, through our membership of the PFAS Consortium, by working with our business partners and the supply chain, and by establishing a working relationship with a well-respected firm of consultants.