

ASML

**Integrated
Report
2019**



United States
Securities and Exchange Commission
Washington, D.C. 20549
Form 20-F

**ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d)
OF THE SECURITIES EXCHANGE ACT OF 1934
for the fiscal year ended December 31, 2019
Commission file number 001-33463**

ASML HOLDING NV

(Exact Name of Registrant as Specified in Its Charter)

The Netherlands

(Jurisdiction of incorporation or organization)

De Run 6501

5504 DR Veldhoven

The Netherlands

(Address of principal executive offices)

Skip Miller

Telephone: +1 480 235 0934

E-mail: skip.miller@asml.com

2650 W Geronimo Place

Chandler, AZ 85224, USA

(Name, Telephone, E-mail, and / or Facsimile number and Address of Company Contact Person)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol	Name of each exchange on which registered
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Ordinary Shares (nominal value €0.09 per share)	ASML	The NASDAQ Stock Market LLC
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Securities registered or to be registered pursuant to Section 12(g) of the Act:

None

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

None

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

**419,810,706 Ordinary Shares
(nominal value €0.09 per share)**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes (x) No ()

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.

Yes () No (x)

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes (x) No ()

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes (x) No ()

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or an emerging growth company.

See definition of "large accelerated filer," "accelerated filer," and "emerging growth company" in Rule 12b-2 of the Exchange Act.:

Large accelerated filer (x) Accelerated filer () Non-accelerated filer () Emerging growth company ()

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ()

† The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP (x) International Financial Reporting Standards as issued by the International Accounting Standards Board () Other ()

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow.

Item 17 () Item 18 ()

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act)

Yes () No (x)

Name and address of person authorized to receive notices and communications from the Securities and Exchange Commission:

James A. McDonald

**Skadden, Arps, Slate, Meagher & Flom (UK) LLP
40 Bank Street, Canary Wharf London E14 5DS England**

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A definition or explanation of abbreviations, technical terms and other terms used throughout this Integrated Report can be found in the chapter Definitions. In some cases numbers have been rounded for readers' convenience.

This report comprises regulated information within the meaning of articles 1:1 and 5:25c of the Dutch Financial Markets Supervision Act (*Wet op het Financieel Toezicht*).

In this report the name 'ASML' is sometimes used for convenience in contexts where reference is made to ASML Holding N.V. and/or any of its subsidiaries, as the context may require.

Special note regarding forward-looking statements

In addition to historical information, this Integrated Report contains statements relating to our future business and / or results. These statements include certain projections, business trends 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", "could", "should", "project", "believe", "anticipate", "expect", "plan", "estimate", "forecast", "potential", "intend", "continue" and variations of these words or comparable words. They appear in a number of places throughout this Integrated Report and include statements with respect to our expected trends and outlook, strategies, corporate priorities, expected semiconductor industry trends and roadmap, expected market growth and drivers of such trends and growth, expected financial results, including expected sales, EUV revenue, gross margin, capital expenditures, R&D and SG&A expenses, cash conversion cycle, target effective annualized tax rate, sales target for 2020, annual revenue opportunity and potential for 2025, expected growth in 2020, expected trends in customer demand and demand for particular systems and upgrades and expected trends in end markets, including Memory, Logic and Foundry, expected innovation drivers, expected trends in DUV systems revenue, expected DUV sales and Holistic Lithography and expected installed based management revenues, our supply chain strategies and goals, customer, partner and industry roadmaps, ASML's applications business, expected development of High-NA and its benefits, including the expected timing for development of future generation EUV systems, the expected benefits of the indirect interest in Carl Zeiss SMT GmbH, expected productivity of our tools and systems, including EUV productivity targets and goals, and system performance, expected shipments of our tools and systems, including demand for and timing of shipments, statements with respect to the expected benefits of ASML's systems, including statements with respect to DUV and EUV competitiveness, the development of EUV technology and EUV industrialization, expected productivity upgrade releases, enabling high-volume production of next generation chips and expected designs of such chips and their benefits, and revenue recognition, predicted growth in wafer production, sustainability strategy, shrink being a key driver supporting innovation and providing long-term industry growth, lithography enabling affordable shrink and delivering value to customers, sustainability strategy, goals and targets, including targeted greenhouse gas emission and waste reduction and recycling initiatives and investments, our expectation of the continuation of Moore's Law and that EUV will continue to enable Moore's Law and drive long-term value for ASML well beyond the current decade, tax strategy, capital allocation policy, dividend policy, our expectation to continue to return cash to our shareholders through share buybacks and dividends including our proposed dividend for 2019 and our share buyback program for 2020-2022, and statements with respect to the expected impact of accounting standards.

These forward-looking statements are not historical facts, but rather are based on current expectations, estimates, assumptions and projections about the business and our 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 How we manage risk - Risk factors. These forward-looking statements are made only as of the date of this Integrated Report. We do not undertake to update or revise the forward-looking statements, whether as a result of new information, future events or otherwise.

2019 at a glance

Interview with our CEO



Peter Wennink, Chief Executive Officer

'The 20-year EUV journey has really been a joint effort by our stakeholders'

How do you view 2019?

I'm sure that in time we will look back on 2019 as the year that EUV lithography really broke through. Without wanting to play down any of the great work that's been done throughout all our business lines and functions, this was the milestone year when, after a 20-year EUV journey, our customers started high-volume chip manufacturing on our EUV machines.

Is there a specific group of people you would like to put in the spotlight for making EUV a reality?

In order to bring EUV to where it is today, we have made significant investments over two decades. We will now start to earn back our EUV investments. So firstly, our investors made it possible for us to invest those funds. They understand very well that ASML always takes the long view, and that our focus on long-term value creation has enabled superior returns. Let's not forget that three of our biggest customers were among our investors, through our Customer Co-Investment Program (CCIP). We are grateful for all their efforts to integrate EUV into their operations. The EUV journey also required our suppliers to step up. They have worked with us from the start, and have made significant investments in their innovation and production capabilities. Last but not least, our employees have worked tirelessly to conquer each and every technology challenge that was thrown at them – and believe me when I say that these challenges were awesome and seemingly endless. To see it through to the end was a major accomplishment. In other words, the 20-year EUV journey has really been a joint effort by all our stakeholders.

What does the EUV breakthrough mean for the future of ASML?

Now that EUV is established on our customers' roadmaps, we see a clear path for the continuation of Moore's Law beyond the current decade. For the first half of this decade, we can support customers' shrink roadmaps with continuous improvements of the current EUV platform. And, by the way, the capabilities of our EUV systems are significantly extended by our holistic lithography suite of products, which includes Optical Proximity Correction, and optical and e-beam metrology and inspection systems. In the first half of this decade, we will introduce the next EUV platform, with a higher numerical aperture, which enables even further chip shrink. There is a lot we still need to do to make it all happen. We have to make EUV just as reliable and productive as our DUV platform, which will continue to exist alongside EUV. This will require close collaboration between our research & development teams, our suppliers, our factories and our support teams at customer fabs around the world.

What risks do you see that could hamper this growth?

We've already seen strong growth in recent years, and it's been a major task to bring thousands of new colleagues on board. This has been a significant challenge, and we saw some good people leave the company. We put together a coherent onboarding program for new hires. We've made improvements to our labor market program, recruitment strategy, onboarding processes and employee engagement programs, and these efforts are paying off. We recognize that a fast-growing company like ours needs to constantly work on keeping its organization simple and transparent. Our redesigned 'we@asml' employee survey told us that the engagement of our employees is very high compared with our peers. However, our employees also observe inefficiencies, which may well be the result of our fast growth. Resolving these will be a focus area for us in coming years.

How do you get ASML's employees to focus on a shared vision?

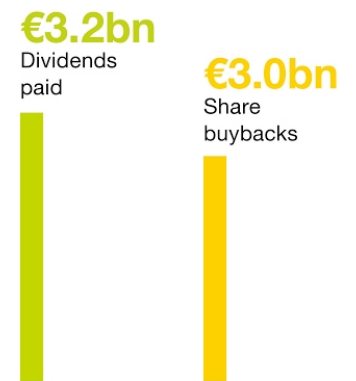
Our large number of new employees and our evolution as a company drove us to review what we stand for and determine how we can help our people internalize our values and familiarize themselves with our strategy and purpose. ASML's values – Challenge, Collaborate and Care – are at the heart of this effort. They're in our DNA. We are where we are today because of our relentless focus on innovation and collaboration, and the founders' mentality that created this company. And as we grow, we need to continue to tap into these core values to support our growth now and into the future. These values play out in several ways: ASML has been able to serve customers and other stakeholders because we collaborate well with a wide network of colleagues and partners. We want everyone to be heard and realize their full potential. For this, we need people to have a curious and challenging mindset. And thirdly, we care about our stakeholders and think about the long-term impact our decisions may have on them. We will emphasize these values because as our environment and our societies evolve, they will help the company and our employees stay the course and take smart decisions that benefit all stakeholders.

Talking of the long-term, what is your sustainability agenda?

For a long time, ASML was not very known to the general public. We've always had good relationships with the communities where we operate, the schools that nurture talent, as well as governments who are keen to foster high-tech enterprise that provides economic growth. In recent years, we've become more visible. Our impact on society has increased due to our market success, growth, and contribution to innovation. So we're stepping up our efforts to be even more transparent about our social, ecological and economic footprint. We're becoming more ambitious with our targets: increase circularity of material used, lower our environmental footprint in our operations and products, and support the innovation ecosystem, to name a few. We've also been working hard to overcome technical challenges in reducing the energy consumption of our products, while at the same time continuing to increase their performance. To fulfill our leadership role and reinforce our innovation footprint for future generations, we give back to the industry by supporting and sharing our expertise with high-tech startups. We've also increased our commitments to support schools that are seeking suitably qualified science, technology, mathematics and engineering teachers. We support facilities in the community, especially those with little access to the benefits our business successes bring.

2019 Highlights

Last 5 years



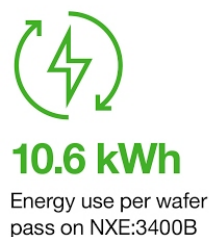
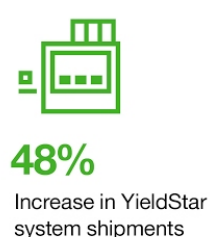
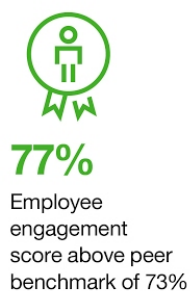
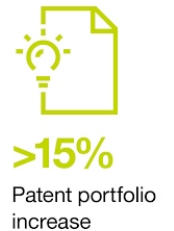
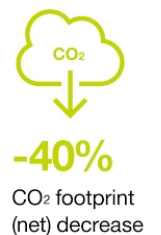
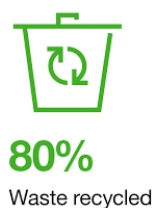
44.7%

Gross margin



170

Wafers per hour achieved by multiple NXE:3400C systems



**Who we are
and what we do**

Our company

At a glance

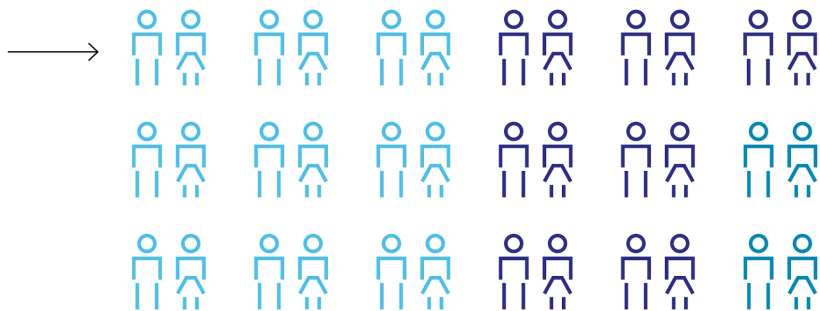
We are a global innovation leader in the chip industry. We provide chipmakers with hardware, software and services to mass produce patterns on silicon through lithography. What we do increases the value and lowers the cost of a chip, which advances us all towards a smarter, more connected world.

Headquartered in Europe's top tech hub, the Brainport Eindhoven region in the Netherlands, we're a global team of 24,900 people from 118 different nationalities, based in over 60 locations across 16 countries worldwide.

People

24,900

Total employees
(in FTE)



118

Nationalities
working at ASML

11,886

Operations employees
(Manufacturing, supply
chain management and
customer support)

10,166

R&D employees

2,848

Sales and support
employees

Locations

A global presence

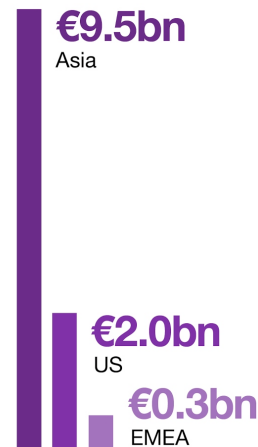
Headquartered in Veldhoven, the Netherlands, ASML has over 60 locations in 16 countries worldwide



60

Locations in
16 countries

2019 Net sales by region



Our purpose

For all the ways we have moved forward as a society, the world faces crucial challenges for the future. We must change how we think and act on themes that impact everyone, like energy use, climate change, mobility and access to healthcare and nutrition.

At ASML, we believe that the chip industry is in a unique position to help tackle these challenges. From artificial intelligence (AI) to a vast internet of things (IoT), microchips are at the heart of modern technology. So whether it's transitioning to sustainable energy, improving global health, increasing the safety and efficiency of transport, tackling pollution, bridging the digital divide, or feeding eight billion people without exhausting the earth's resources, our vision is that we will enable the groundbreaking technology that will help solve some of humanity's toughest challenges.

As the innovation leader that makes vital systems for chip manufacturing, we are proud to not only be a part of these solutions, but also the ones who are making them possible. We can only play this role if we continue to challenge the status quo, tap into the collective knowledge of our global ecosystem and create an environment where people can contribute, learn and grow. At ASML, we believe our purpose is to unlock the potential of people and society by pushing technology to new limits.

The long-term growth of the semiconductor industry is based on the principle that the energy, cost and time required for electronic computations can be reduced by shrinking transistors on microchips. One of the main drivers of shrink is the resolution that systems can achieve, which is mainly determined by the wavelength of the light used and the numerical aperture of the optics. A shorter wavelength – like a finer brush used for painting – can print smaller features. A larger numerical aperture can focus the light more tightly, which also leads to better resolution. To enable shrink, what we do – lithography – is key.

As such, we are a focused supplier of holistic lithography solutions to all of the world's major chipmakers. Our mission is together with our partners, to provide leading patterning solutions that drive the advancement of microchips. Through our sustained investment in, and our dedication to, research and development, we innovate at least at the same pace as our customers. We put our innovations in the hands of chipmakers as quickly as possible by engineering in parallel, not sequentially, while ensuring their quality, reliability, manufacturability, and serviceability.

‘At ASML, we believe our purpose is to unlock the potential of people and society by pushing technology to new limits’

Our core values

To help solve humanity's toughest challenges while at the same time addressing our own, we must continue to amplify ASML's core values that created our success – Challenge, Collaborate, Care.

We challenge

We challenge boundaries, question the status quo and stand up for the ideas we believe in. We're comfortable with discussion and debate, because it is often inherent to stress-testing and championing an idea. This is what enables us to push technology forward, keep things simple and do things with care and attention. We always challenge ourselves to add value to our customer, ensuring that we continually improve across key work aspects, like safety, quality, efficiency and cost.

We collaborate

We collaborate to tap into our collective potential. Together with our partners in our ecosystem, we expand our knowledge and skills, learn from each other, and share approaches to deliver the best results. What we do is unique, and we need each other to make it possible. As we continue to grow and our ecosystem of partners expands, this collaborative mindset becomes even more essential to success.

We care

As we push technology further together, we have to do so with care. As an industry leader, we realize our impact extends from people, to society, to the planet. We care not only for those we work with, but for our customers, suppliers, the world we live in and the communities where we do business. We believe in integrity and respect for people and their human rights. We take personal responsibility to create a safe, inclusive and trusting environment where people from all backgrounds are encouraged and enabled to speak up, contribute, learn, make mistakes, and grow. We also take care to create clarity in how we organize ourselves to achieve our goals, making sure we have a clear framework for what we do and how we do it.

These values will help our company and our employees to make smart decisions that will benefit all stakeholders. Our values and purpose, together with the great responsibility we have as an industry leader, make us keenly optimistic for the future.

Where we come from

Our company was founded in 1984 in Eindhoven under the name of ASM Lithography, a joint venture between Philips and ASM International. As they moved into their new space near the Philips factories at Strijp T in Eindhoven, our first employees could never have imagined that in just three decades, ASML would be a global innovation leader.

We've grown from our humble beginnings to a global force through relentless focus on innovation, sheer commitment through tough times, and a willingness to rely on others to come to a better result.

Although we're constantly looking to the future, where we have come from is just as important to us as we evolve. These behaviors have been key to our success over the past 35 years, and they've become even more important to us as we continue to define our purpose and articulate the values that underpin everything we do. Understanding what made us successful in the past will help us maintain our success in the future.

What guides us

Innovation is rarely a straight line. We've always known that it takes laser focus, multidisciplinary teamwork and a keen eye for how we can best help our customers. And even then, we had to show grit. It took a decade of tenacity to get our technology off the ground. We cared for this company like it was our own and proudly committed to its success. We believed then as we do now that even the biggest challenge can be overcome by chipping away, if necessary with hundreds of people over many years.

We also learned to rely on others to come to a better result – without losing focus. That meant expanding our own knowledge and skills by building an ecosystem of expert suppliers, strategic partners, academia and service providers. We also acquired leading companies with unique technologies that strengthened our ability to deliver better solutions to our customers. We started to see ourselves as architects and integrators, inspiring our partners to innovate on the cutting edge of engineering while sharing risk and reward. And like us, some of our earliest customers are now leaders in the chip industry.

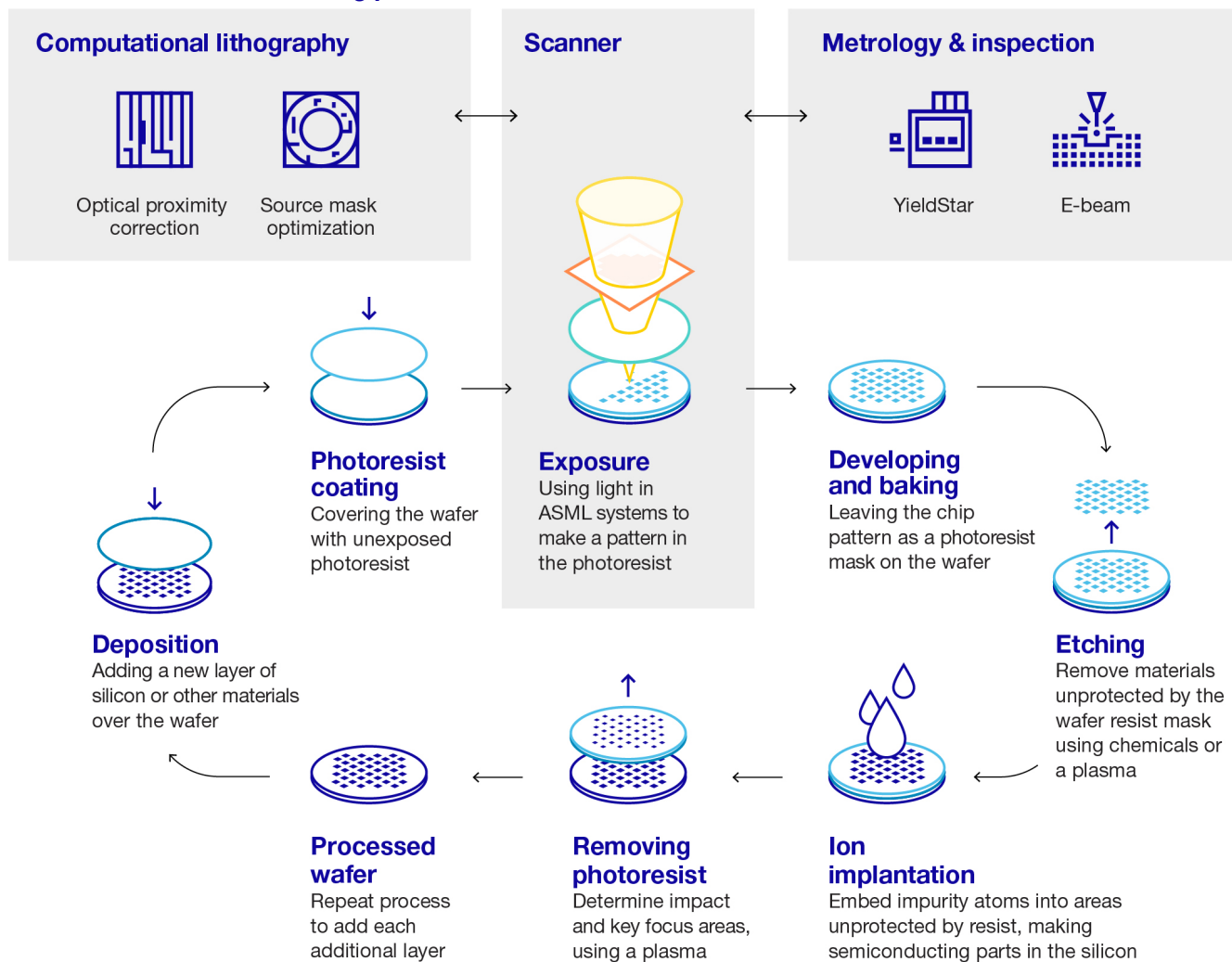
The role of lithography

Lithography has been a driving force in creating more powerful, faster and cheaper chips. While an early chip from the 1970s could fit thousands of micrometer-sized transistors, today’s most advanced chips are a complex web of billions of transistors, the smallest of which are just 10 nm. To get some idea of how small that is: your fingernails grew 10 nm in the time it took to read the previous sentence. Shrinking transistors further is becoming increasingly difficult. But we aren’t as close to the fundamental limits of physics as some would think. Next-generation chip designs will include more advanced materials, new packaging technologies and more complex 3D designs, which will create the electronics of the future. What will always be needed is a way to mass produce these designs at the right cost. That’s where we will continue to play a big role, as ASML’s holistic lithography product portfolio will work to enable affordable transistor shrink.

A lithography system - also called a scanner - is essentially a projection system. Light is 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 makes another copy on the wafer.

This process is repeated until the wafer is covered in patterns, completing one layer of the wafer’s chips. To make an entire microchip, this process can be repeated 100 times or more, laying patterns on top of patterns to create an integrated circuit. The size of the features to be printed varies depending on the layer, which means that different types of lithography systems are used for different layers – from our latest-generation EUV (extreme ultraviolet) systems for the most critical layers with the smallest features to DUV (deep ultraviolet) systems for the less critical layers with larger features.

Semiconductor manufacturing process



Our products and services

The semiconductor industry is driven by affordable scaling, which is powered by ASML's holistic lithography product portfolio. We continue to push our entire system portfolio to new productivity levels and imaging performance. Our portfolio is aligned to industry trends and our customers' product roadmaps, which require lithography-enabled shrink beyond the current decade. We provide our customers with everything they need to mass produce patterns on silicon, allowing them to increase the value and lower the cost of a chip.

‘Our highly differentiated solutions provide unique value drivers for our customers and ASML’

Our holistic lithography solutions integrate our product portfolio: EUV lithography systems, DUV lithography systems, metrology and inspection systems, and computational lithography. In addition, we support our growing installed base with best-in-class customer support. These highly differentiated solutions provide unique value drivers for our customers and ASML, working together to ensure affordable shrink.

Extreme ultraviolet (EUV) lithography systems

ASML is the world's only manufacturer of lithography machines that use extreme ultraviolet light. EUV lithography uses light with a wavelength of just 13.5 nm. This is a reduction of almost 14 times the wavelength of the other lithography solution in advanced chipmaking, DUV lithography, which uses 193 nm light.

Our EUV platform extends our customers' Logic and Memory roadmaps by delivering resolution improvements, state-of-the-art overlay performance and year-on-year cost reductions. Our EUV product roadmap is intended to drive affordable scaling to 2030 and beyond.



TWINSKAN NXE:3400C

The TWINSKAN NXE:3400C is our latest-generation EUV lithography system, combining productivity, highest resolution, and state-of-the-art overlay and focus performance.

We're developing the future generation of EUV lithography systems, using a higher numerical aperture, known as High-NA technology. The first R&D systems are planned to be shipped in early 2022 with volume production tools in 2024/2025. This technology will enable geometric chip scaling beyond the current decade, offering a resolution and overlay capability that is 70% better than our current EUV platform.

Deep ultraviolet (DUV) lithography systems

Our DUV platform is the industry 'workhorse', offering immersion and dry lithography solutions that help manufacture a broad range of semiconductor nodes and technologies. Our DUV immersion and dry systems lead the industry in productivity, imaging and overlay performance for high-volume manufacturing of the most advanced Logic and Memory chips. With DUV immersion we increased the numerical aperture of our ArF model by maintaining a thin film of water between the last lens element and the wafer in order to support further shrink. This technology is only applicable for our ArF model - the other DUV models don't use this technology.

Immersion systems

Our immersion systems can deliver both single-pass and multi-pass lithography and have been designed to be used in combination with EUV lithography to print the different layers of a chip. The TWINSKAN NXT:2000i is our state-of-the-art immersion system that's being ramped-up in high-volume manufacturing of the 7 nm Logic and advanced DRAM nodes. This system has the fastest ramp-up to high-volume manufacturing in our immersion platform, with respect to productivity and reliability levels.

Dry systems



TWINSKAN XT:1460K

Our portfolio of dry systems offers tool types for all different wavelengths. The TWINSKAN XT:1460K is our latest-generation dual-stage ArF dry lithography system. It offers excellent overlay and imaging performance at high productivity. The TWINSKAN XT:1060K is ASML's most advanced KrF (krypton fluoride) laser lithography system offering best-in-class resolution and overlay, and has a higher NA to support the more critical KrF layers. The TWINSKAN XT:860M, our KrF lithography system for volume 200 mm and 300 mm wafer production at and below 110 nm resolution, supports high demand for 3D NAND applications. The TWINSKAN XT:400L is ASML's latest-generation i-line lithography system, using a mercury vapor lamp to print features down to a 220 nm resolution, also for 200 and 300 mm wafer production.

Metrology and inspection systems

As chipmakers continue to shrink nodes, they face unprecedented engineering, material, structural and manufacturing difficulties. Our Applications portfolio addresses these challenges by helping customers achieve their patterning fidelity requirements by controlling the quality and consistency of the patterns being printed on the chip. The information captured through our metrology and inspections systems helps us to control the thousands of knobs in the scanner in order to enlarge the process window for our customers while at the same time improving yield performance. The portfolio includes our YieldStar optical metrology platform, our HMI e-beam metrology and inspection platform and our computational lithography and patterning-control software solutions.

Delivering speed and accuracy, our metrology and inspection portfolio covers every step of the manufacturing process, from R&D to mass production. Together with our computational lithography and patterning control software solutions, these systems help chipmakers achieve the highest yield and best performance in mass production.

YieldStar optical metrology



YieldStar 1375

Our YieldStar optical metrology solutions can quickly and accurately measure the quality of patterns on the wafer.

YieldStar 380G offers the latest in-resist overlay and focus metrology. It provides enhanced throughput compared to previous generations. One of the most important features of the new system is the move from single wavelength measurement to dual and multi-wavelength measurement. This significantly improves accuracy and robustness, without extra time.

YieldStar 1375 is the only optical tool in the market for fast, accurate overlay for in-device metrology. This is providing yield improvements, which is triggering customer adoption in their processes.

E-beam metrology and inspection

Our HMI e-beam solutions help to locate and analyze individual chip defects amid millions of printed patterns. This extends our control scope, and offers our customers additional value.

This pattern fidelity metrology allows us to guide the e-beam inspection system to the most critical areas on the wafer, based on the predictive model, to increase the effective productivity.

We are extending this technology even further with a multi-beam design, expanding the application opportunity in high-volume production. The biggest new opportunity is in the extension of overlay control to a comprehensive control of pattern fidelity.

Computational lithography

Our computational lithography and software solutions revolve around creating applications that enhance the setup of the lithography system so chipmakers can print exactly what they want to print.

Accurate simulation models of the lithography process are a foundational element for all these applications. These models represent a wide variety of physical and chemical effects. Machine learning solutions are now broadly used both in the simulation models as well as in the applications.

Managing our installed base systems

Our Installed Base Management product portfolio, and its wide range of service and upgrade product offerings, is structured in line with the life cycle of our customers' technology nodes. It aims to offer customers the best possible value proposition.

We develop and sell product options and enhancements designed to increase throughput, as well as improve patterning and overlay. This allows for optimal cost of ownership over the lifespan of our systems. We have developed field-upgrade packages, which allow our DUV and EUV scanners to be upgraded from one model to another in the field.

Our Mature Products and Services (MPS) business refurbishes used lithography equipment and offers associated services.

Customer support

We support our customers with a broad range of applications, services, and technical-support products to maintain and enhance our systems' performance. We have more than 5,900 customer-support employees, including service engineers and applications specialists, who work towards ensuring the systems in our customers' fabs are running at the highest levels of predictability and availability. We offer 24/7 support, next-day parts delivery, an easy, centralized customer portal, and training for customer engineers.

Our markets

Our customers are the world's leading microchip manufacturers, and our success is inextricably linked with theirs. We design our machines based on their input, engage in helping them achieve their technology and cost roadmaps, and work together to make sure our machines are running smoothly in their fabs.

Our customers can be grouped into Memory and Logic chipmakers:

Memory chips can store a large amount of data in a very small area. They are used in an increasing variety of electronic products like smartphones, high-performance computing, automotive or personal computers, and other communication devices. There are two main classes of memory: NAND and DRAM.

With NAND chips, information can be stored even when a device is powered off. DRAM memory is used to efficiently provide information to the processor. These DRAM and NAND chips are typically made in dedicated memory-chip factories.

Logic chips, which process information in electronic devices, are produced by two groups of manufacturers. The first group, known as Integrated Device Manufacturers (IDM), designs and manufactures these chips. The second group is made up of contract manufacturers known as foundries. Foundry manufacturers don't design chips but produce them for fabless companies.

**'Our customers are the world's leading microchip manufacturers, and
our success is inextricably linked with theirs'**

Factors driving demand

The chip market has grown by 5% per year on average over the past 20 years, but the factors driving this growth have radically changed.

In the 1990s, personal computers (PCs), both desktops and later laptops, drove chip demand. In the first decade of this century, the market driver evolved from PCs to smartphones. These in turn produced a new market driver, data centers, where data from PCs and smartphones is routed, stored, and processed with the extensive use of specialized logic chips, DRAM and NAND.

Advanced chips are needed to store and crunch this data. While the most advanced Logic and Memory chips are powering high-end trends in artificial intelligence (AI), big data and automotive technology, the simpler, low-cost chips are integrating sensing capabilities in everyday technology to create a vast internet of things (IoT). This category of end-point devices includes security cameras, home and industrial devices, and autonomous vehicles. These are exponentially adding to the growth in data being transmitted, processed and stored.

The combination of increasing data together with more powerful processing capability from advanced Logic chips is enabling the application of AI techniques, such as machine learning and deep learning, leading to a whole new set of applications and services. These new applications are fueling new growth drivers such as smart assistants and real-time language translation.

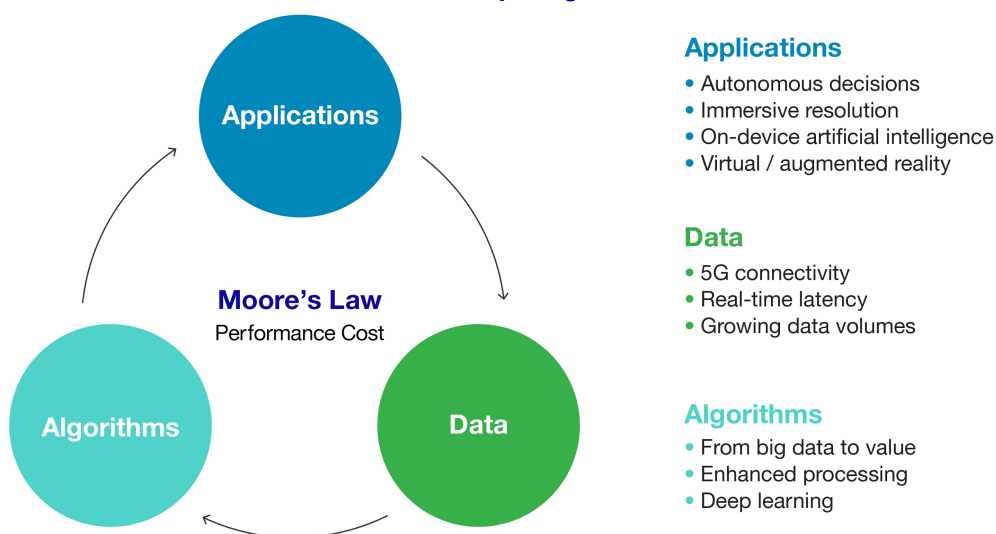
Industry trends and opportunities

Technology is fast evolving. The next level of computing is dawning. It's all about immersive and ubiquitous computing in a world where we have many devices connected to us through the IoT.

There are around 26 billion connected devices in use, with more being added every second. The IoT, which includes connected homes, smart cities, industrial IoT and personal wearables, is recognized as one of the key applications set to drive semiconductor revenues. And as the IoT expands and grows, so will the number of sensors and amount of data generated, transferred and stored.

5G is another transformational technology set to drive the transition from a smartphone-based wireless world to an immersive world. AI, meanwhile, is being enabled by the increasing processing capability of advanced semiconductors. These, in turn, are reinforced by new classes of devices. If the IoT and 5G enable the connected world, then AI makes sense of it.

Trends in semiconductor-enabled computing



A new tomorrow

Connected IoT devices are expected to create up to 175 ZB (zettabyte) of data per year by 2025. The vast amount of data that people can access, and the insights this provides, will fuel semiconductor business growth and transformation. This will increase the pressure on computing power and storage capacity to enable real-time access and experience. Mobile computing, where you bring the computer with you, is evolving towards ubiquitous computing, which means that computing power will be available wherever you go.

Due to the vast amount of data being generated, the global data landscape is evolving fast. Currently, around 10% of enterprise-generated data is created and processed outside a traditional centralized datacenter or cloud. By 2025, this is expected to reach 75%.

'Due to the vast amount of data being generated, the global data landscape is evolving fast'

Big data needs to move to fast data – the near or real-time application of big data analytics to smaller data sets – to allow for ubiquitous computing in the new world of 'edge', where AI, machine visioning and virtualization are becoming the reality of the new tomorrow.

Shrink Moore

To enable 'edge' – which brings computation and data storage closer to the location where it is needed – our customers are investing in developing more advanced semiconductor processes to create more powerful Logic and Memory microchips. At the same time, these also need to be more energy efficient and cost effective.

For the next decade, the semiconductor industry roadmap is fueled on three cylinders:

- 3D integrated circuits enabling better performance, power, form factor and functionality
- Geometric scaling to reduce cost
- Domain-specific architecture driven by energy efficiency

Geometric scaling (shrink) is a key industry driver supporting innovation and providing long-term industry growth.

How we create value

The success of our business depends on strong, sustainable relationships with all stakeholders in the value chain to achieve the desired innovations in semiconductor technology. We use input from stakeholders and trends in our industry and society to develop our strategy, our products and services. We define our stakeholders as our shareholders, customers, suppliers, employees and the society we operate in.

Our business model is founded on creating value year on year and with a long-term view. We have identified the value we create for our stakeholders as well as our impact, using the capitals model of the International Integrated Reporting Council (IIRC). The long-term value we create for our stakeholders can be defined as:

- **Shareholder value:** Our large and sustained investments in research and development to execute our business strategy keeps us as a leader in holistic lithography. Our innovations contribute to the long-term growth of the semiconductor industry which benefits our solid financial performance and capital return policy.
- **Customer value:** As one of the world's leading manufacturers of chipmaking equipment, we invest in innovations that enable the continued shrink of microchips. With EUV and the next generation of EUV, High-NA, we secure continuation of Moore's Law. This allows our customers to develop ever-more powerful chips for new applications and devices. At the same time we help our customers to reduce their cost.
- **Supplier value:** As we grow and our innovations enter ever-high level of complexity, we want our suppliers to grow with us. We innovate together with our supplier network, sharing knowledge and tapping into each other's technology expertise. Long-term relations, close cooperation and transparency with our suppliers are key to our success.
- **Employee value:** Our workforce has grown steeply in recent years. In the past 5 years, we have created more than 10,100 jobs in the communities where we operate. Every day our employees come together to unlock the potential of each nanometer to break new ground. We are a proud employer of 118 nationalities at ASML, allowing for diverse points of view in our quest to develop the best ideas and solutions. Developing our people is crucial to the sustained success of our business, therefore we invest in their career development.
- **Societal value:** With our continuous innovations, we enable new technology that supports the growth and transformation of the semiconductor industry, using artificial intelligence to offer new applications and services to address society's needs. Through our innovation ecosystem we nurture innovation by giving back to society, such as sharing our expertise with universities and research institutes, supporting young tech companies, and promoting STEM education worldwide.

Our value creation model

Capital resources

Financial
€12.6bn
 Total shareholders' equity
€3.1bn
 Long-term debt

Manufacturing
€6.5bn
 Total cost of sales
7
 Manufacturing sites
11,886 FTE
 Employees in operations


Intellectual
€2.0bn
 R&D expenses
4
 R&D sites
10,166 FTE
 Employees in R&D


Human
24,900 FTE
 Total employees
€19m
 Training and development
118
 Nationalities

Social
 ASML Foundation
 Community involvement
 Nurture high-tech ecosystem


Natural
1,367 TJ
 Energy consumption
 Committed to circular economy

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

Our strategy

 Enhance holistic lithography extension to build a winning position


 Secure DUV competitiveness by enhancing performance


 EUV industrialization in high volume manufacturing


 Enable further shrink by next-generation High-NA technology

2019 outcome

Financial
€2.40
 Proposed annualized dividend per share
€2.6bn
 Net income
€6.16
 EPS (basic)

Manufacturing
€11.8bn
 Total net sales
229
 Lithography systems sold
44.7%
 Gross margin

Intellectual
>13,700
 Patent portfolio
€843m
 IP & developed technology value

Human
77%
 Employee engagement score
 Increase in employer brand ranking
4.3%
 Attrition

Social
17
 Projects supported through ASML Foundation
 Promoted STEM education
 Supported startups and scaleups

Natural
80%
 Material recovery
-32.5%
 CO₂ scope 1 and 2 net footprint decreased
417 kg
 Waste per million revenue

Value created


Shareholder value
 Long-term organic growth


Customer value
 Continuing Moore's Law


Supplier value
 Contributing to new technology


Employee value
 Sustainable employment in the community


Societal value
 Enabling new technological advancement

Sustainable impact

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE


13 CLIMATE ACTION


8 DECENT WORK AND ECONOMIC GROWTH


4 QUALITY EDUCATION

8 DECENT WORK AND ECONOMIC GROWTH


12 RESPONSIBLE CONSUMPTION AND PRODUCTION


Our strategy

The long-term growth of the semiconductor industry is based on the principle that the power, cost and time required for every computation on a digital electronic device can be reduced by shrinking the density of transistors on microchips. Our guiding principle is continuing Moore's Law towards ever-smaller, cheaper, more powerful and energy-efficient semiconductors. To enable shrink, lithography is key, as the process is used to pattern the structures on a microchip.

We innovate across our entire product portfolio at the same pace as our customers through large and sustained investment in research and development. To accelerate our product development, we engineer in parallel, not sequentially, all the while guarding the product's quality, reliability, manufacturability and serviceability. This enables us to get our innovations into the hands of chipmakers faster.





'We innovate across our entire product portfolio at the same pace as our customers through large and sustained investment in R&D'

We collaborate with chipmakers to understand how our technology best fits their needs, challenges and visions of the future. It is through this collaboration and trust that we can build for today and develop for tomorrow.

ASML invests in a technology-based innovation roadmap that enables the continued shrink of microchips by enhancing resolution with EUV and High-NA, together with the holistic scaling of overlay and pattern fidelity control. This is how we pursue our long-term strategic vision.

To realize our long-term strategic vision within the semiconductor industry, we continue to drive our core strategy, which we define around four major pillars: Holistic lithography extension, DUV, EUV and High-NA.







Four pillars of our business strategy

Holistic lithography extension	Strengthen our leadership position in in-device metrology, enabling high-order overlay correction. Secure a winning position in pattern fidelity control and combine this with superior computational lithography.	
DUV competitiveness	Continue our innovation leadership , driving DUV to the highest level of performance by expanding our installed base and through continuous improvement and operational excellence.	
EUV industrialization	Secure high-volume manufacturing and improve cost effectiveness for our customers by enhancing the value of EUV technology for future nodes down to the 2 nm Logic node.	
High-NA	Enable next-generation geometric shrink by extending our 0.33 NA product portfolio to enable High-NA EUV at the 2 nm Logic node, followed by Memory nodes at comparable density.	

Our five strategic areas of sustainability

Our innovations push the boundaries of science and physics to provide the best value for our stakeholders for today and in the future. At the same time we want to create sustainable impact. Sustainability is an integral part of our business strategy. Staying focused on what matters for our business and for our stakeholders is the cornerstone of our sustainability strategy. Through a materiality assessment we identify and assess the topics most relevant to our stakeholders and which sustain ASML's long-term business growth. We focus on five strategic areas of sustainability to create long-term value for our stakeholders, shape a sustainable future, and contribute to the United Nations Sustainable Development Goals.

Five sustainability areas

<h3>Innovation ecosystem</h3>	<p>We don't innovate in isolation to ensure the fast pace of innovation in our value chain. We develop technology together with the help of our partners and collaborative knowledge network.</p>	<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p> 
<h3>People</h3>	<p>Empowering individuals for the collective good to ensure our employees are proud to work for us and engaged with our ambitions as a company.</p>	<p>4 QUALITY EDUCATION 8 DECENT WORK AND ECONOMIC GROWTH</p>  
<h3>Responsible supply chain</h3>	<p>Setting the bar higher for our world-class supplier network to achieve the innovations we strive for, by ensuring we conduct our business in a sustainable and responsible manner.</p>	<p>8 DECENT WORK AND ECONOMIC GROWTH</p> 
<h3>Circular economy</h3>	<p>Minimizing waste, maximizing resources to extract the maximum value from the materials we use and repurpose our products across their life cycles.</p>	<p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p> 
<h3>Climate & energy</h3>	<p>Taking every step to lower our footprint to achieve zero emissions across our operations. While increasing productivity of our products, we are also working towards enhancing the energy efficiency of our products.</p>	<p>13 CLIMATE ACTION</p> 

The next section of this report focuses on the achievements we made in 2019 in terms of our strategic business and sustainability goals. It highlights our successes, challenges and long-term ambitions, with the aim of providing our stakeholders with a holistic view of how we create value. The materiality table in the next section details how we have integrated these topics into our reporting.

What we achieved in 2019

Materiality: assessing our impact

Dialogue and knowledge-sharing are important in an innovation-driven industry. To this end, we continually and openly communicate with our main stakeholder groups through various channels and at different levels in our organization. Our stakeholders are parties affected by our activities or those who have a direct interest in or who can influence our company's long-term business success. See Non-financial statements - Stakeholder engagement for details.

How we manage sustainability

Our Sustainability Strategy is approved and signed off by our Board of Management. The highest member of the organization directly responsible for sustainability matters is our Executive Vice President and Chief Strategy Officer, who is a member of the Board of Management. Each of the material and corporate citizenship themes is assigned to a senior manager, whose responsibility is to monitor progress against agreed targets and ensure availability of sufficient resources to meet targets and objectives. In the event of insufficient progress, it is discussed during operational performance review meetings and raised with our senior management during a review meeting or during other relevant committee meetings. Our performance on sustainability areas, as outlined in the materiality table, is part of the long-term incentive plans of our Board of Management and senior management. We measure our performance by benchmarking our result from the annual comprehensive Dow Jones Sustainability Index with the best of the semiconductor industry.

Our materiality process

The materiality process consists of three main steps:

1. Identification of relevant aspects

We annually update a shortlist of relevant topics based on an analysis of stakeholder feedback, continuous stakeholder engagement, risks and opportunities, and a review of the industry and relevant global trends. In addition, we look into guidelines, standards and legislation (such as the GRI, ISO 26000 and the EU Non-financial Reporting Directive), a sector and media analysis, and analysts' questionnaires (such as the Dow Jones Sustainability Index assessment and the Carbon Disclosure Project). Relevant topics are those important for our stakeholders in their decision-making and those with which ASML has or can have an environmental, social or economic impact within the organization and in the value chain or society.

2. Analysis and prioritization

In order to select the material topics, the relevant topics are assessed on both the significance of our environmental, social and economic impacts, as well as the relevance to our stakeholders. The impact of these topics is gauged using available data, stakeholder feedback, discussions with senior management and Board of Management members, business owners and other relevant internal stakeholders (such as subject-matter experts). Assessment results are validated and approved by Board of Management.

3. Implementation: strategy and report structure

The results of the materiality assessment are used to shape our strategy, as well as to define the content of this Integrated Report, in line with the GRI principles for defining report content.

This report focuses on the material themes that we disclose in a comprehensive manner. However, we also want to meet our stakeholders' expectations. For our corporate citizenship themes, we seek to address the elements that are of particular interest to our stakeholders. This results in themes being addressed in different levels of detail.

Results of our materiality assessment

We identified the environmental, social, and governance topics which have the greatest impact on our business and the greatest level of concern to stakeholders along our value chain. Assessing these topics enables us to focus upon the most material topics and effectively address these in our sustainability strategy, policies and programs.

In our latest assessment, conducted in 2018 for the sustainability strategy 2019-2025, we identified 10 material themes, summarized in the materiality table below as our Sustainability and Business focus areas. These are the themes most relevant to our stakeholders in their decision-making, and in areas where ASML has or could have the highest impact. We also identified other factors that we need to address as a company committed to conducting our business in an accountable and caring way. These include issues our stakeholders expect us to act on or issues we also have an impact on. They have been categorized under the 'Corporate citizenship' themes.

We also support the 2030 ambition defined in the United Nations Sustainable Development Goals (SDGs) adopted by the United Nations. These goals aim to protect the planet and improve the lives of people everywhere. We have mapped out how our strategy and current efforts actively support these goals and the materiality table outlines the five most relevant SDGs to which we contribute. The SDG 9 'Industry, Innovation and Infrastructure' goal is connected to the core of our company, as innovation is our lifeblood and the engine that drives our business. We also contribute towards the SDG 4 'Quality Education', SDG 8 'Decent Work and Economic Growth', SDG 12 'Responsible Production and Consumption' and SDG 13 'Climate Action' goals. Our performance against these SDGs is highlighted throughout this report.

Materiality	Area	Value chain impact			SDGs					
		Supply chain	ASML operations	Product use	4	8	9	12	13	
Technology and innovation ecosystem										
Technology	B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Innovation ecosystem	S	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Product safety	C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Customer intimacy	B		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Our people										
People	S		<input checked="" type="checkbox"/>							
Fair remuneration	C		<input checked="" type="checkbox"/>							
Labor relations	C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
Employee safety	C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Community involvement	C		<input checked="" type="checkbox"/>							
Our supply chain										
Supply chain	B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
Responsible supply chain	S	<input checked="" type="checkbox"/>								
Our operations										
Circular economy	S	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Climate and energy	S	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Water management	C		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Operational excellence	B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Financial performance										
Financial performance	B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
How we manage risk										
Business risk and continuity	C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Business ethics and compliance	C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
Human rights	C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
Tax policy	C		<input checked="" type="checkbox"/>							

B = Business focus area, S = Sustainability material focus area, C = Corporate citizenship area

Technology and innovation ecosystem

Innovation is the driving force for our growth and success, now and in the future. We innovate across our entire product portfolio at the same pace as our customers through large and sustained investment in R&D. Innovation is crucial to the continuing success of our business. To stay ahead, we invest heavily in R&D. To drive the fast pace of innovation in our value chain, our technology is developed together with the help of our partners and collaborative knowledge network.

Technology

We are system architects and integrators.
We develop our technology within our value chain.



2,000

Wafers per day demonstrated on EUV NXE:3400C systems under Memory customer conditions and more than 170 wafers per hour achieved



1st

YieldStar 380G shipped. This system allows the use of even more wavelengths



€2.0bn

R&D expenses



EUV

Reached high-volume manufacturing at customers site

Innovation ecosystem

We don't innovate in isolation.



1,300

Hours of support to high-tech startups and scaleups



€420k

Total value of in-kind support to startups and scaleups



17%

Startups supported through Startup Alliance, awarded 'Star' level (of 70 in portfolio)



Around €40m

Contributed to four EU subsidy projects

How we innovate

Our ability to innovate is crucial to our business success. Through our innovations, we help our customers achieve their goals and realize new technology and applications. We have a solid system in place to manage and enhance innovation, achieving significant breakthroughs in recent years.

Innovation through collaboration

We innovate through partnerships. Our innovation philosophy is one where we see ourselves as architects and integrators, working with partners in an innovation ecosystem. We develop our technology in close collaboration with our customers to ensure we build today what they need tomorrow. Our machines are developed based on their input, and we engage closely with them to help achieve technology and cost roadmaps.

In the same way, we work closely with our suppliers, trusting them to manufacture parts and modules for our systems. Many of them are deeply involved in developing new technology and achieving the innovations we seek. With some of these so-called 'farmout suppliers', we work as co-investors. We've been in partnership with Carl Zeiss AG for over two decades. This partnership runs under the principle of 'two companies, one business' working together to drive operational excellence. To accelerate innovation in High-NA technology, we hold an interest in and support Carl Zeiss SMT in R&D and other capital investments for the design of optical columns in our lithography systems.

'Our collaborative approach allows us to accelerate innovation'

We co-develop expertise within a wide network of technology partners, such as universities and research institutions. Some of our partners include imec in Belgium, the Shanghai Integrated Circuit Research and Development Center in China, the technical universities in Twente, Delft and Eindhoven, and the Advanced Research Center for Nanolithography (ARCNL) in the Netherlands. In 2019, as in previous years, these partnerships delivered good results.

Imec achieved a breakthrough by developing a test vehicle that we can use to move closer towards manufacturing 3 nm node chips. ARCNL experimentally investigated the emission of EUV light from a laser-produced plasma, which is the essential ingredient for EUV source technology. This research offered insight into how to obtain a record-high 'conversion efficiency' of a tin plasma. This is a key step in generating EUV light in our systems, which can help to further increase their productivity.

In this innovation ecosystem, long-term collaboration is based on trust. We share both risk and reward and work hard at developing long-term relationships with our partners, listening to each other and pushing each other to continuously innovate. This collaborative approach allows us to accelerate innovation. It also provides us with access to a large leading-edge knowledge base across a wide range of technologies.



Sharing knowledge at ASML's Technology Conference

Nowhere is the power of our R&D capability more evident than at our annual ASML Technology Conference. One of the largest of its kind in the world, it brings together internal technology experts and representatives from our global customer base. We held our 20th edition of the conference and our biggest ever in 2019, with around 6,000 participants attending simultaneous sessions in Den Bosch, the Netherlands, and Wilton, San Diego, and Silicon Valley in the US.

Our D&E senior management delivered presentations on the conference's theme, 'Today we create a new tomorrow', explaining ASML's history of 'dreaming big' and how we make these dreams a reality. The conference is also an occasion to recognize employees who have made outstanding contributions to our technology and innovation. An engineer from our EUV Scanner Plasma group received this year's Global Inventor Award, in recognition of his contribution to 170 inventions since 2001. We also presented the 'Best Customer Solution' and the 'Best Innovation' award.

Managing innovation

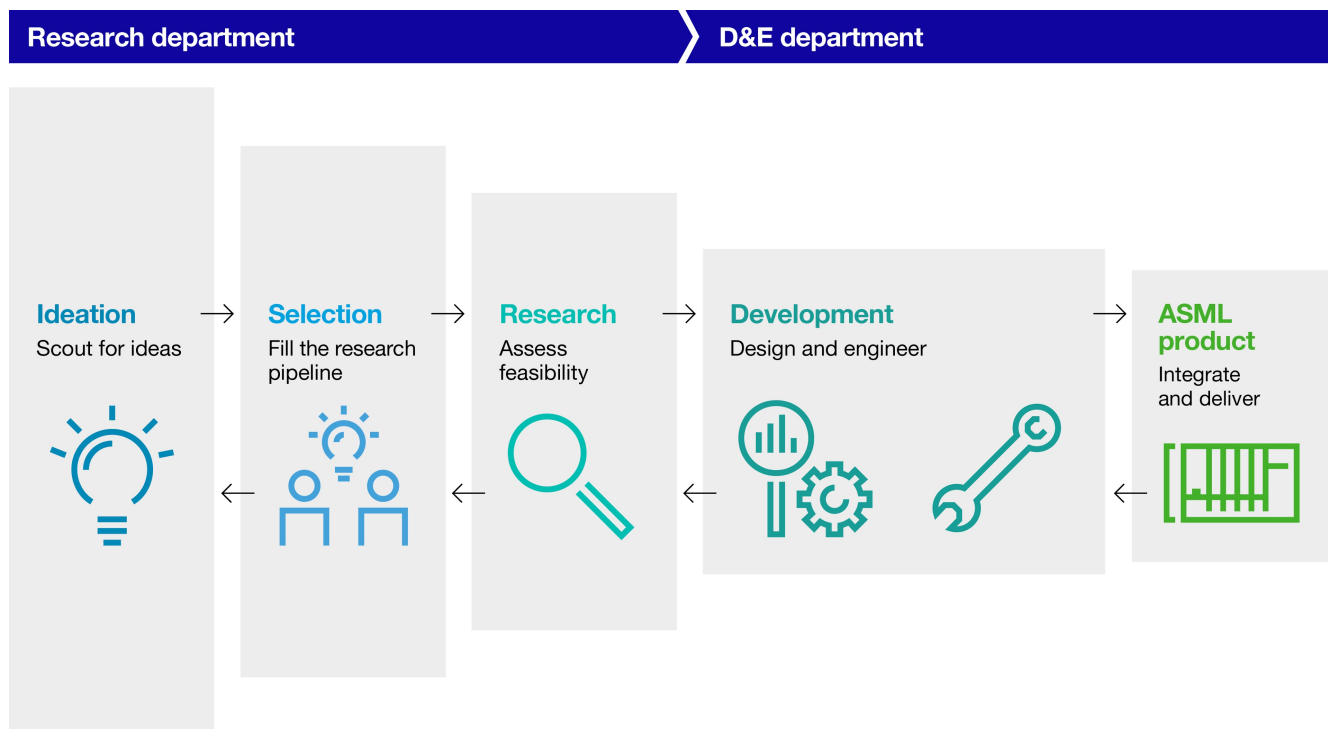
Every day, more than 10,000 of the brightest minds in R&D take on the exciting challenge to innovate the most advanced lithography systems in the world. We manage this process by balancing our customers' needs, product capabilities and technology solutions. To stay ahead, we invest heavily in R&D. In 2019, we spent €2.0 billion on R&D, compared to €1.6 billion in 2018.

Our Research department's main focus is exploring ideas and demonstrating their feasibility with a long-term view. It also helps in finding technology solutions to challenges in our products and application that have moved into development.

Our researchers continuously scout for technological innovations and solutions – within the semiconductor industry and beyond – to assess if they can be applied in ASML's technology roadmap to support our customers to drive the semiconductor device roadmap. We stimulate our experts to build a wide network in the broader technology space.

The constant stream of new ideas is crucial to fill our technology pipeline flows through the so-called ‘innovation funnel’. Here we select new ideas that have the potential to advance our products and customer application. Ideas that successfully pass the ‘proof of concept’ stage in our Research department are transferred to the Development & Engineering (D&E) department. D&E takes them on into our Product Generation Process for product development. We then build and test system prototypes in the necessary environments. Prototypes that pass these tests may eventually lead to new product releases.

Innovation funnel



Our D&E engineers drive our machines forward by creating new components or subsystems, integrating them into the functional system, or developing new applications to help move the industry forward.

In D&E, we work on a multitude of advanced optical and mechatronic modules, along with application software and operating systems. D&E innovates with a strong focus on time-to-market, often starting new system development before the previous generation has even reached the customer. Teams in D&E have extensive contact with leading research institutes, keeping up to date with the latest developments in their respective fields.

Innovation achievements

We continue to make solid progress in EUV. Customers have introduced their first EUV-manufactured devices and they are mentioning EUV in their product announcements.

Our NXE:3400C was among our major innovation achievements of 2019. It contains important productivity improvements, most importantly an increase in throughput to 170 wafers per hour (wph) from a previous >125 wph, enabling our customers' volume production. This is expected to deliver cost-effective shrink for both Logic and DRAM.

We demonstrated >2,000 wafers per day (wpd) under customer DRAM Memory condition based on the NXE:3400C's performance. These achievements gave DRAM customers the required confidence to order EUV for high-volume manufacturing.

**‘The NXE:3400C is expected to deliver cost-effective shrink for both
Logic and DRAM’**

Innovation pipeline

In 2019, we were closely involved in launching a multi-disciplinary project in the Eindhoven Engine, part of the ‘Brainport’ region. High-tech students, scientists and academics from a wide variety of disciplines joined business-oriented partners to share knowledge and draw on the benefits offered by multi-disciplinary collaboration in working toward identifying new and timely technology-based solutions.

Our cooperation with ARCNL led to new insights into how to make generation of extreme ultraviolet light in our EUV systems more efficient. Our installed base will also benefit from this milestone, as part of the technology will be released as a productivity upgrade to maximize performance of the EUV installed base.

On both 300 mm and 200 mm, we continue innovations in DUV to support future nodes and new applications. We have a roadmap to bring our ArF dry system to the high-performance NXT platform.

Investments in R&D partners

We monitor the level of engagement with our innovation ecosystem by measuring our investments in R&D partners. This includes investments in suppliers that innovate and help us develop system parts or modules. We also measure the degree to which we invite external technology experts to share competencies with us by the number of R&D partner agencies we engage with. Our collaboration with and investment in our wide network of R&D partners enables us to share our expertise with the ecosystem. Together we build a strong knowledge network to create technological solutions that society can tap into.

We also cooperate with partners in projects subsidized by the European Union or national governments, another indication of the extent to which we proactively engage with our ecosystem. In 2019, we participated in four EU subsidy projects: TAKE5, TAKEMI5, TAPES3 and Pin3s. Our contribution for 2019 is nearly €40 million. In most of these projects, we work with universities, research and technology institutes and other high-tech companies. An example of this is the project series 'Key Enabling Technology', which aims to enable the industry to move to the next generation of IC technology, so keeping pace with Moore's Law. The projects in the series are built around three pillars: lithography, metrology and process development, each of which plays a crucial role in moving us towards next-generation technology.



EU supports ASML and high-tech partners in Pin3s project

Led by ASML, a group of European companies and research institutes started the Pin3s research pilot project into 3 nm semiconductor technology in December 2018. The European Union contribute up to €30 million of the total cost of €141.6 million for this project. Our partners in the project include Prodrive, Reden, Sioux CCM, Solmates, Thermo Fisher Scientific (Fei), TU Delft, the University of Twente, VDL ETG, imec and the Applied Materials club.

Pin3s is by far the largest of 11 research projects launched under the umbrella of the program 'European cooperation for electronic components and systems for European leadership' (Ecsel). Ecsel is a so-called joint undertaking, a public-private partnership established in 2014 by the European Union. It receives €1.17 billion in subsidies from the EU's Horizon 2020 program. National and regional governments and project participants supplement this subsidy by about €5 billion. This money will be spent on research and innovation in nanoelectronics, cyber technology and system-integration technologies.

Product safety

We want to innovate, but not at the cost of safety. Our people are our greatest asset, and it's our duty to provide a safe work environment at all times. In our products and processes, we think about how to make ASML a safe place to work. We do this in every stage of a product lifecycle: technology, development, production, transport, installation, maintenance, upgrades and decommissioning. And we make sure we cover all our stakeholder groups, including employees, customers, suppliers, neighbors, contractors and visitors.

Managing product safety

Safe products start with good design. As part of this philosophy, we try to eliminate the human factors as much as possible. We emphasize safety by design in hardware followed by safety by procedure. Prevention is key. We seek to ensure all the products and tools we develop comply with the world's stringent product-safety regulations and legislation applicable to the countries where we do business. In some cases, where there are no safety precautions available to address potential hazards, we develop our own safety precautions for the tools and products we develop at ASML.

'The products and tools we develop comply with stringent applicable laws and regulations'

We create safe products through our technical capabilities. We believe what and how we design has consequences, and guards against the human factor becoming a risk factor. An example of this is the way we interlock laser-beam activities to limit our employees' exposure to dangerous laser beams. This prevents workplace activities from turning into potential accidents.

We have clear systems in place to support our approach to product safety. When we start designing our systems, our safety engineers conduct an initial Safety Risk Assessment (SRA). They take nine key risk areas into account that we have identified, and alert risk experts if they believe designs might pose a safety risk. Our product designers are trained to identify any safety issues in the early stages of the design process.

In each subsequent stage of the D&E process, we evaluate product safety. We track any reported product-related incidents – including supply chain incidents – through our incident-reporting system and investigate these to prevent recurrence.

Every year, we provide management with a product-safety review, where we report any product safety incidents. In 2019, as in previous years, we are proud to say there were no recordable incidents caused by our equipment.



Safety compliance

Our D&E safety competence leads are on hand to provide thorough knowledge about the way of working and design rules around specific safety hazards. The products and tools we develop comply with the EU Safety Directive, customer-specific safety guidelines and semiconductor industry guidelines (SEMI S2). These are identified in the System Performance Specification (SPS) on product safety and compliance, which is updated every three years.

We are SEMI S2 compliant for every product type shipped. In 2019, a report confirming SEMI S2 compliance was available for every product type we shipped. We also have a CE declaration of conformity for all ASML products and tools.

With the influx of new people into ASML, we are in the process of addressing the challenge of training people up in the latest product-safety requirements. In 2019, we developed specific baseline CBT (computer-based training) to meet this need, which is in the process of being rolled out.

In 2019, we focused our attention on three main areas in product safety:

- **Dangerous materials and shipment of dangerous materials** (such as strong magnets that could cause interference with navigation, high-pressure items, filter purifiers, etc.). We launched a special project looking into dangerous goods, relating specifically to best practice around the shipping of dangerous goods.
- **Safety requirements for suppliers.** We have a number of ongoing pilot projects, looking at, for example, how suppliers design electrical, pressure and laser systems. Outsourcing sub-parts can present quality challenges, as quality issues could end up in our machines without our knowledge. As the end supplier, we have to be sure we guard against safety breaches.
- **Legislation and compliance worldwide.** A key focus is for us to thoroughly familiarize ourselves with the rules and standards in countries we ship to and how these countries interpret these rules. In many cases, rules are interpreted in different ways. These differences need to be addressed and managed.



RoHS and REACH

We are committed to complying with EU guidelines for handling hazardous materials and chemicals, the so-called RoHS directive and the REACH regulation, even though the products we manufacture are currently excluded from the RoHS directive. We aim to, whenever possible, reduce and eliminate use of hazardous substances and replace non-compliant parts with RoHS-compliant alternatives.

REACH regulation is ever changing, which presents a potential challenge. Each year, there are new additions to the hazardous substances list. We are proactive in reviewing these, approaching our supply chain and investigating whether it's likely that any of these could end up in our products.

Supporting startups and scaleups

An inclusive and sustainable innovation ecosystem can unleash dynamic and competitive technologies that provide new solutions to society's challenges. To nurture innovation by new generations of technological talents, ASML supports young tech companies.

As a caring company, we believe it's our responsibility to give back to the communities where we operate. We make use of our experts' in-depth competencies and knowledge to support startups and scaleups. By fostering entrepreneurship, we aim to help these young enterprises excel and grow. Sharing our expertise is also a way to strengthen our regional high-tech ecosystem. In 2019, we provided around 1,300 hours of support to high-tech startups and scaleups. The total value of our in-kind support is around €0.4 million.

ASML Makers Award

We support new companies at different stages of development. For those seeking to transform a high-tech idea into a business case, we offer help in kind. ASML experts make themselves available for an agreed number of hours to share knowledge and experience with these startups. We provide this support to winners of our ASML Makers Award. These are usually university students or young scholars who successfully pitched an as-yet embryonic high-tech innovation or prototypes. In 2019, we granted three ASML Makers Awards to students from TU Eindhoven for their business case on 'Pressure sensitive keyboards', another for students from TU Enschede for 'Accellent resonant accelerometers' and a third award for students from TU Delft for 'ViBrace'. We also awarded a startup company that developed a prototype for an autonomous rover (robot car), equipped with a hyper-spectral camera to detect disease, stress and quality control in vineyards.

Eindhoven Startup Alliance

For startups that have moved further along in their life cycle, and feasible scaleups ready to grow, we offer support through two initiatives: the Eindhoven Startup Alliance, together with HighTechXL, and the Make Next Platform.

We set up the Eindhoven Startup Alliance in 2016 with six tech-minded peers from the region to boost innovation and entrepreneurship in the Eindhoven Brainport area. The Alliance facilitates collaboration between multinational corporations, SMEs, research institutes and government. It supports promising new companies with the aim of accelerating their development and strengthening the ecosystem for high-tech manufacturing in the region.

Since its inception, the Eindhoven Startup Alliance has built a portfolio of about 70 startups. Of these, about 70% are still in business, while about 17% have achieved the steep growth envisioned by the alliance and as such have been awarded the Alliance's 'Star' status.

'We support new companies to strengthen the region's high-tech ecosystem'

In 2019, the Alliance narrowed its focus to those startups that build business cases on the most complex types of high-tech technology, a category the alliance dubbed 'deep-tech'. Supporting startups that work with these sophisticated technologies creates more value for the alliance partners and the Eindhoven region.

In line with this focus on 'deep-tech', we developed a new approach in 2019. We chose a promising – existing but innovative – technology and selected a team of experts from the region to build a startup company based on this licensed technology.

The Alliance had a total of eight companies using a licensed technology in the pipeline at year-end 2019. Our goal over the next five years is to establish about 45 startup companies through the alliance based on this technology licensing model. Our own target is to help at least 20% of startups reach the 'Star' level.



Promising startups

In 2019, ASML and its partners in the Eindhoven Startup Alliance set up three promising startup companies. One developed an innovative cooling device for high-performance computers, a product that has sparked interest from companies such as Intel and IBM. Another startup uses particle-accelerating technology to make a new generation of scanning devices for parcels sent by post, which can be used to detect illegal substances and security checks. This company was selected as one of eight finalists out of a total of 80 companies that responded to a challenge by US Homeland Security to come up with innovative solutions to address the opioid crisis.

We encourage ASML staff to join Alliance projects and help startups by sharing their expertise, which also benefits our innovation and business processes. Not only do our experts gain knowledge about new technologies, they also get the opportunity to experience the different stages of a young company's evolution – from developing a product proposition to going to market and needing to find customers. We believe this makes our top experts better leaders and all-rounders.

In 2019, we also introduced a new tool to assess the value of technology startups. Based on objective criteria, the tool measures the progress startups make over time, and how this affects their value. Developed by ASML and its alliance partners, the tool is particularly relevant for venture capital and other investors targeting startups. We expect it to help attract investment for startups.

Make Next Platform

We set up the Make Next Platform to help young technology companies that have moved beyond the startup phase and are ready to expand. These companies, so-called scale-ups, face challenges such as finding the funding needed to grow, knowing how to target new customer groups and recruiting new employees with the right skills. Together with engineering company Huisman, airport logistics specialist Vanderlande and aerospace, defense, public transport and security-systems specialist Thales NL, ASML uses the platform to share technology, knowledge and business experience.

We also exchange best practices, coach young manufacturers and support them in their development to become global players by giving them access to our networks. The Dutch non-profit Stichting Technology Rating provides due diligence services that help the Make Next Platform select companies it wants to support.

One of the scaleups we continued to support in 2019 was Lightyear, a company developing and manufacturing a solar-powered car. Lightyear is an offshoot of Solar Team Eindhoven, a group of technology students that won several solar-powered car races. Like any scaleup that experiences steep growth, Lightyear can use the support and guidance of larger and more experienced corporations like ASML.

We also continue to support Smart Photonics, an Eindhoven-based producer of photonic integrated circuits chips. These chips are used in a wide range of applications, from low-power consumption datacenters to devices for medical diagnostics. Our goal is to support two to three additional scaleups a year, and to have supported 14 new scaleups by 2025.


Technology and innovation ecosystem KPIs

The table below shows the key performance indicators (KPIs) and the related 2025 targets. Our new sustainability strategy was adopted in 2019 - as a result no comparative results for 2017 and 2018 are shown for new indicators not previously disclosed. See Non-financial statements - Non-financial indicators for our performance indicators (PIs) and related results.

KPI	2017	2018	2019	Target 2025
R&D expenses (in billion €)	1.3	1.6	2.0	n/a
Investment in R&D partners (in billion €)	—	—	0.5	n/a
Number of R&D partner agencies	—	—	144	n/a
Startups reached Star level from total startups supported (in %)	—	—	17%	> 20%
Number of scale up companies supported (in #)	—	—	5	14

Contributing to the Sustainable Development Goals

Our ambitions, commitments and programs as described in this chapter contribute to the following SDGs. For more information on the performance, see section Non-financial statements - Non-financial indicators.

SDG target	How we measure our performance
 <p>SDG target 9.1 - Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all</p>	<ul style="list-style-type: none"> Supporting startups to Star level Supporting scaleup projects Collaboration in EU projects
<p>SDG target 9.4 - By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities</p>	<ul style="list-style-type: none"> Collaboration with research partners Energy efficiency of our products measured per wafer pass
<p>SDG target 9.5 - Enhance scientific research, upgrade technological capabilities of industrial sectors in all countries, in particular developing countries. For developing countries, this includes, by 2030, encouraging innovation and increasing the number of research and development workers per one million people, as well as public and private research and development spending</p>	<ul style="list-style-type: none"> Investments in R&D Collaboration with R&D partner agencies

Customer intimacy

As one of the world's leading manufacturers of chipmaking equipment, we enable our customers to create the patterns that define the electronic circuits on a chip. Our customers are the world's leading microchip manufacturers, and our success is inextricably linked with theirs.

We collaborate with our customers to understand how our technology best fits their needs and challenges. For this reason, we engage with our customers at all levels: building partnerships, sharing knowledge and risks, and aligning our investments in innovation. We develop our solutions based on their input, engage in helping them achieve their technology and cost roadmaps, and work together, often literally in the same team, to make sure our solutions match.

Achieving customer intimacy

To us, customer intimacy is about the entire customer relationship across all channels, from the early stages of innovation onwards. We aim to foster loyalty, advocacy and continuous engagement with the goal of achieving complete customer satisfaction.

**'Dedicated customer interactions help us align our future product plans
with our customers' goals'**

As ASML matures and grows, our innovations lead to more sophisticated solutions, and how we interact with our customers evolves. As customer requirements become more complex, our time to bring solutions to market increases. It takes longer to align, so we need to start earlier. Transparency is key in this process, and our customer-intimacy strategy supports this.

It's crucial to be in a true partnership with our customers, to share in the risks and rewards of what we do. Trust and a shared vision are at the heart of this.

Staying close to our customer

To support and sustain our partnerships with customers, we have a structure of customer interactions across various channels in the organization, including, for example, customer-alignment meetings. Here, members of our Board of Management, senior managers and customer representatives come together to ensure our product development plans are in line with their business goals and needs.



Customer-alignment meetings

We run these regularly with our key customers. These meetings, among others, include our Executive Review Meetings, at which members of our senior management team and Board of Management discuss business and strategies with customers; Technology Review Meetings, at which our senior technology experts and CTO discuss technology plans and requirements with customers, and Operational Review Meetings, where we review topics related to our customers' operational activities.

We have a dedicated Sales and Customer Management department, which is responsible for building and maintaining our customer relationships and ensuring all relevant ASML departments contribute to meeting their needs. We market and sell our products directly to our customers, without agencies or other intermediaries. Our account managers, field and application engineers, and service and technical-support specialists are located throughout Asia, the US and Europe.



Customer support

With more than 5,900 customer-support employees, including service engineers and applications specialists, we make sure our systems in our customers' fabs are running smoothly. We offer 24/7 support and provide training for customer engineers. We work together with our customers to find solutions to continuously improve our installed base performance in a rapidly changing environment.

Measuring our approach

Our Voice of the Customer program helps ensure our employees hear firsthand about our customers' needs and challenges. This is especially important for employees without direct access to customers. To reach as many of our people as possible, the program makes use of different channels of communication: live presentations and Q&As with senior customer representatives, recorded customer interviews, online articles, and personal engagement with customer representatives who are based near our offices in Veldhoven.

We run a biennial Customer Feedback Survey, which asks our customers to rate our performance. It presents them with questions on the most important areas of improvement for our account teams and business lines. Along with Voice of the Customer, the survey helps us define the improvement areas we need to focus on. Our account teams use company gatherings, such as our ASML all-employee meeting, as opportunities to share customer feedback.

We identified improvement areas in 2019, drawing on the findings of the 2018 survey. Common themes include proactive and increased communication, timely responses and effective problem solving. We shared these findings with all sectors and business lines. They will use these to develop their own priorities and create an improvement plan. Our next survey is in 2020.

In addition, we set ourselves a target of achieving a top-three ranking among large suppliers of semiconductor equipment. Based on an annual survey, conducted by research specialists VLSI, we ranked 3rd (2018: 3rd) on the list of large suppliers of chipmaking equipment with a score of 9.2 out of 10.0 (2018: 9.1).

‘We build partnerships and align our investments in innovation in the best way possible’

In line with our business strategy, our focus in 2019 was to bring EUV to high-volume manufacturing at customer sites. We also focused on our customer relationships as they related to our evolving product roadmaps and new customers in different geographic locations.

We applied our customer intimacy strategy in the same way but with more of a focus on tailoring it to different customers where required. In this way, we will continue to build partnerships and align our investments in innovation in the best way possible.

Our strategy is clearly resonating with our customers. They are showing their trust in us by investing in our newest technology, supporting the industry driver of shrink beyond the current decade.

Customer intimacy KPIs

KPI	2017	2018	2019
Overall Loyalty Score (Customer Feedback Survey) ¹	—	73.3%	—
VLSI Survey results ²			
Large suppliers of chip-making equipment - score	9.0	9.1	9.2
Suppliers of Fab equipment - score	9.0	9.1	9.2
Technical leadership for lithography equipment - score	9.4	9.6	9.6

1. The Customer Loyalty Survey is held every two years.

2. Measured on a scale from 0 to 10, with 10 being the top score.

Our people

Our future is built by an engaged workforce. We work hard to attract the world's top talent and to ensure our employees are proud to work for us and engaged with our ambitions as a company.

24,900

Total employees
(in FTE)

13,732

Europe

5,436

US

5,732

Asia

1,650

Jobs created

1,030

Europe

280

US

340

Asia

118

Nationalities
working at ASML

Employee engagement

Engagement is what connects us and drives us to better results and better collaboration.



77%

Employee engagement
score above peer
benchmark of 73%



0.28

Recordable
incident rate



4.3%

Attrition rate

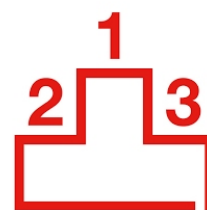


45

Hours of training
average per FTE

Employer brand

Strong brand awareness feeds our future talent pipeline and attracts top talent from around the globe.



10

Netherlands

19

South Korea

152

China

2019 Employer brand
ranking (Universum:
Engineering students)

As of 2020 Taiwan and the US will be included in the official Universum rankings.

The ranking result for China is from the latest Universum ranking (2018) and is applicable to 2019

People

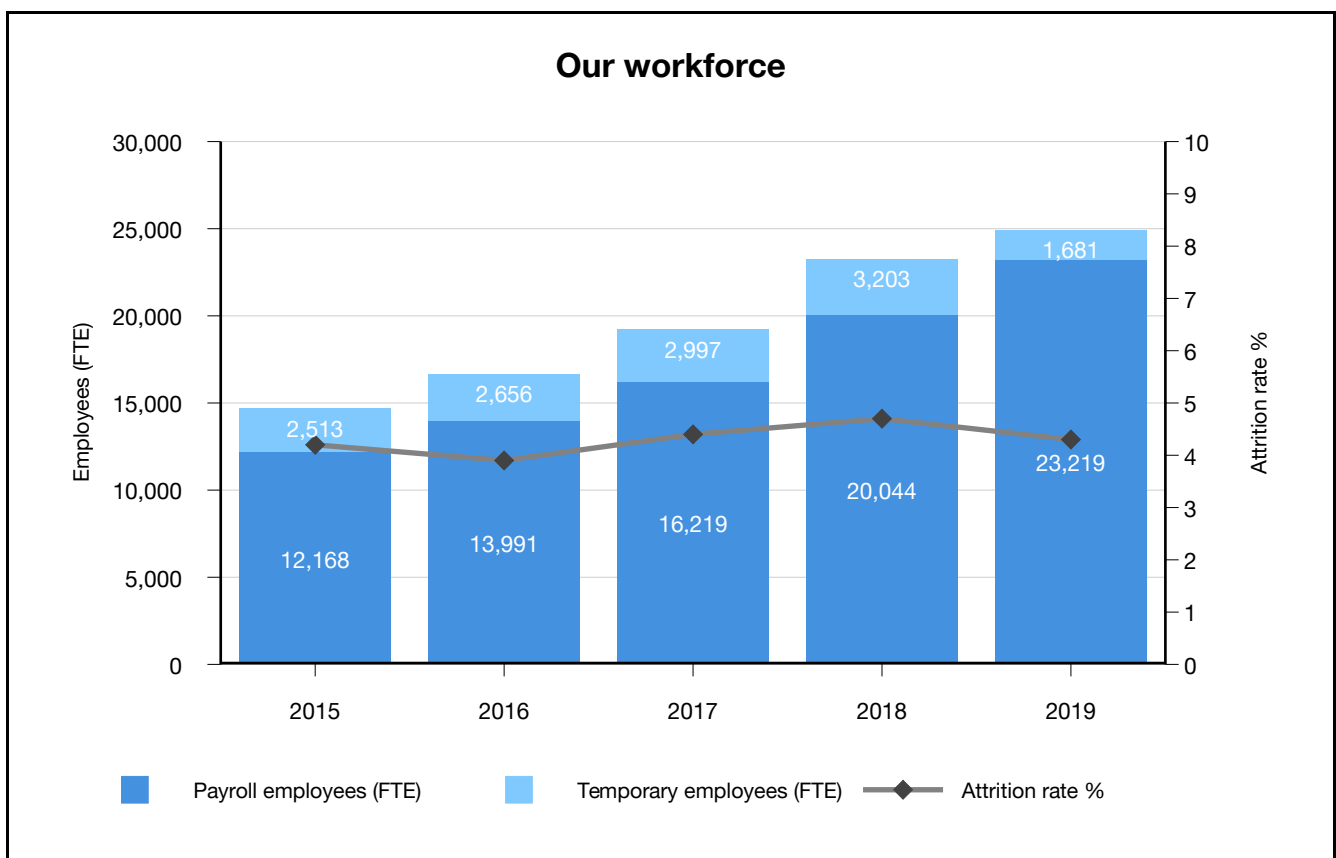
Every day our employees come together to unlock the potential of each nanometer to break new ground. Without our diverse and highly educated workforce, we would not be able to push the limits of technology. Therefore, we want to offer our people the best possible employee experience in all locations where we operate, enabling them to develop their talent, feel respected and operate to the best of their abilities. Providing the best possible employee experience enables us to attract and retain the best talent.

Employee engagement

Employee engagement is critical to the performance of our organization and our long-term success as a company. Boosting engagement depends on a wide variety of factors and activities. In 2019, we put special focus on our company culture, offering career-development opportunities, investing in a strong talent pool, seeking to continuously improve new employees' onboarding experience, and soliciting employee feedback through our company-wide employee engagement survey. The insights our survey provides enables us to improve employee experience and work on our policies and processes.

Strengthening our company culture

ASML's workforce has grown steeply in recent years. In 2019, we hired 2,219 new employees, bringing our total workforce to 24,900 FTE at year end. This is a sharp increase as compared to the 14,681 FTEs we employed in 2015. About 40% of our workforce in 2019 had been at ASML for less than two years. This strong growth in total workforce, the large number of new employees and the evolution of the company drove us to review what we stand for as a company and determine how we can help our people to internalize our values and familiarize themselves with our strategy and purpose. We put ample effort into shaping and strengthening a common company culture, where shared means and our values prevail. This will be further deployed in 2020.



Building a strong talent pool

In an innovative, high-tech, fast-changing industry, it's vital to strengthen and continuously invest in our talent pool to anticipate evolving business requirements and developments in the labor market. We empower our employees to develop their talent, pursue their career ambitions and to thrive. We strongly believe that personal development works best when our employees can invest in themselves. At ASML, we give employees the time, opportunity and support, while they put in the effort, passion and drive needed to enhance their development. We offer tailor-made training and development programs to help grow the highly skilled professionals we employ at ASML.

To maintain our technological leadership and pace of innovation, we need to ensure that the right knowledge is available to our people at the right time. To do this, we have our own technical development centers in-house for our D&E, customer support and manufacturing employees to tailor the training to the specific technical needs of these departments. Most of our trainings take place on the job, given the nature of our innovative business and co-value creation. Overall we are promoting the 70-20-10 approach for learning interventions, meaning that 70% is on the job learning, 20% through coaching, while 10% is learning through training courses. The average number of training hours in this last category, including development programs, was 45 hours per employee in 2019. The total cost of this was €19 million.



Career-development opportunities

Developing our people is crucial to the sustained success of our business. Employee development is never a straight line because employees are at different stages in their employee journey and have different needs. We offer various career paths and have various tools in place to support our employees' career navigation.

We continuously look into ways to improve how we can help employees identify opportunities for professional development within ASML. To this end, we have started a project to refresh our employee career-track tool. We want to guide them in deciding how to fill any potential gaps in their competencies and what action we need to take for their long-term career development. Together, managers and employees define individual Development Action Plans (DAPs).

We also deployed a new behavioral and soft skills-training curriculum, replacing the previous one. It now offers a better mix of computer based training (CBT), video and classroom teaching.

Strengthening leadership skills

In 2019, we continued our efforts to optimize our Management Development Curriculum. We are aiming for a uniform, company-wide approach to ensure management training is more effective and efficient. Our Management Development Curriculum aims to support the development of leaders at all levels. This includes basic management, managing managers and authentic leadership skills.

In addition, we have leadership programs where we fast-track the careers of our most promising managers through our Potential Acceleration Program. To ensure our managers are aware of what's expected from them and help them develop the skills and competencies they need, we offer programs to help them become better leaders.

Fun and efficient onboarding

As our global workforce grows exponentially, onboarding is one of our key priorities. This means that a comprehensive and robust onboarding experience – one that brings new people up to speed quickly and efficiently – is critically important. We welcomed 2,219 new colleagues (in FTE) in 2019.

We put significant effort into continually improving the onboarding of new employees. In 2019, we completed the rollout of a new onboarding program across ASML. As a result of this program we saw a decrease in the attrition rate for new hires, i.e. people who joined us less than two years ago. Developed over the past two years, it includes improvements in how we ensure new employees are effective in their jobs as quickly as possible after joining ASML. The program provides detailed information for all new employees about our company's purpose, values and ways of working in different parts of the business. We also have a new onboarding guidelines and toolkit for managers. We offer most onboarding information in an easily accessible form on our intranet. We began developing virtual games and business-simulation tools to make onboarding more fun and efficient.

Measuring engagement

In 2019, we redesigned our employee survey that measures engagement. We renamed it we@ASML (previously me@ASML) to emphasize the importance of collaborating to achieve our business goals. Conducted each year, the new survey has fewer questions and is better benchmarked. This means we can compare our engagement scores with other companies more effectively. We will also conduct short surveys to allow employees to express their views on topics that may arise from the main survey, including sector-specific needs.

Our 2019 survey showed that our employee engagement is high, with an engagement score of 77%, compared to the external benchmark of 73%. This means we met our goal of scoring at least on par with our peers. The survey also showed that our employees feel we are doing well in terms of innovation, and are providing opportunities to learn and develop. Confidence in senior leadership making the right decisions is high. The survey registered a strong level of trust within teams. Our employees also indicated they're comfortable voicing their ideas. On the other hand, respondents see room for improvement in how teams collaborate with each other. They say they would appreciate further clarity on the future direction of our company, as well as expectations around their roles. We encourage business lines and functions to organize team sessions to discuss the results and plan follow-up actions to enhance employee engagement. Our ambition is having a highly engaged workforce. We set ourselves the target of achieving an employee engagement score at least on par with our peers.

Strong employer brand

Our strong growth means we need to hire large numbers of employees. Highly skilled people with a technical background are scarce in the labor market and competition is growing. We see that top-tier talent selects their employer of choice, not the other way around. This is a general development that employees choose their future employer and it is important for them that the employer has a proper value proposition. To ensure that we are able to attract top talent, we developed a new employee value proposition in 2019. It defines who we are, what we stand for and how we create a unique employee experience. It forms the basis of our recruitment strategy and labor market communication program.

We view our recruitment as an ongoing process and continuously seek to improve and professionalize how we go about it. To ensure we can sustain our long-term recruitment strategy, we asked our business units in 2019 what knowledge and competencies they expect to need most at ASML in coming years. Among the strategic competencies put forward were experts in data science and application engineering. We use this information to fine-tune our target audiences and recruitment efforts.

We tweak our labor market communications based on the professional skills and competencies we need at a particular point in time. Our corporate website, asml.com, which was revamped in 2019, also contributes to a better understanding of what we do and what we stand for as an employer. We measure how ASML is perceived by external audiences – and potential employees in particular – by monitoring our position in an independent external employer-branding ranking. We have defined targets for the different local labor market on our positioning by 2025. See Our people KPIs.

These and other efforts helped us meet our recruitment target in 2019. We welcomed 2,219 new employees. Our attrition rate – the percentage of employees leaving our company – was significantly below that of our industry, meaning we again met our target. After a few years of modest increase – though always remaining well below that of our industry – our attrition rate significantly decreased in 2019, standing at 4.3% versus 4.7% in 2018. This shows that our efforts to create a unique employee experience, our employee engagement programs and our onboarding of new employees are paying off. While attrition can open up a knowledge gap in the company, we also view it as an opportunity to bring in new talent and enhance existing talent. We strive for a healthy attrition rate, aiming for between 3.0% and 8.0%. For high performers, our target is to have a rate 50% lower than the overall attrition rate target. The attrition rate of our high performers was 2.4% in 2019.



Brand awareness

Our main goal in increasing brand awareness is for us to become better known and for our audience to remember at least three defining qualities about us: that we are a creative and ambitious high-tech company in the semiconductor industry, that we seek to connect our engineering to our ambition to have a positive impact on the world, and that we are an attractive employer. Strong brand awareness allows us to feed the future talent pipeline and attract top talent from around the globe.

In 2019, we ran a project to measure and better manage how we are perceived as an employer. First, we studied how ASML is perceived among potential employees, such as engineers, software and IT specialists, and students, in the countries where we recruit. Using employer brand-awareness surveys and employer rankings from different countries, including the Netherlands, the US and Korea, we were able to measure ASML's employer brand awareness at national levels. We used this data to develop tailored messages about our employee value proposition for each of our recruitment markets. We can also use this messaging for tailored labor market communications efforts for each country.

Promoting diversity and inclusion

We believe a diverse and inclusive workforce provides the necessary mix of voices and points of view required to develop the best solutions and ideas for our business and for how we innovate. We know that a great idea can come from anyone, so we foster a melting pot of different backgrounds, talents and passions. We're proud of our diversity – it makes us stronger.

Over the years, we've seen progress in this area. We became more diverse in terms of culture and nationality in 2019, employing people from 118 different nationalities. Gender diversity has also shown an upward trend in recent years, with female employees reaching 16% in 2019. This figure remains unchanged from 2018 but indicates a steady increase from 12% five years ago. Operating in the technology industry, gender diversity is a general concern. In general, there is a lower ratio of women compared to men in technology and science-related studies. We continuously seek to recruit and retain women in our workforce. To increase our future female talent pool, we support initiatives to get young women interested in technology. We run an intensive technology-promotion program to foster interest among young people, and increase the local and regional talent pool. We also raise awareness of career prospects in a sector offering many development opportunities. Still, we need to improve our gender diversity, and we see an effective gender policy as a challenge.

We promote the integration of LGBTI people in the workplace, through, for example, our 'Pink ASML' network. We also promote the inclusion of people with disabilities. Although we have applied effort in this area, we have not reached the level of integration we'd like to see. This remains one of our challenges.

Fair remuneration

We want our remuneration to be fair and balanced. In our remuneration policy, we strive for global consistency, while respecting what is common practice in local markets. We believe our employees are key to our company's success and deserve to share in its success. We continuously review how our remuneration compares to the market benchmark for technology professionals in each region where we operate. Where necessary, we make changes to our remuneration policies and levels. Each year, we analyze paid salaries for gender disparity. In 2019, as in previous years, we found no major differences in these salaries. See Non-financial statements - Non-financial indicators for details on gender payment.



Living wage

At ASML, we are confident that we meet adequate living-wage requirements, meaning that employees earn salaries that meet their and their families' basic needs but also provides some discretionary income. Our company has a predominantly highly educated workforce with relatively high levels of remuneration. In 2019, we conducted an analysis of how our lowest base salary compared to the local minimum wage and local 'living wage' in the countries and regions where we operate. We did not detect any gaps. On average, our salaries are significantly above local living wage.

Labor relations

We want to provide fair labor conditions and social protection for all our employees, regardless of their location and whether they are on a fixed or temporary contract.

We support the principles of the International Labor Organization (ILO) and we respect the rights of all employees to form and join trade unions of their own choosing, to bargain collectively and to engage in peaceful assembly.

We strive to comply with the relevant legislations in every country we operate in. In those countries where we have employee representation, we engage in regular dialogue with the different organizations representing our employees. In these conversations, topics are put forward by both the company and the employee representatives and are discussed.

In 2019, we saw an increased number of employee representative bodies established, particularly in Asian countries, further strengthening employee representation and facilitating dialogue.

Find more information in the ASML Code of Conduct, on asml.com, within 'Business principle - We respect people and planet'.

Ensuring employee safety

At ASML, safety is not just a priority – it's a core value. We have a moral obligation to do everything in our power to provide safe and healthy working conditions for all our employees, contractors and visitors. This means ensuring all our operations are safe and secure. Our objective is to provide safe, injury-free and healthy working conditions for everyone on our premises and to all ASML employees wherever they work. We count on each other – every one of us working at, and for, ASML – to live these values.

Our employee and product safety commitment is captured in our Sustainability Policy, which applies to ASML worldwide. In addition, our 'ASML Environment, Health and Safety Guide' aims to provide practical, useful and essential Environment, Health and Safety (EHS) information for our employees. The guide explains our aims and objectives and clearly describes the rules and policies we follow. It's designed to create awareness and ownership.

We provide employees with EHS training to raise their awareness, stimulate responsible behavior and familiarize them with EHS standards. For more information on product safety, see [What we achieved in 2019 - Technology and innovation ecosystem - Product safety](#).



Today we design a safe tomorrow

We aim for 'triple-safe' status, built on these pillars:

- | | |
|---------------------|---|
| Safe People | We encourage our colleagues to behave safely and Speak Up |
| Safe Product | We design safe products and tools by using common standards and our common sense |
| Safe Process | We share our knowledge and experience proactively to ensure a safe way of working |

Our approach to employee safety

We take responsibility for protecting our employees, by making ASML a safe place to work. EHS is crucial to creating a safe and trusted working environment. We believe that all work-related injuries and occupational illnesses are preventable. As such, we are working towards a long-term ambition for zero injuries and work-related illnesses. We use the highest possible professional standards and continuous improvement is a key principle of our management system.

Our EHS management system is structured based on the ISO 45001 and complies with the requirements set out therein. At the end of 2019, we completed our internal compliance audits, and we aim to start the ISO 45001 certification program in 2020.

Incident management is a key element of our EHS management system. This process ensures we not only record incidents and injuries but also cases where we have unsafe situations or near-misses. These allow us to address high-risk situations before they can turn into actual incidents and cause injuries to our employees. We investigate all incidents and near-misses to determine the root cause, and take corrective action to prevent them from recurring or occurring in the future.

It's impossible to completely eradicate risk, but we can continuously work towards reducing it. We believe we need to do everything within our reach to minimize risk and it is our responsibility to provide our people with the right protection, procedures and processes to keep them safe.

Managing a safe workplace

To ensure that we implement our EHS guidelines effectively, we have a safety program in place. ASML's Board has appointed the Chief Operating Officer (COO) as the lead for the EHS management system. We've also established a Corporate EHS Committee to oversee and approve ASML EHS strategy. Our line managers are responsible for day-to-day EHS management. Our EHS Competence Center gathers the best practices and defines the EHS standards for ASML, helping our managers to implement these standards at the workplace.

'We encourage our employees to speak up whenever they encounter safety risks'

To improve our EHS performance, we encourage our employees to speak up whenever they encounter safety risks. Every employee is empowered to stop the work if they feel unsafe. Together with their manager and EHS expert, a safe way of working will be defined and the work can be resumed.

We conduct regular hazard and risk evaluations, which provide further insights into our main hazard and risk areas. We can then take appropriate action to mitigate these risks.

How we did in 2019

In 2019, we launched new e-training, updated our safe travel policy, worked on a uniform-safety communication plan and launched a company-wide safety-culture assessment. This will serve as input for a safety behavior and leadership program for coming years with the aim of having a proactive safety culture within ASML.

Training is an important way to prepare and inform our people. In 2019, we updated our EHS Fundamentals training, modernizing and tailoring it towards the needs of our people. Conducting this training is mandatory for all employees working at ASML, no matter what type of work they do. In 2020, we will build on this, creating more sector and role-specific safety training, which we will roll out to dedicated user groups.

Despite our best efforts, our recordable incident rate increased to 0.28 in 2019 (0.24 in 2018). This is slightly above our target of 0.27 for 2019. Although there was an increase in this rate, the severity of the incidents was low, relating to muscle injuries, bruises and cuts. In 2020, we will continue our efforts to reinforce our safety culture program. As in previous years, we did not record any work-related fatalities or serious injuries in 2019. We register EHS-related incidents in line with the US Occupational Health and Safety Act.



'EHS Fundamentals' e-learning launches

To support employees in understanding ASML's basic safety rules and desired behaviors, we developed our new 'EHS Fundamentals' training. In 2019, during a phased roll-out, all employees received an automated invite from our myLearning system to complete this short but vital training. In the training, employees follow four colleagues throughout their day at ASML and all the safety-related situations they encounter. They earn points as they help colleagues make the right choices with regard to safe behavior. This serves to help employees become better acquainted with the basic rules, signs and general safety features at ASML.

Community involvement

As a global technology leader and employer, ASML is committed to having a positive impact on the communities where we operate, to create additional social value by giving back to society. By fostering close community ties, we learn more about the world around us and raise awareness about our business, industry and interests. Our involvement is also a way for us to fulfill our leadership role, since communities can benefit from our success.

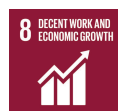
Our community relations program, which falls under our CEO's area of responsibility, is built on three pillars:

1. Build attractive communities
2. STEM education in local communities
3. Charity and global projects

The total amount of cash commitments and in-kind support that ASML spent on charities, community involvement, organizations, and our own ASML Foundation in 2019 was around €5 million.

Build attractive communities

ASML has a presence in many countries around the world, and some of our locations have expanded significantly in recent years. This is good news for our communities as it means more job opportunities as well as growth opportunities for local businesses. Our expansion can, however, also have a negative impact. A bigger workforce can, for example, lead to traffic congestion and increased pressure on the local housing market. We aim to be active members of our communities and to manage our growth well. This means contributing to make communities more attractive for everyone – local as well as our employees and their families.



The social value we create

ASML is growing fast and we're continuously looking for talented people. The current job market is competitive, and we know that people often make career choices based on more than just the job itself. It's important for us to create an attractive environment for current and future employees and their families that helps them become part of their local community and connect to new friends.

Key programs

- Event sponsoring and government engagement: Through our sponsoring program, we support organizations and events such as sports teams and cultural activities.
- Working with regional partners: We're working with our partners in Brainport Eindhoven to make the region more attractive to live and work.
- ASML is driving an initiative to promote sustainable transport and ensure the region is accessible for all.

Results

Netherlands: We supported Cityfest, a new cultural festival in Veldhoven. CityFest's 'Keep it vibrant' program covers a broad scope of ages and interests, and includes local bands, dance, pop, classical music, live acts, street musicians and a kids' square.

Netherlands: Every year, ASML organizes a music festival, 'ASML on stage', for employees and their friends. The festival covers all kind of music styles, from hard rock to classical music, from folk to dance. The festival, attended by around 2,000 people, was held in the Muziekgebouw in Eindhoven.

US: in San Diego, employees and family/friends took part in a bike tour to raise money for Multiple Sclerosis research and funding.

Netherlands: Through the Brainport National Action Agenda, we support initiatives related to sports, culture and education.

Netherlands: We aim to significantly reduce the number of cars on our campus at Veldhoven. We encourage our employees to use public transportation, and we also actively promote the use of e-bikes for a healthy commute.

STEM education in local communities

Technology is in our DNA, so it's only natural that a key part of our community focus is on STEM education, particularly technology education and upskilling. As the rate of technological advancement accelerates, society is facing a critical skills shortage. We believe we have a responsibility to prepare people for an increasingly digital future. This future poses many challenges, but also opportunities, especially for those with digital expertise.



The social value we create

To help usher in this new digital age, we look for ways to get more closely involved in education. For many years, ASML technology ambassadors have given guest lectures at primary and secondary schools and technology events around the world, passing on their passion for technology and science to the next generation. We've also invited school-age children into our workspaces to give them a glimpse of what we do and what we aim to achieve.

Key programs

- Promote STEM initiatives worldwide
- We run an intensive technology promotion program to boost interest in technology among young people and increase the local and regional talent pool. We also raise awareness of career prospects in a sector offering many development opportunities.

Results

Netherlands: To address the shortage of STEM teachers, we created the hybrid teaching program. We're not only growing our number of technology ambassadors but also enabling 100 engineers in the Netherlands to become part-time or 'hybrid' teachers, paid by ASML. We expect to start this program in 2020, and, looking ahead, plan to expand it to the US and Asia.

US: ASML San Diego supported the EXPO Day where employees helped promote STEM education at Petco Park during the San Diego Festival of Science & Engineering by showing kids how to program robots.

Asia: In Shanghai, ASML supported the 2nd ASML Youth Maker and Hacker Science & Technology Innovation. Some 80 school children from 15 elementary and secondary schools took part in the contest. The contest was designed to promote science education and inspire more students to choose STEM in their future education and careers.

Netherlands: In Eindhoven, ASML participated in the Night of the Nerds event during Dutch Technology week. The Night of the Nerds is a festival where young people, aged between 14 and 19, can learn more about technology and participate in various workshops. The event attracted about 5,000 people.

Asia: ASML is proud to sponsor the Taiwan Railways Fair of Popular Science. This national project, held by the Ministry of Science and Technology, aims to inspire and engage more than 9,000 primary school students from 23 cities in Taiwan. We cooperated with 80 SPIE/OSA Student Chapters from six universities in Taiwan to host a unique Optical Sciences train cabin.

Charity and global projects

At ASML, we know that being part of a community means not only caring for our own employees but also looking out for those beyond our organization. We believe that when an entire community flourishes, we all benefit. This is why we work with organizations to provide support directly where we can make a difference. Our contributions are both financial and in-kind.



The social value we create

By working outside of ASML and by meeting people that are not part of our everyday lives, we learn a lot and make new friends. Our world becomes bigger and we realize we can make an impact that goes beyond the realm of technology.

Key programs

- Employee Volunteering program: We encourage our employees to work one day per year as volunteers to lend a helping hand.
- Sponsorship and charity program: We want to offer opportunities for all people in our communities.
- Partnership for education programs through ASML Foundation.

Results

We contributed more than 7,500 hours of volunteering work in 2019. Among our volunteering activities, we paint shelters, repair playgrounds, work in nature, clean beaches or take elderly people out for a day of fun. Groups of employees also get together to organize food drives or make sure that children from financially disadvantaged homes receive Christmas presents.

For example, ASML is one of the sponsors of the PSV Eindhoven football club. We donate tickets from our sponsorship allocation to families who are not able to afford to attend matches.

We also have a new partnership with the Van Gogh Museum, where we will use our research capabilities to help preserve Van Gogh's artwork. At Vincent in Nuenen, we initiated the creation of Vincent's Lightlab where visitors can learn about light, technology and art.

In 2019, the ASML Foundation supported 17 projects in seven countries and committed about €0.9 million. The Foundation is our charity of choice.



The ASML Foundation focuses especially on the UN's fourth Sustainable Development Goal: to ensure inclusive and quality education for all and promote lifelong learning. The ASML Foundation aims to increase the self-sufficiency of disadvantaged children through educational initiatives that develop their talent and help unlock their potential. Although closely linked to our company, the ASML Foundation operates independently.

The ASML Foundation mainly supports projects in the regions where ASML operates: Asia, Europe and the US. These projects address the specific needs in that region. In the US for example, projects mainly focus on preventing school dropouts in underprivileged areas, and on the promotion of STEM, especially for girls. Projects in Asia differ per country. In developing areas in Asia, for example, projects focus on education for girls to prevent child marriages and on vocational training for young people to increase their self-sufficiency. In China, the focus is on STEM for girls in rural areas. In Europe, and in the Netherlands specifically, the foundation focuses on education for disadvantaged children, and children lacking in education, providing help that suits the children's specific needs.

We encourage our employees to support the ASML Foundation, either financially or through volunteer work.

Examples of projects supported in 2019:

Since 2018, the ASML Foundation has partnered with PLAN International to promote girls in technology. Titled 'STEM - Girls Can Do It', the project focuses on young people in rural China, near ASML's offices in Chengdu and Xi'an. It aims to promote more gender-balanced STEM education. The project will expose about 1,200 young people, of which 70% are girls, to science, technology, engineering and mathematics, and teach them coding and programming. Employees from the local ASML offices are actively involved in the partnership, by hosting events at ASML's offices and by introducing female engineers as role models.



We continued our relationship with the YT Lee Foundation in Taiwan, an organization aimed at getting children from underprivileged families interested in technology. The program, which runs from 2019 to 2022, also focuses on training teachers to provide the type of education that will excite youngsters about technology. The aim is to reach 20 teachers and 1,500 students in three years.

In Connecticut in the US, we support a program focused on developing a diverse talent pool by creating better access to opportunities for prospective software technology students. This is mostly directed at women and youngsters from marginalized backgrounds.

We are also collaborating with Closing the Loop, which provides closed-loop solutions for mobile phones. We collect used mobile phones at ASML's premises in Veldhoven, and Closing the Loop uses these to finance the recycling of used mobile phones in developing countries.

For more information, visit www.asmlfoundation.org.

Our people KPIs



The table below shows the key performance indicators (KPIs) and the related 2025 targets. Our new sustainability strategy was adopted in 2019 - as a result no comparative results for 2017 and 2018 are shown for new indicators not previously disclosed. See Non-financial statements - Non-financial indicators for our performance indicators (PIs) and related results.

KPI	2017	2018	2019	Target 2025
Engagement score We@ASML survey ¹	—	—	77%	Be on par with peers
Employer brand ranking (from Universum: Engineering students) ²				
Netherlands	—	—	10	Top 10
US	—	—	—	In ranking in 2020
China	—	—	—	Top 100
Taiwan	—	—	—	To be determined in 2020
South Korea	—	—	19	Top 20

1. In 2019, we redesigned our employee survey that measures employee engagement (previously me@ASML). A different measurement method and fewer questions are used to determine the We@ASML engagement score. Therefore, the We@ASML engagement score of 2019 cannot be compared to the Me@ASML score of 2017.
 2. As of 2020, the US, China and Taiwan will also be included in the employer brand ranking (from Universum: engineering students).

Contributing to the Sustainable Development Goals

Our ambitions, commitments and programs as described in this chapter contribute to the following SDGs. For more information on the performance, see section Non-financial statements - Non-financial indicators.

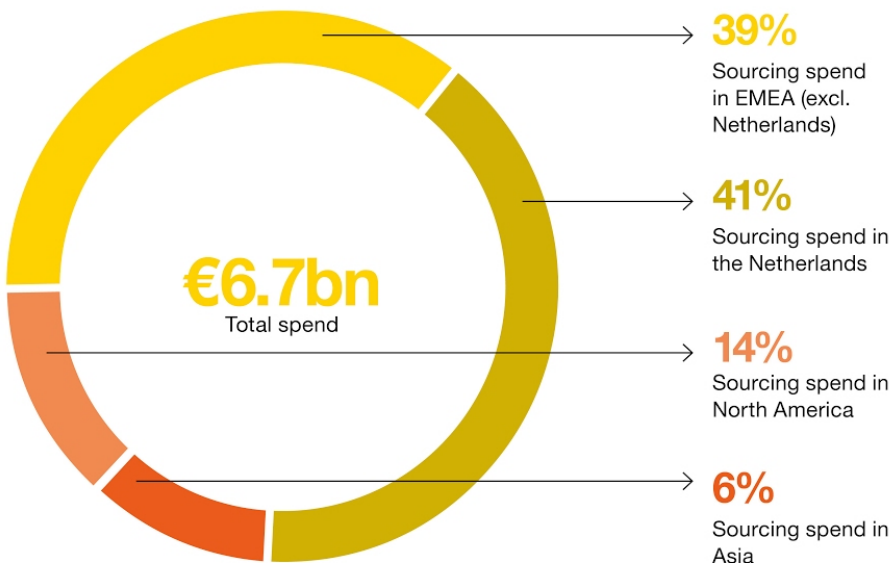
SDG target	How we measure our performance
 <p>SDG target 4.3 - By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university</p> <p>SDG target 4.4 - By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship</p> <p>SDG target 4.5 - By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations</p>	<ul style="list-style-type: none"> • Employee training and development indicators • Diversity indicators • Community involvement and technology promotions • Scholarships granted • ASML Foundation projects
 <p>SDG target 8.1 - Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7% gross domestic product growth per annum in the least developed countries</p> <p>SDG target 8.2 - Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high value-added and labor-intensive sectors</p> <p>SDG target 8.5 - By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value</p> <p>SDG target 8.6 - By 2020, substantially reduce the proportion of youth not in employment, education or training</p> <p>SDG target 8.8 - Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment</p>	<ul style="list-style-type: none"> • Financial performance • Human capital return on investment • Employee engagement score • Workforce data including diversity and inclusion • Fair remuneration pay ratio • Employee attrition rate • New hires • Employee safety indicators

Our supply chain

Our world-class supplier network helps us to realize the innovations we strive for. They are key to helping us achieve success by ensuring we conduct our business in a sustainable and responsible manner. We want to build long-term relationships with our suppliers by developing stable partnerships, strengthening supply chain resilience and practicing circular procurement.

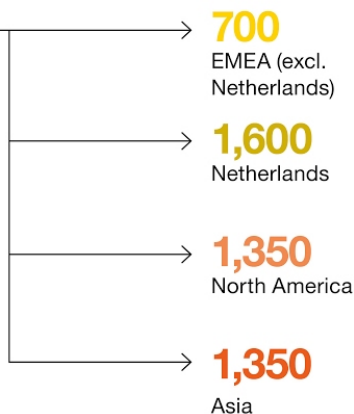
Our supply chain

We invest in developing our supplier landscape.



5,000

Total suppliers



Responsible supply chain

We are a member of the Responsible Business Alliance (RBA).



Expand

Circular procurement program



78%

Completion of RBA Self-Assessment Questionnaire by key suppliers



0%

Suppliers identified with overall high-risk level on sustainability (RBA)

Our supply chain

At ASML, we rely heavily on our supplier network to achieve the innovations we strive for. The goal of our strategic sourcing and procurement (SS&P) is to ensure we get the products, materials and services we need to meet our short- and long-term needs. This supports our operations from the earliest moment of development to the end-of-life stages of our systems.

ASML invests considerable resources to develop and introduce new systems and system enhancements, such as EUV lithography, e-beam metrology and holistic lithography. As these are complex technologies, ASML focuses on a high value-added integration role to maximize the total system competence and shorten cycle times. To enable this focus on system-integration, ASML relies on an extensive supply base of around 790 Product Related (PR) suppliers and around 4,200 Non-Product Related (NPR) suppliers. Long-term relations, close cooperation and transparency with suppliers and partners are key to success.

We invest in developing our supply landscape to help suppliers meet our requirements with regard to quality, logistics, technology, cost and sustainability. Our supply chain strategy includes six priorities regarding the capabilities of our suppliers and how we work with them: the development and maintenance of best-in-class competencies; efficient and dedicated operations; having resilient suppliers able to adjust to volatile market cycles; close cooperation with suppliers to secure involvement early in the new product introduction process; a commitment to quality and expectation that our suppliers will proactively invest in and maintain a state-of-the-art quality management system; and active contribution to our sustainability strategy.

‘We invest in developing our supplier landscape’

Continuously improving our suppliers’ performance and capabilities is at the heart of our sourcing strategy. We have a framework to communicate process requirements and compliance expectations to suppliers. One example is our supplier-profiling methodology, consisting of a supplier performance dashboard, a supplier capability self-assessment and a risk profile. The framework outlines our approach to supplier management and development towards the desired ASML supplier landscape. This provides an enhanced knowledge base to improve our dialogue with suppliers around their performance and development potential.

ASML always strives to select the best supplier that meets our requirements on all five capability dimensions. We monitor supplier performance in terms of quality, logistics, technology, cost and sustainability. When performance drops below annually set thresholds and does not recover upon request and within a reasonable time frame, ASML will take action to secure reliable future supplies.



Product and non-product related suppliers

With around 5,000 suppliers in our total supplier base, we distinguish between product-related and non-product related suppliers. Product-related suppliers provide materials, equipment, parts and tools used directly to produce our systems. This category comprises 790 suppliers and represents the highest percentage of our procurement volume, accounting for 66% of our total spend. Our product-related critical suppliers are accountable for 95% of the product-related spend.

Non product-related suppliers are goods and services suppliers, providing products and services supporting our operations, varying from temp labor to logistics and from cafeteria services to IT services. With over 4,200 suppliers, this group represents nearly 85% of our total supplier base in terms of the number of suppliers.

In 2019, we took steps to improve our strategic sourcing and procurement processes. We introduced product-related category management first and are now expanding our reuse program. We also completed an initiative to further embed product-safety requirements in our supplier profile. Liaising with all relevant suppliers, we discussed information-security improvements in the supply chain.

Our production capacity in the first quarter of 2019 was adversely affected by a fire at the end of 2018, at the site of a supplier of electronics components and modules. However, overall production for the year achieved set targets as higher production in the second quarter offset slightly lower production in the first.

Our risk-management approach

We rely on our suppliers to develop, manufacture and deliver the innovative and unique parts used in our lithography systems. Due to the highly specialized nature of many of our parts and modules, it is not economical to source from more than one supplier. Our sourcing strategy therefore prescribes 'single sourcing, dual competence'. Our reliance on single sourcing requires us to proactively manage supplier performance and risk.

To that end, Sourcing conducts continuous performance and risk management of the supply base with the purpose to: i) Assure and improve performance, ii) Secure continuity of supply, iii) Protect our Intellectual Property and maintain a leading technology position and iv) Prevent reputational damage. Five risk domains are assessed (Calamity, Ownership, Financial, IP & Information Security and Compliance). In cases where risk exceeds the agreed threshold, mitigation measures are taken.

As suppliers operating in the same industry or market are typically exposed to similar risk, we evaluate suppliers' risk and performance within the context of their supply market category. We will adjust our category strategies where needed to meet ASML's short and long-term business needs.

In 2019, we focused on improving business-recovery capabilities, contract coverage for suppliers with unique IP, improved financial transparency and the expansion of our information security and cyber-resilience program with suppliers.

To improve business-recovery capabilities, we require suppliers to have business-recovery capabilities in line with the ISO22301 standard. Supplier-recovery plans are requested, evaluated and, where needed, improved to prevent potential business disruptions. In 2019 we included > 200 suppliers in our business-continuity program.

Suppliers with access to top secret information or with privileged access to our IT systems are asked to improve information security through the ISO27001 standard. In 2019, we included 98 suppliers in our Information Security program.

Other examples of successful mitigation implemented as a result of the risk assessed are: getting long-term supplier agreements (LTSA) and/or continuous supply agreements in place, ensuring the availability of IP in Escrow or, in specific cases, buying IP, closely monitoring financials, requiring suppliers to put their inventory in separate locations, requiring suppliers to implement fire-prevention controls and increasing buffer stock. For a further description of our risk management, see How we manage risk.



Building relationships

One of the ways we foster a strong relationship with suppliers is through our annual Supplier Day in Veldhoven. In 2019, around 225 representatives from 135 PR and NPR suppliers from across the globe attended the event. This event is an opportunity for our suppliers to familiarize themselves with our strategy and targets, host workshops and presentations, and meet our senior management, including our Chief Strategy Officer and Chief Technology Officer. We also invited quality specialists from our suppliers to our 'crossing events'. Organized twice a year by our Supplier Network Management department, these meetings serve as a platform to discuss operational improvements for our products, such as improvements in quality or production volume.

Responsible supply chain

At ASML, we are committed to conducting our business in a caring and accountable manner, and being recognized as a responsible business partner.

Since 2011, we have been a member of the Responsible Business Alliance (RBA), the world's largest industry coalition dedicated to corporate social responsibility in global electronics supply chains. We have adopted the RBA Code of Conduct, which is a set of social, environmental and ethical industry standards. We also screen our supplier base on sustainability performance using this standard from the RBA.

'We assess compliance with the RBA Code of Conduct through a risk-based approach'

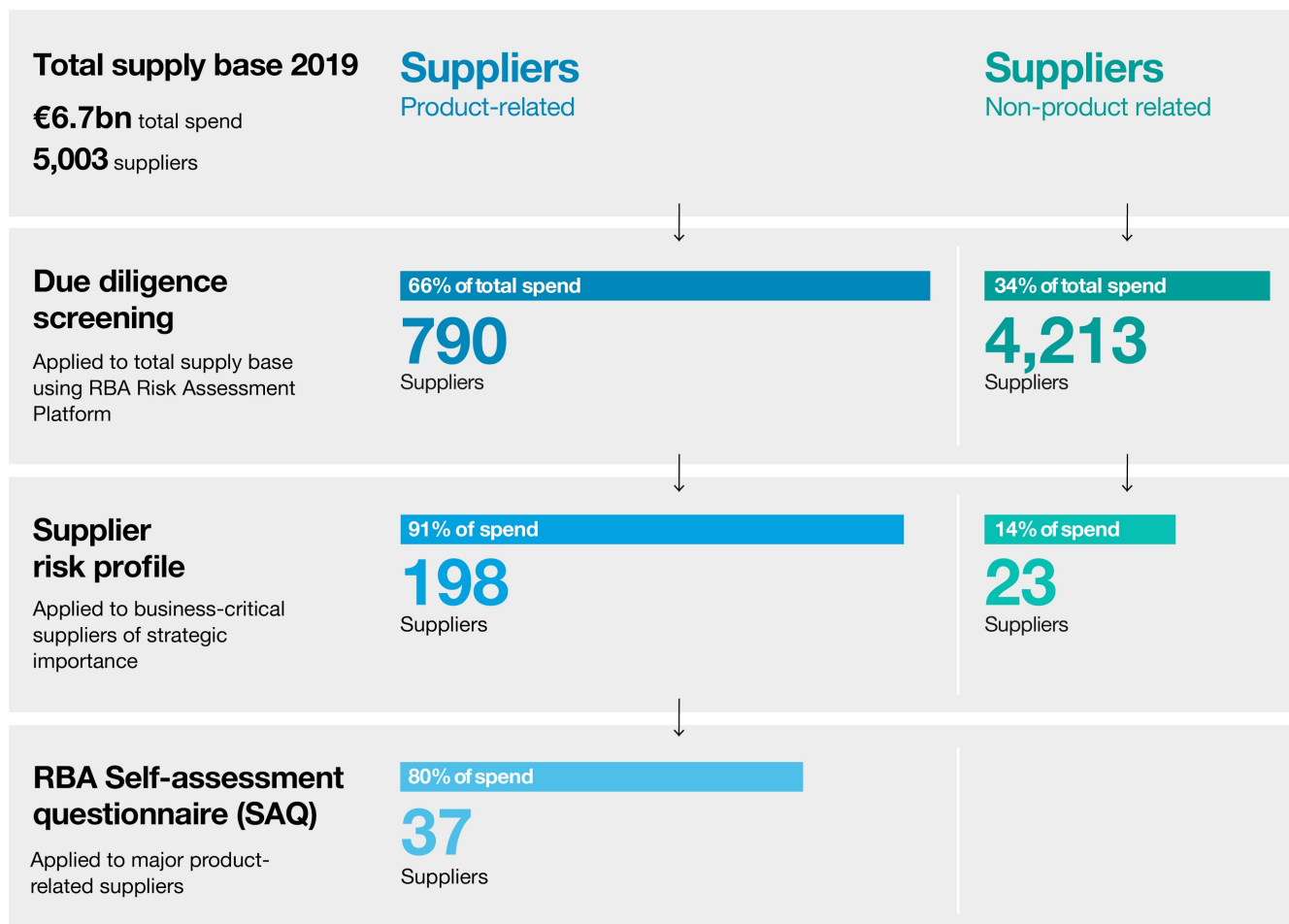
To underpin our commitment to a sustainable and resilient supplier network, we expect our key suppliers and their suppliers to comply with the RBA Code of Conduct as well. This requirement is included in our long-term product-related suppliers' contracts. We encourage our suppliers to develop their own sustainability strategies, policies and processes, and actively pursue our suppliers' adherence to this code.

We assess compliance with the RBA Code of Conduct through a risk-based approach. In 2019, we expanded the scope of the sustainability risk identification to include the total supply base in the RBA Risk Assessment Platform. This means we scan all new suppliers for potential high risks and work with them during the onboarding process to remedy any issues we identify. We expect our strategic and high-risk suppliers to complete the RBA Self-Assessment Questionnaire (SAQ) each year to validate their compliance with the RBA Code of Conduct and to determine a supplier's potential gaps in relation to the standards set forth in the RBA Code of Conduct. A category of around 200 vitally important suppliers may also be subject to audits.

In general, the RBA SAQ results show a relatively low risk level in our supply base, as most of our suppliers operate in countries with a strong rule of law and are law abiding.

Sustainability risk approach

We are a member of the Responsible Business Alliance (RBA) and are committed to conducting our business in a caring and accountable manner. We assess compliance with the RBA Code of Conduct through a risk-based approach.



Managing high-risk suppliers

A key performance indicator of our approach to ensuring a sustainable supply chain is the percentage of suppliers in scope who complete the RBA SAQ. In 2019, 78% of the major suppliers in scope completed this questionnaire. Our target is to achieve a 90% completion rate by 2025, while we will expand the scope of our RBA assessment to include non-product related suppliers and high-risk regions. Our second key performance indicator is to have 100% mitigation plans in place for high risk suppliers as identified by the RBA self-assessment.

We also conduct supplier audits to address risks we identify in our regular risk assessments. These audits intend to verify supplier self-assessment and completion of improvement plans. In 2019, we audited 12 of our suppliers on sustainability criteria. If a supplier does not conform to our required standards, our policy is to discuss mitigating measures.

Assessing human rights risks

Our robust risk-based assessment and audit process for suppliers covers human rights issues. In our due diligence process, we use the RBA Risk Assessment Platform to identify inherent risks in labor (including human rights), ethics, health & safety and environmental standards across our full supply base. In the event of a medium or high risk relating to labor being identified, we engage with the supplier and conduct a more detailed analysis. For strategic suppliers covering 80% of our product-related spend, we expect them to complete the annual RBA SAQ. This SAQ covers more than 400 risk elements related to labor (including human rights), ethics, environmental and safety factors, control elements and management systems, including their performance. It helps us to determine a supplier's risk profile on sustainability. When we identify compliance gaps, we engage with the supplier to determine corrective action plan(s). In the 2019 RBA SAQ program, we identified three suppliers with high risk on labor. These related to management systems rather than actual breaches of human rights. We are following up on improvements with these suppliers.

In 2019, we completed a more in-depth forced and/or bonded labor due diligence with four Tier 1 suppliers. We were able to confirm that there was no occurrence of forced or bonded labor in their factories. In the future we will use this in-depth due diligence in cases where the RBA self-assessment indicates an elevated risk of forced and/or bonded labor.

Circular procurement

As part of ASML's commitment to enhancing sustainability, we want to play our part in realizing a circular economy model. We do this by reusing parts, increasing energy efficiency in our processes and reducing scrap where possible. We see this as a responsibility to be shared between ourselves and our customers and suppliers.

Our procurement team plays an important role in implementing circular economy principles by promoting circular procurement at all times. We aim to raise awareness of circularity among our procurement managers, so they incorporate reuse and recycling in their way of thinking and procurement practices.

Our ambition for 2025 is to increase our circular-procurement practice. In 2019, we started a process of defining key performance indicators to measure progress in our circular procurement. For more about our approach to the circular economy policy and programs, see What we achieved in 2019 - Our operations - Circular economy.



Supplier Day 2019

On September 26, representatives from our key suppliers joined our Supplier Day at the High Tech Campus Eindhoven. This year's theme, 'Make it Worth it', focused on enhancing collaboration to ensure the future success of the industry. Supplier Day is held annually to update our suppliers on the market outlook, our priorities, focus areas and commitments, through breakout sessions, panel discussions, Q&A and presentations.

We finished the day with an awards presentation, recognizing several suppliers for their work with ASML, including an award to a supplier for its valuable contribution to ASML's circular-economy ambitions.

Our outlook

In 2020, our main focus will be to further expand our circular-procurement efforts.

In 2020, the cross-sector Reuse program in ASML will target over €75 million of value to be reused. A key development is the setup of new circular processes and contracting with the majority of our first-tier supply base and align incentives for maximizing reuse value.

Circular procurement extends beyond the reuse of packaging materials. For example, wafer tables are refurbished. With Zeiss we will continue projection optics box (POB) reuse, and a number of refurbishing projects for lenses.

NPR procurement will create three specific initiatives around CO₂ reduction. With Corporate Real Estate, we will invest in increasing the use of green energy for our main campus in Veldhoven. Together with the travel management team, we will seek to lower the carbon footprint of business travel and our lease car fleet in the Netherlands.

Conflict minerals

Like many companies in the electronics industry, ASML and its suppliers use minerals in manufacturing. We are committed to addressing concerns related to so-called conflict minerals. These are minerals mined in the Democratic Republic of the Congo or any neighboring countries under conditions of armed conflict and human rights abuses. The four main minerals concerned are tin, tantalum, tungsten and gold, collectively referred to as 3TG. We closely monitor the use of conflict minerals in our supply chain.

We require our suppliers and sub-suppliers to have policies in place and take due diligence measures that will enable us to investigate if products and components supplied to us contain conflict minerals. To identify and manage the sourcing of our components and especially 3TG, ASML has developed a due diligence process. Every year, we ask suppliers to fill out a Conflict Minerals Reporting Template (CMRT) based on the previous reporting year. This is updated each year. See www.asml.com for our Conflict Minerals Statement and Conflict Minerals Disclosure.

Our supply chain KPIs

The table below shows the key performance indicators (KPIs) and the related 2025 targets. Our new sustainability strategy was adopted in 2019 - as a result no comparative results for 2017 and 2018 are shown for new indicators not previously disclosed. See Non-financial statements - Non-financial indicators for our performance indicators (PIs) and related results.



KPI	2017	2018	2019	Target 2025
RBA self-assessment completed (in %) ¹	—	—	78%	90%
Suppliers with high risk on sustainability elements evaluated and follow-up agreed (in %) ²	—	—	25%	100%

1. This indicator shows the percentage of major suppliers that completed the annual RBA self-assessment questionnaire (SAQ). Major suppliers are those suppliers that together account for 80% of the product-related procurement spend.

2. Four suppliers were identified with a high risk on sustainability elements. At the time of publication of this report, a follow-up plan is agreed with one supplier. We are engaging with the other three suppliers to define the follow-up plan.

Contributing to the Sustainable Development Goals

Our ambitions, commitments and programs as described in this chapter contribute to the following SDGs. For more information on the performance, see section Non-financial statements - Non-financial indicators.

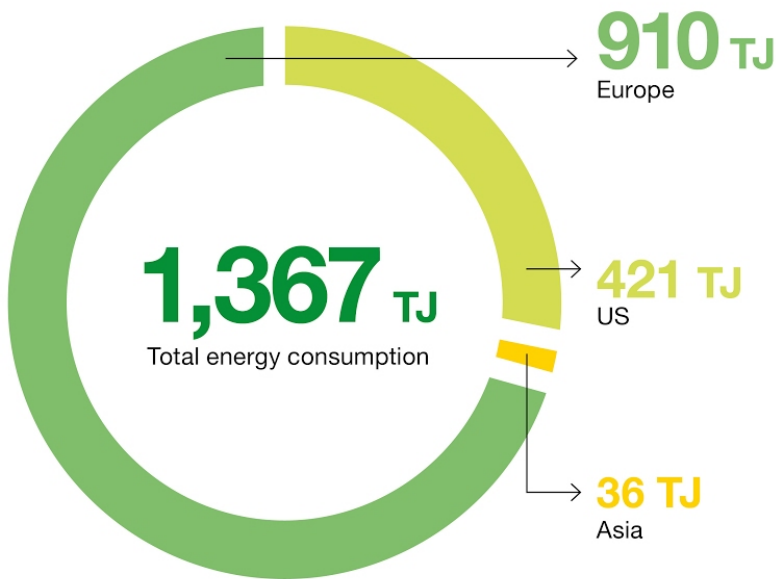
SDG target	How we measure our performance
 SDG target 8.8 - Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	<ul style="list-style-type: none"> • Compliance with RBA Code of Conduct • RBA self-assessment questionnaire completion • Suppliers with high risk on sustainability elements evaluated and follow-up agreed
 SDG target 12.2 - By 2030, achieve the sustainable management and efficient use of natural resources	<ul style="list-style-type: none"> • Promote circular procurement

Our operations

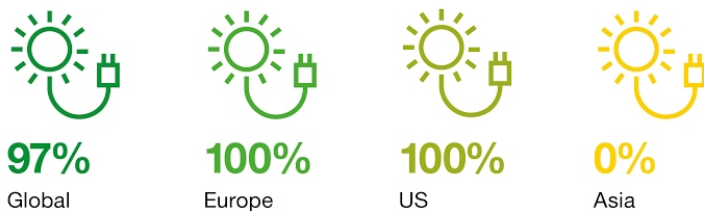
Climate change is a global issue that requires urgent action. ASML is committed to decreasing its greenhouse gas (GHG) emissions into the atmosphere and to reduce its carbon footprint across operations. Our ambition is to achieve zero emissions across our operations by 2025.

Climate and energy

We aim to invent, develop and manufacture our products in a more environmentally friendly way.

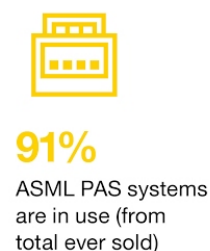
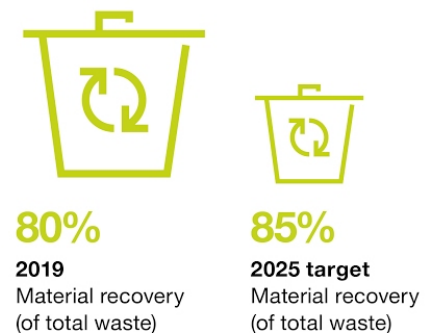
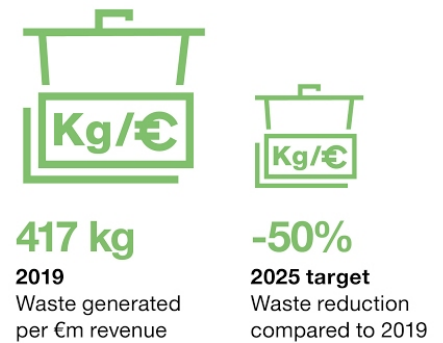


Renewable electricity consumption



Circular economy

We are committed to minimizing waste and maximizing the use of resources.



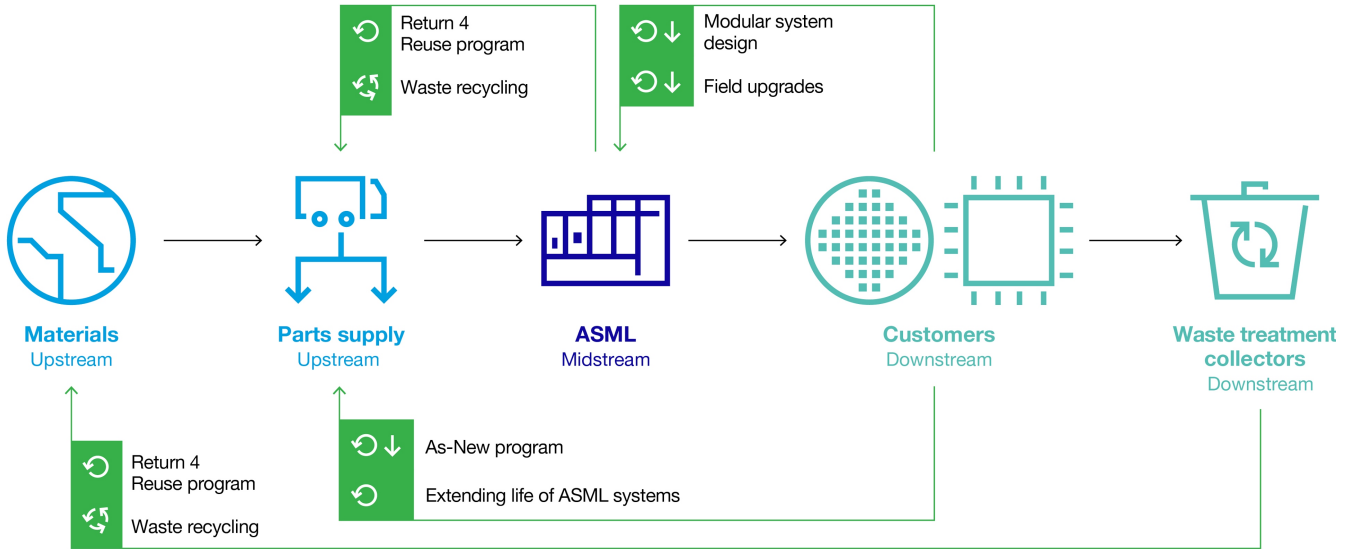
Circular economy

As we move away from the linear ‘take, make, dispose’ model, we believe the circular economy is key to ensuring the future success and competitiveness of the semiconductor equipment industry.

We are committed to minimizing waste and maximizing the use of resources. The modular design of our products lets us extract the most value we can from the materials we use and repurpose our products across their life cycles.

While continuously innovating, we also want to ensure the increasingly sustainable use of materials across our processes and value chain to reduce our environmental footprint.

ASML's circular economy approach



↓ REduce ↻ REuse ♻️ REcycle

ASML's commitment

We are committed to playing our part. We do this by responsibly managing our waste throughout our operations and maximizing the lifetime of materials in our systems, so extending their lifespans. To this end, we also work closely with our value chain, as we view this as a joint responsibility between ASML, its customers and suppliers.

‘A circular economy is essential to the success and competitiveness of our industry’

Due to our products’ modular designs, we ensure that those in use at our customers’ sites can be upgraded to a higher performance level without replacing the entire product. After use in the most advanced chipmaking factories, we further extend the lifetime of our products by refurbishing systems and repurposing them for other customers and semiconductor environments.

With regards to service and upgrading parts, our initiatives ensure that modules can be restored and qualified to an as-new condition for re-use within our systems.

Reduce waste

Reducing our environmental footprint and managing our waste is key to ASML’s circular economy approach and our sustainability practices. There are several waste sources within ASML. These include office waste, packaging waste, hazardous waste from the chemicals we use in our processes, and product waste from parts resulting from upgrades or defective spare parts.

ASML emphasizes the environmental impact of waste in our new sustainability strategy. We chose 2019 as the baseline year for all locations to measure and report waste reductions for the period 2020-2025.

We seek to reduce waste by a range of initiatives, such as our Return4Reuse program, engage with our suppliers, site-specific reductions, and increase material recycling. In addition, we carefully monitor the hazardous waste we generate in our manufacturing processes.

We believe that reducing our environmental footprint is a shared responsibility between our operations and supply chain. To this end, we are raising awareness of our circular economy principles with our procurement managers and engaging with suppliers.

We aim to reduce, reuse and recycle our waste as much as possible, rather than sending it to incineration or landfill. Based on Lansink's Ladder Waste hierarchy, we manage our waste through proper classification, separation and safe disposal. There are two key performance indicators relating to our waste management: waste generated per revenue, focusing on normalizing total waste generated per revenue (kg/€ million), and waste material recovery, the percentage of total waste recovered by the recycling of materials. The level of material recovery at ASML reached 80% in 2019. See Circular economy KPIs.



Return4Reuse

We are improving the reuse of packing, locking and transport materials from the field and factory, aiming to return and reuse 80% or more in the next install or relocation.

We aim to embed this new thinking as the new norm and standardize return and reuse. It started with our EUV systems, but we are now expanding the Return 4 Reuse program into our DUV systems. All packing, locking and transport materials are reused at use level (highest level of reuse). The concept is driven by an automated circular process triggering the limited manual interventions to return and reuse the materials by itself. This makes the process sustainable and allows us to focus on increasing the amount of material for reuse. In 2019, around 1.5 million kg of materials were received for further reuse, so preventing it from ending up as waste.

Our focus up to now has been packaging and transport materials used for system installs. But many other activities, including system relocations, As-New returns, and service activities and upgrades also require packaging and transport materials. We aim to involve ASML manufacturing sites worldwide in this reuse process and maximize its impact by standardizing best practice across all business lines.

Waste management challenges

Managing the waste chain is a complex issue and, with an external company, we've been analyzing what constitutes waste and what we need to consider as *our* waste (e.g. ASML's packaging waste disposed at our customers' sites). We are in the process of broadening our scope and looking at ways to not only reduce our waste internally but also prevent ASML materials becoming waste at customers' sites. As part of refining how we collect and collate accurate data with respect to kilograms of waste, we're in the process of analyzing what our customers are returning and what they discard.

Hazardous waste

We use hazardous substances to produce and operate our products and systems. This makes us subject to a variety of governmental regulations relating to environmental protection (as well as employee and product health and safety), including the transport, use, storage, discharge, handling, emission, generation, and disposal of hazardous substances.

Hazardous waste can include lamps, batteries, hazardous liquids, empty packaging from hazardous materials, and cleaning wipes and filters. Liquids, including acetone and sulphuric acid, are among the most important of our waste streams. The majority of these materials are recovered by recycling. We aim to extract optimal use from these materials and use no more than we need.

New ambitions for 2025

In 2019, we set an ambitious target of cutting our amount of waste per revenue by 50% by 2025. Achieving this target requires a change in mindset. To execute our circular economy strategy, we must embed circularity in our way of working and thinking.

We will need to shift our focus to buying services rather than products, which requires a change in business processes. From the start, materials must be designed for reuse. Applied to packaging, for example, this means it must be designed in such a way that users are able to open packaging without damaging it. Reuse will be key in the design phase.

How we manage waste is currently focused around improvement projects, but this is moving towards overall business processes. In 2019, and working towards our 2025 ambitions, we are deploying a number of waste-management initiatives. These include:

- Circular procurement and circular design
- Local waste-reduction programs
- Real-estate portfolio management
- Return4Reuse
- As-New program
- Flexible cleanrooms

Limiting waste is also a focus in our approach to real estate. For example, we aim to achieve a BREEAM score of 'excellent' for our planned new campus in Veldhoven. This means that any new buildings we develop are sustainable, as little as possible is thrown away during the building process, and we reuse what we can. This supports our circular economy approach.



New flex cleanroom concept

Cleanrooms are a key part of our field-service warehouse infrastructure. They allow us to support our EUV customers by providing clean tooling to quickly respond to their needs. We've launched a new concept in cleanroom design at three of our service warehouses, reducing waste, cost and construction time. Our new 'flex' cleanrooms can move between locations and be assembled quickly, while providing the same standards and performance as our current fixed cleanrooms. The systems' modular, cross-flow design is also expandable, meaning work does not need to stop when an extra section is added.

We built the first flex cleanroom in Pyeongtaek, Korea, with others now added in Taichung and Tainan, Taiwan. More than 95% of the materials in the flex cleanroom system are reusable. This saves money as well as construction time and effort – down from 13-15 weeks for a fixed cleanroom to one to two weeks for a flex cleanroom. The high reuse percentage significantly cuts waste and contributes to a greener approach to cleanroom infrastructure.

Reuse of parts and materials

Working together with customers and suppliers, we aim to remanufacture used system parts. These can be reused as if they were new parts, so preventing unnecessary waste.

We launched the As-New pilot in 2015 and reached proof of concept stage in 2016. The first pilot scheme showed a reduction in our environmental impact, and we have now rolled this out to most of the countries where we operate.

Our As-New modules, suitable for multiple product lifecycles, are now being integrated into our mainstream manufacturing lines. These include operating parts or modules returning from the field after system upgrades. The parts undergo full inspection, testing and qualification. With As-New, parts can be used for services and new systems.

Maintaining quality

We set high quality standards on As-New parts and we expect our suppliers involved to meet these standards. The qualification standard and requirement we set is identical to new parts, meaning the same specifications, performance requirements, warranty, and so on, apply. We allow our customer to audit on the quality of As-New modules.

Our ambition is to increase the application of As-New modules in our systems, to prevent the unnecessary scrap of well-functioning parts and modules. The program is in the process of being integrated into our mainstream manufacturing lines and we want to expand the program's scope. To this end, we are investigating which modules are suitable for As-New multiple-product life cycles.

'We set high quality standards on As-New parts and expect our suppliers involved to meet these standards'

Added to its role in the circular economy, As-New has been well received by our business lines. There's been an active pull on the program by the manufacturing lines wanting to see more parts qualifying for As-New.

In 2019, we launched our policy and procedure for As-New, taking us to 2025 and possibly beyond. We're in the process of working out how to scale it up. This process includes looking into our parts inventory and R&D selecting the parts that can qualify for As-New.

To scale up, we're looking at factors such as refining our policy, engaging with suppliers, looking at our ways of working, and assessing how we can track and trace parts.

Lifetime extension of mature products

Our refurbished products business, known as MPS (Mature Products and Services), refurbishes and upgrades our older lithography systems to a higher performance level to extend their lives and offer associated services. We focus on mature products, proactive lifecycle management and More than Moore markets.

MPS focus on two product families: the 'classic' PAS 5500 (around 1800 systems and customers worldwide), and the first generation of TWINSCANS – the AT platform. For the PAS platform we refurbish these systems for a new life. Depending on the extent of the refurbishment, we perform these in-house or at customer sites. MPS also focuses on the first generation of Twinscans - the AT platform - with measures to proactively manage the announced end of life by guaranteeing the availability of spare parts through 2021, with a program to extend that as long as possible on a best-effort basis. This helps our customers to extend their systems' lifespan, draw the best value from their capital and support our broader circular economy approach.

Life cycle management

Managing the continued availability of spare parts is key to the extended lifetime service we offer. Finding older parts is challenging as these will have been superseded by better and newer parts. When we cannot find these, we devise workarounds to make sure we can continue to deliver service.

If a part no longer works, we seek solutions through a sequence of actions, including trying to source the original component, searching for another brand, or identifying a part that performs the same function. If this does not work, we're usually able to secure components through Last Time Buy – a supplier's 'last call' for a part or component before production switches to its successor. Over time, when that is no longer workable, we redesign parts.

We track the spare parts we have in our portfolio, see how they are being used and when we expect to run out of these parts. For the PAS systems, we use this information to update our priorities for redesigning parts. And for the AT systems we try to continue supplying parts by harvesting them from systems that are decommissioned by our customers.

Guaranteeing our service roadmap

We see that customers are continuing to use the current PAS 5500 installed base to produce products on 200 mm wafers and below, and we foresee this demand growing. With the PAS 5500, which was introduced as far back as 1991, we extended our guaranteed service roadmap from 2022 to 2030. We guarantee our customers that all support, and the necessary services and spare parts they need to maintain their systems, will be available for the next 10 years.

In 2019, we replaced our entire service toolkit inventory as it was obsolete, and spent time during the year ensuring it complied with all relevant rules and regulations. To ensure knowledge-sharing and expertise, we also set up knowledge bases and databases, making these available for use around the world.



System lifetime

A well-maintained ASML lithography system can last for decades and be used by more than one fab. For example, many ASML lithography systems are used in cutting-edge fabs and are then given a new lease of life in a fab where the manufacturer requires comparatively less sophisticated chips (such as accelerometers or radio-frequency chips). Almost every lithography system that we've ever shipped is still in use at a customer fab.

Dedicated resources

MPS has a dedicated worldwide customer support network, which includes our own resources for field refurbishment and D&E. Our competence center in Linkou, Taiwan, concentrates mature product knowledge in one place. We have more than 250 specialized engineers in the field, working together with our customers.

Our service engineers are an integral part of our customer-engineering teams, which jointly execute service tasks, as well as being specialized in the more complex service activities that take place less often.

‘We seek to achieve this by developing a knowledge base, training and job rotation’

These service engineers report back on what they see happening in the field. We use this intelligence to keep our customers informed and establish if we need to devise a service product. We also actively track and trace how many parts we still can supply, which parts are supply limited, and how fast the supply-limited parts are consumed. Based on this, we continuously update our redesign plans.

As ASML's technology and innovations evolve, the servicing of 20-year-old systems, and older, calls for expertise that is not always readily available. In some cases, customer and ASML engineers with PAS 5500 expertise are retiring, while, internally, engineers are attracted to our newer technology. It can be a challenge to maintain the competence of PAS 5500 service engineers, with expertise on the PAS systems, in the field. We seek to achieve this by developing a knowledge base, training and job rotation.

Ultimately, all ASML's systems will become legacy products. So MPS is a key part of ASML's offering, enabling our customers to get the best value from their capital investment and at the same time support the circularity principles we aspire to around the globe.

Circular economy KPIs


The table below shows the key performance indicators (KPIs) and the related 2025 targets. Our new sustainability strategy was adopted in 2019, as a result no comparative results for 2017 and 2018 are shown for new indicators not previously disclosed. See Non-financial statements - Non-financial indicators for our performance indicators (PIs) and related results.

KPI	2017	2018	2019	Target 2025
Total waste generated normalized to revenue (kg/Million €) ¹	—	—	417	-50% from 2019 baseline
Material recovery (% of total waste) ¹	—	—	80%	85%
ASML PAS systems sold still in use (in %)	—	—	91%	

1. Construction waste is excluded from the calculation of this indicator, because this waste is not resulting from the daily operations of ASML. The amount of construction waste tends to fluctuate over the years and can therefore make the trend of the indicator unclear.

Contributing to the Sustainable Development Goals

Our ambitions, commitments and programs as described in this chapter contribute to the following SDGs. For more information on the performance, see section Non-financial statements - Non-financial indicators.

SDG target	How we measure our performance
 <p>SDG target 12.2 - By 2030, achieve the sustainable management and efficient use of natural resources</p>	<ul style="list-style-type: none"> • Material recovery • Promote circular procurement
<p>SDG target 12.4 - By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment</p>	<ul style="list-style-type: none"> • RoHS / REACH compliance of parts used
<p>SDG target 12.5 - By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse</p>	<ul style="list-style-type: none"> • Waste reduction • Increase reuse of parts and modules in our products • Lifetime extension of used systems • Reuse of packaging

Climate & energy

Climate change has become an urgent matter around the world. It affects every country on every continent. It's a challenge that requires global responsibility to limit a temperature rise worldwide to well below 2°C. It poses risks, but also opportunities for all companies.

Our renewable energy strategy sets out our ambition to achieve zero emissions across our operations. We aim at optimizing the efficiency of our utility installations in our buildings as well as our manufacturing process. While we're increasing the productivity of our products, we're also working towards reducing their energy consumption to enhance our energy efficiency.

We aim to invent, develop and manufacture our products in a more environmentally friendly way, striving to ensure that our products are manufactured and can be operated responsibly across their entire life cycle.

'We aim to invent, develop and manufacture our products in a more environmentally friendly way'

At ASML, we're committed to decreasing our greenhouse gas (GHG) emissions into the atmosphere and reducing our carbon footprint across our operations, as well as in our value chain by enhancing the energy efficiency of our products and utility installations that operates our manufacturing building and offices.

Climate change risk and opportunities

Climate change is a global challenge that requires urgent action by everyone. This also impacts ASML. We identify and assess the impact of climate-related risks and opportunities through an Enterprise Risk Management model. We assess risks both top-down (company-level) and bottom-up (organization and process-level). For more information, see [How we manage risk - Business risk and continuity](#) and [How we manage risk - Risk factors](#).

We assess the risk related to climate change and its impact, using the assessment guidelines of the Task Force on Climate-related Financial Disclosures (TCFD). We defined climate-related risks relevant to us, as well as risks related to the transition to a lower-carbon economy. As national governments respond to the threat of climate change, political and regulatory risk increases.

We have seven manufacturing sites around the world. Veldhoven is the largest of these, representing 78% of our total gross greenhouse gas emissions (scope 1 and 2 emissions). A signatory to the Paris Agreement, the Netherlands has set its goal to reduce emissions by 49% in 2030, and expects a considerable contribution from industry to achieve this. Should carbon pricing be implemented, the financial cost of our energy consumption will increase.

The physical risks of climate change – e.g. extreme weather conditions, chronic heat waves (drought) and the rise of sea level (floods) – that could disrupt our operations and/or damage our assets are evaluated regularly in our Enterprise Risk Management process. The impact of these risks is deemed limited, as our main facilities and suppliers are not located in high-risk areas.

In addition, climate change may trigger issues concerning the availability of natural resources, and energy or health and safety matters. It may also indirectly impact the political situation in a country, which may cause supply-chain disruption in first tier and beyond. We see that these risks already exist in our industry. We monitor these, as changes can occur at any time.

With increased global awareness of climate change, managing the environmental impact of products is a concern for our customers and other stakeholders, and their preference may shift towards lower carbon-footprint products. While helping the semiconductor industry to continue to realize Moore's Law, we are committed to taking every step to lower our carbon footprint.

To realize this we have deployed a renewable energy strategy to reduce exposure to dependency on fossil fuel and enhanced energy efficiency in our operations by optimizing our global real-estate portfolio and efficiency of asset installations. Climate change and the increase in outside temperature will also force us to monitor the cooling capacity in our factory locations. If necessary, we may need to install more efficient and effective cooling systems, which will reduce overall energy consumption of the installed cooling capacity.

We are committed to taking every step required to lower our carbon footprint. Our Sustainability Strategy sets out our ambition to achieve zero emissions across our operations by 2025. For more information, see [CO₂ emissions](#).



Paris Agreement

The Netherlands is part of the UNFCCC and a signatory to the Paris Agreement. The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C. The Dutch government has set a goal to reduce its GHG emissions by 49% in 2030. Dutch industry's ultimate aim is to be circular and to emit virtually no greenhouse gas by 2050. Factories will then run on sustainable electricity from the sun and wind, or energy from geothermal energy, hydrogen and biogas. By 2030, the industry must already emit considerably less CO₂. That is an intermediate step on the way to full sustainability. Politicians can implement measures to achieve these goals, such as implementing carbon-pricing mechanisms to reduce GHG emissions.

Energy efficiency of our products

Growing consumer demand for faster, ever-more sophisticated devices in our increasingly interconnected world fuels the need for constant innovation and development in the semiconductor industry. To enable this, chip manufacturers look to us to continue to achieve lithography-enabled shrink. Lithography is the driving force in creating more powerful, faster and cheaper chips. But just as the demand for enhanced chip functionality increases, so does the complexity of our lithography systems. Our ongoing challenge is to meet our customers' expectations of increasing the performance of our products while also reducing their energy consumption.

Our product-efficiency strategy

Our product-efficiency strategy is based on making our systems more efficient and improving the conversion efficiency of EUV light, while ensuring we use energy in the most efficient way. Our focus areas include:

- Less energy per wafer output. We enable innovative growth in the semiconductor industry by increasing the productivity of ASML's lithography tools. In addition, by enhancing resolution with EUV and High-NA, together with holistic scaling of overlay and pattern fidelity control, we enhance energy efficiency.
- Responsible use of energy by committing to only using the energy we need.
- Contributing to energy-efficient fabs by providing more energy-efficient installation solutions.

Managing our energy efficiency

Energy measurements show that the energy efficiency of our latest DUV system, the TWINSCAN NXT:2000i, is similar to the previous generation systems, TWINSCAN NXT:1980Di and NXT:1970Ci, while the latest system delivers improved imaging and overlay performance to our customers with a throughput increase (wafers per hour) of 10%.

This newest system, the NXT:2000i, enables further shrink and allows patterning of more transistors per wafer. This translates into the production of more energy-efficient and affordable chips with enhanced functionality.

Looking at the energy usage of ASML machines in the chip-production process, we can assess the amount of energy needed to produce a transistor. Our calculations show that for the lithography steps required to produce a 20 nm logic chip, about 25% less energy is needed than for a 28 nm logic chip. The energy used to produce a 16 nm chip will be about the same as for a 20 nm chip, and for a 10 nm chip we expect the energy use to be about another 5% less.

As our EUV systems have now reached the stage of high-volume manufacturing at our customers' sites, our next step is to reduce the energy use of our EUV products. Generating light with shorter wavelengths for EUV means the process of producing light requires more energy. Our use of energy has become more visible and addressing this is a priority. As such, making our systems as efficient as possible has become a key driver in our product portfolio.

'We want to increase throughput not only by increasing a system's source power but also by increasing its efficiency'

To meet end-users' demand for ever-more sophisticated devices with more functionalities, our customers aim to produce higher-density chips. This translates into more functionality requirements of our systems, which means they use more power to run these functionalities. While increasing our products' performance, we aim to maintain energy consumption and use the energy as efficiently as possible. To this end, we are investing in designing our products in such a way that they use energy in the most efficient way.

We want to increase throughput not only by increasing a system's source power but also by increasing its efficiency by optimizing sequences and control schemes. This will benefit our customers in that they will not only produce more wafers per day but also need fewer systems – a customer can increase productivity without building a new fab, which translates into less overall energy use. Most of these enhancements are also offered as upgrades for the installed base tools.

In EUV, there are many opportunities to achieve this, in particular in relation to the conversion efficiency of laser radiation into EUV. This conversion process uses the most energy and it's here that we are focusing most of our design effort to make our systems more efficient. If we can increase our conversion efficiency, we can improve the systems' energy consumption. Making this happen is one of the key challenges for our R&D teams.

EUV at high-volume point

With our latest EUV systems now running high-volume production at customer fabs, we're exploring opportunities to achieve energy savings for these systems across the following areas:

- Improving cooling architecture to enable 'free cooling' by using warmer cooling water to remove the heat in the lithography scanner and its source. We are also exploring if some electronic parts of the EUV system can operate at higher cooling water temperatures. This would reduce the amount of energy needed for cooling purposes in these systems.
- Reducing unnecessary power consumption of electronics by, for example, improving the architecture and design of these electronics.
- Alternatives for hydrogen abatement including investigating hydrogen recycling with third parties.

In 2019, we ran a pilot at our factory in Veldhoven aimed at reducing the energy used for the hydrogen abatement system. Through this system, we created a more energy-efficient solution compared to the current system where hydrogen is burned with the use of natural gas.

We also made progress with our ongoing project around water cooling in fabs, which is set at an industry standard. Cooling water is required to remove heat in the fabs, which is a highly energy-intensive process. We are working closely with customers and industry bodies to find an alternative energy-efficient solution for process cooling water.



Enabling energy efficient chips

The power needed for every computation on a digital electronic device can be reduced by shrinking the size of transistors on chips. Our lithography systems enable the resolution required to realize this shrink, and our customers use these systems to produce higher-density chips. Overall, this high density translates into the use of fewer natural resources and less energy consumption per transistor over a chip's lifetime compared to older-generation chips.

Consumers' devices are becoming ever-more sophisticated and include more functionalities. Our lithography system makes the chips possible that enable the advances of these applications. While our products are becoming more energy efficient, our customers' customers are also using resources in a more efficient way, such as more energy-efficient datacenters, smart energy water meters, and so on.

Energy-efficiency challenges

By 2025, we aim to reduce the energy use per wafer of our future-generation NXE systems by 60% compared to the latest model, the NXE:3400.

To achieve this, we need to overcome several strategic technical challenges. These include ways to create EUV plasma in the most efficient way, increase the power of the EUV light, improve the debris-management architecture, develop mirror coatings that are capable of dealing with higher EUV intensities, improve the heat management of optical components, and heat management of the wafer itself, which heats up by the exposure light during the production process.

These technical challenges are especially hard to solve, given that there is no precedent anywhere in the world. At ASML, we need to find these solutions ourselves and this type of experimentation presents all sorts of challenges. This requires ongoing innovation and ASML is on its way to achieving these solutions.

CO₂ emissions

We are committed to minimizing our energy consumption, the environmental impact of our operations and our related carbon footprint. We are doing this by enhancing the energy efficiency of our buildings and, where possible, shifting to renewable energy. We also aim to reduce emissions in our value chain.

Our Greenhouse Gas (GHG) emissions

Scope 1

Direct CO₂ emissions from our operations



Status 2019:
16.9 kilotonne

Target 2025:

Zero

Scope 2

Indirect emissions from energy use across our operations



Status 2019:
5.3 kilotonne

Target 2025:

Zero

Scope 3

All other indirect emissions, including from suppliers, logistics, use of our products



Status 2019:
6,500 kilotonne

Target 2025:

Reduce

Scope 3 data is calculated according to Greenhouse Gas (GHG) Protocol methodology and contains data estimations

Achieving energy efficiency

Our current energy master plan aims to achieve a 10% energy saving by 2020 compared to the 2015 energy-consumption baseline of 111 terajoules (TJ) and ensure we use 100% renewable electricity (scope 2) by year end 2020. These targets form part of our updated Sustainability Strategy 2019-2025, but we've raised the bar for ourselves by extending our ambitions to achieve carbon neutrality in our operations for both scope 1 and 2 by 2025.

Our main direct CO₂ emissions come from the fossil fuels we use in the testing phase after the assembly of our immersion lithography systems.

In 2019, we made strides towards achieving the climate and energy objectives defined for the period to the end of 2020. We had several projects running in 2019 that will generate energy savings. The savings are realized by improved technical installations or by an improved production process. These projects will be completed and implemented in our operations in the course of 2020, with the energy savings then coming into effect. We realized 80TJ in energy savings, up from 77TJ reached in 2018, which brought us closer to achieving our target of 111 TJ savings by the end of 2020.

Projects focused on energy saving in our infrastructure were among the initiatives that helped us meet our targets in 2019. These included measures such as replacing conventional lamps in our offices with LED and the recovery of exhaust heat. Maintaining the right conditions in cleanrooms is energy intensive, and we continued to work towards reducing these levels of energy consumption. In 2020, we expect to generate additional savings by optimizing the cooling capacity of our installations in Veldhoven.



Employee buy-in for action on climate change

We informed employees about our ongoing sustainability projects on World Environment Day in June. We celebrated this event for the first time to enhance awareness around the importance of environmental care and get employee buy-in. For example, nine presenters shared the ambition and progress of their projects. We called on employees to take action wherever possible to make a positive impact on the environment. In total, we submitted 14 business challenge proposals to our employees. These challenges include ways to contribute to a sustainable environment.

We are investigating opportunities to achieve zero emissions (scope 1 and 2) and reach our 2025 sustainability ambitions. These opportunities include enhancing energy savings through energy-efficient solutions in our technical installations, implementing an offsetting strategy to balance our emissions, and reducing emissions through process improvements. We are in the process of finalizing our energy master plan for the period 2021-2025, which includes project initiatives to achieve our 2025 target.

Renewable energy strategy

Manufacturing chipmaking equipment requires energy to run the assembly and test of the system. It's also needed to maintain the consistent climate conditions required to deliver quality products: constant temperature, humidity and air quality. This represents the majority of our electricity consumption.

Electricity accounts for more than 77% of the energy we use at ASML. We want to reduce our energy-related CO₂ emissions by financing renewable electricity generating projects, like GO2, REC and I-REC. We achieved 97% renewable electricity across our operations in 2019 and are on track with our ambition to achieve 100% renewable electricity by year end 2020. We aim to maintain this target up to 2025.

Optimizing our real estate portfolio

As we grow as a company, we need more buildings to accommodate our expanding workforce and operations. This means our campuses will get bigger. We see this as an opportunity to make our buildings as environmentally sound as possible. Sustainable redesigning and expanding our campus in Veldhoven is a key activity in this regard. Optimizing the use of every m² in our portfolio is also a key strategy to reduce our environmental footprint: every m² saved is a m² we don't need to heat, cool, ventilate or light.



Sustainable facilities

To facilitate flexible growth for our future, we are building a new campus in Veldhoven. Our aim is to create a workplace that makes our employees feel engaged and want to thrive. The campus will reflect a unified ASML identity and 'look and feel', while also celebrating our diversity. There will also be a sustainability focus for this new build. Its design and use of materials will be assessed on sustainability performance using BREEAM guidelines. We want to achieve a BREEAM score of 'excellent'. This ranking will ensure that our campus, its buildings and the way we manage and operate our facilities is sustainable.

Reviewing our value chain carbon footprint

We recognize that environmental impact goes beyond our operations. In general, most of the environmental impact of energy consumption in our industry comes from the use of products and the greenhouse gas emissions in the downstream and upstream value chain. We expanded our scope by including a greater focus on scope 3 emissions.

Anticipating our new targets for the period 2020-2025, we made an inventory of the scope 3 emissions in our value chain in 2019. The parameters and methods used for the calculation of our scope 3 indirect emissions are based on guidance by the Greenhouse Gas Protocol, the organization that provides widely used international standards for this purpose. This means that the total volume of scope 3 emissions includes certain assumptions about the emission levels in the industries our suppliers operate in and about the lifetime of our products. We calculated the related scope 3 emissions based on the amounts spent on suppliers in different industries. Likewise, we calculated the impact on scope 3 emissions of the lifetime of our products, which is estimated at a relatively long 20 years, compared to industry peers. We focused on emissions from major suppliers, transportation, business travel and commuting, as well as emissions related to the use of our products. For more on the energy efficiency of our products, see Climate & energy - Energy efficiency of our products.

The results of the scope 3 emissions inventory show that around 94% are product-related emissions, in which the category 'downstream' – use of sold products – accounts for 60% and the category 'upstream' – purchased goods and services – accounts for 34% of the total emissions. The remaining 6% of our scope 3 emissions concern, among others, activities related to transportation, business travel and commuting.

This assessment will provide a benchmark for reduction targets in the coming years. The benchmark information is used to identify the most feasible hot spots for reducing carbon emissions. Recognizing that most suppliers have not yet established greenhouse gas inventory mechanisms, we encourage our value chain partners to work with us to jointly reduce greenhouse gas emissions.

Among the ongoing and planned initiatives to achieve our 2025 objectives we have defined reduction targets and projects for transportation, business travel and commuting.

Our environmental management system

We are committed to having an environmental management system in place that helps us monitor our energy and emissions, improve performance and enhance efficiency. The environmental management system is integrated into our combined Environmental, Health and Safety (EHS) management system. All our facilities operate on the basis of this EHS management system, which is ISO 14001 certified by third-party BSI and structured in accordance with ISO 45001 requirements. This certification gives our stakeholders the confidence that we are committed to achieving our environmental goals.

We measure progress in our emissions reductions by monitoring our scope 1, 2 and 3 emissions, representing three key performance indicators. Our participation in the annual assessment by the Carbon Disclosure Project, a non-profit global disclosure program, also helps steer our environmental initiatives. Our score in the most recent CDP Climate Change 2019 assessment is C, which is on same level as the sector average scoring.

Climate and energy KPIs


The table below shows the key performance indicators (KPIs) and the related 2025 targets. Our new sustainability strategy was adopted in 2019 - as a result no comparative results for 2017 and 2018 are shown for new indicators not previously disclosed. See Non-financial statements - Non-financial indicators for our performance indicators (PIs) and related results.

KPI	2017	2018	2019	Target 2025
Renewable electricity (of total electricity purchased)	70.2%	86.3%	96.6%	100.0%
Fossil fuels consumed (in TJ) by location				
Veldhoven	—	—	159	
Wilton	—	—	111	
Linkou	—	—	—	
San Diego	—	—	46	
Total	—	—	316	See scope 1
System energy efficiency NXE:3x00¹				
System	—	NXE:3400B	—	
Throughput	—	107	—	
Measured energy efficiency (kWh / wafer pass) ²	—	10.6	—	-60% from 2018 baseline
Scope 1 CO₂ emissions (in kton)³				
Gross	19.0	17.5	16.9	
Net	19.0	17.5	16.9	0.0
Scope 2 CO₂ emissions (in kton)³				
Gross	—	—	141.4	
Net	27.6	15.4	5.3	0.0

1. The 2018 measurement of the NXE:3400B is the baseline for the KPI target. No measurements have been performed in 2019.
2. System-energy efficiency is measured according to the SEMI S23 standard, and scaled to 100% availability of our systems.
3. Market-based conversion factors are used to calculate the Scope 1 and Scope 2 CO₂ emissions in kton. The consolidation approach of emissions: financial control (as outlined in the 'GHG Protocol Corporate Standard').

Contributing to the Sustainable Development Goals

Our ambitions, commitments and programs as described in this chapter contribute to the following SDGs. For more information on the performance, see section Non-financial statements - Non-financial indicators.

SDG target	How we measure our performance
 SDG target 13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	<ul style="list-style-type: none"> • Energy efficiency of our products measured per waferpass • Renewable electricity strategy • Scope 1 and 2 emissions • Optimize real estate to enhance energy efficiency

Water management

Semiconductor manufacturing processes use a lot of water. It's a scarce resource and the availability of water is a global challenge. Water is an essential resource in the semiconductor manufacturing process of our customers, however the water use in our own operations is limited. ASML's products are designed to use water according to a 'closed loop' (recycling) system. The water used in our manufacturing process is meant to keep the system cool against the heat released during the exposure process. The water consumption at ASML is more than 20 times less than most companies in the semiconductor industry. Nevertheless, we promote the responsible use of water throughout our company and our water-savings master plan in Veldhoven sets out our water-saving initiatives.

Operational excellence

ASML has achieved strong growth in the past few years due to groundbreaking innovations and technology leadership. We've introduced several generations of cutting-edge chipmaking systems and built significant market share in lithography systems. As we mature as a company and further build on this strong market position, we put effort into ways to continuously improve the customer experience and help customers reduce the cost of ownership. We seek to combine our innovation power with operational excellence.

Focus on people, process and product

In 2019, we pursued the Quality roadmap we introduced in 2016. This outlines what we need to do to improve quality and meet our customers' needs. In doing so, we focus on people, processes and products.

People

To enhance awareness of the importance of continuous quality improvement, our Quality Ambassadors share best practices and promote new ways of working in their teams. Our network of Quality Ambassadors grew to 285 employees worldwide in 2019. Quality is also an important topic during onboarding of new hires. We grew our Extended Quality Leadership Team, which directs the Quality professionals and the initiatives, to 60 people. Our Board of Management and senior management joined 22 'gemba walks' in 2019, on-site observations to help them understand workplace challenges. We also ran a range of other initiatives geared towards our employees, such as our annual FoQus event, where we discuss ways to improve quality. This year's theme was 'Cooperation, Accountability and Results'. Around 360 ASML quality professionals from 11 countries attended the event.

Process

At our annual Quality Day, we introduced a new problem-solving framework and 'problem definition' computer-based training. Another process improvement to enhance quality is our new centralized statistical process control (SPC), which we introduced at our TWINSCAN and EUV factory. This tool has been now deployed in all five factories. We involve our suppliers in the SPC program, and 50 suppliers were using SPC methods by year-end 2019. For our key customers, we introduced a new 'Quality heat map', which provides insight into how satisfied they are with our products and service level. It also highlights where we face challenges.

Product

We measure the results of our product-quality improvement efforts through different indicators. One of them is 'material quality performance' (MQP), indicating the part of the supplier deliveries with quality issues, which was at a level of 0.8% in 2015 and stabilized the last years to a level of 0.4% by the end of 2019. 'Quality at install', which indicates how well our systems operate upon installation at our customers' factories, improved by 31% compared to Q4 2018. Our focus on improvements in software quality resulted in a reduction of the number of software updates (patches) from 130 in 2016 to 50 this year (DUV and EUV). The dead-on-arrival rate, which keeps count of non-functioning spare parts, decreased from 1.2% in 2016 to 0.5% in 2018, and remained stable in 2019. We launched the Parts Quality Framework, which includes initiatives to enhance quality of spare parts and promote a 'First Time Right' approach when dealing with product-related issues.

Doing better with Lean

We have embraced the Lean philosophy for implementing operational excellence, and have introduced many initiatives across our business to improve our way of working. These initiatives are called 'deployments'. A deployment can have various goals, ranging from a quicker installation of our systems, to improved on-time delivery, to shifting from corrective to preventive maintenance. In 2019, we worked on more than 50 deployments. Six of these reached a mature stage. This means they laid the foundation for institutionalizing operational excellence within operations.

In 2019, we achieved major improvements in our strategy-deployment process. In a strategy deployment, we translate our longer-term objectives into one-year goals. We introduced the cross-sector value stream approach to better align targets and priorities.

We also made good progress in our objective of familiarizing 10,000 operations employees with our Lean way of working, reaching a group of about 7,000 employees.

CFO financial review

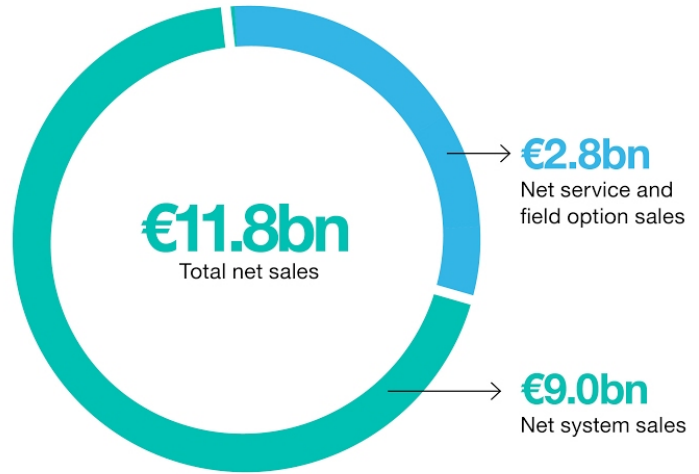
2019 financial performance



€2.40
Proposed annualized dividend per share



€6.16
Basic net income per ordinary share



€0.4bn
Share buyback



Total net sales per geographical region

All the data provided is expressed in € millions.

Asia

5,357

Taiwan

2,202

Korea

1,378

China

463

Japan

120

Singapore

3

Rest of Asia

America

1,980

US

Europe

314

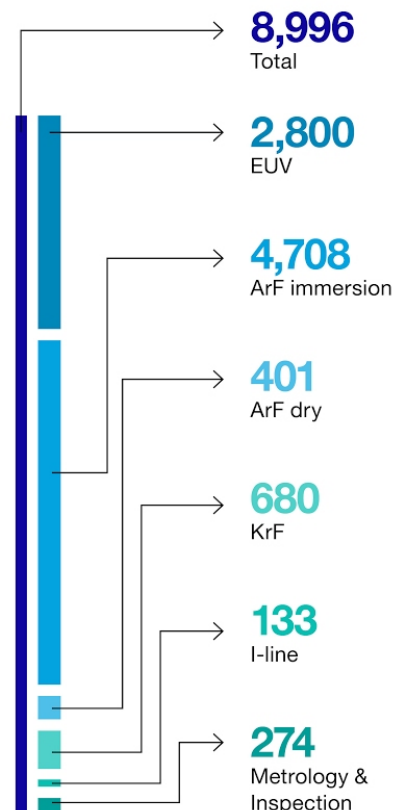
EMEA excl. Netherlands

3

Netherlands

Net system sales per technology

All the data provided is expressed in € millions.



Overview of the 2019 financial performance



Roger Dassen, Chief Financial Officer

'Major innovation drivers such as artificial intelligence, 5G, high-performance computing, autonomous driving and big data are resulting in an increased demand for leading edge nodes'

This was a growth year for ASML, setting another record with €11.8 billion in net sales, which is more or less in line with what we expected at the beginning of the year. We experienced a significant shift in net sales from Memory to Logic in 2019. Logic customers are accelerating the ramp-up of their leading edge nodes, while the Memory market continued to digest inventory in the supply chain and operate with reduced wafer output as they worked to reach a more normalized supply-demand balance. This led to a decrease in Memory demand while we experienced an increase in Logic demand. Major innovation drivers such as artificial intelligence, 5G, high-performance computing, autonomous driving and big data are enabling new end-user applications. These applications require increasingly more high performance Logic, fueling increased demand for leading edge nodes.

In EUV, it was a breakthrough year with the technology now starting in high-volume production and producing consumer products that are available in the market. We anticipated increasing our EUV shipments year on year from 18 to 30 in 2019, however due to temporary supply chain delays four EUV systems initially planned to ship in 2019 will now ship in early 2020. Despite these challenges, we successfully shipped 26 EUV systems, including our first NXE:3400C for use in high-volume manufacturing. In total, we shipped 9 NXE:3400Cs in 2019. The NXE:3400C delivers increased productivity of over 35%, as well as improved availability. The higher performance of the NXE:3400C offers significant customer value, and as we share in this higher value, it translates to improved pricing and margins for ASML.

While the increase in net sales led to an increase in total gross profit, gross profit as a percentage of net sales decreased from 46.0% in 2018 to 44.7% in 2019, primarily due to the product mix, including higher sales from EUV systems. While we continue to make solid progress on EUV gross profit, it still has a lower gross profit percentage compared to DUV. EUV gross profit includes negative gross profit impact from EUV services in 2019.

We continue to invest in the future of ASML, with a significant increase in 2019 to €2.0 billion. The increase is in line with our roadmap to bring EUV to high-volume manufacturing, the development of High-NA, as well as programs supporting our holistic lithography solutions in DUV and Applications.

We incurred a temporary decrease in our effective tax rate to 6.9% of income before income taxes in 2019, mainly due to an increase in tax benefits following the regulations of US Tax Reform.

Liquidity and free cash flow were attention areas in 2019. This is due to a combination of our sales being concentrated at the end of the year, the ongoing ramp-up of EUV, and our continued investment into the future. This is seen in the growth of our net working capital, as well as increased R&D and capital expenditure spend in 2019. In line with market practice and per investor requests, we adjusted our capital return policy and plans in 2019, introducing a semi-annual dividend. This adds an interim dividend payment in Q4. At the same time, we announced we would not complete the entire €2.5 billion share buyback program within the anticipated two-year time frame starting in January 2018.

Overall, it was another strong year for ASML, driven by Logic and the positive momentum in EUV. The expanding end-market applications that fuel demand for advanced nodes provide basis for continued growth and we continue to be excited about the future.

ASML operations update on key performance indicators

The following table presents the KPIs used by our Board of Management and senior management to measure performance.

	Year ended December 31		2018		2019	
	(in millions, unless otherwise indicated)		€	% ¹	€	% ¹
Sales						
Total net sales			10,944.0		11,820.0	
Increase in total net sales (%)			22.1		8.0	
Net system sales			8,259.1		8,996.2	
Net service and field option sales			2,684.9		2,823.8	
Sales of lithography systems (in units) ²			224		229	
Immersion systems recognized (in units)			86		82	
EUV systems recognized (in units)			18		26	
Profitability						
Gross profit			5,029.2	46.0	5,279.8	44.7
Income from operations			2,965.3	27.1	2,790.8	23.6
Net income			2,591.6	23.7	2,592.3	21.9
Liquidity						
Cash and cash equivalents			3,121.1		3,532.3	
Short-term investments			913.3		1,185.8	
Net cash provided by operating activities			3,072.7		3,276.4	
Free cash flow ³			2,463.2		2,390.5	

1. As a percentage of total net sales.

2. Lithography systems do not include metrology and inspection systems.

3. Free cash flow is a non-GAAP measure and is defined as net cash provided by operating activities (2019: €3,276.4 million and 2018: €3,072.7 million) minus purchase of property, plant and equipment (2019: €766.6 million and 2018: €574.0 million) and purchase of intangible assets (2019: €119.3 million and 2018: €35.5 million). We believe that free cash flow is an important liquidity metric, 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 because these payments are necessary to support the maintenance and investments in our assets to maintain the current asset base. Free cash flow therefore provides an alternative measure (in addition to net cash provided by operating activities) for investors to assess our ability to generate cash from our business. For further details about the purchase of property, plant and equipment and the purchase of intangible assets see Consolidated Financial Statements - Consolidated Statements of Cash Flows.

The following discussion and analysis of our results of operations should be viewed in the context of the risks that may interfere with our business objectives or otherwise affect our results of operations, see How we manage risk - Risk factors.

For our five-year financial summary, see Other appendices - Appendix - Selected financial data.

Operating results of 2019 compared to 2018

Year ended December 31 (in millions, except per share data)	2018		2019		2018 vs. 2019
	€	% ¹	€	% ¹	% Change
Net system sales	8,259.1	75.5	8,996.2	76.1	8.9
Net service and field option sales	2,684.9	24.5	2,823.8	23.9	5.2
Total net sales	10,944.0	100.0	11,820.0	100.0	8.0
Cost of system sales	(4,141.2)	(37.8)	(4,676.2)	(39.6)	12.9
Cost of service and field option sales	(1,773.6)	(16.2)	(1,864.0)	(15.8)	5.1
Total cost of sales	(5,914.8)	(54.0)	(6,540.2)	(55.3)	10.6
Gross profit	5,029.2	46.0	5,279.8	44.7	5.0
Research and development costs	(1,575.9)	(14.4)	(1,968.5)	(16.7)	24.9
Selling, general and administrative costs	(488.0)	(4.5)	(520.5)	(4.4)	6.7
Income from operations	2,965.3	27.1	2,790.8	23.6	(5.9)
Interest and other, net	(28.3)	(0.3)	(25.0)	(0.2)	(11.7)
Income before income taxes	2,937.0	26.8	2,765.8	23.4	(5.8)
Provision for income taxes	(351.6)	(3.2)	(191.7)	(1.6)	(45.5)
Income after income taxes	2,585.4	23.6	2,574.1	21.8	(0.4)
Profit (loss) related to equity method investments	6.2	0.1	18.2	0.2	193.5
Net income	2,591.6	23.7	2,592.3	21.9	—

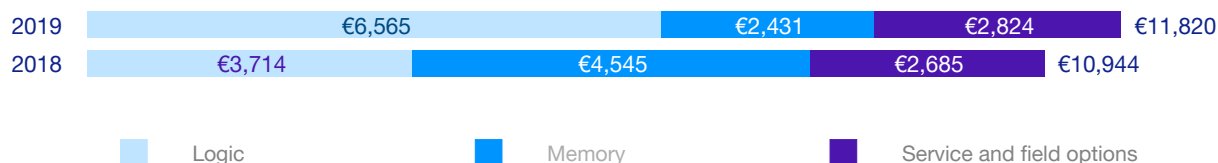
1. As a percentage of total net sales.

For a comparison of ASML's operating results for the fiscal year ended December 31, 2018 with the fiscal year ended December 31, 2017, please see Item 5.A of ASML's annual report on Form 20-F for the fiscal year ended December 31, 2018.

Total net sales and gross profit

We achieved another record year in 2019, mainly due to the growth of EUV into volume production, especially within the Logic market. Total net sales increased by 8.0%, driven by an increase in net system sales of 8.9%, with an increase in net service and field options sales of 5.2% in 2019 compared to 2018.

Significant shift in 2019 from Memory to Logic



Increase in 2019 net sales driven by growth in EUV



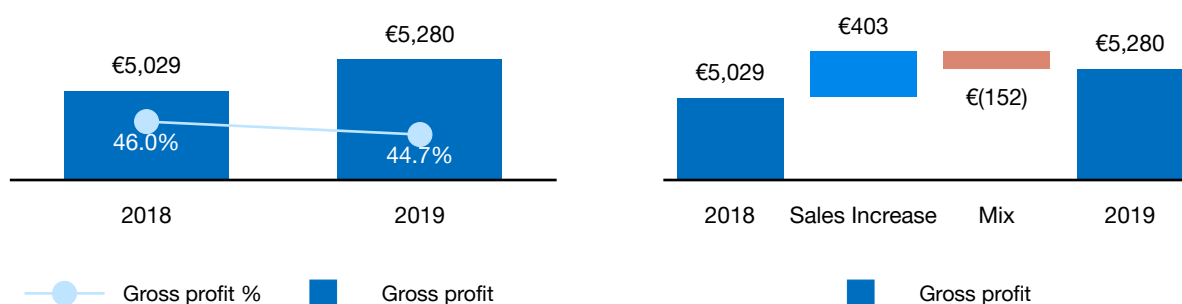
The increase in net system sales is driven by the increase in EUV, both in the number of units and also in the transition to the high productivity NXE:3400C model that has a higher ASP. The Logic sector was the largest end-user growth driver, as well as the largest consumer of our most advanced EUV systems. In addition to the growth in EUV, Logic was also the key driver for the DUV business in 2019, although DUV net sales were consistent from 2018 to 2019. This is due to net sales to the Memory sector decreasing significantly compared to 2018, as we saw our Memory customers digesting the capacity additions in 2017 and 2018 in order to keep demand and supply in balance. Taiwan saw the highest geographic system sales growth at over 100% in support of multiple new factories. Similar to DUV, Metrology & Inspection net sales decreased from 2018 to 2019 in line with Memory demand.

The slight increase in net service and field option sales is mainly driven by an increase in the sales of productivity and focus upgrade packages, in combination with a growing installed base, partially offset by lower field upgrade sales to Memory customers, as they were more focused on their spending control despite the fact there was less production loading at our Memory customers.

Gross profit

Gross profit increased as a result of an increase in sales, though Gross profit as a percentage of net sales decreased from 46.0% in 2018 to 44.7% in 2019, primarily due to the product mix, including higher sales from EUV systems. While we continue to make solid progress on EUV gross profit, it still has a lower gross profit percentage compared to DUV. EUV gross profit includes negative gross profit impact from EUV services in 2019. Additionally, the decreased sales to Memory impacted the DUV product mix in 2019, as well as it resulted in lower demand for our e-beam inspection tools, which are normally accretive. We exited the year with 48.1% gross profit percentage for the last quarter, which gives an indication of the improvements in EUV profitability throughout 2019, both in systems and services.

Growth from increased sales, offset by product mix

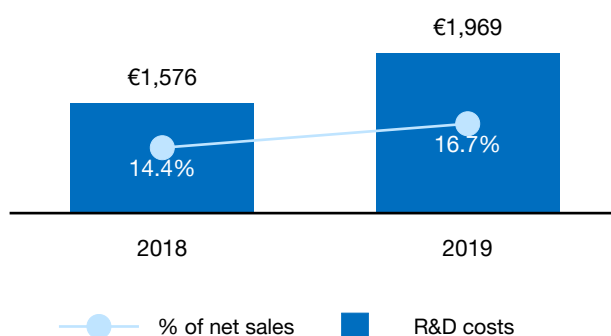


Research and development costs

R&D costs were €1,968.5 million in 2019 as compared to €1,575.9 million in 2018. The increase is in line with our roadmap to bring EUV to high-volume manufacturing, as well as our investments into the future through the development of High-NA. R&D costs for both 2019 and 2018 were primarily focused on programs supporting our holistic lithography solutions in EUV, DUV immersion, and Applications. In 2019, R&D activities mainly related to:

- EUV - Further improving availability and productivity focused on the final stages of industrialization related to our NXE:3400B system, as well as the accelerated introduction of the NXE:3400C. In addition, R&D activities included progressing our roadmap includes High-NA to support our customers with 2 nm logic and beyond
- DUV immersion - The industrialization of our latest generation immersion system NXT:2000i, development of our next generation immersion system NXT:2050 and migration of our ArF dry XT platform to our NXT platform. In addition we are completing industrialization of new modules and further improving our roadmaps on alignment/overlay and productivity
- Applications - Introduction of HMI multi-beam technology and further development of Yieldstar and process window control solutions

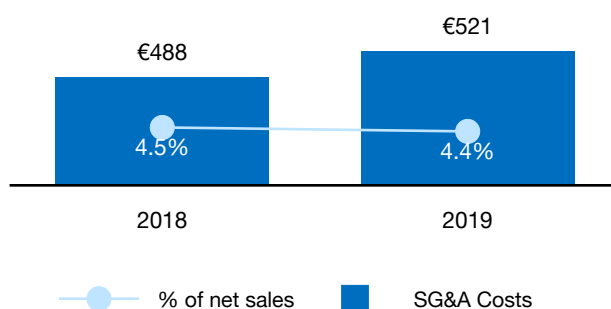
R&D costs grow as we invest in our future



Selling, general and administrative costs

SG&A costs increased by 6.7% from 2018 to 2019, though slightly declining as a percentage of net sales from 4.5% to 4.4%. The increased expense is due to the continued growth of our business, leading to growth in the number of employees, which is partly offset by a decrease in legal costs due to the settlement of the Nikon litigation in February 2019.

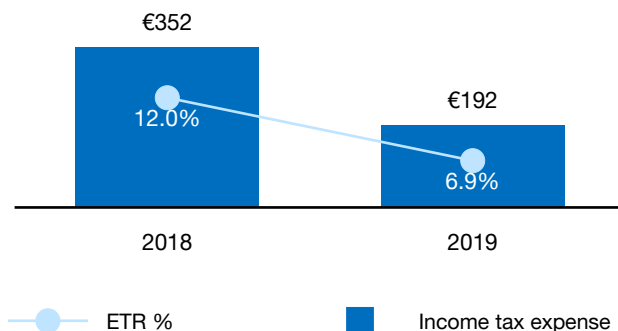
SG&A costs increase with growth of company; consistent as a % of net sales



Income taxes

The effective tax rate decreased to 6.9% of income before income taxes in 2019 compared to 12.0% in 2018, mainly due to an increase in tax benefits following the regulations of US Tax Reform.

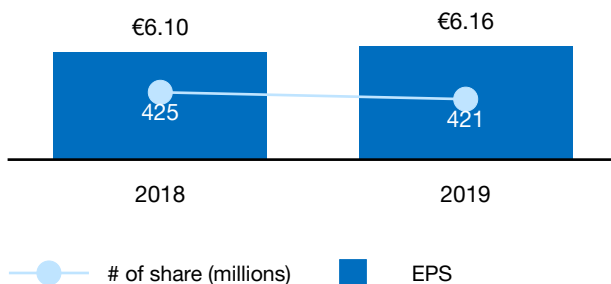
2019 ETR decreased mainly due to benefits from US tax reform



Net income

Net income in 2019 amounted to €2,592.3 million, or 21.9% of total net sales, representing €6.16 basic net income per ordinary share, compared with net income in 2018 of €2,591.6 million, or 23.7% of total net sales, representing €6.10 basic net income per ordinary share.

Increased earnings and reduction of shares leads to EPS growth



Financing policy

We continue to hold on to our long-held conservative financing policy, which is based on three foundational elements:

- Liquidity: Maintain financial stability with a target to keep our cash & cash equivalents, together with short-term investments, above a minimum range of €2.0 to €2.5 billion
- Capital structure: Maintain a capital structure that targets a solid investment grade credit rating
- Cash return: Provide a sustainable dividend per share that will grow over time, paid semi-annually, while returning structural excess cash to shareholders on a regular basis through share buybacks or capital repayment

Liquidity

Our principal sources of liquidity consist of cash and cash equivalents, short-term investments and available credit facilities. In addition, we may from time to time raise additional funding in debt and equity markets. We seek to ensure that our principal sources of liquidity will be sufficient to satisfy our liquidity requirements at all times.

Our liquidity needs are affected by many factors, some of which are based on the normal ongoing operations of the business, and others by the uncertainties of the global economy, the bulky character of our business and the specific characteristics of the semiconductor industry. Although our cash requirements fluctuate based on the timing and extent of these factors, we believe that cash generated from operations, together with our other sources of liquidity are sufficient to satisfy our expected requirements, including our expected capital expenditures, research and development expenses and debt servicing.

We invest our cash and cash equivalents and short-term investments in short-term deposits with financial institutions that have investment grade credit ratings and in money market and other investment funds that invest in high-rated short and medium-term debt securities. Our investments are mainly denominated in euros and to some extent in US dollars and Taiwanese dollars.

	Year ended December 31 (in millions)	2018 €	2019 €
Deposits with financial institutions		188.2	434.8
Investments in money market funds		2,342.6	2,139.7
Interest-bearing bank accounts		590.3	957.8
Cash and cash equivalents		3,121.1	3,532.3
Deposits with financial institutions		913.3	1,185.8
Short-term investments		913.3	1,185.8

Our available committed credit facility, with a group of banks, is €700.0 million as of December 31, 2019 and as of December 31, 2018. No amounts were outstanding under the committed credit facility at the end of 2019 and 2018. This facility was renegotiated in 2019, including the extension of the maturity date to July 2024 with two uncommitted 1-year extension options on the first and the second anniversary of the facility (extending the maturity potentially to 2026). In 2019 we entered into a local uncommitted credit facility with a bank in China ensuring local liquidity and operational requirements are met at all times, also given existing regulatory restrictions regarding flexible intercompany funding. The total amount of this facility is €130.0 million and covers bank guarantees, standby letters of credit, as well as advances up to €75.0 million. Per December 31, 2019, no amounts were outstanding under this facility.

Capital structure

Our objectives when managing our capital structure are to safeguard our ability to satisfy our capital providers by maintaining a capital structure that ensures liquidity and supports a solid investment grade credit rating. The capital structure includes both debt and the components of equity, in accordance with both US GAAP and IFRS. The capital structure is mainly altered by, among other things, adjusting the amount of dividends paid to shareholders, the amount of share buybacks or capital repayment, and any changes in the level of debt. Our capital structure is formally reviewed with the Supervisory Board each year in connection with our updated long term financial plan and relevant scenarios. The outcome of this year's review confirmed to maintain our historical financing policy in relation to our capital structure.

Our current credit rating from Moody's is A3 (stable) and from Fitch is A- (stable), which is consistent with the credit ratings as of December 31, 2018.

Our outstanding series of Eurobonds contain the following amounts and maturities:

- €500 million in 2022.
- €750 million in 2023.
- €1,000 million in 2026.
- €750 million in 2027.

Cash return policy

ASML aims to distribute a dividend that will be growing over time, paid semi-annually. In addition to dividend payments, we intend to return cash to our shareholders on a regular basis through share buybacks or capital repayment, subject to our actual and anticipated level of liquidity requirements and other relevant factors.

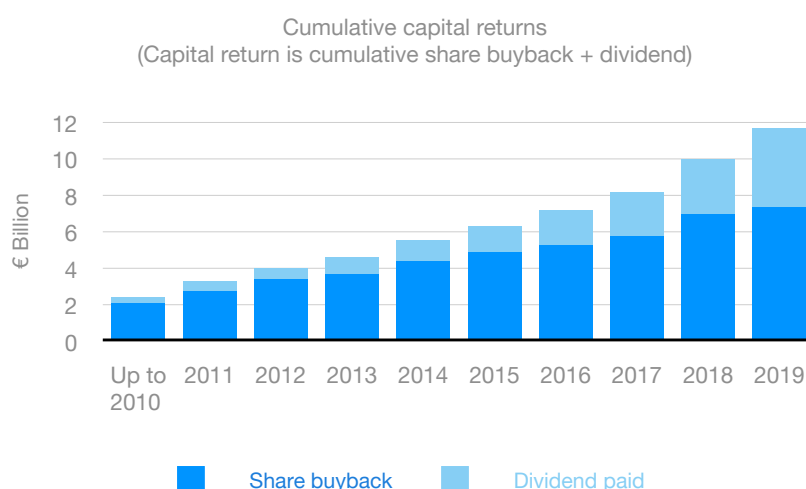
The dividend proposal and amount of share buybacks in any given year will be subject to the availability of distributable profits, retained earnings and cash, and may be affected by, among other factors, the Board of Management's views on our potential future liquidity requirements, including for investments in production capacity and working capital requirements, the funding of our R&D programs and for acquisition opportunities that may arise from time to time, and by future changes in applicable income tax and corporate laws.

Supported by our long-term business plan, we will submit a proposal at the 2020 Annual General Meeting to declare a total dividend for 2019 of €2.40 per ordinary share. Recognizing the interim dividend of €1.05 per share paid November 15, 2019, this leads to a final dividend of €1.35 per share to be paid in the second quarter of 2020. This is a 14% increase compared to the 2018 dividend of €2.10 per share.

On January 17, 2018, we announced a share buyback program amounting to €2.5 billion, to be executed within the 2018-2019 time frame. The shares to be repurchased under this program were intended to be canceled, with the exception of up to 2.4 million shares, which would be used to cover employee share plans.

In 2018, we repurchased 2,400,000 shares to cover employee share plans and 4,644,389 shares for cancellation for a total consideration of €1,146.2 million. No shares were canceled in 2018.

In January 2019, 5,806,366 ordinary shares were canceled, of which 3,468,737 shares were repurchased under the 2016-2017 program. In 2019, we repurchased 1,948,808 shares for cancellation for a total consideration of €410.0 million. The total number of repurchased shares under the 2018-2019 program was 8,993,197 shares for a total amount of €1,556.1 million and therefore the 2018-2019 program was not completed for the full amount.



Cash flow analysis

The cash flow results of 2019 were similar to 2018, however the cash provided by operating activities was heavily skewed towards the end of the year. This is due to a combination of our sales being concentrated at the end of the year, the introduction of down payments from our customers for EUV and prepayments from our customers. The ongoing ramp of EUV and our continued investment to secure our future growth opportunities requires significant cash investment in net working capital, capital expenditures and R&D. We are still able to return cash to our shareholders through a growing dividend, while introducing an interim dividend paid in Q4. At the same time, we announced we would not complete the entire €2.5 billion share buyback program within the two-year time frame starting in January 2018, this was partly caused by the heavily skewed cash flow pattern in 2019 and the payment of the interim dividend.

	Year ended December 31 (in millions)	2018 €	2019 €
Cash and cash equivalents, beginning of period		2,259.0	3,121.1
Net cash provided by (used in) operating activities		3,072.7	3,276.4
Net cash provided by (used in) investing activities		(491.5)	(1,157.5)
Net cash provided by (used in) financing activities		(1,724.3)	(1,712.3)
Effect of changes in exchange rates on cash		5.2	4.6
Net increase (decrease) in cash and cash equivalents		862.1	411.2
Cash and cash equivalents, end of period		3,121.1	3,532.3
Short-term investments		913.3	1,185.8
Cash and cash equivalents and short-term investments		4,034.4	4,718.1
Purchases of property, plant and equipment and intangible assets		(609.5)	(885.9)
Free cash flow		2,463.2	2,390.5

Net cash provided by (used in) operating activities

The net cash provided by operating activities in 2019 increased by €203.7 million compared to 2018 primarily due to the introduction of down payments from our customers for EUV and prepayments from our customers, partially offset by growth in our working capital. This growth is seen in the combined increase in Accounts receivable and Finance receivables of €350.3 million due to an increase in sales for EUV, skewed towards the end of the year, an increase in Inventories of €404.7 million in line with the ongoing ramp of EUV, an increase in Other assets of €199.1 million mainly a result of supporting the growth of our business through advanced payments to Carl Zeiss SMT GmbH, and an increase in Current tax assets and liabilities of €202.6 million driven by an increase in prepaid tax positions. Cash provided from operating activities includes the sale of Accounts receivable through a factoring arrangement totaling €1.3 billion.

Net cash provided by (used in) investing activities

Net cash used in investing activities increased in 2019 and consists primarily of purchases of property plant and equipment and intangible assets, which increased by €276.4 million in 2019 due to the ongoing ramp-up of EUV, acquisition of the intellectual property assets of Mapper and our continued investment to secure our future growth opportunities. Additionally there is an increase due to net conversion of cash and cash equivalents into short-term investments.

Net cash provided by (used in) financing activities

Net cash used in financing activities decreased in 2019 by €12.0 million and consists primarily of payment of dividends to shareholders and share repurchases. Purchases of shares through our share buyback program decreased by €736.2 million due to cash flows being heavily skewed towards the very end of the year. This decrease was partially offset by an increase in payment of dividends of €728.6 million as we introduced an interim dividend payment, aligning cash distributions closer to our cash flow pattern. We paid an interim dividend from our available distributable reserves of €1.05 per share on November 15, 2019.

Long-term growth opportunities

Trend information

We expect 2020 to be another growth year supported by healthy Logic demand and a likely recovery of the Memory market in second half of the year. The expected growth is primarily driven by increasing EUV sales, as well as significant growth in our Installed Base business. The positive industry momentum around innovation and expanding new markets further strengthen our confidence in the 2020 outlook and our 2025 growth scenarios.

In Logic, we see the major innovation drivers that fueled increased demand for leading edge nodes in 2019, continuing to drive demand in 2020. This is evident in several customer announcements regarding ramp-up plans for 7 and 5 nm nodes.

In Memory, customers have indicated they are seeing early signs of demand recovery in some market channels and improvements in memory chip pricing also support this view. As customers have lowered lithography tool utilization to reduce wafer output throughout the weak memory demand period, they will first use this underutilization to return to normal supply levels. Subsequently, this is expected to trigger equipment demand. As a result, it seems likely that we will see stronger lithography equipment demand from the Memory market in the second half of 2020.

Increasing customer confidence in EUV is translating into more layers in Logic production as well as expanding to new markets with the adoption in Memory. We continue to see demand building for next years' shipments and expect a healthy order flow to continue. In order to fulfill the expected strong demand increase, we expect to ship 35 systems in 2020 and are working on cycle time reduction to enable a capacity of 45-50 systems next year.

We expect significant growth in our Installed Base Management business as the demand for services will continue to expand as our installed base grows. Additionally, we anticipate an increased contribution to service sales from EUV as these systems start running wafers in volume manufacturing, as well as expect significant demand for upgrades, particularly in EUV, as customers utilize upgrades as a quick way to increase capacity.

Our expectations and guidance for the first quarter of 2020 can be summarized as follows:

- Total net sales of between €3.1 billion and €3.3 billion
- Gross margin of between 46% and 47%
- R&D costs of around €550 million
- SG&A costs of around €140 million
- Effective annualized tax rate of around 13%

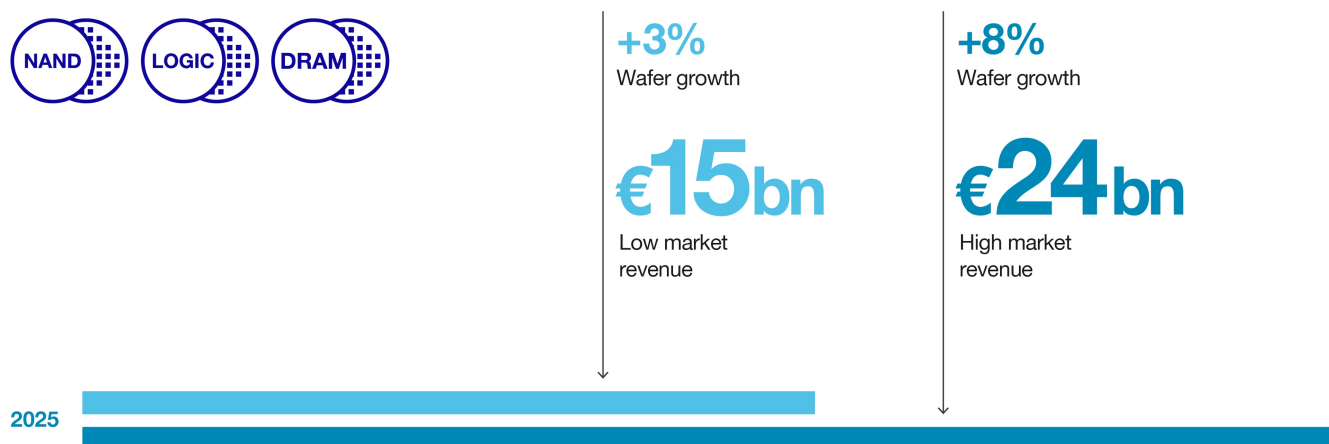
The trends discussed above are subject to risks and uncertainties. See Special note regarding forward-looking statements.

Outlook 2025

In November 2018, we presented our extended view of our long-term growth opportunity up to 2025.

For 2025, we have modeled potential revenue scenarios within the context of different business sensitivities. We recognize our potential growth opportunity is sensitive to market growth, and potential annual revenue for 2025 between €15 billion in a low-market scenario and €24 billion in a high-market scenario.

Outlook 2025



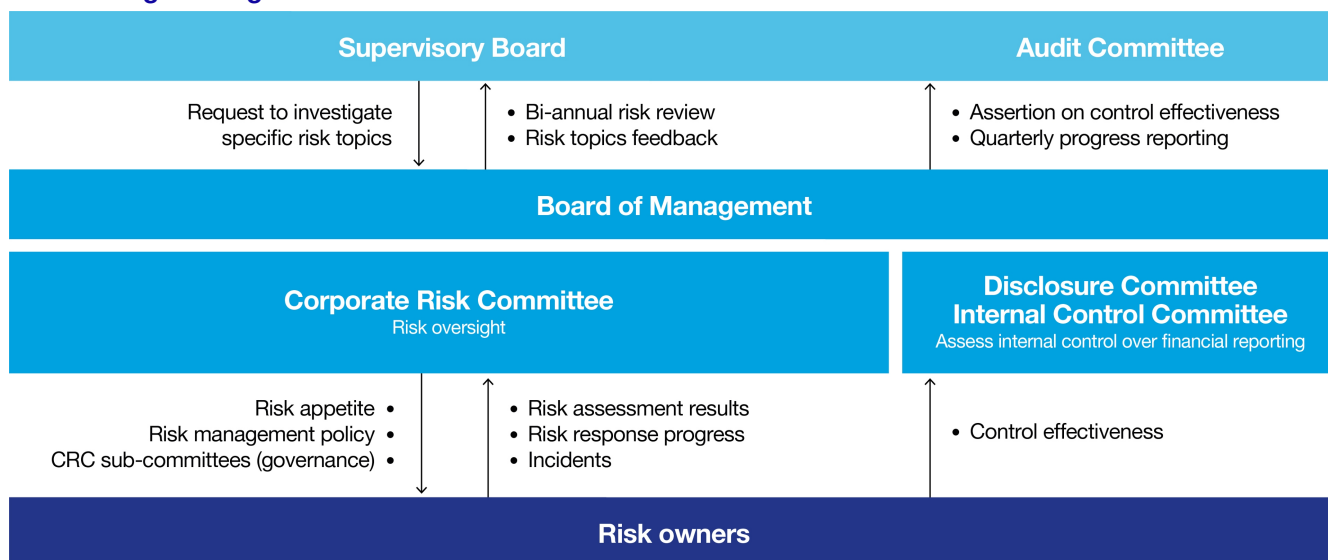
Our revenue potential is primarily based on organic growth. We continuously review our product roadmap and have, from time to time, made focused acquisitions / equity investments to enhance the industrial value of our product offering. Based on such reviews and the assessment of clear potential product and value synergies, we may also evaluate and pursue focused merger and acquisition activities in the future. Within this growth ambition, we expect to continue to return significant amounts of cash to our shareholders through a combination of share buybacks and growing annualized dividends.

How we manage risk

Business risk and continuity

The Corporate Risk Management function helps us achieve our objectives by setting standards and enabling management to make ASML's governance, risk management, internal control and compliance more efficient and effective. The function also helps to identify opportunities that allow us to achieve our objectives and enable continuous sustainable growth.

Risk management governance



The Board of Management is responsible for ensuring that we comply with applicable legislation and regulations. It's also responsible for managing the internal and external risks related to our business activities.

The Board of Management has delegated its risk oversight to ASML's Corporate Risk Committee. The committee is chaired by the COO and comprises senior management representatives from all sectors within ASML, including the CEO and CFO. It works as a central risk oversight body, which reviews, manages and controls risks in our risk universe. It also approves the risk appetite (i.e. the acceptable level of risk), risk-management policies and risk-mitigation strategies. Our risk universe is reviewed annually. We take into account a broad range of internal and external information sources such as macroeconomic and industry trends, relevant guidelines and legislation (e.g. the EU Directive on disclosure of non-financial and diversity information and the Dutch Corporate Governance Code), and stakeholders' needs and expectations in all areas, including sustainability. We may have a different risk appetite for different identified risks, and our approach is geared towards mitigating the risks to a reasonable level.

Our Vice President Corporate Risk and Assurance is responsible for leading the development and maintenance of the Enterprise Risk Management (ERM) framework and facilitates the execution of the ERM process. This enables the organization to meet business objectives.

Our ERM process assesses both top-down (company-level) and bottom-up (organization and process-level) risks. It is built on a comprehensive risk universe, consisting of external and internal risk factors that could influence our operational, business continuity, financial and regulatory compliance objectives.

The risk universe allows consolidated and comparative analysis across ASML. The ERM process is also there to make sure that actions to mitigate risk are monitored through a system of multidisciplinary assessments, reporting and operational reviews. These include:

- Senior management meetings to assess ASML's corporate initiatives, as well as the execution of our strategy.
- Operating and business review meetings with ASML's senior management. These focus on financial performance, the realization of operating objectives and responses to emerging issues.
- Quarterly updates of ASML's risk landscape, aligning key operational risk areas with the Corporate Risk Committee.
- ASML's risk universe and risk landscape are aligned with associated risk owners at least once a year.
- We execute risk assessments according to the risk management plan and any additional engagement approved by the Corporate Risk Committee.
- ASML's Anti-fraud Policy develops controls to aid in preventing, deterring and detecting fraud against ASML.
- Assurance assignments are performed by internal audit.
- On a semi-annual basis, ASML's key senior management members sign letters of representation. These confirm, among other things:
 - Compliance with applicable laws and regulations.
 - Adequate processes and controls that enable the preparation of financial statements.
 - Completeness of transactions and commitments.
- There is regular reporting and review by the Supervisory Board.

In the risk-management process, the Supervisory Board provides independent oversight on management’s response to mitigating critical risk areas based on biannual risk reviews. The Supervisory Board's Audit Committee provides independent oversight on the risk-management process and timely follow-up on priority actions based on quarterly progress updates.

The Disclosure Committee and Internal Control Committee are there to make sure risk management complies with external reporting requirements, and to assess the effectiveness of related internal controls over financial reporting.

The Disclosure Committee tracks compliance with requirements arising from US and Dutch law, and applicable stock exchange rules, US GAAP, EU-IFRS and the Sarbanes-Oxley Act. The committee is made up of various members of the senior management team, and reports to the CEO and CFO. The Chair reports to the Audit Committee on the outcome of meetings. The Disclosure Committee gathers all relevant financial and non-financial information and assesses whether public disclosures are accurate and complete. Along with the Internal Control Committee, it also advises the CEO and CFO on the effectiveness of the disclosure controls and procedures, and the internal control over financial reporting (the Sarbanes-Oxley Act).

The Internal Control Committee, which includes three members of the Disclosure Committee, advises the Disclosure Committee in its assessment of our internal control over financial reporting and disclosures, under the Sarbanes-Oxley Act. The Chair of the Internal Control Committee updates the Audit Committee, the CEO and CFO on the progress of this assessment. The Chair also includes this item in the report to the full Supervisory Board.

Risk management process



All material risk-management activities have been discussed with the Audit Committee and the Supervisory Board. See How we manage risk - Risk factors. See also Leadership and governance - Corporate governance - Other information on governance - ASML Reports.

We define strategies to address relevant risks and take these into account when we define the corporate priorities. For example:

- To address the rapid commercial and technological changes in the semiconductor industry, as well as the increasing complexity in executing our product introduction roadmap, we focus on partnerships, collaboration and knowledge-sharing with our customers and suppliers. We work closely to align roadmaps, oversee execution and ensure we maximize customer value. See What we achieved in 2019 - Technology and innovation ecosystem and Our supply chain.
- To address our dependence on a limited number of suppliers, we nurture high-quality and collaborative relationships with our suppliers. We share our expert knowledge, including risks and rewards, so we all work together to achieve cost-effective shrink, boost innovation and enable our industry to grow. See What we achieved in 2019 - Our supply chain.
- To address risks related to intellectual property rights, we have developed a management mechanism to not only protect our own intellectual property rights, but also respect the intellectual property of other parties. To protect ourselves from incidents related to cybersecurity, we have set up a broad information-security program, which looks at measures to prevent, detect and respond to security threats.
- To address the scarcity of staff with specific technical expertise, we put effort into educating, training and retaining talent. We also promote initiatives that encourage young people to study science, technology and engineering. See What we achieved in 2019 - Our people.

Risk factors

In conducting our business, we face many risks that may interfere with our business objectives. It is important to understand the nature of these risks. We assess our risks by using the risk universe below. ASML categorizes the significant risks that it faces into the six categories below. Any of these risks and 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.

ASML Risk universe

Strategy and products

- Industry cycle risk
- Political risk
- Climate change risk
- Product portfolio risk
- Business model risk
- Merger & acquisition risk
- Competition risk
- Innovation risk
- Product stewardship risk
- Roadmap execution risk
- Intellectual property rights risk

Finance and reporting

- Business planning risk
- Foreign exchange rate risk
- Liquidity risk
- Interest rate risk
- Capital availability risk
- Counterparty credit risk
- Shareholder activism risk
- Disclosure/external reporting risk

Partners

- Customer dependency risk
- Cost of ownership risk
- Product / service quality risk
- Supplier strategy & performance risk
- Supply chain disruption risk

People

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

Operations

- Product industrialization risk
- Process effectiveness & efficiency risk
- Safeguarding of assets risk
- Environment, health & safety risk
- Continuity of own operation risk
- Information security risk
- Information technology risk

Legal and compliance

- Legal liability risk
- Violation of laws & regulations risk
- Internal control / compliance risk

Strategy and products

Our business will suffer if we or the industry do not respond rapidly to commercial and technological changes in the semiconductor industry

Our success in developing new technologies, products, and in enhancing our existing products, depends on a variety of factors. These include the success of our and our suppliers' R&D programs and the timely and successful completion of product development and design relative to competitors. Our business will suffer if the technologies that we pursue to assist our customers in producing smaller and more energy-efficient chips are not as effective as those developed by competitors, or if our customers adopt new technological architectures that are less focused on lithography products. The success of our EUV technology, which we believe is critical for keeping pace with Moore's Law – which postulates that the number of transistors on a chip doubles approximately every 24 months at equivalent cost – remains dependent on continuing technical advances by us and our suppliers. We invest considerable financial and other resources to develop and introduce new technologies, products and product enhancements. If we are unsuccessful in developing new technology, products and product enhancements such as High-NA and multi-beam, or if competitors successfully introduce alternative technologies or processes, our competitive position and business may suffer and we may be unable to recoup some or all of the investments that we have made.

We may incur increased costs related to inventory obsolescence, as a result of technological changes. Such costs may be higher as the complexity of technology increases.

Due to the highly complex nature of our systems including newer technologies, our customers may purchase existing technology systems rather than new leading-edge systems or may delay their investment in new technology systems to the extent that such investment is not economical or required given their product cycles. Some of our customers have experienced and may continue to experience delays in implementing their product roadmaps, which increases the risk of slowing down the overall transition period (or cadence) for the introduction of new systems.

We are also dependent on our suppliers to maintain their development roadmaps to enable us to introduce new technologies on a timely basis, and if they are unable to keep pace whether due to technological factors, lack of financial resources or otherwise, this could prevent us from meeting our development roadmaps.

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

Our lithography systems and applications have become increasingly complex, and accordingly, the costs and time period to develop new products and technologies have increased, and we expect such costs and time period to continue to increase. In particular, developing new technology such as High-NA and multi-beam requires significant R&D investments by us and our suppliers in order to meet our and our customers' technology demands. Our suppliers may not have, or may not be willing to invest in the resources necessary to continue the development of the new technologies to the extent such investments are necessary, which 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, we may be unsuccessful in introducing new products and unable to recoup our R&D investments.

We face intense competition

The lithography equipment industry is highly competitive. Our competitiveness depends upon our ability to develop new and enhanced lithography equipment, related applications and services that are competitively priced and introduced on a timely basis, as well as our ability to protect and defend our intellectual property rights. We compete primarily with Canon and Nikon in respect of systems. Both Canon and Nikon 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 particular, we face competition from Nikon and Canon in existing technologies such as DUV systems. In addition, adverse market conditions, industry overcapacity or a decrease in the value of the Japanese yen in relation to the euro, could further intensify price-based competition, resulting in lower prices, and lower sales and margins.

We also compete with providers of applications that support or enhance complex patterning solutions, e.g. Applied Materials Inc. and KLA-Tencor Corporation. These applications effectively compete with our Applications offering, which has become an increasingly significant part of our business. The competition we face in our applications business may be higher than for our systems, as there are more competitors and potential competitors in this market.

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

As a supplier to the global semiconductor industry, we are subject to the industry's business cycles, of which the timing, duration and volatility are difficult to predict. The semiconductor industry has historically been cyclical. Newer entrants in the industry, including Chinese entrants, could increase the risk of cyclicity in the future. Certain key end-market customers – Memory and Logic – exhibit different levels of cyclicity and different business cycles. Sales of our lithography systems, services and other holistic lithography products depend in large part upon the level of capital expenditures by semiconductor manufacturers, which in turn are influenced by industry cycles and a range of competitive and market 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.

Our ability to maintain profitability in an industry downturn will depend substantially on whether we are able to lower our costs and break-even level, which is the level of sales that we must reach in a year to have positive net income. If sales decrease significantly as a result of an industry downturn and we are unable to adjust our costs over the same period, our net income may decline significantly or we may suffer losses. Furthermore, as the value per system increases and we have and continue to grow in terms of employees, facilities and inventories, it may be more difficult for us to reduce our costs in order to respond to an industry downturn.

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

We derive most of our revenues from the sale of a relatively small number of lithography systems (229 units in 2019 and 224 units in 2018). As a result, the timing of shipment, including any delays, and recognition of system sales for a particular reporting period from a small number of systems may have a material adverse effect on our business, financial condition and results of operations in that period. Due to the higher average sales price of EUV systems as compared to DUV, fluctuations in EUV orders and EUV systems sales may have a larger impact on our results.

Failure to adequately protect the intellectual property rights upon which we depend could harm our business

We rely on intellectual property rights such as patents, copyrights and trade secrets to protect our proprietary technology and applications. However, we face the risk that such measures could prove to be inadequate and we could suffer material harm because, among other things:

- Intellectual property laws may not sufficiently support our proprietary rights or may change in the future in a manner adverse to us;
- Patent rights may not be granted or interpreted as we expect;
- Patents will expire which may result in key technology becoming widely available that may harm our competitive position;
- The steps we take to prevent misappropriation or infringement of our proprietary rights may not be successful; and
- Third parties may be able to develop or obtain patents for similar competing technology.

In addition, legal proceedings may be necessary to enforce our intellectual property rights, to determine the validity and scope of the proprietary rights of others, or to defend against claims of infringement. Any such proceedings may result in substantial costs and diversion of management resources, and, if decided unfavorably to us, could result in significant costs or have a significant impact on our business.

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

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

In addition, our customers or suppliers may be subject to claims of infringement from third parties, 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 or suppliers for some or all of any losses incurred or damages assessed against them as a result of such infringement.

We also may incur substantial licensing or settlement costs to settle disputes or to potentially strengthen or expand our intellectual property rights or limit our exposure to intellectual property claims of third parties.

Since May 2017, a number of patent infringement suits between Nikon on the one hand and ASML and its supplier Carl Zeiss SMT GmbH were pending in multiple jurisdictions. In early 2019 we settled this litigation – see Note 16 Commitments, contingencies and guarantees for more information.

While we have settled this litigation with Nikon, the royalty reports and payments due to Nikon under the cross license are subject to Nikon's audit and review (and vice versa). We continue to face the risk that we may be subject to claims alleging the infringement of others' patents or intellectual property rights or involved in patent litigation to defend our intellectual property rights.

Patent litigation is complex and may extend for a protracted period of time, giving rise to the potential for both 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, and / or settlement involving significant costs to be paid by us.

We are exposed to economic and political developments in our international operations that could adversely impact our business, financial condition and results of operations

Global trade issues and changes in and uncertainties with respect to multilateral and bilateral treaties and trade policies, including the ability to obtain required licenses and approvals and the effects of trade sanctions, export controls, tariffs and similar regulations and international trade disputes, can impact our ability to produce and deliver our systems and services internationally.

Certain of our manufacturing facilities as well as customers are located in Taiwan. Customers in Taiwan represented 45.3% of our 2019 total net sales and 18.2% 2018 total net sales. Taiwan has a unique international political status. The People's Republic of China asserts sovereignty over Taiwan and does not recognize the legitimacy of the Taiwanese government. Changes in relations between Taiwan and the People's Republic of China, Taiwanese government policies and other factors affecting Taiwan's political, economic or social environment could have a material adverse effect on our business, financial condition and results of operations. Furthermore, certain of our manufacturing facilities as well as customers are located in South Korea. Customers in South Korea represented, 18.6% of our 2019 total net sales and 34.0% of our 2018 total net sales were derived from customers in South Korea. There are tensions with the Democratic People's Republic of Korea (North Korea), which have existed since the division of the Korean Peninsula following World War II, which have increased significantly in recent years. A worsening of relations between those countries or the outbreak of war on the Korean Peninsula could have a material adverse effect on our business, financial condition or results of operations.

We have a presence or do business in a number of jurisdictions, including the People's Republic of China and Russia. In particular, our business in People's Republic of China has increased in recent years and is expected to increase further. Such increased presence in new jurisdictions increases the risks we face, including risks relating to compliance with multilateral and bilateral treaties, delays in receipt of appropriate permits, compliance with anti-corruption and anti-bribery laws and regulations, our ability to effectively manage and control our growing business, attracting and retaining sufficiently qualified personnel, the protection of our intellectual property and information technology systems and restrictions on repatriation of cash abroad. For example, we have and are continuing to experience delays in processing work permits for foreign nationals, which could potentially delay development and support provided to customers.

The US administration has enacted trade measures, including import tariffs and other tariffs on People's Republic of China and on other countries and restrictions on conducting business with certain Chinese entities. The European Union and other countries, including China, have raised tariffs on certain products from the United States. Our business involves the sale of systems and services to customers in a number of countries, including China where our business has grown in recent periods, and includes sensitive technologies that may be the subject of increased export regulations, policies or practices. These and further 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. Such developments can impact our ability to sell systems and services to our customers and to obtain necessary permits, including permits for use of US technology and for employees producing and developing such technology.

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

We may in the future acquire businesses or technologies to complement, enhance or expand our current business or products or that might otherwise offer us growth opportunities. Any such acquisitions could fail to achieve our financial or strategic objectives, fail to perform as we plan or disrupt our ongoing business and adversely impact our results of operations. Furthermore, our ability to complete such transactions may be hindered by a number of factors, including potential difficulties in obtaining government approvals.

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

In connection with acquisitions, anti-trust regulators have in the past and may in the future impose conditions on us, including requirements to divest assets or other conditions that could make it difficult for us to integrate the businesses that we acquire. Furthermore, as the industry is becoming more consolidated, anti-trust clearances may become harder to obtain, which could inhibit future desired acquisitions.

As a result of acquisitions, we have recorded, and may continue to record, a significant amount of goodwill and other intangible assets. Current accounting guidelines require, at least annually and potentially more frequently, assessment of whether there are indicators that the value of goodwill or other intangible assets has been impaired. Furthermore, we have recorded our indirect interest in Carl Zeiss SMT GmbH as an equity method investment and, therefore, we must assess in each reporting period whether there are triggers that cause this investment to be impaired. Any reduction or impairment of the value of our indirect investment in Carl Zeiss SMT GmbH, goodwill or other intangible assets will result in additional charges against earnings, which could materially reduce our reported results of operations in future periods.

Finance and reporting

Fluctuations in foreign exchange rates could harm our results of operations

We are exposed to currency risks. Our Financial Statements are expressed in euros. Accordingly, our results of operations are exposed to fluctuations in exchange rates between the euro and such other currencies, and 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 Korean won and the Taiwanese dollar 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, yen, US dollar or Taiwanese dollar.

In general, our customers run their businesses in US dollars and therefore a weakening of the US dollar against the euro might impact the ability or desire of our customers to purchase our products at quoted prices.

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

We aim to pay a semi-annual dividend that is growing (on an annualized basis) over time, and we conduct share buyback programs from time to time. The dividend proposal and amount of share buybacks in any given year will be subject to the availability of distributable profits, retained earnings and cash, and may be affected by, among other factors, the Board of Management'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 for acquisition opportunities that may arise from time to time, and by future changes in applicable income tax and corporate laws. We may also suspend buyback programs from time to time, which would reduce the amount of cash we are able to return to shareholders. Accordingly, the Board of Management may decide to propose not to pay a dividend or pay a lower dividend and may suspend, adjust the amount of or discontinue share buyback programs or we may otherwise fail to complete buyback programs.

Restrictions on shareholder rights may dilute voting power

Our Articles of Association provide that we are subject to the provisions of Dutch law applicable to large corporations, called 'structuurregime'. These provisions have the effect of concentrating control over certain corporate decisions and transactions in the hands of our Supervisory Board. As a result, holders of ordinary shares may have more difficulty in protecting their interests in the face of actions by members of our Supervisory Board than if we were incorporated in the US or another jurisdiction.

Our authorized share capital also includes a class of cumulative preference shares and we have granted Stichting Preferente Aandelen ASML, a Dutch foundation, an option to acquire, at their 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.

See Leadership and governance - Corporate governance - Board of Management and Supervisory Board, and Consolidated Financial Statements - Notes to the Consolidated Financial Statements - Note 21 Shareholders' equity.

Partners

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

We rely on outside 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, as 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. 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 a timely manner or at all, additional costs resulting from switching to alternate suppliers, reduced control over pricing and quality. Delays in supply of these components and subassemblies, which could occur for a variety of reasons, such as disruptions experienced by our suppliers, including work stoppages, fire, cyber attacks, energy shortages, pandemic outbreaks such as the novel corona virus, flooding or other natural disasters, can lead to delays in delivery of our products which would impact our business. A 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, which could damage relationships with our customers and materially impact our business.

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

In addition, some of our key suppliers, including Carl Zeiss SMT GmbH, 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, and 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, which can lead to delays in delivery of our systems and can limit our capabilities to react quickly to changing market conditions. Conversely, a failure to predict demand could lead to excess and obsolete inventory.

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

Historically, we have sold a substantial number of lithography systems to a limited number of customers. Customer concentration 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 of our systems. Consequently, while the identity of our largest customers may vary from year to year, sales may remain concentrated among relatively few customers in any particular year. The recognized total net sales to our largest customer from each year accounted for €4,688.6 million, or 39.7% of total net sales in 2019, compared with €2,476.8 million, or 22.6% of total net sales in 2018 and €2,454.4 million, or 27.4% of total net sales in 2017. The loss of any significant customer or any significant reduction or delay in orders by a significant customer may have a material adverse effect on our business, financial condition and results of operations.

Additionally, as a result of our limited number of customers, credit risk on our receivables is concentrated. Our three largest customers (based on total net sales) accounted for €2,191.8 million, or 77.2% of accounts receivable and finance receivables on December 31, 2019, compared with €1,491.3 million, or 58.8% on December 31, 2018. Accordingly, business failure or insolvency of one of our main customers could result in significant credit losses.

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

Our business and future success significantly depends upon our employees, including a large number of highly qualified professionals, as well as our ability to attract and retain employees. Competition for such personnel is intense and has increased in recent years, and we may not be able to continue to attract and retain such personnel. Our R&D programs require a significant number of qualified employees. If we are unable to attract sufficient numbers of qualified employees, this could affect our ability to conduct our R&D on a timely basis. In addition, if we lose key employees or officers to retirement, illness or otherwise, particularly a number of our highly qualified professionals and / or senior management, we may not have sufficient time to find a suitable replacement. Moreover, 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 (e.g. from other industries or companies). As a result, we must educate and train our employees to work on our systems. Therefore, a loss of a number of key professionals and / or senior management can be disruptive, costly and time consuming. Our R&D activities with respect to new technology systems, such as High-NA and for further development of EUV technology, and our service activities have increased our need for qualified personnel. Competition for qualified personnel is particularly significant in the area surrounding our headquarters in Veldhoven, the Netherlands, and in the other regions where our facilities are located, where a number of other high technology companies are also located.

Furthermore, the increasing complexity of our products results in a longer learning-curve for new and existing employees and suppliers leading to an inability to decrease cycle times and may result in the occurrence of significant additional costs. Our suppliers face similar risks in attracting qualified employees, including attracting employees in connection with R&D programs that will support our R&D programs and technology developments. To the extent that our suppliers are unable to attract qualified employees, this could impact our R&D programs or deliveries of components to us.

In recent years, our organization has grown significantly. As a result of this growth in a short period of time, we may be unable to effectively manage, monitor and control our employees, facilities, operations and other resources.

Operations

We may face challenges in managing the industrialization of our products and bringing them to high-volume production, which could impact profitability

Bringing our 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 our ability to manage costs. Customer acceptance of our products depends on performance of our products in the field. As our products become more complex, we face an increasing risk that products that we develop may not meet development milestones or specifications and that our products may not perform according to specifications, including quality standards, increases. If our products do not perform according to specifications and performance criteria or if quality or performance issues arise, this may result in additional costs, reduced demand for our products, and our customers being unable to meet planned wafer capacity.

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

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, as new products may have higher cycle times to produce resulting in increased working capital needs. This impact on liquidity increases as our products become more complex and expensive.

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

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

All of our manufacturing activities, including subassembly, final assembly and system testing, take place in cleanroom facilities in Veldhoven, the Netherlands, in Wilton, Connecticut, and in San Diego, California, both in the US, in Pyeongtaek, South-Korea, in Beijing, China, in Linkou and Tainan, Taiwan. These facilities may be subject to disruption for a variety of reasons, including work stoppages, fire, energy shortages, pandemic outbreaks such as the novel corona virus, flooding or other natural disasters. We cannot ensure that alternative production capacity would be available if a major disruption were to occur.

Hazardous substances are used in the production and operation of our systems and failure to comply with applicable regulations or failure to implement appropriate practices for the environment, health and safety could subject us to significant liabilities

Hazardous substances are used in the production and operation of our products and systems, which subjects us to a variety of governmental regulations relating to environmental protection, and employee and product health and safety, including 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 systems) can be dangerous and can result in injury. The failure to comply with current or future regulations could result in substantial fines being imposed on us or other adverse consequences. Additionally, our products have become increasingly complex. The increasing complexity requires us to invest in continued 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. Failing to comply with applicable regulations or the failure of our implemented practices for customer and employee health and safety could subject us to significant liabilities.

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

We rely on the accuracy, availability and security of our information technology systems. Despite the measures that we have implemented, including those related to cybersecurity, our systems could be breached or damaged by computer viruses and systems attacks, natural or man-made incidents, disasters or unauthorized physical or electronic access.

From time to time, we experience cyber attacks on our information technology systems as well as the information technology systems of our suppliers, customers and other service providers, whose systems we do not control. These attacks include malicious software (malware), attempts to gain unauthorized access to data, and other electronic security breaches of our information technology systems as well as the information technology systems of our suppliers, customers and other service providers that have led and could lead, for us, our customers, suppliers or other business partners, including R&D partners, 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). In addition any system failure, accident or security breach could result in business disruption, theft of our intellectual property, trade secrets (including our proprietary technology), 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. Furthermore, computer viruses or other malware may harm our systems and software and could be inadvertently transmitted to our customers' systems and operations, which could result in loss of customers or litigation. We may also be required to incur significant costs to protect against or repair the damage caused by these disruptions or security breaches in the future, 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, providing customers with incentives to maintain the business relationship, or taking other remedial steps with respect to third parties. These cybersecurity threats are constantly evolving. We, therefore, remain potentially vulnerable to additional known or yet unknown threats, as in some instances, we, our customers, and our suppliers may be unaware of an incident or its magnitude and effects. We also face the risk that we expose our customers to cybersecurity attacks through the systems we deliver to our customers, including in the form of malware or other types of attacks as described above, which could harm our customers.

In addition, from time to time, we implement updates to our information technology systems and software, which can disrupt or shutdown our information technology systems. We may not be able to successfully launch and integrate these new systems as planned without disruption to our operations. For example, we are currently implementing a new ERP system and infrastructure. As a result of this system implementation or otherwise, we have and could continue to experience disruptions in our operations.

Legal and compliance

We are subject to increasing and increasingly complex regulatory and compliance obligations

In recent years our business has grown significantly in terms of sales, operations, employees and our business infrastructure. As a result, the complexity of complying with rules and regulations has increased. Furthermore, as we have expanded our business in countries where we did not previously operate, we have become increasingly subject to compliance with additional rules and regulations in such jurisdictions, including anti-corruption, anti-bribery and human rights standards, which can be complex. We are also subject to investigations, audits and reviews by authorities in such jurisdictions regarding compliance with rules and regulations, including tax laws.

The General Data Protection Regulation (the "GDPR") came into effect in May 2018. The regulation imposes a strict data protection compliance regime and includes new rights. The GDPR applies to the collection, use, retention, security, processing, and transfer of personally identifiable information of residents of EU countries, and created a range of new compliance obligations. Implementation of, and compliance with the GDPR has increased and could continue to increase our cost of doing business. In addition, the GDPR may be interpreted or applied in a manner that is unforeseen by or adverse to us. Violations of the GDPR may result in significant fines (up to 4% of worldwide net sales or €20.0 million, whichever is greater) and reputational harm.

Furthermore, the existing rules and regulations that we are subject to, including regulations relating to trade, national security, tax, exchange controls, reporting, anti-corruption laws, data protection, are becoming more complex and the trade and national security environment has resulted in increasing restrictions. We also face the risk that trade and security regulations could limit our ability to sell our products and services in certain jurisdictions.

A global transition to a lower carbon economy and / or climate change may result in the imposition of increased environmental regulations that could lead to technology restrictions, modification of product designs, an increase in energy prices and the introduction of energy or carbon taxes, pollution requirements, required remediation equipment, or other requirements. A variety of regulatory developments have been introduced that focus on restricting or managing the emission of carbon dioxide, methane and other greenhouse gases. This could result in a need to purchase at higher costs new equipment or raw materials with lower carbon footprints. Such regulations may result in an increase in our cost of goods or an increase in compliance costs.

Such changes in the regulation that applies to our business can increase compliance costs and the risk of non-compliance. Non-compliance can result in fines and penalties and regulation could impact our ability to sell our products and services.

Our business and operations could suffer in the event of successful misappropriation of our intellectual property or proprietary or confidential information

We are increasingly subject to attempted misappropriation attacks, including theft of our trade secrets, proprietary customer data, intellectual property or other confidential information by third parties or our own employees. For example, in the past we have been subject to the misappropriation of our software by certain employees.

Changes in taxation could affect our future profitability

We are subject to income taxes in the Netherlands and numerous other jurisdictions. Our effective tax rate has fluctuated in the past and may fluctuate in the future.

Changes in tax legislation in the countries where we operate can affect our effective tax rate. For example, in 2012 the OECD has embarked on a project to propose measures against so called Base Erosion and Profit Shifting or BEPS. Based on the BEPS reports the EU has proposed directives to counter base erosion and profit shifting which in turn has resulted or will result in legislative proposals in EU member states. Similar legislative initiatives inspired by the BEPS reports have been taken in Asian jurisdictions in which we operate. These initiatives have resulted in increased compliance requirements for ASML.

In December 2017, US President Trump signed the Tax Cuts and Jobs Act (TCJA), which significantly changed the US income tax code. Regarding TCJA several aspects are currently still waiting for further clarification in the form of to be published Treasury Regulations. In September 2019, a delay to the previously announced reduction in the general Dutch corporate income tax return was proposed. Furthermore, an increase from 7% to 9% in 2021 to the favorable Dutch corporate income tax rate for innovation was proposed. We are continuing to assess the impact of developments in tax legislation.

Changes to tax legislation of jurisdictions we operate in, 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 we operate in. An example is the so-called innovation box tax legislation in the Netherlands. In case these jurisdictions alter their tax policies in this respect this 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, which can affect our worldwide effective tax rate and adversely impact our net income.

Business ethics and compliance

Business ethics

We conduct business with honesty. Pursuing our business objectives, we aim to be a responsible partner in society, acting with integrity towards our employees, customers, business partners and shareholders, as well as the wider community in which we operate. We are committed to conducting our business in compliance with applicable laws and regulations in all the countries we operate in. We promote and uphold ethical behavior, fostering a culture where speaking up is encouraged and appreciated.






Code of Conduct and Business Principles

Through leadership at all levels, we work to sustain a culture in which ethical behavior is recognized, valued and demonstrated, and where everyone working at ASML feels comfortable to speak up and hold each other accountable. Our Code of Conduct is an expression of what we stand for and believe in. As a company, we're committed to operating as a socially responsible corporate citizen. Our Code of Conduct describes five core values and corresponding Business Principles (see also asml.com - Code of Conduct) that apply to all employees worldwide. It guides us in conducting our business and taking decisions in the best interest of all our stakeholders, and ensures we compete in a fair manner. In addition, we have set out policies and guidelines on how to put the core values into practice, guiding our employees in decision-making processes.

‘Our Code of Conduct guides us in conducting our business and taking decisions in the best interest of our stakeholders.’

As a member of the Responsible Business Alliance (RBA), we have adopted the RBA Code of Conduct, which is a set of social, environmental and ethical standards. Our Code of Conduct is in line with the RBA Code of Conduct. We expect our suppliers to adhere to the RBA Code. For more information, see [What we achieved in 2019 - Our supply chain](#).

Our policies and guidelines, guided by our Code of Conduct

The Code of Conduct states our five core values	Example of principles	Corporate policies and/or guidelines
 We respect people and planet	<ul style="list-style-type: none"> ▪ Value and respect differences (diversity of cultures, zero tolerance on discrimination and harassment) ▪ Equal opportunity ▪ Environment, health and safety 	<ul style="list-style-type: none"> ◦ Human Rights policy ◦ Sustainability policy ◦ RoHS Product Compliance ◦ Conflict Minerals policy
 We operate with integrity	<ul style="list-style-type: none"> ▪ Conflict of interest ▪ Anti-bribery and corruption ▪ Competition laws (antitrust) ▪ Insider trading rules 	<ul style="list-style-type: none"> ◦ Gifts and Entertainment policy ◦ Anti-fraud policy ◦ Anti-bribery and Corruption policy ◦ Antitrust Compliance policy
 We preserve our assets	<ul style="list-style-type: none"> ▪ Privacy of employees, customers and suppliers ▪ Confidentiality of information ▪ Intellectual property rights 	<ul style="list-style-type: none"> ◦ Global Privacy policy ◦ Data Retention policy ◦ Information Security policy ◦ Knowledge Protection policy ◦ Handling Confidential Information policy
 We manage professionally	<ul style="list-style-type: none"> ▪ ASML Quality values ▪ Employee and product safety ▪ ASML financial and non-financial statements are full, fair, accurate, timely and understandable 	<ul style="list-style-type: none"> ◦ Quality policy ◦ Environment, Health & Safety guide ◦ Corporate Governance policy ◦ Review and Sign-off policy
 We encourage speaking up	<ul style="list-style-type: none"> ▪ Speak up (Whistleblowing) ▪ Violation of Code of Conduct 	<ul style="list-style-type: none"> ◦ Speak Up policy ◦ Global sanctions



How we structure our ethics organization

Our ethics governance consists of four levels:

1. Our Ethics Board, chaired by our CEO and reporting to the Board of Management, is responsible for policymaking and the supervision of ASML's compliance with legal and ethical requirements. The Ethics Board meets regularly to give guidance on relevant issues.
2. Our Ethics Committee investigates significant notifications about potential breaches of ASML's Code of Conduct or Business Principles worldwide.
3. Our Corporate Ethics Office is responsible for overseeing and implementing our ethics program. All reports of a possible breach of ASML's Code of Conduct and/or Business Principles are screened by the Corporate Ethics Officer and each report is discussed with the Ethics Committee.
4. Our ethics organization includes employees who, in addition to their regular roles at ASML, act as Ethics Liaisons in all countries we operate in. These serve as trusted representatives and act as the first local point of contact for employees with questions and concerns related to ethics.

How we promote ethical behavior

The purpose of the Ethics Program is to support management in managing ethical risks. It does this by fostering a culture of integrity and creating an open and honest culture where the instinct to do the right thing and to comply with the law and ASML policies is embedded across the organization.

Fostering a culture of integrity starts with management setting the right example. To support managers to be leaders who act with integrity, we have developed a practical handbook with guidelines, tips about dealing with specific situations and tools they can use in daily operations.

The Ethics Program includes training in our Code of Conduct and raising awareness around the importance of ethical behavior and our Speak Up policy. It also provides information and guidance on dealing with topics such as personal relationships at work, conflict of interest, dealing with cultural differences, and ethical aspects around ancillary activities or other positions outside of ASML. The program includes our Annual Ethics Awareness Week, when we address a specific theme around ethics. In 2019, the theme was Speak Up. To gain insight into how we performed in the area of ethics, we also conducted an Ethics Survey among all our employees. The survey results will allow us to check our current performance around ethics, identify areas of improvement, and benchmark ASML's ethics organization and program.

Encourage people to Speak Up

Our Speak Up policy, which includes our Whistleblower policy and our Ethics Investigation Procedure, outlines the steps employees are encouraged to take if they experience or suspect a breach of our business ethics. This policy and procedure reassure employees that they can report a breach without fear of repercussions. For employees or external stakeholders who prefer to remain anonymous, we have a Speak Up system available to report breaches anonymously. This is run by an independent external service company.

In 2019, we registered 255 'Speak Up' messages from employees. As in previous years, many of these related to issues resulting from cultural differences, leading to challenges with style and language of communications between employees. Other messages concerned issues such as alleged bullying and conflict of interest, including, for example, if employees are allowed to accept gifts from customers. We have looked into and addressed all Speak Up messages.

As in previous years, we did not incur any fines for breaches of ethical regulations.



Respecting Human Rights

We conduct business on the basis of fairness, good faith, and integrity and we expect the same from all those we work with. To this end we also believe that we have the responsibility to respect human rights and contribute to positive impact.

We are committed to respecting universal human rights and honoring the value of ethics as expressed in our Code of Conduct and Business Principles. We support the principles laid down in the OECD Guidelines for Multinational Enterprises and those in the International Labor Organization's Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy. We have established a Human Rights Policy which is publicly available on www.asml.com.

Our Human Rights Policy complements our ASML Code of Conduct and the Responsible Business Alliance Code of Conduct we adhere to. It expresses our commitment to human rights and responsible labor practice in our operations and in our supply chain. The Human Rights policy applies to ASML and its controlled subsidiaries anywhere in the world. The overall responsibility for identifying and managing human rights issues in our direct operations falls under the remit of our Executive Vice President HR. Responsibility for human rights in our supply chain falls under the remit of our Executive Vice President & Chief Strategy Officer.

Our Human Rights commitment and principles	International human rights standards and guidelines
<ul style="list-style-type: none"> • Diversity & Non-discrimination, including equal opportunities. For more information, see section Promoting diversity & inclusion and Fair remuneration • No child labor. Minimum age of employment is aged 18, as such the UN convention on the rights of the child, in which 'child' is defined as everyone under the age of 18, is not applicable. Age verification is included in our recruitment process. • Freedom of association & collective bargaining. For more information, see section Labor relations • Working hours & work-life balance • Minimum wage standard & living wage. For more information, see section Fair remuneration • Harassment prohibition • Workplace safety. For more information, see section Employee safety and Product safety • Freely Chosen Employment. We prohibit any form of slavery, forced and bonded labor, forced child labor and/or human trafficking. • Human Rights in our supply chain. We expect our suppliers to adhere to the Responsible Business Alliance Code of Conduct, which includes labor, ethical, health & safety and environmental standards. For more information, see section Responsible supply chain • Grievance mechanism & Speak Up. For more information, see section Encourage people to Speak Up • Public reporting 	<ul style="list-style-type: none"> ○ ILO Declaration on Fundamental Principles and Rights at Work (Convention 1- 8) ○ UN Global Compact (principle 1 -6) ○ OECD Guidelines for Multinational Enterprises (protect and respect human rights and access to remedy) ○ Universal Declaration of Human Rights ○ Responsible Business Alliance (RBA) ○ Code of Conduct (labor, ethical, health & safety and environmental standards)

We received no grievance on breaches with human rights in 2019.

Assessing human rights in our operations

In 2019, we conducted a risk assessment to identify the inherent risks related to human rights within ASML's ecosystem. This was based on the UN Guiding Principles on Business and Human Rights, ASML's Human Rights policy and the Code of Conduct of the Responsible Business Alliance (RBA). The assessment results have been shared with the Ethics Board, chaired by our CEO.

The results of our analysis showed that the inherent risk of human rights vulnerabilities in ASML's own operations are working hours, health & safety, and workplace harassment. The vulnerable rights-holder groups identified within ASML are contractors, ethnic minorities and migrant workers.

a. Working hours and overtime

The standard weekly working hours in the locations where we operate are on average 40 hours. Our company standards are based on the International Labor Standards of the International Labor Organization (the Forty-Hour Week Convention) and the RBA norms. A workweek must not exceed the maximum set by local law and a workweek should not be more than 60 hours per week, including overtime, except in an emergency or unusual situation. We pay constant attention to protecting our employees from working overtime during peak periods. As overtime remains an important attention point for management, we keep monitoring the use of overtime and take appropriate measures to manage the situation.

b. Health & safety

It is our obligation to provide safe and healthy working conditions for all our employees and others working on our premises. In our products and processes, we think about how to make ASML a safe place to work. We put significant effort into creating awareness and to have a proactive safety culture within ASML. In 2019, we increased our disclosure on health & safety indicators, based on OHSAS 18001 standards, such as the number of first-aid incidents and the number of near misses. For more information, see the sections Ensuring employee safety, Product safety and Non-financial indicators.

c. **Workplace harassment**

We are a global company with operations in more than 60 locations in 16 countries. We have a culturally diverse workforce, employing nearly 120 nationalities. This leads to a higher inherent risk around the issue of workplace harassment in human rights. Our Speak Up policy enables our employees and external stakeholders to report human rights concerns and questions. In 2019, we recorded 58 Speak Up messages linked to human rights. These messages were related to our business principle 'We respect people and planet'. More specifically, they concerned issues such as bullying, harassment, problems with style and language of communication. None of these resulted in grievances. We look into all Speak Up messages and implement appropriate remedial actions whenever necessary to prevent any recurrence. We provide annual training on our Code of Conduct, which includes our approach to human rights. For more information, see section How we promote ethical behavior.

In addition, as a member of the RBA, we conduct the RBA Self-Assessment Questionnaire annually for our main locations of operations. Our overall scoring was 89.6% in 2019 (from ASML Corporate SAQ), showing low risk on all four sustainability elements: labor, ethics, health & safety and environment. We apply the same high expectations and human rights standards for our suppliers. For more information, see section Responsible supply chain.

Compliance focus

The role of our corporate compliance function is to make sure we conduct business in compliance with all relevant national and international laws and regulations, as well as professional standards, accepted business practices and our own internal standards.

In 2019, we made some changes to our compliance governance structure as part of our effort to adapt our compliance function to the fast-growing size of our company, and to take a more proactive approach in ensuring compliance with laws and regulations.

Our Legal Compliance group now oversees adherence to a wide variety of compliance-related areas, such as our securities and insider trading, antitrust, and anti-bribery and anti-corruption. When needed, Legal Compliance takes charge of any regulatory investigations. In addition, our Legal Compliance group advises management about the regulatory framework, including changes in legislation and regulations. It cooperates closely with our Internal Control and Compliance group, which is tasked with overseeing a consistent application of processes and controls between the multiple compliance areas that are relevant to ASML. Over 2019 the Internal Control and Compliance group was extended to further encompass an efficient and effective incorporation of the compliance areas in the organization.

Our Legal Compliance group's responsibility includes overseeing compliance with our Anti-bribery and Anti-corruption policy. This policy is earmarked to prevent bribes in any form, including kickbacks. It also monitors whether our charitable contributions and sponsorships meet ethical and regulatory standards.

Among the challenges our compliance function faces, is the continued expansion of ASML, as well as the growing number of regulations, laws and standards in the countries we deal with.

There were no breaches of our Anti-bribery and Anti-corruption policy in the reporting year.

Tax policy

Our tax policy is an integral part of our sustainability strategy. The taxes we pay are an important part of ASML's contribution to the economies we operate in. Tax is of continued interest to our stakeholders, so we strive for transparency in the way we report and pay our taxes.

Approach to tax

Our policy is based on a well-defined set of principles and internationally accepted standards. We support and adhere to the principles promoting tax transparency and responsible tax management as set out in the OECD Action Plan on Base Erosion and Profit Shifting (BEPS), and the EU Anti-Tax Avoidance Directives (ATAD I and II).

Tax governance

Our globally organized Tax Department is responsible for tax management. It falls under the supervision of our Board of Management via the CFO, who is ultimately responsible for the tax strategy. Our integrated global tax team is spread over three hubs in the three regions in which ASML operates and aligns on cross-border tax matters. ASML's global tax team is well connected to ASML's operations worldwide.

The Audit Committee of the Supervisory Board (SB) reviews our tax strategy and annually confers with our tax professionals to discuss tax policies and the impact of tax laws and regulations on ASML.

Our tax strategy

ASML aims to report on and pay taxes in accordance with all relevant tax laws and regulations. We commit to not only comply with the letter of these laws and regulations – the literal reading of the relevant laws – but also with their intent.



Our tax principles

We base our tax principles on our Code of Conduct and our Business Principles. It guides us in how we report and pay tax in the countries we operate in.

- We act in accordance with tax laws and regulations.
- We report taxable income in a jurisdiction commensurate with the added value of the business activities in that jurisdiction.
- We do not use tax structures intended for tax avoidance, nor will we engage in the artificial transfer of profits to low tax jurisdictions.
- We do not use tax havens (as defined by the European Commission's 'blacklist') for tax-avoidance purposes.
- We pursue an open and constructive dialogue with the tax authorities in the jurisdictions we operate in, based on mutual respect, transparency and trust, disclosing all relevant facts and circumstances.
- We endorse and follow the OECD transfer pricing guidelines. ASML's profit allocation methods are based on internationally accepted standards as published by the OECD, as well as relevant rules and regulations in the local jurisdictions we operate in.
- We make tax disclosures in accordance with reporting requirements, US GAAP and IFRS.

We aim to be clear about all aspects of our tax position and to share these in a transparent manner, fostering a relationship of honesty, transparency and trust with the tax authorities. The latter is reflected in the number of bilateral advance pricing agreements (BAPA) we have with the tax authorities in our significant jurisdictions.

ASML's technology is driving our profitability. Around 90% of our income is taxable in the Netherlands as most of our value creation through research, design and manufacturing activities is based there. The income from other activities, such as regional equipment sales distribution and after-sales support, is subject to taxation in the countries where these activities take place – the main ones being China, South Korea, Taiwan and the US.

Through acquisition, we have acquired legal entities in countries on the EC's blacklist in the past. Our policy is to liquidate these entities where possible. In 2019, we liquidated two Samoa entities we indirectly acquired through an acquisition. As a result, we do not operate in any of the countries on the EC's blacklist.

Risk profile

ASML is active in over 60 offices located in 16 countries. The tax regulations in these countries are subject to change, among others due to recent developments in the international tax arena (e.g. BEPS). The tax regulations are often complex and subject to interpretation. Failure to comply with these tax regulations may lead to additional tax assessments, including penalties.

ASML's tax strategy is aimed at maintaining a low tax-risk appetite, for which it has set up an effective tax risk-management framework.

Tax Risk Management framework

We aim to file all the required tax-relevant returns with the appropriate tax authorities in a timely and complete manner. To ensure this happens, tax-return processes are monitored through ASML's comprehensive corporate control framework and comprehensive tax control framework. The control frameworks are regularly reviewed and tested.

We discuss potential tax risks and our tax position with the Audit Committee on a regular basis. Additionally, in the Netherlands, we participate in a cooperative compliance program with the Dutch tax authorities.

Leadership and governance

Board of Management



Peter T.F.M. Wennink (1957, Dutch)
Term expires 2022

President, Chief Executive Officer and Chair of Board of Management

Mr. Wennink joined ASML in 1999 and was appointed as Executive Vice President, CFO and member of our Board of Management at the 1999 AGM. Mr. Wennink was appointed as President and CEO in 2013.

Mr. Wennink has an extensive background in finance and accounting. Prior to his employment with ASML, he worked as a partner at Deloitte Accountants B.V., specializing in the high-technology industry with an emphasis on the semiconductor equipment industry.

Mr. Wennink is a member of the Dutch Institute of Registered Accountants, a member of the supervisory board of the Eindhoven University of Technology, and a member of the Advisory Board of the Investment Committee of Stichting Pensioenfonds ABP (Dutch pension fund for government employees). He also serves on the board of the FME-CWM (the employers' organization for the technology industry in the Netherlands) and is chairman of the Eindhovensche Fabrikantenkring.



Martin A. van den Brink (1957, Dutch)
Term expires 2022

President, Chief Technology Officer and Vice Chair of Board of Management

Mr. Van den Brink joined ASML when the company was founded in 1984. Mr. Van den Brink held several positions in engineering and from 1995 he served as Vice President Technology. He was appointed as Executive Vice President Product & Technology and member of the Board of Management at the 1999 AGM. Mr. Van den Brink was appointed as President and CTO in 2013.

Mr. Van den Brink earned a degree in Electrical Engineering from HTS Arnhem (HAN University), and a degree in Physics (1984) from the University of Twente, the Netherlands.

Mr. Van den Brink was awarded an honorary doctorate in physics by the University of Amsterdam, the Netherlands, in 2012.



Roger J.M. Dassen (1965, Dutch)
Term expires 2022

Executive Vice President and Chief Financial Officer

Mr. Dassen joined ASML in June, 2018 and was appointed as Executive Vice President and CFO and member of our Board of Management at the 2018 AGM.

Prior to joining ASML, Mr. Dassen was the Global Vice Chair and member of the Executive Board of Deloitte Touche Tohmatsu Limited. Before that, he was the CEO of Deloitte Holding B.V.

Mr. Dassen earned a Master's degree in Economics and Business Administration (1988), University of Maastricht; a post-master in Auditing (1990), University of Maastricht; and a PhD in Business Administration (1995).

Mr. Dassen is a professor of auditing at the Free University of Amsterdam and serves as a member of the Supervisory Board of the Dutch National Bank. He is also the Chair of the Supervisory Board of the Maastricht University Medical Center+.



Frits J. van Hout (1960, Dutch)
Term expires 2021

Executive Vice President and Chief Strategy Officer

Mr. Van Hout joined ASML in 1984 and rejoined ASML in 2001, after an eight-year absence. He was appointed as Executive Vice President and Chief Marketing Officer and became a member of our BoM at the 2009 AGM. Mr. Van Hout served as Executive Vice President and Chief Program Officer from July 1, 2013 and was appointed Executive Vice President and Chief Strategy Officer effective April 1, 2018. Prior to his BoM membership, Mr. Van Hout served as ASML's Executive Vice President Integral Efficiency, Senior Vice President Customer Support and held various other positions.

Mr. Van Hout served as CEO of the Beyeler Group and held various management positions at Datacolor International from 1992 until 2001.

Mr. Van Hout earned a Master's degree in Theoretical Physics (1981), University of Oxford; and a Master's degree in Applied Physics (1984), Eidgenössische Technische Hochschule, Zürich.

Mr. Van Hout is a member of the Board of the Stichting Brainport, the Eindhoven Region Economic Development Board and Stichting Continuïteit BE Semiconductor Industries, deputy Chair of the Supervisory Board of Aixtron SE as well as member of the Supervisory Board of Bambi Belt Holding B.V and Stichting PhotonDelta.



Christophe D. Fouquet (1973, French)
Term expires 2022

Executive Vice President EUV

Mr. Fouquet joined ASML in 2008 and was appointed as Executive Vice President EUV and became a member of our BoM at the 2018 AGM.

Mr. Fouquet has held several positions at ASML, including Executive Vice President Applications, which he has held from 2013 until 2018. Prior to joining ASML, Mr. Fouquet worked at semiconductor equipment peers KLA Tencor and Applied Materials.

Mr. Fouquet earned a degree in Physics at the Institut Polytechnique de Grenoble.



Frédéric J.M. Schneider-Maunoury (1961, French)
Term expires 2022

Executive Vice President and Chief Operations Officer

Mr. Schneider-Maunoury joined ASML in December, 2009, as Executive Vice President and COO and was appointed to our BoM at the 2010 AGM.

Prior to joining ASML, Mr. Schneider-Maunoury served as Vice President Thermal Products Manufacturing of the power generation and rail transport equipment group ALSTOM. Previously, Mr. Schneider-Maunoury was general manager of the worldwide Hydro Business of ALSTOM. Mr. Schneider-Maunoury also held various positions at the French Ministry of Trade and Industry.

Mr. Schneider-Maunoury is a graduate of Ecole Polytechnique (1985) and Ecole Nationale Supérieure des Mines (1988) in Paris.

Supervisory Board



Gerard J. Kleisterlee (1946, Dutch)
Member of the Supervisory Board since 2015; second term expires in 2023

Chair of the Supervisory Board, Chair of the Selection and Nomination Committee and member of the Technology Committee

Mr. Kleisterlee was the President and CEO of the Board of Management of Royal Philips N.V. from 2001 until 2011, after having worked at Philips from 1974 onwards.

Currently, Mr. Kleisterlee is the Chair of the Board of Vodafone Group Plc. and the Deputy Chair and Senior Independent Director of Royal Dutch Shell Plc.



Antoinette (Annet) P. Aris (1958, Dutch)
Member of the Supervisory Board since 2015; second term expires in 2020

Member of Technology Committee and Selection and Nomination Committee

Ms. Aris is Senior Affiliate of Strategy at INSEAD, France, a position she has held since 2003.

From 1994 to 2003 Ms. Aris was a partner at McKinsey & Company in Germany.

Currently, Ms. Aris is a member of the supervisory boards of Jungheinrich AG, Randstad Holding N.V. and Rabobank Group.



Clara (Carla) M.S. Smits-Nusteling (1966, Dutch)
Member of the Supervisory Board since 2013; second term expires in 2021

Chair of the Audit Committee

Ms. Smits-Nusteling was CFO and a member of the Board of Management of Royal KPN N.V. from 2009 until 2012.

Prior to that, Ms. Smits-Nusteling held several finance and business related positions at Royal KPN N.V. and PostNL.

Currently, Ms. Smits-Nusteling is the Chair of the Board of Tele2 AB, a member of the Management Board of the Foundation Unilever N.V. Trust Office, Non-Executive Director of the Board of Directors of Nokia Corporation and lay judge of the Enterprise Court of the Amsterdam Court of Appeal.



Douglas A. Grose (1950, American)
Member of the Supervisory Board since 2013, second term expires 2021

Vice Chair of the Supervisory Board, Chair of the Technology Committee and member of the Selection and Nomination Committee

Mr. Grose was CEO of GlobalFoundries from 2009 until 2011.

Prior to that, Mr. Grose served as senior vice president of technology development, manufacturing and supply chain for Advanced Micro Devices, Inc. He also spent 25 years at IBM as General Manager of technology development and manufacturing for the systems and technology group.

Currently, Mr. Grose is a member of the Board of Directors of SBA Materials, Inc., and President of NY CREATES (New York Center of Research, Economic Advancement, Technology, Engineering and Science).



Johannes (Hans) M.C. Stork (1954, American)
Member of the Supervisory Board since 2014; second term expires in 2022

Member of the Technology Committee and the Remuneration Committee

Mr. Stork is Senior Vice President and CTO of ON Semiconductor Corporation, a position he has held since 2011.

Prior to that, Mr. Stork held various management positions at IBM Corporation, Hewlett Packard Company, Texas Instruments, Inc. and Applied Materials, Inc., including Senior Vice President and CTO of Texas Instruments, Inc. and Group Vice President and CTO of Applied Materials, Inc. He was also a member of the Board of Sematech.

Currently, Mr. Stork is a member of the Scientific Advisory Board of imec.



Terri L. Kelly (1961, American)
Member of the Supervisory Board since 2018; first term expires in 2022

Member of the Remuneration Committee

Ms. Kelly was the President and Chief Executive Officer at W.L. Gore & Associates Inc. from 2005 until April 1, 2018, after having worked at Gore since 1983 in various roles, including management positions. Ms. Kelly served on the board of directors of Gore through July 2018.

Currently, Ms. Kelly serves as Trustee of The Nemours Foundation, Vice-Chair of the University of Delaware and Trustee of the Unidel Foundation. She is also a member of the Board of Directors of United Rentals, Inc.



Rolf-Dieter Schwalb (1952, German)
Member of the Supervisory Board since 2015; second term expires in 2023

Chair of the Remuneration Committee and member of the Audit Committee

Mr. Schwalb was CFO and member of the Board of Management of Royal DSM N.V. from 2006 to 2014.

Prior to that, he was CFO and member of the Executive Board of Beiersdorf AG. He held a variety of management positions in Finance, IT and Internal Audit at Beiersdorf AG and Procter & Gamble Co.



Wolfgang H. Ziebart (1950, German)
Member of the Supervisory Board since 2009; fourth term expires in 2020

Member of the Technology Committee and the Audit Committee

Mr. Ziebart was President and CEO of Infineon Technologies A.G. from 2004 until 2008.

Prior to that, Mr. Ziebart was on the Boards of Management of car components manufacturer Continental A.G. and automobile producer BMW A.G.

Currently, he is the Chair of the supervisory board of Nordex SE, a member of the supervisory board of Webasto SE and a member of the Board of Veoneer, Inc.

Company Secretary : Mr. Robert F. Roelofs, appointed in 2002

Deputy Company Secretary : Ms. Angela J.F.M. van de Kerkhof, appointed in 2017

Message from the Chair of our Supervisory Board



Gerard Kleisterlee, Chair of the Supervisory Board

'The Supervisory Board is comfortable with ASML's chosen strategy and we will keep a keen eye on the identified key issues to ensure ASML can realize its full potential'

Dear Stakeholder,

With the definite breakthrough of EUV in 2019, ASML has added another impressive year of growth and profitability to the successful implementation of its strategy, bringing a broader and deeper mix of products that provides more value to customers. As touch points and dependencies increase, so do the responsibilities for ASML to ensure we serve our customers well at all times.

As a Supervisory Board we are keenly aware of the challenges that ASML is facing as a result of its impressive growth and development. Going forward, ASML's pivotal role in the semiconductor industry implies that it is essential for us to provide ongoing innovation to enable our customers the continuation of Moore's Law. Moreover, with ever more complex systems and solutions we also need to ensure stability, transparency and security of supplies to our customers. This requires ASML to take the next steps in maturing its organizational structure and its supply chain. In the past year we have spent a significant part of our time to discuss the related plans with the Board of Management and monitor their progress.

Organizationally, the Supervisory Board focused on the development of ASML's organization structure, its way of working and its leadership development and succession planning. ASML's leaders of the future will inherit an organization of higher complexity and global relevance. They need to be prepared and ready.

Another area of scrutiny has been the integrity of ASML's systems and its knowledge management systems. The accumulated knowledge in ASML's organization is one of the company's key assets and provides it a significant competitive advantage. It is essential that ASML effectively protects its knowledge and intellectual property as it expands its geographic presence.

The Supervisory Board paid particular attention to ASML's actions to ensure it can rely on robust suppliers of its own, capable of matching ASML's growth ambitions. Medium-sized ASML suppliers will have to up their game to drive up quality, availability and circular thinking, while the symbiotic relationship with strategic partners like partly-owned lens maker Carl Zeiss SMT will deepen as we journey together towards High-NA EUV over coming years.

The semiconductor industry is a globally integrated network of partners and suppliers, and current geopolitical tensions loom over this industry, threatening the continuation of the societal benefits the chip industry has delivered to the world over the past five decades. The Supervisory Board supports ASML's efforts to inform and engage in dialogue with governments around the world to ensure ASML can take advantage of the opportunities offered by the continuing development of the chip industry, also in China, which has a reported ambition to produce more of the chips it consumes.

As announced on January 22, 2020 Wolfgang Ziebart will retire as a member of ASML's Supervisory Board at the end of his current term, after having served on the board since 2009. The Supervisory Board wants to thank Mr. Ziebart for his valuable contribution over the past eleven years, during which the board has greatly benefited from his knowledge and experience. We wish him all the best for the future.

The Supervisory Board is comfortable with ASML's chosen strategy and we will keep a keen eye on the identified key issues to ensure that ASML can realize its full potential.

Gerard Kleisterlee
Chair of the Supervisory Board

Supervisory Board report

The Supervisory Board supervises and advises the Board of Management in performing its management tasks and setting the direction for ASML. The Supervisory Board focuses on long-term and sustainable value creation, with the goal to ensure that the Board of Management pursues a strategy that secures its leading position as a supplier of holistic lithography solutions to the semiconductor industry. We uphold an appropriate system of checks and balances, provide oversight, evaluate performance and give advice where required or requested. Through good governance, we help to ensure that ASML acts in the best interests of the company and its stakeholders. In this Supervisory Board Report, we report on our activities in 2019.

Activities in 2019

During 2019, the Supervisory Board devoted a considerable amount of time discussing strategic topics. The Supervisory Board performed its recurring annual review of ASML's overall corporate strategy and discussed the long-term plans of the EUV, DUV and Applications business lines, as well as the long-term financial plan and approved the annual budget. As part of the annual strategy review, the Supervisory Board and Board of Management also held dedicated sessions to discuss the strategic challenges related to balancing ASML's output capability with market demand flexibility and balancing innovation with cost, quality and sustainability. The translation of the corporate strategy into corporate and business priorities was also discussed by the Supervisory Board. Furthermore, strategic topics were addressed during the year by means of strategy deep dives on China, the supply chain and the Cymer Lights Source business. As part of the strategy deep dive on the supply chain, the Supervisory Board also paid visits to two key suppliers of ASML in order to be informed first hand on topics such as the relationship and cooperation with ASML, the challenges related to the flexibility of market demand. The Supervisory Board also visited the suppliers' production facilities to witness the production of certain key modules for ASML's systems.

Given the significant growth of ASML in recent years, one of the focus areas of the Supervisory Board in 2019 was People and Organization. On several occasions, the Supervisory Board was provided with updates in this area, zooming in on specific organizational changes as well as on the program to further streamline business processes in view of ASML's growth and increasing complexity. The Supervisory Board spent time discussing the onboarding programs for new employees as well as the results of the bi-annual employee engagement survey. The Supervisory Board also reviewed the culture and values initiative aimed at translating the culture and DNA that made ASML successful in the past to values that support the execution of ASML's strategy aimed at long-term value creation for all stakeholders. Furthermore, the Supervisory Board, assisted by the Selection and Nomination Committee, extensively discussed and provided advice in respect of ASML's talent management and people development program as well as succession planning for the Board of Management and senior management.

Another important topic discussed at each Supervisory Board meeting was the financial and business performance of ASML. To that end, the Supervisory Board was provided with extensive updates on financials, market situation, customers and investor relations.

As part of ASML's risk management process, the Supervisory Board received risk management updates during the year, focusing on the risk landscape and risk appetite as well as the measures put in place by the Board of Management to mitigate the critical risks. Specific risk areas reviewed by the Supervisory Board in deep dive sessions were security, including IT security, supplier dependency and export controls in light of the geopolitical context. For further information on ASML's risk management, see the section 'How we manage risk'.

The Supervisory Board, assisted by the Audit Committee, reviewed the financing of ASML and the Company's capital return policy. The Supervisory Board approved the Board of Management's proposal for the financial year 2018 dividend and discussed and approved the revision of the capital return policy to provide for dividend payments on a semi-annual basis. The Supervisory Board also discussed and approved the proposal to pay an interim dividend in November 2019 and discussed the proposal for the final dividend in respect of the financial year 2019. Furthermore, the Supervisory Board provided advice to the Board of Management in relation to the execution of the 2018 - 2019 share buyback program and on the new share buyback program starting in 2020.

The Supervisory Board discussed ASML's operational strategy, including industrial footprint. The Supervisory Board also reviewed the further development and expansion of the campus in Veldhoven, which is an important project in supporting the further growth of ASML. This was followed by a site visit to the Veldhoven campus, including a tour of the EUV and DUV factories.

Other topics discussed by the Supervisory Board during 2019 were ASML's IP strategy, including the acquisition of IP assets and employees from Mapper, significant litigation cases and the corporate responsibility strategy, as sustainability is also a long-term qualitative target for the Board of Management. The Supervisory Board also monitored compliance with rules and regulations including the Dutch Corporate Governance Code.

The annual and interim financial statements, including non-financial information, the quarterly results and accompanying press releases, as well as the outcomes of the year-end US GAAP and EU-IFRS audits were reviewed by the Supervisory Board.

The Supervisory Board also extensively discussed its own composition, profile and functioning, the composition and functioning of its Committees as well as the composition and functioning of the Board of Management. The Supervisory Board also monitored the performance of the Board of Management and decided on the Board of Management's remuneration targets and target achievements. Reference is made to the Reports of the Selection and Nomination Committee and the Remuneration Committee as included in this Supervisory Board Report.

A Supervisory Board delegation held two formal meetings with the Works Council in 2019. This year the Supervisory Board and the Works Council exchanged views on the rapid growth of the Company and the effects thereof on the Company as a whole and in particular on the company culture and its core values. Also discussed was the maturing of the organization, with more focus on processes and procedures, and how to balance this with the culture of continuous innovation. In addition, the onboarding processes and the effectiveness thereof were discussed and evaluated, as well as the role of ASML's leadership in this area. Furthermore, the meetings generally focused on the strategy and overall performance of ASML, the composition of the Supervisory Board and the Board of Management, the Remuneration Policy for the Board of Management, the alignment of remuneration policies for senior management and the job grades below that level and long-term value creation in general.

A Supervisory Board delegation and the Works Council also discussed the nomination for reappointment to the Supervisory Board of Ms. Aris, who was reappointed per the 2019 AGM and for whose position the Works Council had an enhanced right of recommendation.



Meetings and Attendance

In 2019, the Supervisory Board held eight meetings. Of these meetings, four were held at the company's headquarters in Veldhoven, one meeting was at an off-site location and three were held via telephone conference. In addition to these meetings, there were several informal meetings and telephone calls among Supervisory Board and/or Board of Management members.

The Supervisory Board meetings and the Supervisory Board committee meetings are held over several days, ensuring there is time for review and discussion. At each meeting, the Supervisory Board members discuss among themselves the goals and outcome of the meeting, as well as topics such as the functioning and composition of the Supervisory Board and the Board of Management. Also discussed during each meeting are the reports from the different Committees of the Supervisory Board.

The Supervisory Board meetings and the meetings of the four Supervisory Board committees were well attended. See table below for a full overview of Supervisory Board members' meeting attendance.

Most Board of Management members were present for the Supervisory Board meetings. Besides the formal meetings, Supervisory Board members were in regular contact with the Board of Management and its individual members.



38%

Female members



4

Supervisory Board committees



8

Supervisory Board meetings held in 2019



96%

Attendance rate



5.5

Years average tenure

Supervisory Board facts and figures

Meeting attendance by individual Supervisory Board members

Name	Supervisory Board	Audit Committee	Remuneration Committee	Selection and Nomination Committee	Technology Committee
Gerard Kleisterlee (Chair)	8/8	7/8	n/a	4/4	4/5
Annet Aris	8/8	n/a	n/a	4/4	5/5
Douglas Grose	8/8	n/a	n/a	4/4	5/5
Terri Kelly	7/8	n/a	5/5	n/a	n/a
Rolf-Dieter Schwalb	8/8	8/8	5/5	n/a	n/a
Carla Smits-Nusteling	8/8	8/8	n/a	n/a	n/a
Hans Stork	7/8	n/a	5/5	n/a	5/5
Wolfgang Ziebart	7/8	7/8	n/a	n/a	5/5

For further details on the structure, organization and responsibilities of the Supervisory Board, see Leadership and governance - Corporate governance - Supervisory Board.

Composition, Diversity and Independence

The Supervisory Board currently consists of eight members, the minimum being three members. The Supervisory Board determines the number of Supervisory Board members required to perform its functions. ASML is subject to the law applicable to large corporations ('structuurregime'). As such, members of the Supervisory Board are appointed by the General Meeting based on binding nominations proposed by the Supervisory Board. The General Meeting may reject binding nominations of the Supervisory Board by way of a resolution adopted with an absolute majority of the votes cast, representing at least one-third of ASML's outstanding share capital. If the votes cast in favor of such a resolution do not represent at least one-third of the total outstanding capital, a new shareholders' meeting can be convened, at which the nomination can be overruled by an absolute majority. The Supervisory Board informs the General Meeting and the Works Council about upcoming retirements by rotation at the AGM in the year preceding the actual retirement(s) by rotation. This ensures they have sufficient opportunity to recommend candidates for the upcoming vacancies. The Supervisory Board has the right to reject the proposed recommendations. Furthermore, the Works Council has an enhanced right to make recommendations for one-third of the members of the Supervisory Board. This enhanced recommendation right implies that the Supervisory Board may only reject the Works Council's recommendations in limited circumstances: (i) if the relevant person is unsuitable or (ii) if the Supervisory Board would not be duly composed if the recommended person were appointed as Supervisory Board member.

To ensure an appropriate and balanced composition, the Supervisory Board spends considerable time discussing its (future) composition as well as its rotation schedule on an ongoing basis. The Supervisory Board attaches great importance to its composition, independence and diversity in the broadest possible sense and strives to meet all the associated guidelines and requirements. In order to properly perform its tasks the Supervisory Board considers it to be very important that its members are able to act critically and independently of one another, the Board of Management and other stakeholders. All current members of the Supervisory Board are fully independent as defined by the Code, and such independence is annually assessed by the members of the Supervisory Board by means of a statement addressing the relevant requirements for independence. The current composition of ASML's Supervisory Board is diverse in terms of gender, nationality, knowledge, experience and background and has a suitable level of experience in the financial, economic, technological, social and legal aspects of international business. It also meets the Dutch statutory requirements aimed at ensuring a balanced representation of men and women. In case of (re) appointments, the Selection and Nomination Committee checks whether the candidates fit the Supervisory Board's profile.

Members of the Supervisory Board serve for a maximum term of four years from the date of their appointment or a shorter period as per the Supervisory Board's rotation schedule. Members can be reappointed, provided that their entire term of office does not exceed 12 years. A member of the Supervisory Board may be reappointed once for another period of maximum four years. After that, the Supervisory Board member may subsequently be reappointed again for a maximum period of two years; this appointment may be extended for a final term of no more than two years. The rotation schedule is available in the Governance section on our Website.

If the General Meeting loses confidence in the Supervisory Board, it may, by an absolute majority of the votes representing at least one-third of the total outstanding capital, withdraw its confidence in the Supervisory Board. This resolution shall result in the immediate dismissal of the entire Supervisory Board. In such case, the Enterprise Chamber of the Amsterdam Court of Appeal shall appoint one or more members to the Supervisory Board at the request of the Board of Management.

Per the 2019 AGM, the term of appointment of Mr. Kleisterlee, Mr. Schwalb, Mr. Ziebart and Ms. Aris expired. The Supervisory Board nominated all members for reappointment because of their valuable contribution to the company and the Supervisory Board in particular. As regards Mr. Ziebart, the nomination for reappointment was made particularly because of Mr. Ziebart's background and experience in various industries, including the semiconductor industry, and in various roles. Mr. Ziebart has proved himself to be a valuable contributor to the Supervisory Board over the past ten years, during which the Supervisory Board has benefited from his knowledge, experience and leadership capabilities. At the 2019 AGM, Mr. Kleisterlee and Mr. Schwalb were reappointed for a second term of four years. Mr. Ziebart was reappointed for a fourth term of one year. As Ms. Aris' initial appointment in 2015 was based on the Works Council's enhanced recommendation right, her nomination for reappointment was also based on this enhanced recommendation right. At the 2019 AGM, Ms. Aris was reappointed for a second term of one year. The reason for the one-year appointment terms of Mr. Ziebart and Ms. Aris was the optimization of the Supervisory Board's rotation schedule, in particular the prevention of a relatively high number of retirements by rotation in one year.

Per the 2020 AGM, the appointment terms of Ms. Aris and Mr. Ziebart will expire. Ms. Aris has informed the Supervisory Board that she is available for reappointment. Taking into consideration her valuable contribution to the company and the Supervisory Board in particular, the Supervisory Board intends to propose to the General Meeting to reappoint Ms. Aris. For the intended nomination of Ms. Aris the Works Council has an enhanced recommendation right. Mr. Ziebart has informed the Supervisory Board that he is not available for reappointment and will retire per the 2020 AGM, upon completion of his current term. As announced on January 22, 2020, the Supervisory Board intends to nominate Mr. D.W.A. (Warren) East and Mr. Mr. D.M. (Mark) Durcan for appointment as member of the Supervisory Board effective from the 2020 AGM. The agenda and explanatory notes for the 2020 AGM will contain further information about these intended nominations for appointment and reappointment.

For further information and background on the members of the Supervisory Board, including details on nationality, gender and age, please see the Supervisory Board members' information in Leadership and governance - Supervisory Board as well as the Supervisory Board skills matrix set out below.

Name	Gerard Kleisterlee (Chair)	Annet Aris	Douglas Grose	Terri Kelly	Rolf-Dieter Schwalb	Carla Smits-Nusteling	Hans Stork	Wolfgang Ziebart
General skills								
Executive board member of (listed) international company	●		●	●	●	●	●	●
Finance / governance	●	●			●	●		●
Remuneration	●	●		●	●	●	●	●
HR / employee relations	●	●	●	●	●	●	●	
IT / digital / cyber	●	●			●	●	●	●
ASML-specific skills								
Semiconductor ecosystem	●	●	●				●	●
Deep understanding of semiconductor technology	●	●	●				●	●
High-tech manufacturing / integrated supply chain management	●	●	●	●			●	●
Business in Asia	●		●	●	●		●	●

Evaluation

The Supervisory Board greatly values the structural and ongoing evaluation process as a means of ensuring continuous improvement in our way of working. Each year, the Supervisory Board, assisted by the Selection and Nomination Committee, evaluates the composition, competence and functioning of the Supervisory Board and its committees, the relationship between the Supervisory Board and the Board of Management, its committees, its individual members, the Chairs of both the Supervisory Board and the committees, as well as the composition and functioning of the Board of Management and its individual members, and the education and training needs for the Supervisory Board and Board of Management members. In principle, the evaluation of the Supervisory Board is performed once every three years by an external adviser; in the other two years, the evaluation of the Supervisory Board is performed by means of a self-assessment using a written questionnaire, followed by one-on-one meetings between the Chair and individual Supervisory Board members. The 2019 evaluation of the Supervisory Board and its Committees was performed together with an external party, using a web-based survey as well as conducting interviews with the individual Supervisory Board and Board of Management members and attending a Supervisory Board meeting as an observer. The evaluation was centered around five themes: composition and governance; information flow; effectiveness of the Supervisory Board committees; dynamics and employer role; strategy and role of adviser. An upward review by the Board of Management was also part of the annual assessment. The results of the evaluation were discussed at the end of 2019 and the Supervisory Board concluded the Supervisory Board and its committees continue to function well. Several suggestions were made to further improve the functioning of the Supervisory Board, such as further optimizing the annual schedule of topics to be addressed in Supervisory Board meetings, further elaborating permanent education through deep dive sessions on identified topics and increasing the number of informal contacts with the Board of Management members and senior managers of ASML.

The Board of Management also conducted a self-evaluation in 2019, focusing on the role and responsibilities as well as the functioning of the Board of Management collectively as well as on the functioning of the individual Board of Management members. This self-evaluation was performed in a number of dedicated meetings throughout the year, facilitated by the EVP HR&O. The conclusion of the self-evaluation was that ASML has a well-functioning Board of Management; some suggestions were made in relation to future role, composition and responsibilities of the Board of Management as well as further strengthening the individual feedback loops.

Supervisory Board Committees

The Supervisory Board has four separate committees. In the plenary Supervisory Board meetings, the Chairs of each of the four committees report on the issues and items discussed in the committee meetings. In addition, the meeting documents and minutes of the committee meetings are available to all Supervisory Board members, enabling the full Supervisory Board to make the appropriate decisions.

Audit Committee

In general, the Audit Committee meets at least four times a year and always before the publication of the quarterly, half-year and annual financial results. The Audit Committee assists the Supervisory Board in overseeing the integrity and quality of our financial reporting and the effectiveness of the internal risk management and internal control systems. Frequently discussed topics are the audits and the internal and external audit plans and their execution, our internal control systems, including testing of internal controls over financial reporting in light of Section 404, 302 and 906 of the Sarbanes-Oxley Act, our risk management systems, and our financial- and cash position, our long-term financial plan and the supervision of the enforcement of the relevant legislation and regulations.

The current members of the Audit Committee are Ms. Smits-Nusteling (Chair), Mr. Schwalb and Mr. Ziebart. Mr. Kleisterlee attends the Audit Committee meetings whenever possible. The members of the Audit Committee are all independent members of the Supervisory Board. The Supervisory Board has determined that both Ms. Smits-Nusteling and Mr. Schwalb qualify as an Audit Committee financial expert pursuant to Section 407 of the Sarbanes-Oxley Act and the rules promulgated thereunder as well as pursuant to Dutch statutory rules, taking into consideration their extensive financial backgrounds and experience.

The Audit Committee is provided with all relevant information to be able to adequately and efficiently supervise the preparation and disclosure of financial information. This includes information on the status and development of the (semiconductor) market to be able to judge the outlook and budget for the next 6-12 months, the application of EU-IFRS and US GAAP, the choice of accounting policies and the work of internal and external auditors. Each year, the Audit Committee discusses and reviews such matters as our financing policy and strategy, tax planning policy, fraud policy, and information and communication technology policy.

With regard to internal audit, the Audit Committee reviews the internal audit charter, the internal audit plan and the interaction with the external auditor. As a general rule, the internal auditor attends the Audit Committee meetings and then meets with the Audit Committee after the meeting without management present.

As regards external audit, the Audit Committee generally reviews the audit plan, including scoping, materiality level and fees. Proposed services may be pre-approved at the beginning of the year by the Audit Committee (annual pre-approval) or may be pre-approved during the year by the Audit Committee in respect of a particular engagement (specific pre-approval). The annual pre-approval is based on a detailed, itemized list of services to be provided, which is designed to ensure that there is no management discretion in determining whether a service has been approved and to ensure the Audit Committee is informed of each service it is pre-approving. Unless pre-approval with respect to a specific service has been given at the beginning of the year, each proposed service requires specific pre-approval during the year. The Audit Committee is informed by the external auditor without delay in case the external auditor would discover irregularities in the content of the audit of the financial reports. As a general rule, the external auditor attends the Audit Committee meetings and then meets with the Audit Committee after the meeting without management present to discuss their views on the matters warranting the attention of the Audit Committee, which may include the relationship between the Audit Committee and the external auditor, the relationship between the Board of Management and the external auditor, and any other matters deemed necessary to be discussed.

In addition to the internal auditor and the external auditor, the Audit Committee generally invites the CEO, CFO, Corporate Controller, Corporate Chief Accountant and Vice-President Corporate Risk and Assurance to its meetings.

The Audit Committee held eight meetings in 2019.

In 2019 the Audit Committee focused, among other things, on financial reporting, more in particular the review of ASML's 2019 Integrated and Interim Reports, including the annual and interim financial statements and non-financial information. The Audit Committee also closely monitored the progress and discussed the outcomes of the year-end US GAAP and EU-IFRS audits. The Audit Committee reviewed the quarterly results and the accompanying press releases before publication. On a quarterly basis, the Audit Committee was provided accounting updates by the Corporate Chief Accountant, highlighting the main accounting matters relevant for the quarter. Other important elements of the Audit Committee's quarterly procedures were the discussion of the observations of the External Auditor in relation to the accounting matters, as well as the report by the Disclosure Committee on the accuracy and completeness of the quarterly disclosures. Throughout the year, specific accounting topics were addressed in deep dive sessions, which focused on revenue recognition, the Integrated Report, and an in-depth balance sheet review.

The operational and financial short- and long-term performance of ASML was also discussed extensively, with a focus on various performance scenarios and their impact on ASML's results, cash generation, and financing and capital return policies. The Audit Committee reviewed and provided the Supervisory Board with advice regarding the long-term financial plan, the financing of ASML and ASML's capital return policy. Specifically discussed were the dividend proposal in respect of the 2018 financial year, the decision to revise the capital return policy to enable the payment of an interim dividend, the interim dividend proposal for the 2019 financial year and the execution of the 2018-2019 share buyback program. The Audit Committee (and the Supervisory Board) fully supports ASML's principles regarding its current and future financing and capital return policies, which helps ASML to respond to the cyclical nature of the semiconductor equipment industry.

Throughout 2019, the Audit Committee closely monitored risk management and the risk-management process, including the timely follow-up of high-priority actions based on quarterly progress updates. The Audit Committee also discussed the strategy of the Corporate Risk department, which was amended in view of ASML's changing business context. In addition, the Audit Committee oversaw the annual internal control process. Focus of the internal control updates was on scoping, materiality levels, updates to the internal control framework, the tests of design and effectiveness as well as management's assessment of ASML's internal control over financial reporting and disclosures. The observations made by the Internal Auditor and the External Auditor as regards the design and effectiveness of internal controls were also discussed with the Audit Committee.

During 2019 the Audit Committee discussed ASML's compliance program as well as specific compliance topics such as GDPR, the annual fraud update and quarterly reports on the Ethics program, including whistleblower reporting.

As regards internal audit, the Audit Committee reviewed the strategy of the internal audit function and the annual plan, including the scope of the audit. The Audit Committee was kept updated on the progress of the internal audit activities on a quarterly basis and reviewed the results of audits performed as well as the status of the follow-up on action plans. The Audit Committee also discussed the internal management letter and monitored the follow-up by the Board of Management on the recommendations made in the internal management letter.

As regards external audit, the Audit Committee reviewed the 2019 audit plan, including scoping, materiality level and fees. The Audit Committee monitored the progress of the external audit activities, including review of the observations identified as a result of the quarterly procedures performed by the external auditor, and the audits performed at year-end. The Audit Committee oversaw the follow-up by the Board of Management on the control deficiencies reported by the External Auditor in their periodic internal control update. With respect to the external auditor's communication over the 2019 financial year, the Audit Committee confirms that the communication contained no significant items that need to be mentioned in this report. The Audit Committee also evaluated the performance of the external auditor at the end of 2019, including a review of their independence. The results of the evaluation have led the Audit Committee to recommend to the Supervisory Board to submit to the 2020 AGM a proposal to appoint KPMG as the Company's External Auditor for the reporting year 2021.

Other items discussed by the Audit Committee in 2019 related to ASML's tax policy and planning, IT and IT security strategy, roadmap and related activities. Also, the Audit Committee regularly discussed the program aimed at further improving ASML's business processes given the increased size and complexity of ASML. The Audit Committee reviewed the process for reporting pending and threatening legal matters on the occasion of the XTAL litigation case, and was provided with quarterly legal matters overviews. The Audit Committee also performed an annual review and update of its Rules of Procedure.

The external auditor and the internal auditor attended all Audit Committee meetings. After each in-person meeting, the Audit Committee held one-to-one meetings with the CFO, and with the external and internal auditors.

Remuneration Committee

In general, the Remuneration Committee meets at least two times a year and more frequently when deemed necessary.

The Remuneration Committee oversees the development and implementation of the Remuneration Policy. In cooperation with the Audit Committee and the Technology Committee, the Remuneration Committee reviews and proposes to the Supervisory Board corporate goals and objectives relevant to the variable part of the Board of Management's remuneration. Before proposing these corporate goals and objectives to the Supervisory Board for approval, the Remuneration Committee carries out scenario analyses of the possible financial outcomes on the variable remuneration of meeting these goals, as well as exceeding these goals. Also in cooperation with the Audit Committee and the Technology Committee, the Remuneration Committee evaluates the performance of the members of the Board of Management in view of those goals and objectives, and - based on this evaluation - recommends to the Supervisory Board appropriate compensation levels for the members of the Board of Management. In doing so, the Remuneration Committee takes note of the views of the individual members of the Board of Management with regard to the amount and structure of their own remuneration.

The current members of the Remuneration Committee are Mr. Schwalb (Chair), Ms. Kelly and Mr. Stork, each of whom is an independent, non-executive member of our Supervisory Board in accordance with the NASDAQ Listing Rules. Mr. Schwalb is neither a former member of our Board of Management, nor a member of the management board of another company. Currently, no member of the Remuneration Committee is a member of the management board of another Dutch listed company.

In 2019, the Remuneration Committee held five meetings.

In 2019, the Remuneration Committee completed its review of Remuneration Policy of the Board of Management, which started in 2018 and which led to the recommendation to implement some adjustments. The Supervisory Board subsequently submitted the proposed adjusted remuneration policy to the 2019 AGM for adoption, after having obtained the view of the Board of Management and the Works Council. Next to that, the Remuneration Committee also finalized its proposal to adjust the remuneration of the Supervisory Board, which proposal was also submitted to the 2019 AGM for approval. Both proposals were approved by the general meeting. In the second half of 2019, the Remuneration Committee started the preparation of the amendment of the Remuneration Policy for the Board of Management as well as the preparation of a proposed Remuneration Policy for the Supervisory Board in anticipation of the implementation of the revised EU Shareholder Rights Directive. Both proposals will be submitted to the 2020 AGM by the Supervisory Board.

Furthermore, the Remuneration Committee made recommendations to the Supervisory Board concerning the total remuneration package of the Board of Management and the variable remuneration consisting of an STI in cash and an LTI in shares. The Remuneration Committee also reviewed the shareholding positions of the Board of Management members based upon the share ownership guideline of the Remuneration Policy. As part of the permanent education program the Remuneration Committee was extensively informed on remuneration related international trends and developments as well as international regulatory and governance developments in the area of remuneration which are relevant for ASML. The Remuneration Committee also reviewed the Remuneration report, which details the remuneration of members of the Supervisory Board and the Board of Management.

Working with the Audit Committee and the Technology Committee, the Remuneration Committee reviewed the STI and LTI targets for the Board of Management and proposed 2019 targets to the Supervisory Board. It also provided recommendations to the Supervisory Board regarding the achievement of the 2019 targets and related compensation levels for the Board of Management members in 2019.

The external auditor performs certain agreed-upon procedures with respect to the execution of the Remuneration Policy.

For further details, see Leadership and governance - Remuneration report.

Selection and Nomination Committee

In general, the Selection and Nomination Committee meets at least two times a year and more frequently when deemed necessary.

The Selection and Nomination Committee assists the Supervisory Board with the preparation of the selection criteria and appointment procedures for members of the Supervisory Board and Board of Management. The Selection and Nomination Committee also assist with the periodical evaluation of the scope and composition of the Board of Management and the Supervisory Board, and proposing the profile of the Supervisory Board in relation thereto. The periodical evaluation of the functioning of the Board of Management and the Supervisory Board and the individual members of those boards is also an area where the Selection and Nomination Committee is involved and provides advice to the Supervisory Board. Another area of involvement of the Selection and Nomination Committee is the preparation of the Supervisory Board's decisions for (re)appointing members of the Board of Management and proposing (re)appointments of members of the Supervisory Board. The Selection and Nomination Committee also assists in the supervision of the Board of Management's policy in relation to the selection and appointment criteria for senior management.

The Selection and Nomination Committee monitors and discusses developments in corporate governance, for example those based on legislative proposals or revisions of the Code, but also the outcome of the Report of the Monitoring Committee with respect to compliance with the Code.

The current members of the Selection and Nomination Committee are Mr. Kleisterlee (Chair), Mr. Grose and Ms. Aris, each of whom is an independent, non-executive member of our Supervisory Board in accordance with the NASDAQ Listing Rules.

The Selection and Nomination Committee held four meetings in 2019.

In 2019 the Selection and Nomination Committee spent ample time to discuss the future composition, role and responsibilities of the Board of Management, e.g. reviewing the talent bench, discussing career development of top talent to prepare for future Board of Management roles. The Selection and Nomination Committee also extensively discussed the composition of the Supervisory Board. The Selection and Nomination Committee finalized the update of the Supervisory Board's profile, which was subsequently approved by the Supervisory Board and discussed with the Works Council and in the 2019 AGM. A significant amount of time was spent discussing the Supervisory Board's rotation schedule, more in particular the appointment or reappointment of Supervisory Board members to fill vacancies both in the short and longer term. This resulted in recommendations from the Selection and Nomination Committee to nominate four members for reappointment by the General Meeting in 2019. At the 2019 AGM Mr. Kleisterlee and Mr. Schwab were reappointed for a second term of four years, Ms. Aris was reappointed for a second term of one year and Mr. Ziebart was reappointed for a fourth term of also one year. Ms. Aris was reappointed based on the enhanced recommendation right of the Works Council. The reasoning behind reappointing Ms. Aris and Mr. Ziebart for one year was the optimization of the Supervisory Board's rotation schedule, more in particular the prevention of many simultaneous rotations of Supervisory Board members.

The Selection and Nomination Committee also discussed the upcoming retirements by rotation of Ms. Aris and Mr. Ziebart per the 2020 AGM, as well as the intended nomination for reappointment of Ms. Aris and the intended nominations for appointment of

Messrs. East and Durcan as members of the Supervisory Board. Other topics of discussion in 2019 were the functioning of the individual members of the Supervisory Board and the Board of Management as well as the process and outcome of the Supervisory Board's self evaluation. For further details on the self evaluation, see Supervisory Board Report - Evaluation.

As part of its responsibility to monitor corporate governance developments, the Selection and Nomination Committee discussed, among other things, the implementation of the revised EU Shareholder Rights Directive into Dutch law, which entered into force on January 1, 2020, and the impact of this legislative change on ASML.

Technology Committee

The Technology Committee meets at least two times a year and more frequently when deemed necessary.

The Technology Committee provides advice to the Supervisory Board with respect to our technology plans required to execute our business strategy, including but not limited to, technology trends, the study of potential alternative strategies, the technology strategy, product roadmaps, required technical resources and operational performance in R&D. The Technology Committee makes recommendations to the Supervisory Board on technology related projects with respect to ASML's competitive position. In addition, the Technology Committee discusses the technology targets set to measure short- and long-term performance as well as the achievements related thereto, and advises the Remuneration Committee on this topic.

The Technology Committee's in-depth technology discussions and the subsequent reporting on the main points of these discussions in the full Supervisory Board increases the Supervisory Board's understanding of our technology requirements and enables the Supervisory Board to adequately supervise the strategic choices we face, including our investment in R&D.

The current members of the Technology Committee are Mr. Grose (Chair), Ms. Aris, Mr. Kleisterlee, Mr. Stork, and Mr. Ziebart. The Technology Committee is supported by external experts as well as experts from within ASML who act as advisers to the Technology Committee with respect to the subjects reviewed and discussed by this committee. The advisers do not have voting rights, but regularly attend committee meetings (except for those meetings or calls specifically designated to set and / or evaluate technology targets). External experts may include representatives of customers, suppliers and partners to increase the committee's understanding of the technology and research required to develop our leading-edge systems.

The Technology Committee held five scheduled meetings in 2019.

In 2019 the Technology Committee focused on the execution and implementation of technology programs in EUV (including High-NA), DUV and Applications and provided the Supervisory Board with advice in this area. On EUV, special attention was paid to further improving the operational performance of the EUV systems, execution of the roadmaps that have been defined as well as the further development of High-NA. With respect to DUV the focus was primarily on operational excellence and improving competitiveness. In September, the Technology Committee visited the offices of Brion and HMI in San Jose where the Technology Committee performed an extensive review of the Applications Business Line. During this deep dive the Technology Committee focused primarily on the strategy of the business line and the execution thereof, as well as the status of current performance and developments in the short and the long term. In addition, three external guests were invited to inform the Technology Committee on technological developments, such as cloud computing and artificial intelligence. The Technology Committee also discussed the technology targets and achievements related to our technology programs, and provided the Remuneration Committee and the Supervisory Board with advice on this matter.

A Word of Thanks

Finally, we would like to extend a word of thanks to the Board of Management and all ASML employees for their continued commitment and hard work during 2019.

The Supervisory Board,

Gerard Kleisterlee, Chair
Douglas Grose, Vice Chair
Annet Aris
Terri Kelly
Rolf-Dieter Schwalb
Carla Smits-Nusteling
Hans Stork
Wolfgang Ziebart

Veldhoven, February 11, 2020

Remuneration report

Introduction

The Supervisory Board, on recommendation of the Remuneration Committee, determines the remuneration of the members of the Board of Management. The revised Remuneration Policy was adopted by the General Meeting on April 24, 2019 and applies as of January 1, 2019 onwards.

In this Remuneration Report, an overview is provided of the Remuneration Policy for the Board of Management and the application thereof in 2019. This Remuneration Report will be submitted to the General Meeting in 2020 for an advisory vote.

ASML's performance in 2019

2019 was another growth year for ASML, with a revenue amounting to €11.8 billion. The increase in revenue was mainly due to the growth of EUV into volume production, especially within the Logic market. The number of EUV shipments grew to 26 in 2019, including 9 shipments of our NXE:3400C tools for use in volume manufacturing. The NXE:3400C delivers increased productivity of over 35%, as well as improved availability. The higher performance of the NXE:3400C offers significant customer value, and as we share in this higher value, it translates to improved pricing and margins for ASML.

Net income in 2019 amounted to €2,592.3 million, or 21.9% of total net sales, representing €6.16 basic net income per ordinary share. Important focus areas in 2019 were liquidity and free cash flow, given that our sales were concentrated into the end of the year as well as our continued investment into the future, which can be seen in the growth of our net working capital and an increased R&D and capital expenditure spend in 2019.

Remuneration policy

The Remuneration Policy supports the long-term development of the Company in a highly dynamic environment, while aiming to fulfill all stakeholders' requirements and keeping an acceptable risk profile. More than ever, the challenge for us is to drive technology, to serve our customers and to satisfy our stakeholders. These drivers are the backbone of the Remuneration Policy. The Supervisory Board ensures that the policy and its implementation are linked to the Company's objectives.

The objective of the Remuneration Policy is to enable ASML to attract, motivate and retain qualified industry professionals for the Board of Management to define and achieve our strategic goals. The policy acknowledges the internal and external context as well as our business needs and long-term strategy. The policy is designed to encourage behavior that is focused on long-term value creation, while adopting the highest standards of good corporate governance. The policy is aimed at motivating outstanding achievements, using a combination of non-financial and financial performance measures. Technology leadership and customer value creation are the key drivers of sustainable returns to our shareholders.

The policy is built on the following principles:

- Transparent - The policy and its execution are clear and practical;
- Aligned - The Remuneration Policy is aligned with the policy for ASML senior management and other ASML employees;
- Long-term oriented - The incentives focus on long-term value creation;
- Compliant - ASML adopts the highest standards of good corporate governance; and
- Simple - The policy and its execution are as simple as possible and easily understandable to all stakeholders.

Reference group and market positioning

We offer a remuneration package that is competitive as compared to a relevant labor market. To define this market, a reference group is created, consisting of companies that are comparable to us in terms of size and complexity, data transparency and geographical area. For as long as ASML is positioned around the median of the group of companies with respect to size (measured by enterprise value, revenue and number of employees), the median market level may serve as a reference in determining the level of pay for the Board of Management.

The reference group was updated as part of the revision of the Remuneration Policy, which was presented in the AGM in 2019. It consists of the following companies:

Reference group composition	
AkzoNobel	Leonardo-Finmeccanica
Alstom	Linde
Continental	Nokia
Covestro	Philips
DSM	SAP
Essilor	Schindler
Evonik	Shire
Givaudan	Smith & Nephew
Infineon Technologies	Solvay
Legrand	Yara International

In principle, a benchmark assessment is conducted every two years. In the year without a market assessment, the Supervisory Board considers the appropriateness of any change of base salary on the market environment as well as the salary adjustments for other ASML employees. To ensure an appropriate composition of the relevant labor market, the Supervisory Board reviews the composition of the reference group in conjunction with the frequency of the benchmark. Substantial changes applied to the composition of the reference group will be proposed to the shareholders.

Total direct compensation

The remuneration levels are determined using the total direct compensation. Total direct compensation consists of base salary, an STI and an LTI. Each component and corresponding performance measures are described in this section.

Other remuneration elements are pension and expense reimbursements. The latter may include company car costs, travel expenses, representation allowances, housing costs (gross amount before taxes), social-security costs, and health and disability insurance costs.

Base salary

The policy prescribes a benchmark that will be conducted for the total direct compensation level. The base salary of Board of Management members is derived from this level.

Variable income

The performance parameters are set by the Supervisory Board and consist of financial and qualitative measures. The Supervisory Board may adjust the performance measures and their relative weighting of the variable income based on the rules and principles as outlined in this policy, if required by changed strategic priorities in any given year.

The Supervisory Board assesses the extent to which performance standards are met at the end of a performance period.

2019 variable compensation (on-target)	Presidents	Other Board members
STI	80%	80%
LTI	110%	100%
Total variable compensation as % of base salary	190%	180%

In order to comply with the highest standards of Corporate Governance, appropriate claw-back and change-in-control provisions are incorporated in the employment contracts and management services contracts of all members of the Board of Management.

The Supervisory Board has the discretionary power to adjust the incentive pay-out upward or downward if it feels that the outcome is unreasonable due to exceptional circumstances during the performance period ('ultimum remedium'). Scenario analyses of the possible outcomes of the variable remuneration components and their effect on the remuneration of the Board of Management are conducted.

Short-term incentive

The STI refers to the annual performance-related cash incentive that is applicable to all members of the Board of Management. The target level of the STI is set at 80% of base salary for all members. In case of excellent performance, the maximum opportunity amounts to 150% of target.

To achieve alignment in the remuneration structure of the Board of Management and other ASML employees, the policy includes a modifier on the STI pay-out that is connected to the profit-sharing program for employees. In applying the modifier, the Supervisory Board will take into account the pay-out under the profit-sharing scheme for all ASML employees. The modifier enables the Supervisory Board to discretionarily adjust the STI pay-out of the Board of Management upward with 10% or downward with 20% of base salary.

For the STI the following criteria are set:

	Performance Measure	Weight
	Qualitative	
	Technology Leadership Index	20%
	Market position	20%
	Financial ¹	60%
	Total	100%

1. Every year, prior to the performance period, the Supervisory Board chooses several financial measures, depending on business challenges and circumstances, with a total weight of 60%.

The financial measures are chosen from the below list. The Supervisory Board may still deviate from this list when necessary, given any specific challenges in a given year, but will as much as possible choose measures from the pre-defined list.

Measure	Description
Sales	Total net sales as included in the US GAAP Consolidated Financial Statements
Gross Margin	Gross Profit as a percentage of total net sales
R&D opex	R&D costs as included in the US GAAP Consolidated Financial Statements
SG&A opex	SG&A costs as included in the US GAAP Consolidated Financial Statements
EBITDA Margin %	Income from operations (plus depreciation and amortization) as percentage of total net sales
EBIT Margin %	Income from operations as percentage of total net sales
Net Margin %	Net income as a percentage of total net sales
Free Cash Flow	Net cash provided by (used in) operating activities minus purchases of Property, plant and equipment and intangible assets
Cash Conversion Cycle ¹	Days Inventory Outstanding + Days Sales Outstanding -/- Days Payable Outstanding
Capital Expenditures	Investment in fixed assets

1. The Supervisory Board could also decide to focus on certain elements of Cash Conversion Cycle in any year, i.e. Days Inventory Outstanding, Days Sales Outstanding and / or Days Payable Outstanding, instead of Cash Conversion Cycle only.

Days Inventory Outstanding = Average (last 4 quarters) annual inventory divided by last 4 quarters cost of sales.
Days Sales Outstanding = Average (last 4 quarters) accounts receivable divided by last 4 quarters total net sales.
Days Payable Outstanding = Average (last 4 quarters) accounts payable divided by last 4 quarters cost of sales.

The performance measures form a balanced mix of financial (60%) and other business measures (40%).

For each of the performance criteria the Supervisory Board sets challenging but realistic target levels. The target-setting and performance review occur on an annual basis, except for circumstances where the Supervisory Board considers semi-annual target-setting more appropriate. All performance measures are set in advance and will not change during the performance period.

The pay-out levels are prorated upon the level of achievement of the aforementioned performance criteria. Below threshold performance, there is no pay-out. Meeting threshold performance will result in a pay-out of 50% of target pay-out. In case of excellent performance, the maximum pay-out is capped at 150% of the target pay-out. The STI is paid on an annual basis.

Long-term incentive

The LTI refers to the share-based incentive. All members of the Board of Management are eligible to receive performance-related shares. The target level of the LTI is set at 110% of base salary for the Presidents and 100% for the other members of the Board of Management. In case of excellent performance, the maximum opportunity amounts to 200% of target.

The performance shares are conditionally granted on an annual basis to Board of Management members. The shares will become unconditional depending on the achievement of predetermined performance targets during a three-year period. Each performance cycle starts on the first day of the year of grant. The number of performance shares to be conditionally awarded is calculated at the beginning of this period using the volume-weighted average share price during the last quarter of the year preceding the conditional award.

Performance measures

Three types of performance measures relate to the LTI:

- ASML's total shareholder return compared to a reference index.
- ASML's ROAIC compared to a pre-defined target to be set by the Supervisory Board prior to the performance period.
- Long-term strategic qualitative targets to ensure ASML's ability to keep performing at high standards. Depending on the strategic requirements, the definition and relative weight may change at the discretion of the Supervisory Board:
 - Technology Leadership Index
 - Sustainability

The definition of the total shareholder return target and calculation is as follows:

- ASML's relative change in share price, plus dividends paid over the relevant performance period. The total shareholder return is calculated as the difference between (i) the average (closing) share price during the last quarter of the performance period and (ii) the average (closing) share price during the quarter preceding the performance period; in the calculation, dividends are reinvested at the ex-dividend date. The total shareholder return of ASML (calculated with the ASML New York share) is compared to the PHLX Semiconductor Sector Index. This NASDAQ index is designed to track the performance of a set of companies engaged in the design, distribution, manufacture, and sale of semiconductors. There are two versions of this index, a price return index and a total return index, the latter of which is chosen (NASDAQ: X.SOX), since this index reinvests cash dividends, equivalent to the total shareholder return definition described above.

The definition of the ROAIC target and calculation is as follows:

- ASML's rate of return on capital it has put to work, regardless of the capital structure of the company. It is used as a fundamental metric to measure value creation of the company. The ROAIC is calculated by dividing the Net Operating Profit After Tax by the Average Invested Capital.

The aforementioned performance measures receive the following weights:

LTI performance measures	Weight
ROAIC	40%
Total shareholder return	30%
Technology Leadership Index	20%
Sustainability	10%
Total	100%

Performance incentive zone

The vesting of performance shares depends on the relative total shareholder return as compared to the aforementioned index, the ROAIC performance as compared to the pre-defined target and the evaluation of the qualitative targets by the Supervisory Board. The vesting will be calculated at the end of the three-year performance period for all performance measures, based on a predefined pay-out matrix.

Performance ASML vs PHLX Index (total shareholder return ASML -/- total shareholder return X.SOX)	Pay-out as a % of target
≥ 20%	200%
Between 0% and 20%	Linear between 100% and 200%
Between -20% and 0%	Linear between 50% and 100%
< -20%	—%

For ROAIC, the Technology Leadership Index and Sustainability targets, the same principle of threshold, target and maximum levels applies as for the STI, with the maximum pay-out equal to 200% of target. The Supervisory Board, in cooperation with the relevant subcommittees (Technology Committee, Audit Committee and Remuneration Committee), will assess the performance achieved against ROAIC and the qualitative targets. Both the STI and LTI make use of the Technology Leadership Index as a qualitative performance measure. The objective is equal, but the applicable measures, targets and performance periods are different and aligned with specific short- and long-term strategic priorities.

Grant date

Performance shares will be granted two days after the publication of ASML's annual results in January of the year in which the three-year performance period starts.

Holding period

The minimum holding period is two years after the vesting date. Upon termination of the employment contracts / management services contracts the transfer restrictions will remain in place during the holding period except in case of decease.

In case a tax payment is due by the members of the Board of Management over the retrieved variable income, performance shares may be partially sold at vesting ('sell to cover') in accordance with the law and internal regulations.

Share ownership guidelines

Members of the Board of Management are required to hold at least the value of two times base salary in the form of shares; for the two Presidents, this is three times base salary. This ensures an alignment of the interests of members of the Board of Management with long-term value creation throughout their employment with / services for the Company. The Remuneration Committee of the Supervisory Board will (i) after each financial year, determine the value of ASML shares then held by the individual members of the Board of Management, based on the shareholding data of the members of the Board of Management (to be) published in the Integrated Report over that year, (ii) include vested ASML shares that are still in the holding period when determining the value of the ASML shares held by the individual members of the Board of Management, (iii) not define penalties upfront should the value of ASML shares held by a member of the Board of Management be lower than agreed, but determine potential penalties by using its discretionary judgment, thereby taking into consideration all relevant circumstances, and (iv) allow new members of the Board of Management time to meet the share ownership requirements (three years, depending on the actual situation).

Other remuneration

Benefits

The pension arrangement for the Board of Management is based on the 'excedent' (supplementary) arrangement for our employees in the Netherlands. The plan is a defined contribution opportunity as defined in Dutch fiscal regulations. The total defined contribution is a percentage of the pensionable salary and depends on the participants' age at the beginning of the year. The total net contribution is according to the maximum level as allowed by Dutch fiscal legislation, of which the participant contributes 3.9% of his pension base.

Dependents' pension and disability pension are insured on a risk basis, the premium of which is paid by ASML. As a guiding principle, the value of the pension arrangement is set at the median of executive pensions in the Netherlands using a general industry sample of companies.

Severance payment

All employment agreements, respectively management services agreements, with members of the Board of Management contain specific provisions regarding benefits upon termination of those agreements. If the Company gives notice of termination of the agreement for reasons which are not exclusively or mainly found in acts or omissions on the side of the Board of Management member, a severance amount equal to one year base salary will be made available upon the effective date of termination.

This severance payment will also be made available in case of a termination of the agreement of a Board of Management member with mutual consent between such member and the Company.

Change of control over the company

Board of Management members are also entitled to the aforementioned severance payment in the event ASML or its legal successor gives notice of termination due to a change of control or if the Board of Management gives notice of termination, which is directly related to such change of control and such notice is given within 12 months from the date on which the change of control occurs.

The change of control provision includes a mitigation of the pay-out under the LTI. This entails that the share price will be fixed on the average of i) the average closing share price over a period of 15 trading days prior to the first public announcement of change in control negotiations and ii) the average share price over a period of 30 trading days prior to the closing of the transaction.

Loans

ASML does not grant any loans or guarantees to any of the members of the Board of Management.

Remuneration Board of Management and Supervisory Board in 2019

The remuneration of the Board of Management for the financial year 2019 is based upon and complies with the Remuneration Policy, as further explained below.

The Remuneration Policy supports the long-term development and strategy of the Company in a highly dynamic environment, while aiming to fulfill all stakeholders' requirements and keeping an acceptable risk profile. More than ever, the challenge for us is to drive technology, to serve our customers and to satisfy our stakeholders. The Supervisory Board ensured that the implementation of the Remuneration in 2019 was linked to the Company's objectives and as such encouraged behavior focused on long-term value creation.

The performance parameters for the variable remuneration set by the Supervisory Board in 2019 were based on the Remuneration Policy and consisted of financial and qualitative measures, balancing the various company objectives, both in the short term and the long-term.

The performance measures set for the STI formed a balanced mix of financial (60%) and other business measures (40%), which together ensured a balanced focus on both the (financial) performance of the company in the short term, as well as on the long-term sustainability of the company in terms of technological advancement and customer satisfaction.

The performance measures for the LTI were set in such a way that an optimal balance was achieved between the direct interest of ASML's investors, the long-term financial success of the Company, the long-term continuation of technological advancement, as well as the environmental and social dimensions of sustainability.

Over 2019, the STI will result in a cash payout of 133.8% of the target payout. The two non-financial performance criteria (Technology Leadership Index and Market Position) were both achieved between target and maximum performance level. For the financial performance criteria, the Supervisory Board at the beginning of the year chose the following three measures for the 2019 performance year: 1. EBIT Margin %, 2. EUV Gross Margin %, and 3. Free Cash Flow. The achievement over 2019 for these measures was as follows (expressed as payout percentage of target payout): EBIT margin 122% of target; EUV Gross Margin 150% of target, and Free Cash Flow 150% of target. The total STI outcome results in a cash payout of €5.1 million, representing 107.0% of the base salary of the Board of Management.

At the beginning of 2020, the Supervisory Board decided to apply the same three financial performance measures for 2020 as in the previous year: 1. EBIT Margin %, 2. EUV Gross Margin % and 3. Free Cash Flow.

The Long-Term Incentive (LTI) payout over the performance period 2017-2019 has been 82.7% of max. ASML achieved a TSR (total shareholder return) outperforming the PHLX Semiconductor Sector Index with 55.4 points leading to a payout of 100% of max for this element. For the ROAIC element the payout is 62.0% of max. The two qualitative LTI performance measures (Technology Leadership Index and Sustainability) were both achieved between target and maximum performance level.

Share ownership guidelines

All members of the Board of Management complied with the share ownership guidelines as incorporated in the Remuneration Policy.

Total remuneration Board of Management

The remuneration of the members of the Board of Management based on incurred accounting expenses in 2019, 2018 and 2017 was as follows (in € thousands):

Board of Management	Financial Year	Fixed			Total fixed	% Fixed	Short-term (variable)	Long-term (variable)	Total variable	% Variable	Total Remuneration	Relative proportion (ratio between fixed % and variable %)
		Base salary	Pension	Other benefits								
		€	€	€								
P.T.F.M. Wennink	2019 ^{2,3}	1,000	207	53	1,260	28.9 %	1,070	2,031	3,101	71.1 %	4,361	0.41
	2018 (restated) ^{4,5}	978	203	53	1,234	35.9 %	747	1,452	2,199	64.1 %	3,433	0.56
	2017 (restated) ^{5,6}	978	170	51	1,199	34.7 %	869	1,387	2,256	65.3 %	3,455	0.53
M.A. van den Brink	2019 ^{2,3}	1,000	207	52	1,259	28.9 %	1,070	2,031	3,101	71.1 %	4,360	0.41
	2018 (restated) ^{4,5}	978	203	51	1,232	35.9 %	747	1,452	2,199	64.1 %	3,431	0.56
	2017 (restated) ^{5,6}	978	170	50	1,198	34.7 %	869	1,387	2,256	65.3 %	3,454	0.53
F.J. van Hout	2019 ^{2,3}	680	114	44	838	30.6 %	728	1,172	1,900	69.4 %	2,738	0.44
	2018 (restated) ^{4,5}	661	114	44	819	37.6 %	505	853	1,358	62.4 %	2,177	0.60
	2017 (restated) ^{5,6}	661	114	43	818	35.9 %	587	871	1,458	64.1 %	2,276	0.56
F.J.M. Schneider-Maunoury	2019 ^{2,3}	680	114	30	824	30.3 %	728	1,172	1,900	69.7 %	2,724	0.43
	2018 (restated) ^{4,5}	661	114	31	806	37.2 %	505	858	1,363	62.8 %	2,169	0.59
	2017 (restated) ^{5,6}	661	114	32	807	35.7 %	587	866	1,453	64.3 %	2,260	0.56
R.J.M. Dassen ⁷	2019	680	93	47	820	27.7 %	728	1,408	2,136	72.3 %	2,956	0.38
	2018 (restated) ⁵	386	53	28	467	52.0 %	295	135	430	47.9 %	897	1.09
C.D. Fouquet ⁷	2019	680	74	47	801	36.4 %	728	674	1,402	63.6 %	2,203	0.57
	2018 (restated) ⁵	496	45	32	573	50.9 %	379	173	552	49.1 %	1,125	1.04
Total Board of Management	2019	4,720	809	273	5,802	30.0 %	5,052	8,487	13,539	70.0 %	19,341	0.43
	2018	4,160	732	239	5,131	38.8 %	3,178	4,923	8,101	61.2 %	13,232	0.63
	2017	3,278	568	176	4,022	35.1 %	2,912	4,511	7,423	64.9 %	11,445	0.54

- The remuneration reported as part of the LTI (share awards) is based on costs incurred under US GAAP and EU-IFRS. The costs of share awards are charged to the Consolidated Statements of Operations over the 3-year vesting period based on the number of awards expected to vest. For the first 2 years, we apply the maximum achievable number of share awards, and in the final performance year of the awards we update this estimate for the non-market performance conditions. Therefore the costs for the financial year 2019 include costs of the Board of Management performance share plan 2019 (at maximum vesting), 2018 (at maximum vesting) and 2017 (at revised best estimate of the number of shares that will vest). Furthermore, any difference between the amount based on the best estimate of achievable number of shares awards and the amount based on the actual number of share awards that vest, is released to the Consolidated Statements of Operations in the financial year in which the share awards vest.
- The LTI (share awards) remuneration reported for the year 2019 includes an adjustment for the 2016 Board of Management performance share plan based on the actual number of share awards vested in 2019. The adjustment for Mr. Wennink, Mr. van den Brink, Mr. van Hout and Mr. Schneider-Maunoury amounts to €(346,501), €(346,501), €(234,185) and €(234,185) respectively. The remuneration committee awarded the Board of Management a payout of 75% of maximum compared to the result of 65% of maximum for vesting of the 2016 award. This resulted in an incremental fair value step-up for the LTI (share awards) for the year 2019 of €0.6 million. The adjustment for Mr. Wennink, Mr. van den Brink, Mr. van Hout and Mr. Schneider-Maunoury amounts to €168,774, €168,774, €114,067 and €114,067 respectively. The net impact is respectively €(177,727), €(177,727), €(120,118) and €(120,118).
- The LTI (share awards) remuneration reported for the year 2019 includes an adjustment for the 2017 Board of Management performance share plan based on a best estimate of the number of share awards, which are expected to vest in 2020. The adjustment for Mr. Wennink, Mr. van den Brink, Mr. van Hout and Mr. Schneider-Maunoury amounts to €(943,898), €(943,898), €(542,241) and €(542,241) respectively. Additionally a modification has been taken into account for a non-market element. This resulted in an incremental fair value step-up for the LTI (share awards) for the year 2019 of €4.2 million. The adjustment for Mr. Wennink, Mr. van den Brink, Mr. van Hout and Mr. Schneider-Maunoury amounts to €1,337,544, €1,337,544, €768,379 and €768,379 respectively. The net impact is respectively €393,646, €393,646, €226,138 and €226,138.
- The LTI (share awards) remuneration reported for the year 2018 includes an adjustment for the Board of Management performance share plan 2015 based on the actual number of share awards vested in 2018. The adjustment for Mr. Wennink, Mr. van den Brink, Mr. van Hout and Mr. Schneider-Maunoury amounts to €(394,434), €(394,434), €(264,593) and €(257,605) respectively.
- The LTI (share awards) for 2018 and 2017 have been restated refer to the details of the restatement to the section Restatement remuneration Board of Management below.
- The LTI (share awards) remuneration reported for the year 2017 includes an adjustment for the Board of Management performance share plan 2014 based on the actual number of share awards vested in 2017. The adjustment for Mr. Wennink, Mr. van den Brink, Mr. van Hout and Mr. Schneider-Maunoury amounts to €(271,533), €(271,533), €(182,095) and €(177,459) respectively.
- As per the 2018 AGM Roger Dassen and Christophe Fouquet were appointed as members of the Board of Management. Roger Dassen replaced Wolfgang Nickl who stepped down from his position with ASML as per the 2018 AGM.

The remuneration of W.U. Nickl, former member of the Board of Management based on incurred accounting expenses in 2019, 2018 and 2017 was as follows (in € thousands):

Former Board of Management	Financial Year	Fixed			Total fixed	% Fixed	Short-term (variable)	Long-term (variable)	Total variable	% Variable	Total Remuneration	Relative proportion (ratio between fixed % and variable %)
		Base salary	Pension	Other benefits								
		€	€	€		STI (cash)	LTI (share awards) ¹	€		€		
W.U. Nickl ⁵	2018 (restated) ^{2,3}	220	25	19	264	18.2 %	168	1,020	1,188	81.8 %	1,452	0.22
	2017 (restated) ^{3,4}	661	67	47	775	43.5 %	587	419	1,006	56.5 %	1,781	0.77

- The remuneration reported as part of the LTI (share awards) is based on costs incurred under US GAAP and EU-IFRS. The costs of share awards are charged to the Consolidated Statements of Operations over the 3-year vesting period based on the number of awards expected to vest. For the first 2 years, we apply the maximum achievable number of share awards, and in the final performance year of the awards we update this estimate for the non-market performance conditions. Therefore the costs for the financial year 2019 include costs of the Board of Management performance share plan 2019 (at maximum vesting), 2018 (at maximum vesting) and 2017 (at revised best estimate of the number of shares that will vest). Furthermore, any difference between the amount based on the best estimate of achievable number of shares awards and the amount based on the actual number of share awards that vest, is released to the Consolidated Statements of Operations in the financial year in which the share awards vest.
- The LTI (share awards) remuneration reported for the year 2018 includes an adjustment for the Board of Management performance share plan 2015 based on the actual number of share awards vested in 2018. The adjustment for Mr. Nickl amounts to €(253,072).
- The LTI (share awards) for 2018 and 2017 have been restated refer to the details of the restatement to the section Restatement remuneration Board of Management below.
- The remuneration reported as part of the LTI (share awards) for the year 2017 includes an adjustment for the Board of Management performance share plan 2014 based on the actual number of share awards vested in 2017. The adjustment for Mr. Nickl amounts to €(963,017).
- As per the 2018 AGM Roger Dassen and Christophe Fouquet were appointed as members of the Board of Management. Roger Dassen replaced Wolfgang Nickl who stepped down from his position with ASML as per the 2018 AGM.

Restatement remuneration Board of Management

The remuneration of key management personnel, comprising of members of the Board of Management has been restated for 2018 and 2017 due to incorrect accounting for share based remuneration. Restatements have the following impact per board member disclosure (in € thousands):

Board of Management	Financial Year	Original reported	Accounting for	Absence accounting	Restated LTI-share awards
		LTI-share awards	market based elements	incremental fair value step-up for modification 2015 award upon vesting	
		€	€	€	€
P.T.F.M. Wennink	2018	1,560	(174)	66	1,452
	2017	1,471	(84)	—	1,387
M.A. van den Brink	2018	1,560	(174)	66	1,452
	2017	1,471	(84)	—	1,387
F.J. van Hout	2018	908	(100)	45	853
	2017	919	(48)	—	871
F.J.M. Schneider-Maunoury	2018	914	(100)	44	858
	2017	914	(48)	—	866
R.J.M. Dassen	2018	149	(14)	—	135
C.D. Fouquet	2018	191	(18)	—	173
Total Board of Management	2018	5,282	(580)	221	4,923
	2017	4,775	(264)	—	4,511

Restatements have the following disclosure impact for former member of the Board of Management (in € thousands):

Former Board of Management	Financial Year	Original reported	Accounting for	Absence accounting	Timing acceleration	Restated LTI-share awards
		LTI-share awards	market based elements	incremental fair value step-up for modification 2015 award upon vesting		
		€	€	€		€
W.U. Nickl	2018	970	(117)	42	125	1,020
	2017	650	(100)	—	(131)	419

The Remuneration of key management personnel, comprising of members of the Board of Management has been restated for 2018 and 2017 due to incorrect accounting of the following:

Accounting for market based elements

The market based elements were incorporated in the performance plans starting in 2017, but incorrectly accounted for as non-market based elements. In addition, the fair value in use was incorrectly not adjusted for the absence of dividend rights during the vesting period. Impact is €(0.7 million) in 2018 and €(0.4 million) in 2017.

Accounting for incremental fair value step-up for modification of 2015 award

The LTI (share awards) remuneration reported for the year 2018 includes a restatement pertaining to the remuneration committee awarding the Board of Management a payout of 75% of maximum compared to the result of 68.8% of maximum for the 2015 award. This resulted in a modification that was incorrectly accounted for in 2018, resulting in an incremental fair value step-up of €0.3 million.

Timing of accounting for acceleration - former member of the Board of Management

The accelerated expenses related to the LTI (share awards) of Mr. Nickl, were not fully recorded in the proper period resulting in a correction of the expense recognized between 2018 and 2017 of €0.1 million.

Accounting for excess tax levy upon termination

Total restated remuneration for financial year 2018 is excluding an estimated amount of €8.3 million to account for the tax levy payable to the Dutch tax authorities by the Company on termination benefits pursuant to Article 32bb of the Dutch wage tax act, and including this tax levy brings the total remuneration expense for Mr. Nickl for the financial year 2018 to €9.8 million.

Relationship between accounted remuneration and company's performance

The following table sets forth an overview of the relationship between accounted remuneration and the company's performance (in € thousands):

	2015	2016	2017	2018	2019
Net sales	6,287,375	6,875,073	8,962,658	10,944,016	11,820,001
Net income based on US GAAP	1,387,174	1,557,850	2,066,679	2,591,614	2,592,252
Net income based on IFRS	1,619,489	1,642,800	2,173,400	2,525,515	2,581,107
ASML share price (closing price on Euronext Amsterdam in €)	82.6	106.7	145.2	137.2	263.7
Remuneration President (CEO)	3,558	3,458	3,455	3,433	4,361
Remuneration President (CTO)	3,603	3,462	3,454	3,431	4,360
Remuneration Executive Vice President (CFO)	—	—	—	897	2,956
Remuneration Executive Vice President (CSO)	2,530	2,360	2,276	2,177	2,738
Remuneration Executive Vice President EUV	—	—	—	1,125	2,203
Remuneration Executive Vice President (COO)	2,450	2,301	2,260	2,169	2,724
Average remuneration per FTE	110	110	109	107	106
Internal pay ratio (CEO versus employee remuneration)	32	31	32	32	41

The remuneration of the CFO and Executive Vice President EUV is lower in 2018, since they were appointed as members of the Board of Management per the 2018 AGM.

Explanation of changes in company's performance versus remuneration

The table set out above aims to provide insight into the Company's performance over the past five years and the development of the remuneration. The metrics sales, net income and share price are used to measure company performance, as they are key metrics serving as a good proxy for ASML's general performance, as well as in view of comparability with other companies. The Company has grown significantly over the last years, not only reflected in the number of employees but also in terms of revenue. Since 2014, net sales increased with 102%. The performance of the Company in that same period has increased significantly as well, reflected for example in Net Income (82% growth since 2014 based on IFRS) and Total Shareholder Return (195% growth). The size of the company (measured by enterprise value, revenue and number of employees) is taken into account in determining the group of reference companies that are used for the benchmark to assess the competitiveness of the Board of Management remuneration compared to the labor market. This has led to revisions of the Board of Management remuneration policy in 2017 and 2019, resulting into higher base salaries as well as higher levels of STI (at target) and LTI (at target). Actual remuneration may fluctuate year over year depending on actual STI pay-out in any year, as well as the vesting of performance shares (LTI) in any year and the share price at that moment. Average remuneration per FTE has decreased slightly since 2015, mainly due to the relatively high influx of new employees in that period and a faster growth of employees in countries with lower average salaries.

Relationship between CEO and average remuneration (pay ratio)

Revision of the Board of Management Remuneration Policy in 2019 and the slight decrease of the average remuneration per FTE has resulted in an increase of the pay ratio to 41:1 in 2019 (2018 (restated) 32:1)¹. ASML intends to grant competitive remuneration to employees at all position levels within the Company. At each level remuneration should reflect the responsibilities of the role. The build-up of remuneration from level to level should therefore be gradual and in line with increasing responsibilities, also following market practice. At the highest level the steps become gradually bigger as responsibilities ultimately rise from a divisional level to an overall company level. The Supervisory Board considers the current build-up and the overall pay ratio of 41:1 to be equitable, considering the current size and organization structure of the company.

1. This ratio consists of the CEO's total remuneration during 2019 of 4,360,636, compared to the average remuneration of all employees. The average remuneration of all employees was calculated using the average number of payroll employees in FTE (wages and salaries + pension and retirement expenses + share-based payments) / average number of payroll employees = €2,352 million / 22,192 = €106 thousand. This ratio is prepared in accordance with the Dutch Corporate Governance Code and has not been prepared to comply the Pay Ratio Disclosure requirements under SEC regulations.

Total remuneration current members of the Supervisory Board

The following table sets forth an overview of the remuneration awarded to Supervisory Board members over five years (in € thousands):

	Financial year	Supervisory Board	Audit committee	Remuneration committee	Selection and nomination committee	Technology committee	Other	Total fixed	% Fixed	Total variable	% Variable	Total remuneration
		€	€	€	€	€	€	€		€		€
G.J. Kleisterlee	2019 ¹	108	15	—	17	12	—	152	100 %	—	— %	152
	2018 ¹	100	13	—	15	10	—	138	100 %	—	— %	138
	2017 ¹	99	12	—	14	10	—	135	100 %	—	— %	135
	2016 ^{1,5}	86	10	—	9	8	—	113	100 %	—	— %	113
	2015 ⁶	60	—	—	—	6	—	66	100 %	—	— %	66
D.A. Grose	2019 ³	83	—	—	12	17	20	132	100 %	—	— %	132
	2018	90	—	—	10	15	—	115	100 %	—	— %	115
	2017 ⁴	88	—	—	10	14	1	113	100 %	—	— %	113
	2016 ⁴	80	—	—	8	12	5	105	100 %	—	— %	105
	2015 ⁴	80	—	—	8	12	4	104	100 %	—	— %	104
T.L. Kelly	2019 ³	73	—	12	—	—	15	100	100 %	—	— %	100
	2018 ²	53	—	7	—	—	—	60	100 %	—	— %	60
	2017	—	—	—	—	—	—	—	— %	—	— %	—
	2016	—	—	—	—	—	—	—	— %	—	— %	—
	2015	—	—	—	—	—	—	—	— %	—	— %	—
A.P. Aris	2019 ³	68	—	—	12	12	5	97	100 %	—	— %	97
	2018	60	—	3	7	10	—	80	100 %	—	— %	80
	2017	60	—	10	—	10	—	80	100 %	—	— %	80
	2016	60	—	8	—	8	—	76	100 %	—	— %	76
	2015 ⁶	60	—	6	—	4	—	70	100 %	—	— %	70
R.D. Schwalb	2019	68	15	17	—	—	—	100	100 %	—	— %	100
	2018	60	13	15	—	—	—	88	100 %	—	— %	88
	2017	60	12	14	—	—	—	86	100 %	—	— %	86
	2016	60	10	11	—	—	—	81	100 %	—	— %	81
	2015 ⁶	60	10	6	—	—	—	76	100 %	—	— %	76
C.M.S. Smits Nusteling	2019	68	22	—	—	—	—	90	100 %	—	— %	90
	2018	60	20	—	—	—	—	80	100 %	—	— %	80
	2017	60	19	—	—	—	—	79	100 %	—	— %	79
	2016	60	15	—	—	—	—	75	100 %	—	— %	75
	2015	60	14	—	—	—	—	74	100 %	—	— %	74
J.M.C. Stork	2019 ³	73	—	12	—	12	20	117	100 %	—	— %	117
	2018	80	—	10	—	10	—	100	100 %	—	— %	100
	2017	80	—	10	—	10	—	100	100 %	—	— %	100
	2016	80	—	6	—	8	—	94	100 %	—	— %	94
	2015	80	—	—	—	8	—	88	100 %	—	— %	88
W.H. Ziebart	2019 ³	68	15	—	—	12	5	100	100 %	—	— %	100
	2018	60	9	3	—	10	—	82	100 %	—	— %	82
	2017	60	—	10	—	10	—	80	100 %	—	— %	80
	2016	60	—	9	—	8	—	77	100 %	—	— %	77
	2015	60	—	12	—	8	—	80	100 %	—	— %	80
Total	2019	609	67	41	41	65	65	888	100 %	—	— %	888
	2018	563	55	38	32	55	—	743	100 %	—	— %	743
	2017	507	43	44	24	54	1	673	100 %	—	— %	673
	2016	486	35	34	17	44	5	621	100 %	—	— %	621
	2015	460	24	24	8	38	4	558	100 %	—	— %	558

1. During 2019, 2018, 2017 and 2016 Gerard J. Kleisterlee was invited as a guest to the Audit Committee and received an observer fee.

2. During 2018 Terri L. Kelly succeeded Pauline F.M. van der Meer Mohr as a member of the Supervisory Board.

3. Other mainly consists of the extra allowance for intercontinental meetings.

4. In 2017, 2016 and 2015 the Vice Chairman of the Supervisory Board received respectively €1,250, €5,000 and €3,750 in addition to the annual fixed fee.

5. After the first quarter for 2016 Gerard J. Kleisterlee replaced Arthur P.M. van der Poel for the role of Chairman of the Supervisory Board.

6. During 2015 Antoinette (Annet) P. Aris, Gerard J. Kleisterlee and Rolf-Dieter Schwalb were appointed as member of the Supervisory Board and therefore received an observer fee in the first quarter.

Additional reimbursements

In addition to the table above, ASML paid a net cost allowance amounting to €1,380 to each Supervisory Board member, and €1,980 to the Chair of the Supervisory Board in 2019.

Loans

The Company has not granted any (personal) loans to, nor has it granted any guarantees or the like in favor of, any of the members of the Supervisory Board.

Total remuneration

The annual remuneration for the members of the Board of Management and Supervisory Board members during 2019 amounts to €20.2 million (2018 (restated): €14.0 million).

Total remuneration former members of the Supervisory Board

The following table sets forth an overview of the remuneration awarded to the former Supervisory members in 2019, 2018 and 2017 (in € thousands):

	Financial year	Supervisory Board	Audit committee	Remuneration committee	Selection and nomination committee	Technology committee	Other	Total fixed	% Fixed	Total variable	% Variable	Total remuneration
		€	€	€	€	€	€	€		€		€
P.F.M. van der Meer	2019	—	—	—	—	—	—	—	— %	—	— %	—
Mohr	2018 ¹	20	4	—	3	—	—	27	100 %	—	— %	27
	2017	60	12	—	10	—	—	82	100 %	—	— %	82

1. During 2018 Terri L. Kelly succeeded Pauline F.M. van der Meer Mohr as a member of the Supervisory Board.

Relationship between Supervisory Board remuneration and company's performance

The remuneration of the supervisory board is not directly linked to the performance of the company.

Remuneration grant by subsidiaries or other companies

No remuneration has been granted and allocated by subsidiaries or other companies whose financials are consolidated by ASML N.V. since all members of the Board of directors and the Supervisory Board are paid directly by ASML N.V.

Severance payments

No severance payments were granted to members of the Board of Management and the Supervisory Board.

Claw-back variable remuneration

No variable remuneration has been clawed-back.

Share-based payments

Performance based share-based remuneration current Board of Management

Board of Management	Grant date	Status	Full control	Number of shares: market based ¹	Fair value at grant date ²	Number of shares: non-market based ¹	Fair value at grant date ²	Total target number of shares at grant date	Total maximum number of shares at grant date	Vesting date	Total number of shares at vesting date ³	Share price at vesting	End of lock-up date
P.T.F.M. Wennink	7/19/19	Conditional	No	2,217	245.4	5,173	194.4	7,390	14,780	1/1/22	—	n/a	1/1/24
	1/19/18 (restated)	Conditional	No	1,958	215.1	4,570	162.8	6,528	13,056	1/19/21	—	n/a	1/19/23
	1/20/17 (restated)	Conditional	No	3,037	145.4	7,085	110.5	10,122	20,243	1/1/20	16,733	263.7	1/1/22
	1/22/16	Unconditional	No	—	—	8,290	83.6	8,290	16,579	1/22/19	12,435	141.4	1/22/21
	1/23/15	Unconditional	No	—	—	8,355	94.4	8,355	16,710	1/23/18	12,533	167.0	1/23/20
	1/24/14	Unconditional	No	—	—	9,640	64.4	9,640	19,280	1/24/17	15,063	113.9	1/24/19
M.A. van den Brink	7/19/19	Conditional	No	2,217	245.4	5,173	194.4	7,390	14,780	1/1/22	—	n/a	1/1/24
	1/19/18 (restated)	Conditional	No	1,958	215.1	4,570	162.8	6,528	13,056	1/19/21	—	n/a	1/19/23
	1/20/17 (restated)	Conditional	No	3,037	145.4	7,085	110.5	10,122	20,243	1/1/20	16,733	263.7	1/1/22
	1/22/16	Unconditional	No	—	—	8,290	83.6	8,290	16,579	1/22/19	12,435	141.4	1/22/21
	1/23/15	Unconditional	No	—	—	8,355	94.4	8,355	16,710	1/23/18	12,533	167.0	1/23/20
	1/24/14	Unconditional	No	—	—	9,640	64.4	9,640	19,280	1/24/17	15,063	113.9	1/24/19
F.J. van Hout	7/19/19	Conditional	No	1,371	245.4	3,198	194.4	4,569	9,137	1/1/22	—	n/a	1/1/24
	1/19/18 (restated)	Conditional	No	1,125	215.1	2,626	162.8	3,751	7,501	1/19/21	—	n/a	1/19/23
	1/20/17 (restated)	Conditional	No	1,745	145.4	4,070	110.5	5,815	11,629	1/1/20	9,613	263.7	1/1/22
	1/22/16	Unconditional	No	—	—	5,603	83.6	5,603	11,205	1/22/19	8,404	141.4	1/22/21
	1/23/15	Unconditional	No	—	—	5,605	94.4	5,605	11,210	1/23/18	8,408	167.0	1/23/20
	1/24/14	Unconditional	No	—	—	6,465	64.4	6,465	12,929	1/24/17	10,101	113.9	1/24/19
F.J.M. Schneider-Maunoury	7/19/19	Conditional	No	1,371	245.4	3,198	194.4	4,569	9,137	1/1/22	—	n/a	1/1/24
	1/19/18 (restated)	Conditional	No	1,125	215.1	2,626	162.8	3,751	7,502	1/19/21	—	n/a	1/19/23
	1/20/17 (restated)	Conditional	No	1,745	145.4	4,070	110.5	5,815	11,629	1/1/20	9,613	263.7	1/1/22
	1/22/16	Unconditional	No	—	—	5,603	83.6	5,603	11,205	1/22/19	8,404	141.4	1/22/21
	1/23/15	Unconditional	No	—	—	5,456	94.4	5,456	10,912	1/23/18	8,184	167.0	1/23/20
	1/24/14	Unconditional	No	—	—	6,300	64.4	6,300	12,599	1/24/17	9,843	113.9	1/24/19
R.J.M. Dassen ^{3,4}	7/19/19	Conditional	No	1,371	245.4	3,198	194.4	4,569	9,137	1/1/22	—	n/a	1/1/24
	1/25/19	Conditional	No	3,000	169.0	7,000	148.3	10,000	20,000	1/1/22	—	n/a	1/1/24
	1/19/18 (restated)	Conditional	No	657	274.6	1,531	185.0	2,188	4,376	1/19/21	—	n/a	1/19/23
C.D. Fouquet ³	07/19/19	Conditional	No	1,371	245.4	3,198	194.4	4,569	9,137	1/1/22	—	n/a	1/1/24
	1/19/18 (restated)	Conditional	No	844	274.6	1,969	185.0	2,813	5,626	1/19/21	—	n/a	1/19/23

- As of 2017, a market-based element (Total Shareholder Return compared to a reference index) was incorporated in the performance plans. The fair value per award has been calculated for the market (30%) and non-market (70%) elements separately as required under US GAAP and EU-IFRS. As from 2019, we state the number of performance shares at grant date at target level. Prior to 2019, the number of shares were stated at maximum vesting (200% of target).
- The number of shares represent the gross compensation, before any tax payments using shares is performed. Vested performance shares may be partially sold to pay for taxes over the performance shares ('sell to cover'), which is in accordance with applicable tax regulations and our Remuneration Policy.
- As per the 2018 AGM Roger Dassen and Christophe Fouquet were appointed as members of the Board of Management. Roger Dassen replaced Wolfgang Nickl who stepped down from his position with ASML as per the 2018 AGM.
- An additional performance share award was awarded to Roger Dassen for a target amount of 10,000 shares on January 25, 2019. The vesting and performance conditions are in line with other Board of Management performance plans.
- The restatement refers to the fair value of shares granted, as determined for accounting purposes. It has no impact on the number of performance shares granted.

Performance based share-based remuneration for former member of the Board of Management

Former Board of Management	Grant date	Status	Full control	Number of shares: market based ¹	Fair value at grant date ⁵	Number of shares: non-market based ¹	Fair value at grant date ⁵	Total target number of shares at grant date	Total maximum number of shares at grant date	Vesting date	Total number of shares at vesting date ²	Share price at vesting	End of lock-up date
W.U. Nickl ^{3,4}	1/19/18 (restated)	Conditional	No	375	215.1	875.5	162.8	1,250.5	2,501	1/19/21	—	n/a	1/19/23
	1/20/17 (restated)	Conditional	No	1,745	145.4	4,070	110.5	5,815	11,629	1/1/20	9,613	n/a	1/1/22
	1/22/16	Unconditional	No	—	—	5,603	83.6	5,603	11,205	1/22/19	8,404	263.7	1/22/21
	1/23/15	Unconditional	No	—	—	5,360	94.4	5,360	10,720	1/23/18	8,040	141.4	1/23/20
	1/24/14	Unconditional	No	—	—	6,187	64.4	6,187	12,373	1/24/17	9,669	167.0	1/24/19
	1/24/14	Unconditional	No	—	—	28,000	64.4	28,000	56,000	1/24/17	43,748	113.9	1/24/19

- As of 2017, a market-based element (Total Shareholder Return compared to a reference index) was incorporated in the performance plans. The fair value per award has been calculated for the market (30%) and non-market (70%) elements separately as required under US GAAP and EU-IFRS. As from 2019, we state the number of performance shares at grant date at target level. Prior to 2019, the number of shares were stated at maximum vesting (200% of target).
- The number of shares represent the gross compensation, before any tax payments using shares is performed. Vested performance shares may be partially sold to pay for taxes over the performance shares ('sell to cover'), which is in accordance with applicable tax regulations and our Remuneration Policy.
- ASML compensated part of the shares and stock options that were forfeited when Mr. Nickl left his former company in the US. This compensation takes the form of a maximum of 56,000 performance related shares awarded in 2014, subject to the performance conditions, a three year vesting period and a two year holding period as applicable under the Remuneration Policy.
- As per the 2018 AGM Roger Dassen and Christophe Fouquet were appointed as members of the Board of Management. Roger Dassen replaced Wolfgang Nickl who stepped down from his position with ASML as per the 2018 AGM.
- The restatement refers to the fair value of shares granted, as determined for accounting purposes. It has no impact on the number of performance shares granted.

Reasons, criteria and principal conditions for granting shares

Reference is made to section Introduction - Remuneration policy, where the reasons, criteria and conditions for granting shares are set out. These apply to each member of the Board of Management.

Main conditions

ASML has share based-payment plans for the company's employees. These plans consist of performance plans including services and service only plans. The performance plans contain 70% non-market based elements and a 30% market based element. The fair value of the market based element of the performance plans (30% Total Shareholder Return as compared to a specific peer group) is measured at the grant date incorporating the expected vesting and expected value at vesting, using a tailored Monte Carlo simulation model. The fair value of the non-market based element of the performance plans (ROAIC (40%), rating in technology index (20%) and sustainability (10%)) and the service plans (being service over specified period of time) is measured at the grant date at the share price less present value of expected dividends during the vesting period, as participants are not entitled to dividends payable and voting rights during the vesting period. The likelihood of the conditions being met for service and non-market performance plans is assessed as part of the company's best estimate of the number of equity instruments that will ultimately vest.

Participants are entitled to a conditional grant of company shares upon awarding. Performance plans are subject to cliff vesting and are accounted for on a straight line basis. Service only plans are subject to graded vesting. Each installment of the plan is therefore accounted as a separate grant with a separate fair value. This means that each installment will be separately measured and attributed to expense over the related vesting period. Expenses for the market based element are recognized during vesting at a fixed vesting level (as the vesting expectation is incorporated in the fair value) provided that all other performance conditions are met. Expenses for the non-market based elements and service plans are recognized during vesting at expected vesting levels, which are updated during vesting period as necessary, with a final update/adjustment at vesting date. All share based remuneration expenses are recognized as personnel expense, with a corresponding entry in equity, during the vesting period of the award. Share based remuneration expenses are included in the same income statement line or lines in the functional grouped consolidated statement of operations as the compensation paid to the employees receiving the stock-based awards.

Option remuneration current and former Board of Management

No options have been granted to the current members and former members of the Board of Management during the last five years.

Shared-based remuneration Supervisory Board

No shares and options have been granted to the current and former members of the Supervisory Board during the last five years.

Shared-based remuneration employees

	EUR-denominated		USD-denominated	
	Number of shares	Weighted average fair value at grant date (€)	Number of shares	Weighted average fair value at grant date (USD)
Conditional shares outstanding at January 1, 2017	884,204	79.33	954,608	95.81
Granted	342,120	125.16	326,804	130.77
Vested	(388,127)	81.13	(387,779)	99.35
Forfeited	(56,107)	70.76	(57,079)	98.97
Conditional shares outstanding at December 31, 2017	782,090	99.10	836,554	107.61
Granted	288,679	161.63	348,997	187.98
Vested	(293,075)	108.10	(315,333)	113.96
Forfeited	(56,867)	96.98	(209,036)	108.33
Conditional shares outstanding at December 31, 2018	720,827	120.73	661,182	146.78
Granted	315,578	190.33	255,885	206.90
Vested	(304,322)	116.82	(282,971)	138.04
Forfeited	(50,054)	96.74	(55,597)	138.43
Conditional shares outstanding at December 31, 2019	682,029	157.48	578,499	179.22

Reasons, criteria and principle conditions for granting shares to employees

Reference is made to section Introduction - Remuneration.

Main conditions

Reference is made to section Share-based payments - Main conditions.

Other information

Every quarter, we offer our worldwide payroll employees the opportunity to buy our shares against fair value using their net salary. The Board of Management is excluded from participation in this plan. The fair value for shares is based on the closing price of our shares listed at Euronext Amsterdam on grant date. The maximum net amount for which employees can participate in the plan amounts to 10.0% of their annual gross base salary. When employees retain the shares for a minimum of 12 months, we will pay out a 20.0% cash bonus on the initial participation amount.

In July 2002, we adopted a non-qualified deferred compensation plan for our US employees that allows a select group of management or highly compensated employees to defer a portion of their salary, bonus, and commissions. The plan allows us to credit additional amounts to the participants' account balances. The participants divide their funds among the investments available in the plan. Participants elect to receive their funds in future periods after the earlier of their employment termination or their withdrawal election, at least 3 years after deferral. Expenses were close to nil relating to this plan in 2019, 2018 and 2017. Cymer has a similar non-qualified deferred compensation plan for a selected group of management level employees in the US in which the employee may elect to defer receipt of current compensation in order to provide retirement and other benefits on behalf of such employee backed by Cymer owned life insurance policies.

As of December 31, 2019, our liability under deferred compensation plans was €56.6 million (2018: €46.8 million).

Option plan remuneration employees

	EUR-denominated		USD-denominated	
	Number of shares	Weighted average fair value at grant date (€)	Number of shares	Weighted average fair value at grant date (USD)
Outstanding, January 1, 2017	323,604	36.61	165,597	58.18
Exercisable, January 1, 2017	323,604	36.61	165,597	58.18
Granted	—	—	—	—
Exercised	(115,606)	25.11	(46,938)	47.11
Forfeited	(399)	55.11	—	—
Expired	—	—	—	—
Outstanding, December 31, 2017	207,599	42.67	118,659	62.85
Exercisable, December 31, 2017	207,599	42.67	118,659	62.85
Granted	—	—	—	—
Exercised	(90,710)	19.86	(46,208)	36.65
Forfeited	—	—	—	—
Expired	(197)	—	(2,152)	—
Outstanding, December 31, 2018	116,692	60.41	70,299	81.43
Exercisable, December 31, 2018	116,692	60.49	70,299	81.43
Granted	—	—	—	—
Exercised	(27,952)	46.90	(14,750)	72.86
Forfeited	—	—	—	—
Expired	—	—	—	—
Outstanding, December 31, 2019	88,740	64.80	55,549	83.71
Exercisable, December 31, 2019	88,740	64.80	55,549	83.71

Details with respect to the stock options outstanding are set out in the following table:

	EUR-denominated			USD-denominated		
	Range of exercise prices (€)	Number of outstanding options at December 31, 2019	Weighted average remaining contractual life of outstanding options (years)	Range of exercise prices (USD)	Number of outstanding options at December 31, 2019	Weighted average remaining contractual life of outstanding options (years)
	20 - 25	7,260	0.79	20 - 25	—	0.00
	25 - 40	8,060	1.72	25 - 40	6,518	1.10
	40 - 50	9,290	2.80	40 - 50	562	1.80
	50 - 60	7,273	3.97	50 - 60	2,869	2.70
	60 - 70	15,318	3.93	60 - 70	423	3.10
	70 - 80	14,115	5.38	70 - 80	1,059	3.30
	80 - 90	13,625	5.85	80 - 90	12,449	4.80
	90 - 100	13,799	5.69	90 - 100	21,957	5.00
	100 - 110	—	0.00	100 - 110	9,712	5.70
Total		88,740	4.16	Total	55,549	4.40

Reasons, criteria and principal conditions for granting shares to employees

Since 2017 options are no longer granted to employees.

Main conditions

The grant-date fair value of stock options is estimated using a Black-Scholes option valuation model. This Black Scholes model requires the use of assumptions, including expected share price volatility, the estimated life of each award and the estimated dividend yield. The risk-free interest rate used in the model is determined, based on an index populated with euro denominated European government agency bond with high credit ratings and with a life equal to the expected life of the equity settled share-based payments. Our option plans typically vest over a three-year service period with any unexercised stock options expiring 10 years after the grant date. Options granted have fixed exercise prices equal to the closing price of our shares listed at Euronext Amsterdam on grant date. As of 2017 we no longer grant options to our employees and all options issued are vested. We therefore no longer disclose the assumptions of the options since there are no changes compared to the Integrated Report 2018.

Other arrangements

Refer for other arrangements to section Introduction - Remuneration policy.

Decision making process

No deviations took place from the decision-making process for the implementation of the remuneration policy.

Temporary deviations from the remuneration policy

No temporary deviations took place from the remuneration policy.

General meeting's advisory vote

The Remuneration Report for the financial year 2019 will be submitted to the General Meeting in 2020 for an advisory vote, in accordance with Dutch law.

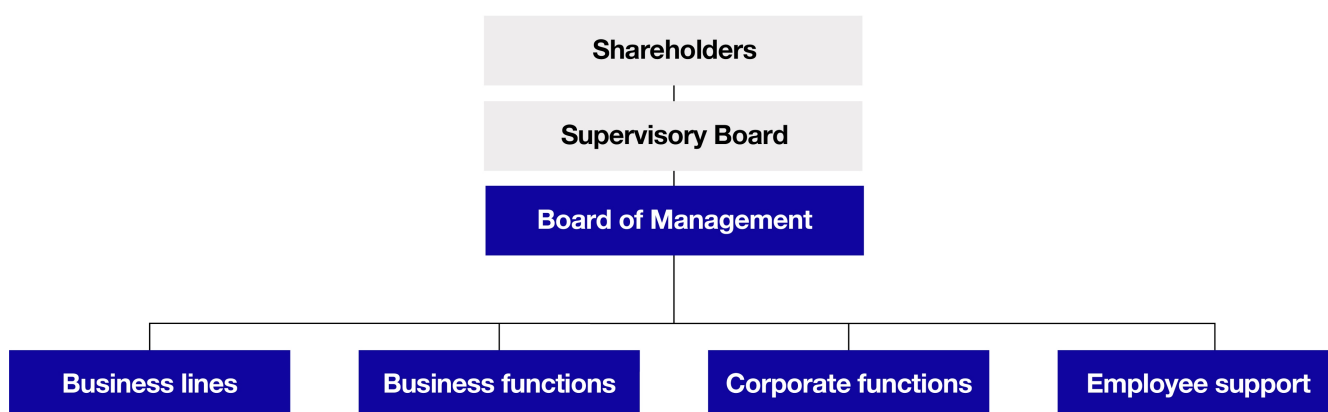
Corporate governance

ASML Holding N.V. is a public limited liability company operating under Dutch law and has a two-tier board structure with a board of management responsible for managing the company under supervision of an independent supervisory board. ASML's shares are listed on Euronext Amsterdam and NASDAQ.

We endorse the importance of good corporate governance, of which independence, accountability and transparency are the most significant elements. These are also the elements on which a relationship of trust between us and all our stakeholders (employees, customers, suppliers, shareholders and the public) can be built.

We continuously monitor and assess applicable Dutch, US and other relevant corporate governance codes, rules, and regulations. ASML is subject to the Dutch Corporate Governance Code, and because we are listed on NASDAQ, we are also required to comply with the Sarbanes-Oxley Act, as well as NASDAQ Listing Rules, and the rules and regulations promulgated by the SEC.

Our Supervisory Board and Board of Management will continue their efforts to ensure our practices and procedures comply with the applicable rules and regulations, including the Code. This section of the report addresses our corporate governance structure, part of which refers to the principles and best practices set forth in the Code, as well as applicable laws on corporate governance. Our Supervisory Board and Board of Management are of the opinion that we comply with all recommendations in the Code.



Board of Management

Role and procedure

ASML's Board of Management is responsible for managing ASML, under the chairmanship of the President and CEO, and the vice chairmanship of the President and Chief Technology Officer (CTO), which together constitutes a dual leadership. The current Board of Management is comprised of six members.

Although the various management tasks are divided among the members of the Board of Management, the Board of Management remains collectively responsible for the management of ASML, establishing a position on the relevance of long-term value creation for ASML and its business, the deployment of ASML's strategy, ASML's risk profile and policies, the achievement of objectives, ASML's results and the corporate social responsibility aspects relevant to ASML.

In fulfilling its management tasks and responsibilities, the Board of Management considers the interests of ASML and the business connected with it, as well as the interests of our stakeholders. The Board of Management is accountable to the Supervisory Board and the General Meeting for the performance of its management tasks.

The Supervisory Board supervises and advises the Board of Management in the execution of its tasks and responsibilities, while the Board of Management provides the Supervisory Board with all the information, in writing or otherwise, necessary for the Supervisory Board to fulfill its duties. Besides the information provided in the regular meetings, the Board of Management provides the Supervisory Board with regular updates on developments relating to our business, financials, operations, and industry developments in general.

Important decisions of the Board of Management that require the approval of the Supervisory Board are, among others:

- ASML's operational and financial objectives.
- The strategy designed to achieve the objectives.
- The parameters to be applied in relation to the strategy designed to achieve the objectives.
- Corporate responsibility issues that are relevant to ASML.

The main elements of the operational and financial objectives, the strategy to achieve the objectives, and the parameters to be applied are included in Integrated Report. The risk factors included in How we manage risk - Risk factors outlines the sensitivity of the results to both external and internal factors and variables.

The Board of Management's rules of procedure include such matters as the general responsibilities of the Board of Management, the relationship with the Supervisory Board and various stakeholders, the decision-making process within the Board of Management, and the logistics surrounding the meetings. The Board of Management's rules of procedure are published in the governance section on our website.

Appointment, other functions

Members of the Board of Management are appointed by the Supervisory Board upon recommendation by the Selection and Nomination Committee and upon notification to the General Meeting. Members of the Board of Management are appointed for a period of four years, after which reappointment is possible.

The Supervisory Board may suspend and dismiss members of the Board of Management, but this can only be done after consulting the General Meeting.

Pursuant to Dutch legislation, a member of the Board of Management may not be a Supervisory Board member in more than two other large companies (within the meaning of Dutch Corporate Law). A member of the Board of Management may never be the Chair of a Supervisory Board of a large company. Board of Management members may only accept a supervisory board membership of another large company after having obtained prior approval from the Supervisory Board. Members of the Board of Management are also required to notify the Supervisory Board of other important functions held or to be held by them. Currently, no members of our Board of Management hold more than two Supervisory Board seats in other large companies and no member of the Board of Management is a Chair of a Supervisory Board of a large company.

Dutch legislation provides for statutory provisions to ensure a balanced representation of men and women on the management boards and supervisory boards of companies governed by this legislation. Balanced representation of men and women is deemed to exist if at least 30% of the seats are filled by men and at least 30% are filled by women. Within the meaning of this legislation, our Supervisory Board currently qualifies as balanced, but no seats are taken by women on the Board of Management. As such the Board of Management would not qualify as balanced. We have the ambition to meet the statutory requirements for ensuring balanced gender representation. This has proven to be challenging in a technology environment such as the one ASML operates in. For that reason and in order to increase gender diversity in the Board of Management, we have a specific program in place to improve gender diversity, aimed at getting women more interested in science, engineering and technology. In this way, we try to increase the number of women throughout ASML. By doing so we aim to increase our future talent pool so that more women will be available in the future for technical positions and (senior) management positions. Given the specific nature of our industry, this is a long-term process. Female participation in our total workforce has improved. Our percentage of female employees increased from 11% in 2010 to 16% in 2019. The percentage of women in managerial position also increased, from 8% in 2013 to 12% in 2019. We are currently developing a detailed Diversity & Inclusion strategy and action plan for the company, to further enhance gender diversity as well as other dimensions of diversity. For more information on our diversity and inclusion initiatives and performance data, see [What we achieved in 2019 - Our people - Promoting diversity and inclusion](#) and [Non-financial statements - Non-financial indicators - Our people](#).

Conflicts of interest

Conflicts of interest procedures are incorporated in the Board of Management's rules of procedure, and reflect Dutch law and the principles and best practice provisions of the Code with respect to conflicts of interest.

There have been no transactions in 2019, nor are there currently any transactions, between ASML or any of ASML's subsidiaries, or any significant shareholder and any member of the Board of Management or officer or any relative or spouse thereof, other than ordinary course compensation arrangements.

Related party transactions

In relation to the implementation of the revised EU Shareholder Rights Directive, ASML has adopted in January 2020 a related party transaction policy, which regulates the process around decision-making and disclosure of material transactions with related parties entered into outside the ordinary course of business or on other than normal market terms. For a description of related party transactions, see [Consolidated Financial Statements - Notes to the Consolidated Financial Statements - Note 25 Related party transactions](#).

Supervisory Board

Role and procedure

As mentioned in Leadership and governance - Supervisory Board report, our Supervisory Board supervises the Board of Management and the general course of affairs of ASML and its subsidiaries. The Supervisory Board also supports the Board of Management with its advice. As we have and intend to keep a two-tier structure, the Supervisory Board is a separate and independent body from the Board of Management and from ASML.

In fulfilling its role and responsibilities, the Supervisory Board takes into consideration the interests of ASML and its subsidiaries, as well as the relevant interests of its stakeholders. The Supervisory Board supervises how the Board of Management determines its position on the long-term value creation strategy and how the Board of Management implements that strategy. The Supervisory Board supervises and advises the Board of Management in performing its tasks, with a particular focus on:

- The achievement of ASML's objectives.
- ASML's corporate strategy and the management of risks inherent to ASML's business activities.
- The structure and operation of internal risk management and control systems.
- The financial reporting process.
- ASML's culture and the activities of the Board of Management in that regard.
- Compliance with applicable legislation and regulations.
- The relationship with shareholders and other stakeholders.
- The corporate social responsibility issues important for ASML.

Major management decisions, such as ASML's strategy, major investments and budget, require the Supervisory Board's approval. The Supervisory Board selects and appoints new Board of Management members, prepares the Remuneration Policy for the Board of Management, and decides on the remuneration for the individual members of the Board of Management. Also, the Supervisory Board is the body that nominates new Supervisory Board candidates for appointment and submits remuneration proposals for the Supervisory Board members to the General Meeting.

The Supervisory Board, through its Selection and Nomination Committee, closely follows the developments in the area of corporate governance and the applicability of the relevant corporate governance rules for ASML. For a more detailed description on the Supervisory Board's activities in the area of corporate governance, see the Supervisory Board report.

Meetings and activities of the Supervisory Board

For detailed information on the meetings and activities of the Supervisory Board in 2019, see Leadership and governance - Supervisory Board report - Meetings and Attendance.

The rules of procedure

The Supervisory Board's rules of procedure include requirements based on the Code, the Sarbanes-Oxley Act and on any other applicable laws, as well as corporate governance practices developed by the Supervisory Board over the years. Given the continuous developments in corporate governance, these rules of procedure are subject to regular review. Items covered in these rules include the responsibilities of the Supervisory Board and its committees, the composition of the Supervisory Board and its committees, logistics surrounding the meetings, the meeting attendance of members of the Supervisory Board, and the rotation schedule for these members.

The Supervisory Board's rules of procedure also include the charters of the four committees. The Supervisory Board has assigned some of its tasks and responsibilities to the four committees. That said, the plenary Supervisory Board remains responsible for the fulfillment of these tasks and responsibilities. The Supervisory Board and its committees may obtain information from officers and external advisers, if necessary for the execution of its tasks. The committees in particular occasionally call upon external advisers, who assist the committees with preparing the recommendations to be decided upon by the full Supervisory Board.

The Supervisory Board's rules of procedure, as well as the charters of the four committees, are regularly reviewed and, if needed, amended. Changes to the Supervisory Board's rules of procedure need to be approved by the full Supervisory Board. Changes to the charters of the committees are approved by the committee concerned. The Audit Committee charter is reviewed annually to check whether the charter still complies with the applicable rules and regulations, especially those relating to the Sarbanes-Oxley Act. The Supervisory Board's rules of procedure, and those of the four committees, were revised in 2017 pursuant to the amended Code and to ensure that our practices and procedures comply with Dutch corporate governance requirements.

Conflict of interest

Conflict of interest procedures are incorporated in the Supervisory Board's rules of procedure, and address Dutch law and the principles and best-practice provisions of the Code with respect to conflicts of interest.

There have been no transactions during 2019, nor are there currently any transactions, between ASML or any of its subsidiaries, and any other significant shareholder, and any Supervisory Board member or any relative or spouse thereof other than ordinary course compensation arrangements.

Remuneration of the Supervisory Board

The General Meeting determines the remuneration of the Supervisory Board members; this remuneration is not dependent on our (financial) results. The Supervisory Board's remuneration was last revised in 2019. In addition to their fee as members of the Supervisory Board, the members are also paid a fee for each committee membership, as well as an extra allowance for each meeting that involves intercontinental travel and a net cost allowance. Detailed information on the Supervisory Board's remuneration can be found in Leadership and governance - Remuneration report.

No member of the Supervisory Board personally maintains a business relationship with ASML, other than as a member of the Supervisory Board.

The members of the Supervisory Board do not receive ASML shares, or rights to acquire ASML shares, as part of their remuneration. Members who acquire or have acquired ASML shares or rights to acquire ASML shares must intend to keep these for long-term investment only. No member of the Supervisory Board currently has any ASML shares or rights to acquire ASML shares. In concluding transactions in ASML shares, members of the Supervisory Board must comply with our Insider Trading Rules.

We have not granted any personal loans, guarantees, or the like to members of the Supervisory Board. Our Articles of Association provide for the indemnification of the members of the Supervisory Board against claims that are a direct result of their tasks as members of the Supervisory Board, provided that such claims are not attributable to willful misconduct or intentional recklessness of the member of the Supervisory Board. We have also implemented the indemnification of the members of the Supervisory Board by means of separate indemnification agreements for each member.

In relation to the implementation of the revised EU Shareholder Rights Directive, ASML will submit a proposed remuneration policy for the Supervisory Board to the 2020 AGM.

Shareholders and General Meeting

Powers

A General Meeting is held at least once a year and generally takes place in Veldhoven, the Netherlands. During this meeting an overview is provided of the course of affairs at ASML as well as the conduct of its management over the past financial year. Also, the financial statements which have been prepared in accordance with applicable laws and regulations are submitted for adoption by the General Meeting. The General Meeting will also be requested to provide the members of the Board of Management and the Supervisory Board discharge from liability for the performance of their responsibilities in the previous financial year.

The General Meeting also has other powers (with due observance of the statutory provisions) such as: to resolve to amend the articles of association; to resolve to issue shares if and insofar as the Board of Management has not been designated by the General Meeting for this purpose; to adopt the Remuneration Policy for members of the Board of Management and the Supervisory Board and to cast an advisory vote in respect of the annual remuneration report.

Proposals placed on the agenda by the Supervisory Board, the Board of Management, or by shareholders, provided that they have submitted the proposals in accordance with the applicable legal provisions, are discussed and resolved. Shareholders representing at least 1.0% of ASML's outstanding share capital or representing a share value of at least €50 million are entitled to place items on the agenda of a General Meeting at the latest 60 days before the date of said meeting.

A recurring agenda item is the limited authorization for the Board of Management to issue (rights to) shares in ASML's capital, and to exclude preemptive rights for such issuances. This agenda item typically includes two elements: i) the authorization to the Board of Management to issue 5.0% (rights to) shares of ASML's issued share capital as of the date of authorization, plus an additional 5.0% of ASML's issued share capital as of the date of authorization that may be issued in connection with mergers, acquisitions and / or (strategic) alliances, and ii) the authorization to exclude preemptive rights in relation to the above share issue, with a maximum of 10.% of ASML's issued share capital as of the date of authorization.

A simple majority is required for the authorization to issue shares. For the authorization to exclude the preemptive rights, a simple majority is required provided at least 50% of ASML's issued share capital is present or represented at the AGM. Otherwise a majority of two thirds of the votes cast is required. The Board of Management must obtain the approval of the Supervisory Board for the issuance of ASML shares as well as for excluding the preemptive rights.

It is important for us to be able to issue (rights to) shares and to exclude the preemptive shareholders' rights in situations where it is imperative to be able to act quickly, for example when financial opportunities arise. This authorization has been used in the past, especially to optimize our financial position. Given the dynamics of the global capital markets, such financing transactions generally need to be executed within a short window of opportunity. The opportunity to issue shares or rights to shares, such as convertible bonds, would be limited if we needed a resolution of the General Meeting to issue shares and / or to exclude the shareholders' preemptive rights and may therefore interfere with the financial flexibility of ASML.

Supported by our long-term business plan, we will submit a proposal at the 2020 Annual General Meeting to declare a total dividend for 2019 of €2.40 per ordinary share. Recognizing the interim dividend of €1.05 per share paid November 15, 2019, this leads to a final dividend of €1.35 per share to be paid in the second quarter of 2020. This is a 14% increase compared to the 2018 dividend of €2.10 per share.

In addition to dividend payments, we intend to return cash to our shareholders on a regular basis through share buybacks or capital repayment, subject to our actual and anticipated level of liquidity requirements and other relevant factors.

On January 17, 2018, we announced a share buyback program amounting to €2.5 billion, to be executed within the 2018-2019 time frame. The shares to be repurchased under this program were intended to be canceled, with the exception of up to 2.4 million shares, which would be used to cover employee share plans.

In 2018, we repurchased 2,400,000 shares to cover employee share plans and 4,644,389 shares for cancellation for a total consideration of €1,146.2 million. No shares were canceled in 2018.

In January 2019, 5,806,366 ordinary shares were canceled, of which 3,468,737 shares were repurchased under the 2016-2017 program. In 2019, we repurchased 1,948,808 shares for cancellation for a total consideration of 410.0 million. The total number of repurchased shares under the 2018-2019 program was 8993197 shares for a total amount of €1,556.1 million and therefore the 2018-2019 program was not completed for the full amount.

On January 22, 2020, we announced a new three-year share buyback program, to be executed within the 2020-2022 time frame. As part of this program, we intend to purchase shares up to €6.0 billion. ASML intends to cancel these shares after repurchase, with the exception of up to 0.4 million shares which will be used to cover employee share plans. The share buyback program will be executed within the limitations of the existing authority granted by the General Meeting on April 24, 2019 and of the future authority granted by the General Meeting. The share buyback program may be suspended, modified or discontinued at any time.

Voting Rights

We are subject to the relevant provisions of Dutch law applicable to large corporations (the 'structuurregime'). These provisions have the effect of concentrating control over certain corporate decisions and transactions in the hands of the Supervisory Board. Members of the Board of Management are appointed by the Supervisory Board. The Supervisory Board shall notify at the General Meeting of intended appointments to the Board of Management. General Meetings will be held at least once a year. We do not solicit from or nominate proxies for our shareholders. However, shareholders and other persons entitled to attend General Meetings may be represented by proxies.

EGMs may be held as often as deemed necessary by the Supervisory Board or Board of Management and must be held if one or more ordinary or cumulative preference shareholders jointly representing at least 10% of the issued share capital make a written request to that effect to the Supervisory Board and the Board of Management specifying in detail the business to be dealt with.

Resolutions are adopted at General Meetings by an absolute majority of the votes cast (except where a different proportion of votes are required by the Articles of Association or Dutch law), and there are generally no quorum requirements applicable to such meetings. In the General Meeting each share confers the right to cast one vote.

Logistics of the General Meeting

The convocation date for the AGM is legally set at 42 days, and the record date at the 28th day prior to the day of the AGM. Those who are registered as shareholders on the record date are entitled to attend the meeting and to exercise other shareholder rights.

The Board of Management and Supervisory Board shall provide the shareholders with the facts and circumstances relevant to the proposed resolutions, by way of an explanation to the agenda and other documents necessary and / or helpful for this purpose. All documents relevant to the General Meeting, including the agenda with explanations, shall be posted in the Investors and Governance sections on our website. The agenda indicates which agenda items are voting items, and which items are for discussion only.

ASML shareholders may appoint a proxy who can vote on their behalf at the AGM. We also use an Internet proxy voting system, thus facilitating shareholder participation without having to attend in person. Shareholders who voted using their Internet proxy voting are required, however, to appoint a proxy to officially represent them at the AGM in person. We also provide the option for shareholders to issue voting proxies or voting instructions to an independent third party (civil law notary) prior to the AGM.

Voting results from the AGM will be made available on our website within 15 days of the meeting.

The draft minutes of the AGM are available on our website, and also upon request by letter or e-mail, no later than three months after the meeting. Shareholders are given the opportunity to provide their comments in the subsequent three months, after which the minutes are adopted by the Chair and the Secretary of the meeting. The adopted minutes are also available on our website and on request by letter or e-mail.

The Audit of Financial Reporting and the Position of the Internal and External Auditor Function

Financial reporting

We have comprehensive internal procedures in place for the preparation and publication of our Integrated Report, quarterly figures, and all other financial information. These internal procedures are frequently discussed by the Audit Committee and the Supervisory Board. The Disclosure Committee assists the Board of Management in overseeing ASML's disclosure activities and ensures compliance with applicable disclosure requirements arising under Dutch and US law, and other regulatory requirements.

The Audit Committee reviews and approves the external auditor's audit plan for the audits planned during the financial year. The audit plan also includes, among others, the activities of the external auditor with respect to their limited procedures on the quarterly results other than the annual accounts. The external auditor regularly updates the Audit Committee on the progress of the audits and other activities.

The Supervisory Board has reviewed and approved, and all Supervisory Board members signed, ASML's 2019 financial statements as prepared by the Board of Management. KPMG has duly examined our financial statements, and the Auditor's Report is included in the Consolidated Financial Statements.

Appointment, role, assessment of the functioning of the external auditor, and the auditor's fee

In accordance with Dutch law, our external auditor is appointed by the General Meeting and is nominated for appointment by the Supervisory Board upon advice from the Audit Committee and the Board of Management. ASML's current external auditor, KPMG, was appointed by the General Meetings in 2018 for the reporting year 2019.

Every year, the Board of Management and the Audit Committee provide the Supervisory Board with a report on the relationship with the external auditor.

The external auditor is present at our AGM to respond to questions, if any, from the shareholders about the auditor's report on the Consolidated Financial Statements.

The Audit Committee approves the remuneration of the external auditor on behalf of the Supervisory Board after consultation with the Board of Management. It has been agreed among the members of the Supervisory Board and the Board of Management that the Audit Committee has the most relevant insight and experience to be able to approve this item. The Supervisory Board has therefore delegated these responsibilities to the Audit Committee.

The Audit Committee monitors compliance with Dutch and US rules on non-audit services provided by the external auditor, which outlines strict separation of audit and advisory services for Dutch public-interest entities.

In principle, the external auditor attends all the Audit Committee meetings, unless the Audit Committee deems this unnecessary. The external auditor's findings are discussed at these meetings. Furthermore, the external auditor also attends the Supervisory Board meetings in which the quarterly financial results are discussed.

The Audit Committee reports to the Supervisory Board on all issues discussed with the external auditor, including the external auditor's reports with regard to the audit of the annual reports as well as the content of the annual reports. The independent auditor's report refers to the responsibilities of management for the financial statements and provides an opinion on the financial statements.

For more information on principal accountant fees and services see Other appendices - Appendix - Principal accountant fees and services.

Internal Audit function

The Internal Audit function assesses our systems of internal controls by performing independent procedures such as risk-based operational audits, IT audits and compliance audits. The Internal Audit department reports directly to the Audit Committee and the Board of Management. The department's annual Internal Audit plan is discussed with and approved by the Audit Committee, the Board of Management and the Supervisory Board. The follow-up on the Internal Audit findings and progress being made compared to the Internal Audit plan are discussed on a quarterly basis with the Audit Committee. The external auditor and Internal Audit department have meetings on a regular basis.

Other information on governance

ASML Holding N.V. is a holding company that operates through its subsidiaries. We have operating subsidiaries in the Netherlands, the United States, Italy, France, Germany, the United Kingdom, Ireland, Belgium, Korea, Taiwan, Singapore, China, Hong Kong, Japan, Malaysia and Israel. Our major operating subsidiaries, each of which is ultimately wholly owned by ASML Holding N.V., are ASML Netherlands B.V., ASML Hong Kong Ltd. and ASML US LLC. See Exhibit index - Exhibit 8.1 - List of main subsidiaries.

The EU Takeover Directive requires that listed companies publish additional information providing insight into the defensive structures and mechanisms they use. The relevant provision has been implemented into Dutch law by means of a decree made on April 5, 2006. The information required to be disclosed in accordance with this decree is listed below.

Our Board of Management has the power to issue ordinary shares and cumulative preference shares insofar as the Board of Management has been authorized to do so by the General Meeting. The Board of Management requires approval of the Supervisory Board for such an issue. The authorization by the General Meeting can only be granted for a certain period not exceeding five years and may be extended for no longer than five years on each occasion. If the General Meeting has not authorized the Board of Management to issue shares, the General Meeting will be authorized to issue shares on the Board of Management's proposal, provided that the Supervisory Board has approved such proposal.

ASML Reports

ASML publishes, among others, the following annual reports regarding the financial year 2019: the statutory Integrated Report containing the Financial Statements in accordance with Part 9 of Book 2 of the Dutch Civil Code and EU-IFRS, as well as the Integrated Report on Form 20-F in conformity with US GAAP. Both reports have the same qualitative base and describe the same risk factors that are specific to the semiconductor industry, ASML and ASML's shares. We also provide sensitivity analyses by providing:

- A narrative explanation of ASML's financial statements.
- The context within which financial information should be analyzed.
- Information about the quality, and variability, of our earnings and cash flow.

With respect to the process of creating the Integrated Report, we have extensive guidelines for the lay-out and the content of our report. These guidelines are primarily based on applicable laws and regulations. For Dutch statutory purposes, we follow the requirements of Dutch law and regulations, including those on the preparation of the consolidated financial statements in accordance with EU-IFRS. For the Integrated Report on Form 20-F, we apply the requirements of the Exchange Act, and prepare the financial statements included therein in accordance with US GAAP. With respect to the preparation process of these and the other financial reports, we apply internal procedures to safeguard the completeness and accuracy of such information as part of its disclosure controls and procedures.

See also How we manage risk - Business risk and continuity where ASML's internal risk management and control systems are discussed.

Code of Conduct

Our Code of Conduct describes what ASML stands for and believes in:

- We respect people and planet.
- We operate with integrity.
- We preserve our assets.
- We manage professionally.
- We encourage Speak Up.

The Code of Conduct and Business Principles can be found on the Governance section of our Website.

Share capital

ASML's authorized share capital amounts to €126.0 million and is divided into:

- 700,000,000 Cumulative Preference Shares with a nominal value of €0.09 each.
- 699,999,000 Ordinary Shares with a nominal value of €0.09 each.
- 9,000 Ordinary Shares B with a nominal value of €0.01 each.

As of December 31, 2019, 425,659,704 ordinary shares with a nominal value of €0.09 each were issued and fully paid up; this includes 5,848,998 treasury shares. No ordinary shares B and no cumulative preference shares have been issued.

A total of 96,566,077 depository receipts for ordinary shares were issued at the launch of the CCIP. This number has since decreased with the sell-down by the relevant customers following expiry of the lock-up. For further information see Reporting obligations under the Act on the supervision of financial markets ('Wet op het financieel toezicht', the FMSA) and under US securities laws below.

Ordinary shares

An ordinary share entitles the holder thereof to cast nine votes at the General Meeting. Each ordinary share consists of 900 fractional shares. Fractional shares entitle the holder thereof to a fractional dividend, but do not entitle the holder thereof to voting rights. Only those persons who hold shares directly in the share register in the Netherlands, held by us at our address at 5504 DR Veldhoven, de Run 6501, the Netherlands, or in the New York share register, held by JP Morgan Chase Bank, N.A., P.O. Box 64506, St. Paul, MN 55164-0506, United States, can hold fractional shares. Those who hold ordinary shares through the deposit system under the Dutch Securities Bank Giro Transactions Act ('Wet giraal effectenverkeer'; the Giro Act) maintained by the Dutch central securities depository Euroclear Nederland or through the Depository Trust Company cannot hold fractional shares. At our 2019 AGM, the Board of Management was authorized from April 24, 2019 through October 24, 2020, subject to the approval of the Supervisory Board, to issue shares and / or rights thereto representing up to a maximum of 5.0% of our issued share capital at April 24, 2019, plus an additional 5.0% of our issued share capital at April 24, 2019 that may be issued in connection with mergers, acquisitions and / or (strategic) alliances.

Holders of ASML's ordinary shares have a preemptive right, in proportion to the aggregate nominal amount of the ordinary shares held by them. This preemptive right may be restricted or excluded. Holders of ordinary shares do not have preemptive right with respect to any ordinary shares issued for consideration other than cash or ordinary shares issued to employees. If authorized for this purpose by the General Meeting, the Board of Management has the power, subject to approval of the Supervisory Board, to restrict or exclude the preemptive rights of holders of ordinary shares. At our 2019 AGM, our shareholders authorized the Board of Management through October 24, 2020, subject to approval of the Supervisory Board, to restrict or exclude preemptive rights with respect to holders of ordinary shares up to a maximum of 10.0% of our issued share capital.

We may repurchase our issued ordinary shares at any time, subject to compliance with the requirements of Dutch law and our Articles of Association. Any such repurchases are and remain subject to the approval of the Supervisory Board and the authorization by the General Meeting, which authorization may not be for more than 18 months. At the 2019 AGM, the Board of Management has been authorized, subject to Supervisory Board approval, to repurchase through October 24, 2020, up to a maximum of two times 10.0% of our issued share capital at April 24, 2019, at a price between the nominal value of the ordinary shares purchased and 110.0% of the market price of these securities on Euronext Amsterdam or NASDAQ.

For details on our share buyback program, see Consolidated Financial Statements - Notes to the Consolidated Financial Statements - Note 21 Shareholders' equity.

Ordinary shares B

Our Articles of Association provide for 9,000 ordinary shares B with a nominal value of €0.01. Each ordinary share B entitles the holder thereof to cast one vote at the General Meeting. No ordinary shares B have been issued.

Special voting rights on the issued shares

There are no special voting rights on the issued shares in our share capital.

Limitation voting rights on ordinary shares indirectly held by the participating customers

In 2012, ASML entered into a customer co-investment program with three key customers - Intel, TSMC and Samsung - to accelerate ASML's development of EUV. Under this program, the participating customers funded certain development programs and invested in ASML's ordinary shares. Currently, only one participating customer still holds (directly or indirectly) ordinary shares. In respect of these ordinary shares, certain voting restrictions apply, pursuant to and as set out in the underlying agreement between ASML and the relevant customer.

Cumulative preference shares

In 1998, our sole anti-takeover device was created by granting a Preference Share Option to the Foundation. This Preference Share Option is the possibility for ASML of issuing preference shares in its share capital to the Foundation under an option agreement between ASML and the Foundation. This option was amended and extended in 2003 and 2007. A third amendment to the option agreement between the Foundation and ASML became effective on January 1, 2009, to clarify the procedure for the repurchase and cancellation of the preference shares when issued.

The nominal value of the cumulative preference shares amounts to €0.09 and the number of cumulative preference shares included in the authorized share capital is 700,000,000. A cumulative preference share entitles the holder thereof to cast 9 votes in the General Meeting.

The Foundation may exercise the Preference Share Option in situations where, in the opinion of the Foundation's Board of Directors, ASML's interests, ASML's business or the interests of ASML's stakeholders are at stake. This may be the case if a public bid for ASML's shares is announced or made, or there is a justified expectation that such a bid will be made without any agreement having been reached in relation to such a bid with ASML. The same may apply if one shareholder, or more shareholders acting in concert, hold a substantial percentage of ASML's issued ordinary shares without making an offer or if, in the opinion of the Foundation's Board of Directors, the (attempted) exercise of the voting rights by one shareholder or more shareholders, acting in concert, is materially in conflict with ASML's interests, ASML's business or ASML's stakeholders.

The Foundation's objectives are to look after the interests of ASML and of the enterprises maintained by ASML and of the companies which are affiliated in a group with ASML, in such a way that the interests of ASML, of those enterprises and of all parties concerned are safeguarded in the best possible way, and influences in conflict with these interests which might affect the independence or the identity of ASML and those companies are deterred to the best of the Foundation's ability, and everything related to the above or possibly conducive thereto. The Foundation seeks to realize its objects by the acquiring and holding of cumulative preference shares in the capital of ASML and by exercising the rights attached to these shares, particularly the voting rights attached to these shares.

The Preference Share Option gives the Foundation the right to acquire a number of cumulative preference shares as the Foundation will require, provided that the aggregate nominal value of such number of cumulative preference shares shall not exceed the aggregate nominal value of the ordinary shares that have been issued at the time of exercise of the Preference Share Option for a subscription price equal to their nominal value. Only one-fourth of the subscription price would be payable at the time of initial issuance of the cumulative preference shares, with the other three-fourths of the nominal value only being payable when we call up this amount. Exercise of the preference share option could effectively dilute the voting power of the outstanding ordinary shares by one-half.

Cancellation and repayment of the issued cumulative preference shares by ASML requires the authorization by the General Meeting of a proposal to do so by the Board of Management approved by the Supervisory Board. If the Preference Share Option is exercised and as a result cumulative preference shares are issued, ASML, at the request of the Foundation, will initiate the repurchase or cancellation of all cumulative preference shares held by the Foundation. In that case ASML is obliged to effect the repurchase and cancellation respectively as soon as possible. A cancellation will result in a repayment of the amount paid and exemption from the obligation to pay up on the cumulative preference shares. A repurchase of the cumulative preference shares can only take place when such shares are fully paid up.

If the Foundation does not request ASML to repurchase or cancel all cumulative preference shares held by the Foundation within 20 months of issuance of these shares, we will be obliged to convene a General Meeting in order to decide on a repurchase or cancellation of these shares.

The Foundation is independent of ASML. The Board of Directors of the Foundation comprises four independent members from the Netherlands' business and academic communities. The current members of the Foundation's Board of Directors are: Mr A.P.M. van der Poel, Mr S. Perrick, Mr J.M. de Jong and Mr A.H. Lundqvist.

Limitations to transfers of shares in the share capital of ASML

There are currently no limitations, either under Dutch law or in ASML's Articles of Association, on the transfer of ordinary shares in the share capital of ASML. Pursuant to ASML's Articles of Association, the Supervisory Board's approval shall be required for every transfer of cumulative preference shares.

Reporting obligations under the Act on the supervision of financial markets ('Wet op het financieel toezicht', the FMSA) and under US securities laws

The following table sets forth the total number of ordinary shares owned by each shareholder that reported to the AFM or SEC a beneficial ownership of ordinary shares that is at least 3.0% (5.0%, in the case of the SEC) of our ordinary shares issued and outstanding as well as the ordinary shares (including shares underlying options) owned by our members of the Board of Management (which includes those persons specified in Leadership and governance - Board of Management), as a group, as of December 31, 2019. The information set out below with respect to shareholders is based on public filings with the SEC and AFM as of January 31, 2020.

	Shares	% of Class ⁶
Capital Research and Management Company ¹	63,964,505	15.24%
BlackRock Inc. ²	27,384,684	6.52%
Baillie Gifford & Co ³	18,262,995	4.35%
Members of ASML's current Board of Management (6 persons) ^{4,5}	107,663	0.03%

1. As reported to the AFM on July 1, 2019, Capital Research & Management Company reports 575,680,545 voting rights corresponding to 63,964,505 shares (based on 9 votes per share) of our ordinary shares but do not have ownership rights related to those shares. Capital World Investors reported on a Schedule 13-G/A filed with the SEC on February 14, 2019, that it is the beneficial owner of 35,735,396 shares of our ordinary shares as a result of its affiliation with Capital Research & Management Company. In addition, the Growth Fund of America reported to the AFM on May 15, 2014 that it owns 3.08% of our outstanding shares. We believe that some or all of these shares are included within the shares reported to be owned by Capital Research and Management Company, as set forth above.
2. Based solely on the Schedule 13-G/A filed by BlackRock Inc. with the SEC on February 4, 2019; BlackRock reports voting power with respect to 24,798,886 of these shares. A public filing with the AFM on July 1, 2019 shows an aggregate indirect capital interest of 5.15% and voting rights of 6.39%, based on the total number of outstanding shares and voting rights at that time.
3. A public filing with the AFM on October 1, 2019 shows Baillie Gifford & Co have 147,694,140 voting rights, corresponding to 18,262,995 shares (based on 9 votes per share), but no ownership rights related to those shares.
4. Does not include unvested shares granted to members of the Board of Management. For further information see Leadership and governance - Remuneration report.
5. No shares are owned by members of the Supervisory Board.
6. As a percentage of the total number of ordinary shares issued and outstanding (419,810,706) as of December 31, 2019, which excludes 5,848,998 ordinary shares which have been issued but are held in treasury by ASML. Please note that share ownership percentages reported to the AFM are expressed as a percentage of the total number of ordinary shares issued (including treasury stock) and that accordingly, percentages reflected in this table may differ from percentages reported to the AFM.

As of December 31, 2019, 73,946,332 ordinary shares were held by 303 registered holders with a registered address in the US. Since certain of our ordinary shares were held by brokers and nominees, the number of record holders in the US may not be representative of the number of beneficial holders or of where the beneficial holders are resident.

Amendment of our Articles of Association

The General Meeting can resolve to amend our Articles of Association. The (proposed) amendment requires the approval of the Supervisory Board.

A resolution to amend the Articles of Association is adopted at a General Meeting, at which more than one half of the issued share capital is represented and with at least three-fourths of the votes cast. If the required share capital is not represented at a meeting convened for that purpose, a subsequent meeting shall be convened, to be held within four weeks of the first meeting, at which, irrespective of the share capital represented, the resolution can be adopted with at least three-fourths of the votes cast. If a resolution to amend the Articles of Association is proposed by the Board of Management, the resolution will be adopted with an absolute majority of votes cast irrespective of the represented share capital at the General Meeting.

A brief summary of the most significant provisions of our Articles of Association is included as Exhibit 99.1 to our form 6-K furnished to the SEC on February 8, 2013 (the 'Articles of Association'), which is incorporated by reference herein.

Severance payments under agreements with members of Board of Management

Employment agreements, respectively management services agreements, for members of the Board of Management contain specific provisions regarding severance payments. If ASML gives notice of termination of the employment agreement respectively management services agreements for reasons which are not exclusively or mainly found in acts or omissions of the member of the Board of Management concerned, a severance payment not exceeding one year's base salary will be paid upon the effective date of termination.

As of July 1, 2013, the relationship between a member of the Board of Management and a listed company can no longer be treated as an employment contract. All members of the Board of Management that were appointed and reappointed at the 2018 AGM have entered into a management services agreement.

Current contracts contain a provision that a member of the Board of Management, on their own initiative (when giving notice of termination pursuant to a change of control), will be entitled to a severance amount. Given that such a resignation is specifically linked to a change of control, ASML does not consider this provision a deviation from the Code.

NASDAQ Corporate Governance Standards

NASDAQ rules provide that foreign private issuers may follow home country practice in lieu of the NASDAQ corporate governance standards subject to certain exceptions and except to the extent that such exemptions would be contrary to US federal securities laws. The practices followed by ASML in lieu of NASDAQ rules are described below:

- ASML does not follow NASDAQ's quorum requirements applicable to meetings of ordinary shareholders. In accordance with Dutch law and generally accepted Dutch business practice, ASML's Articles of Association provide that there are no quorum requirements generally applicable to general meetings of shareholders.
- ASML does not follow NASDAQ's requirements regarding the solicitation of proxies and the provision of proxy statements for general meetings of shareholders. ASML does furnish proxy statements and solicit proxies for the General Meeting. Dutch corporate law sets a mandatory (participation and voting) record date for Dutch listed companies at the 28th day prior to the date of the General Meeting. Shareholders registered at such record date are entitled to attend and exercise their rights as shareholders at the General Meeting, regardless of sale of shares after the record date.
- ASML does not follow NASDAQ's requirement regarding distribution to shareholders of copies of an annual report containing audited Financial Statements prior to our AGM. The distribution of our Integrated Reports to shareholders is not required under Dutch corporate law or Dutch securities laws, or by Euronext Amsterdam. Furthermore, it is generally accepted business practice for Dutch companies not to distribute annual reports. In part, this is because the Dutch system of bearer shares has made it impractical to keep a current list of holders of the bearer shares in order to distribute the annual reports. Instead, we make our Integrated Report available at our corporate head office in the Netherlands (and at the offices of our Dutch listing agent as stated in the convening notice for the meeting) no later than 42 days prior to convocation of the AGM. In addition, we post a copy of our Integrated Reports on our Website prior to the AGM.
- ASML does not follow NASDAQ's requirement to obtain shareholder approval of stock option or purchase plans or other equity compensation arrangements available to officers, directors or employees. It is not required under Dutch law or generally accepted practice for Dutch companies to obtain shareholder approval of equity compensation arrangements available to officers, directors or employees. The AGM adopts the Remuneration Policy for the Board of Management, approves equity compensation arrangements for the Board of Management and approves the remuneration for the Supervisory Board. The Remuneration Committee evaluates the achievements of individual members of the Board of Management with respect to the short and long-term quantitative performance, the full Supervisory Board evaluates the quantitative performance criteria. Equity compensation arrangements for employees are adopted by the Board of Management within limits approved by the AGM.

Compliance with the Corporate Governance Code

ASML fully complies with the Code.

The Board of Management and the Supervisory Board,

Veldhoven, February 11, 2020

Consolidated financial statements

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Supervisory Board

ASML Holding N.V.:

Opinions on the Consolidated Financial Statements and Internal Control Over Financial Reporting

We have audited the accompanying Consolidated Balance Sheets of ASML Holding N.V. and subsidiaries (the “Company”) as of December 31, 2019 and 2018, the related Consolidated Statements of Operations, Comprehensive Income, Shareholders’ Equity, and Cash Flows for each of the years in the three-year period ended December 31, 2019, and the related notes (collectively, the “consolidated financial statements”). We also have audited the Company’s internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2019, in conformity with U.S. generally accepted accounting principles. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Basis for Opinions

The Company’s management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s report on internal control over financial reporting. Our responsibility is to express an opinion on the Company’s consolidated financial statements and an opinion on the Company’s internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (“PCAOB”) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control Over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a critical audit matter does not alter in any way our opinion on the consolidated

financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

“Revenue from contracts with customers” - Complex revenue recognition due to identification of distinct performance obligations and allocation of total contract consideration.

As disclosed in note 2 to the consolidated financial statements, net system sales was EUR 8,996 million for the 12 months ended December 31, 2019. Sales of systems are usually entered into with customers under Volume Purchase Agreements (VPAs). These VPAs usually contain multiple performance obligations, for example delivery of goods, installation, warranty and training. Once these performance obligations are identified, the total contract consideration, including discounts, offer of free goods or services and credits that can be used towards future purchases, is allocated to the performance obligations.

We identified the identification of performance obligations in the contracts as well as the allocation of the total contract consideration, including discounts, offer of free goods or services and credits that can be used towards future purchases, as a critical audit matter since it is inherently judgmental and results in complex accounting. Also, a high degree of auditor judgment is required for testing of the identified performance obligations, including the estimate of the number of tools to be delivered, and the allocation of the total contract consideration (including discounts, offer of free goods or services and credits that can be used towards future purchases) to these performance obligations.

The primary procedures we performed to address this critical audit matter included the following. We tested certain internal controls in the sales process related to VPA contract assessment for the identification of performance obligations and the allocation of the total contract consideration (including discounts, offer of free goods or services and credits that can be used towards future purchases) to these performance obligations, and the correct application of these on individual sales transactions.

Additionally, we inspected all VPAs and supporting documentation for a sample of related individual sales transactions, we performed sensitivity analysis on the estimated number of tools to be delivered, we assessed changes in estimates throughout the year and we performed inquiries with different levels of the organization. Finally, we recalculated the allocation of the contract consideration to the identified performance obligations.

/s/ KPMG Accountants N.V.

We have served as the Company’s auditor since 2015.

Rotterdam, the Netherlands

February 11, 2020

Consolidated Statements of Operations

Notes	Year ended December 31	2017	2018	2019
	(in millions, except per share data)	€	€	€
2, 3	Net system sales	6,424.4	8,259.1	8,996.2
	Net service and field option sales	2,538.3	2,684.9	2,823.8
3	Total net sales	8,962.7	10,944.0	11,820.0
	Cost of system sales	(3,439.9)	(4,141.2)	(4,676.2)
	Cost of service and field option sales	(1,502.6)	(1,773.6)	(1,864.0)
	Total cost of sales ¹	(4,942.5)	(5,914.8)	(6,540.2)
	Gross profit	4,020.2	5,029.2	5,279.8
	Other income	95.8	—	—
	Research and development costs	(1,259.7)	(1,575.9)	(1,968.5)
	Selling, general and administrative costs	(416.6)	(488.0)	(520.5)
	Income from operations	2,439.7	2,965.3	2,790.8
	Interest and other, net	(50.3)	(28.3)	(25.0)
	Income before income taxes	2,389.4	2,937.0	2,765.8
20	Provision for income taxes	(306.0)	(351.6)	(191.7)
	Income after income taxes	2,083.4	2,585.4	2,574.1
9	Profit (loss) related to equity method investments	(16.7)	6.2	18.2
	Net income	2,066.7	2,591.6	2,592.3
22	Basic net income per ordinary share	4.81	6.10	6.16
22	Diluted net income per ordinary share	4.79	6.08	6.15
	Number of ordinary shares used in computing per share amounts			
22	Basic	429.8	424.9	420.8
22	Diluted	431.6	426.4	421.6

1. Cost of sales includes amounts with related parties of €1,321.8 million, €1,173.7 million and €918.4 million in 2019, 2018, and 2017, respectively.

Consolidated Statements of Comprehensive Income

Notes	Year ended December 31 (in millions)	2017 €	2018 €	2019 €
	Net income	2,066.7	2,591.6	2,592.3
	Other comprehensive income:			
	Proportionate share of other comprehensive income from equity method investments	(1.0)	(4.8)	(19.8)
	Foreign currency translation, net of taxes:			
	Gain (loss) on foreign currency translation and effective portion of hedges on net investments	(329.0)	18.2	20.1
	Financial instruments, net of taxes:			
24	Gain (loss) on derivative financial instruments	(16.6)	8.3	3.2
24	Transfers to net income	(3.1)	11.8	(10.7)
	Other comprehensive income, net of taxes	(349.7)	33.5	(7.2)
	Total comprehensive income, net of taxes	1,717.0	2,625.1	2,585.1
	Attributable to equity holders	1,717.0	2,625.1	2,585.1

Consolidated Balance Sheets

Notes	As of December 31 (in millions, except share and per share data)	2018 €	2019 €
	Assets		
4	Cash and cash equivalents	3,121.1	3,532.3
4	Short-term investments	913.3	1,185.8
5	Accounts receivable, net	1,498.2	1,786.8
6	Finance receivables, net	611.1	564.5
20	Current tax assets	79.7	178.7
2	Contract assets	95.9	231.0
7	Inventories, net	3,439.5	3,809.2
8	Other assets ¹	772.6	842.8
	Total current assets	10,531.4	12,131.1
6	Finance receivables, net	275.1	421.1
20	Deferred tax assets	236.3	445.3
8	Other assets ²	806.1	830.4
9	Equity method investments	915.8	833.0
10	Goodwill	4,541.1	4,541.1
11	Other intangible assets, net	1,104.0	1,104.4
12	Property, plant and equipment, net	1,589.5	1,999.3
13	Right-of-use assets - Operating	137.6	205.4
13	Right-of-use assets - Finance ³	—	118.5
	Total non-current assets	9,605.5	10,498.5
	Total assets	20,136.9	22,629.6
	Liabilities and shareholders' equity		
	Accounts payable ⁴	964.0	1,062.2
14	Accrued and other liabilities	911.4	1,039.9
20	Current tax liabilities	187.9	65.6
2	Contract liabilities	1,728.6	2,526.4
	Total current liabilities	3,791.9	4,694.1
15	Long-term debt	3,026.5	3,108.3
20	Deferred and other tax liabilities	251.2	234.4
2	Contract liabilities	1,224.6	1,759.6
14	Accrued and other liabilities	201.7	241.0
	Total non-current liabilities	4,704.0	5,343.3
	Total liabilities	8,495.9	10,037.4
	Ordinary shares; €0.09 nominal value; 699,999,000 shares authorized at December 31, 2019; 419,810,706 issued and outstanding at December 31, 2019; 699,999,000 shares authorized at December 31, 2018; 421,097,729 issued and outstanding at December 31, 2018;		
	Issued and outstanding shares	38.6	38.2
	Share premium	3,741.3	3,772.0
	Treasury shares at cost	(1,621.8)	(1,019.6)
	Retained earnings	9,197.9	9,523.8
	Accumulated other comprehensive income	285.0	277.8
21	Total shareholders' equity	11,641.0	12,592.2
	Total liabilities and shareholders' equity	20,136.9	22,629.6

- Other assets - current includes amounts with related parties of €215.2 million and €231.2 million at December 31, 2019 and 2018, respectively.
- Other assets - non-current includes amounts with related parties of €585.3 million and €533.4 million at December 31, 2019 and 2018, respectively.
- Right-of-use assets - Finance includes amounts with related parties of €107.6 million and €0.0 million at December 31, 2019 and 2018, respectively.
- Accounts Payable includes amounts with related parties of €127.4 million and €60.2 million at December 31, 2019 and 2018, respectively.

Consolidated Statements of Shareholders' Equity

Notes	(in millions)	Issued and Outstanding Shares		Share Premium	Treasury Shares at Cost	Retained Earnings	Accumulated OCI ¹	Total
		Number	Amount					
			€	€	€	€	€	€
	Balance at January 1, 2017	429.9	39.4	3,693.5	(796.2)	6,434.5	601.2	9,972.4
	Components of comprehensive income:							
	Net income	—	—	—	—	2,066.7	—	2,066.7
	Proportionate share of OCI from equity method investments	—	—	—	—	—	(1.0)	(1.0)
	Foreign currency translation and effective portion of hedges on net investments	—	—	—	—	—	(329.0)	(329.0)
24	Loss on financial instruments	—	—	—	—	—	(19.7)	(19.7)
	Total comprehensive income	—	—	—	—	2,066.7	(349.7)	1,717.0
	Fair value differences	—	—	28.6	—	—	—	28.6
21	Purchase of treasury shares	(3.5)	—	—	(500.0)	—	—	(500.0)
21	Cancellation of treasury shares	—	(0.7)	—	650.0	(649.3)	—	—
17	Share-based payments	—	—	53.1	—	—	—	53.1
	Issuance of shares	1.0	0.1	(42.7)	88.3	(23.7)	—	22.0
21	Dividend paid	—	—	—	—	(516.7)	—	(516.7)
	Balance at December 31, 2017	427.4	38.8	3,732.5	(557.9)	7,311.5	251.5	10,776.4
	Opening balance adjustment ²	—	—	—	—	(85.3)	—	(85.3)
	Opening balance January 1, 2018	427.4	38.8	3,732.5	(557.9)	7,226.2	251.5	10,691.1
	Components of comprehensive income:							
	Net income	—	—	—	—	2,591.6	—	2,591.6
	Proportionate share of OCI from equity method investments	—	—	—	—	—	(4.8)	(4.8)
	Foreign currency translation and effective portion of hedges on net investments	—	—	—	—	—	18.2	18.2
24	Gain on financial instruments	—	—	—	—	—	20.1	20.1
	Total comprehensive income	—	—	—	—	2,591.6	33.5	2,625.1
21	Purchase of treasury shares	(7.0)	(0.3)	—	(1,145.9)	—	—	(1,146.2)
17	Share-based payments	—	—	46.3	—	—	—	46.3
	Issuance of shares	0.7	0.1	(37.5)	82.0	(22.8)	—	21.8
21	Dividend paid	—	—	—	—	(597.1)	—	(597.1)
	Balance at December 31, 2018	421.1	38.6	3,741.3	(1,621.8)	9,197.9	285.0	11,641.0
	Components of comprehensive income:							
	Net income	—	—	—	—	2,592.3	—	2,592.3
	Proportionate share of OCI from equity method investments	—	—	—	—	—	(19.8)	(19.8)
	Foreign currency translation and effective portion of hedges on net investments	—	—	—	—	—	20.1	20.1
24	Loss on financial instruments	—	—	—	—	—	(7.5)	(7.5)
	Total comprehensive income	—	—	—	—	2,592.3	(7.2)	2,585.1
21	Purchase of treasury shares	(1.9)	—	—	(410.0)	—	—	(410.0)
21	Cancellation of treasury shares	—	(0.5)	—	902.3	(901.8)	—	—
17	Share-based payments	—	—	74.6	—	—	—	74.6
	Issuance of shares	0.6	0.1	(43.9)	109.9	(38.9)	—	27.2
21	Dividend paid	—	—	—	—	(1,325.7)	—	(1,325.7)
	Balance at December 31, 2019	419.8	38.2	3,772.0	(1,019.6)	9,523.8	277.8	12,592.2

1. As of December 31, 2019, accumulated OCI consists of €(25.6) million loss relating to our proportionate share of other comprehensive income from equity method investments (2018: €(5.8) million loss; 2017: one million loss), €302.4 million relating to foreign currency translation gain (2018: €282.3 million gain; 2017: €264.1 million gain) and €1.0 million relating to unrealized gains on financial instruments (2018: €8.5 million gains; 2017: €(11.6) million losses).

2. As of January 1, 2018, we adopted ASU No. 2016-16 Income Taxes (ASC 740) 'Intra-Entity Transfers of Assets Other Than Inventory', with the impact adjusted to retained earnings as of January 1, 2018.

Consolidated Statements of Cash Flows

Notes	Year ended December 31 (in millions)	2017 €	2018 €	2019 €
Cash Flows from Operating Activities				
	Net income	2,066.7	2,591.6	2,592.3
Adjustments to reconcile net income to net cash flows from operating activities:				
11, 12, 15	Depreciation and amortization ¹	417.5	422.7	448.5
10, 11, 12	Impairment	9.0	15.4	4.7
12	Loss on disposal of property, plant and equipment	2.8	3.6	3.1
17	Share-based payments	53.1	46.3	74.6
7	Inventory reserves	120.1	218.2	221.5
20	Deferred income taxes	(8.4)	(238.5)	(236.8)
9	Equity method investments ²	36.4	61.6	56.9
<i>Changes in assets and liabilities:</i>				
5	Accounts receivable	(1,128.6)	212.4	(255.0)
6	Finance receivables	237.0	(664.9)	(95.3)
7	Inventories	(284.1)	(515.7)	(404.7)
8	Other assets	(169.4)	(404.0)	(199.1)
14	Accrued and other liabilities	90.9	237.7	82.1
	Accounts payable	266.6	97.9	(12.1)
20	Current tax assets and liabilities	(151.8)	13.1	(202.6)
2	Contract assets and liabilities	260.5	975.3	1,198.3
Net cash provided by operating activities		1,818.3	3,072.7	3,276.4
Cash Flows from Investing Activities				
12	Purchase of property, plant and equipment ³	(338.9)	(574.0) ⁴	(766.6)
11	Purchase of intangible assets	(19.1)	(35.5)	(119.3)
4	Purchase of short-term investments	(1,129.3)	(918.1)	(1,291.5)
4	Maturity of short-term investments	1,250.0	1,034.1	1,019.0
	Cash from (used for) derivative financial instruments	27.0	(2.4)	—
	Loans issued and other investments	(0.6)	(1.0)	—
	Repayment on loans	1.6	5.4	0.9
9	Acquisition of equity method investments	(1,019.7)	—	—
Net cash used in investing activities		(1,229.0)	(491.5)	(1,157.5)
Cash Flows from Financing Activities				
21	Dividend paid	(516.7)	(597.1)	(1,325.7)
21	Purchase of treasury shares	(500.0)	(1,146.2)	(410.0)
	Net proceeds from issuance of shares	50.6	21.8	27.2
15	Repayment of debt	(243.0)	(2.8)	(3.8)
Net cash used in financing activities		(1,209.1)	(1,724.3)	(1,712.3)
Net cash flows		(619.8)	856.9	406.6
	Effect of changes in exchange rates on cash	(28.1)	5.2	4.6
Net increase (decrease) in cash and cash equivalents		(647.9)	862.1	411.2
4	Cash and cash equivalents at beginning of the year	2,906.9	2,259.0	3,121.1
4	Cash and cash equivalents at end of the year	2,259.0	3,121.1	3,532.3
Supplemental Disclosures of Cash Flow Information:				
	Interest paid	(91.4)	(61.0)	(59.9)
	Income taxes paid, net of refunds	(475.0)	(554.4)	(678.7)

1. Depreciation and amortization includes depreciation of property, plant and equipment, amortization of intangible assets, and amortization of underwriting commissions and discount related to the bonds and credit facility.
2. Equity method investments includes the profit (loss) related to equity method investments, dividends received from equity method investments and capitalization of R&D and supply chain support funding. The dividend received is a cash inflow in 2019 of €99.9 million (2018: €89.2 million, 2017: €19.7 million).
3. In 2019, an amount of €184.1 million (2018: €191.6 million, 2017: €36.5 million) of the purchase of property, plant and equipment relates to funding provided for tooling to our equity method investment, which is initially recognized as part of the other assets.
4. In 2018, an amount of €54.7 million of land and buildings was reclassified to other assets.

Notes to the Consolidated Financial Statements

1. General information / summary of general accounting policies

ASML, with its corporate headquarters in Veldhoven, the Netherlands, is engaged in the development, production, marketing, selling and servicing of advanced semiconductor equipment. ASML's principal operations are in the Netherlands, the US and Asia.

Our shares are listed for trading in the form of registered shares on Euronext Amsterdam and on NASDAQ. The principal trading market of our ordinary shares is Euronext Amsterdam.

Basis of preparation

The accompanying Consolidated Financial Statements are stated in millions of euros unless indicated otherwise.

The accompanying Consolidated Financial Statements have been prepared in conformity with US GAAP. We have reclassified certain prior period amounts to align with the current period presentation.

Use of estimates

The preparation of our Consolidated Financial Statements in conformity with US GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities on the balance sheet dates, and the reported amounts of net sales and costs during the reported periods. Actual results could differ from those estimates. We evaluate our estimates continuously and we base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. Actual results may differ from these estimates if the assumptions prove incorrect. To the extent there are material differences between actual results and these estimates, our future results could be materially and adversely affected. We believe that the accounting policies described below require us to make significant judgments and estimates in the preparation of our Consolidated Financial Statements. Our most critical accounting estimates include:

- Revenue recognition, including lease accounting
- Inventory reserves
- Uncertain tax positions in income taxes
- Contingencies and litigation
- Evaluation of long-lived assets for impairment

Principles of consolidation

The Consolidated Financial Statements include the Financial Statements of ASML Holding N.V. and all of its subsidiaries. Subsidiaries are all entities over which ASML controls the financial and operating activities, generally accompanying a shareholding of more than 50.0% of the outstanding voting rights. Subsidiaries are fully consolidated from the date on which control is obtained by ASML. All intercompany transactions, balances and unrealized results on transactions with subsidiaries are eliminated. We also assess if we are the primary beneficiary of, and thus would consolidate, any variable interest entity.

Foreign currency translation

The financial information for subsidiaries outside the euro-zone is measured using a mix of local currencies or the euro as the functional currency. The Financial Statements of those foreign subsidiaries are translated into euros in the preparation of ASML's Consolidated Financial Statements. Assets and liabilities are translated into euros at the exchange rate on the respective balance sheet dates. Income and costs are translated into euros based on the average exchange rate for the corresponding period. The resulting translation adjustments are recorded directly in shareholders' equity.

New US GAAP accounting pronouncements adopted

During 2019, ASML has adopted the following accounting pronouncements:

Adoption of ASU 2016-13 "Financial Instruments - Credit Losses (Topic 326)"

ASU No. 2016-13 "Financial Instruments - Credit Losses (Topic 326)" was issued by the FASB in June 2016 and provides financial statement users with more information about the expected credit losses on financial instruments and other commitments to extend credit held by an entity at each reporting date. The adoption of ASU 2016-13 "Financial Instruments - Credit Losses (Topic 326)" does not have a material impact on our Consolidated Financial Statements.

New US GAAP accounting pronouncements issued but not adopted

For the year ended December 31, 2019, there are no new US GAAP accounting pronouncements which have not yet been adopted and are expected to have a material impact on our Consolidated Financial Statements.

2. Revenue from contracts with customers

Accounting Policy - Revenue from contracts with customers

We measure revenue based on the consideration specified in the contracts with our customers, adjusted for any significant financing components, and excluding any taxes collected on behalf of third parties. We recognize revenue when we satisfy a performance obligation by transferring control over a good or service to our customer.

We bill our customers for, and recognize as net sales, any charges for shipping and handling costs. We have a right to part of the payment for our systems upon reserving a production slot, part upon delivery of our systems, and the remaining part upon final acceptance of our systems. Right to payment for our service and field options occurs upon shipment or completion of the service unless described otherwise. The payment term is typically due 15-45 days after the aforementioned events. The costs related to our sales are recognized as cost of sales. For certain contracts and constructive obligations resulting from these arrangements, for which a loss is evident, we recognize the anticipated loss to the extent the costs of completing these contracts and constructive obligations exceed the amount of the contract price. When we satisfy these obligations, we utilize the related liability.

We generate revenue from the sale of integrated patterning solutions for the semiconductor industry, which mainly consist of systems, system related options and upgrades, other holistic lithography solutions and customer services. The main portion of our net sales is derived from volume purchase agreements with our customers that have multiple deliverables (performance obligations), which mainly include the sale of our systems, system related options, installation, training and extended and enhanced (optic) warranty. In our volume purchase agreements we offer customers discounts in the normal course of sales negotiations. As part of these volume purchases agreements, we may also offer free goods or services and credits that can be used towards future purchases. Occasionally, systems, with the related extended and enhanced (optic) warranties, installation and training services, are ordered individually. Our system sales agreements do not include a general right of return.

For bundled packages, we account for individual goods and services, including the free or discounted goods or services, separately if they are distinct - i.e. if a product or service is separately identifiable from other items in the bundled package and if a customer can benefit from it on its own or with other resources that are readily available to the customer.

The consideration paid for our performance obligations is typically fixed, unless specifically noted in the nature of the performance obligations. At times the total consideration of the contract can be dependent on the final volume of systems ordered by the customer. Variable consideration is estimated at contract inception for each performance obligation, and subsequently updated each quarter, using either the expected value method or most likely amount method, whichever is determined to best predict the consideration to be collected from the customer. Variable consideration is only included in the transaction price if it is considered probable that a significant revenue reversal will not occur. In certain scenarios when entering into a volume purchase agreement, free goods or services are provided directly or through a voucher that can be used on future contracts. Consideration from the contract will be allocated to these performance obligations and revenue recognized when control transfers based on the nature of the goods or services provided.

The total consideration of the contract is allocated between all distinct performance obligations in the contract based on their stand-alone selling prices. The stand-alone selling prices are determined based on other stand-alone sales that are directly observable, when possible. However, for the majority of our performance obligations these are not available. If no directly observable evidence is available, the stand-alone selling price is determined using the adjusted market assessment approach, which requires judgment.

Options to buy goods or services in addition to the purchase commitment are assessed to determine if they provide a material right to the customer that they would not have received if they had not entered into this contract. Each option to buy additional goods or services provided at a discount from the stand-alone selling price is considered a material right. The discount offered from the stand-alone selling price will be allocated from the consideration of the other goods and services in the contract if it is determined the customer will exercise the option to buy, adjusted for the likelihood. Revenue will be recognized in line with the nature of the related goods or services. If it is subsequently determined the customer will not exercise the option to buy, or the option expires, revenue will be recognized.

Occasionally we may enter into a bill-and-hold transaction where we invoice a customer for a system that is ready for delivery but not shipped to the customer until a later date, based on customer's request. Transfer of control is determined to have occurred only when there is a substantive reason for the arrangement, the system is separately identified as belonging to the customer, the good has been accepted by the customer and is ready for delivery, and we do not have the ability to direct the use of the system.

Goods or services	Nature, timing of satisfying the performance obligations, and significant payment terms
<i>New systems (established technologies)</i>	<p><i>New systems sales include i-line, KrF, ArF, ArFi and EUV related systems, along with the related factory options ordered with the base system, as well as metrology and inspection systems. Prior to shipment, the majority of our systems undergo a Factory Acceptance Test (FAT) in our cleanroom facilities, effectively replicating the operating conditions that will be present on the customer's site, in order to verify whether the system meets its standard specifications and any additional technical and performance criteria agreed with the customer. A system is shipped only after all contractual specifications are met or discrepancies from agreed upon specifications are waived and customer sign-off is received for delivery. Each system's performance is re-tested through a Site Acceptance Test (SAT) after installation at the customer site. We have never failed to successfully complete installation of a system at a customer's premises; therefore, acceptance at FAT is considered to be proven for established technologies with a history of successful customer acceptances at SAT (equal or better than FAT).</i></p> <p><i>Transfer of control of a system undergoing a FAT, and recognition of revenue related to this system, will occur upon delivery of the system, depending on the Incoterms.</i></p> <p><i>Transfer of control of a system not undergoing a FAT, and recognition of revenue related to this system, will occur upon customer acceptance of the system at SAT.</i></p>
<i>Used systems</i>	<p><i>We have no repurchase commitments in our general sales terms and conditions, however from time to time we repurchase systems that we have manufactured and sold and, following refurbishment, will resell to other customers. This repurchase decision is mainly driven by market demand expressed by other customers and less frequently by explicit or implicit contractual arrangements relating to the initial sale. We consider reasonable offers from any vendor, including customers, to repurchase used systems that we can refurbish, resell, and install as part of our normal business operations.</i></p> <p><i>Transfer of control of the sale of the repurchased and refurbished systems, and related revenue recognition, will occur either upon delivery of the system to the carrier or upon arrival of the system to the customer's loading dock, depending on the Incoterms and if a FAT was performed prior to shipment. If no FAT was performed, then transfer of control will be upon customer acceptance at SAT. If a FAT was performed, then transfer of control will be upon customer acceptance at FAT, refer to "New systems (established technologies)".</i></p>
<i>Field upgrades and options (system enhancements)</i>	<p><i>Field upgrades and options mainly relate to goods and services that are delivered for systems already installed in the customer factories. Certain upgrades require significant installation efforts, enhancing an asset the customer controls, therefore resulting in transfer of control over the period of installation, measured using the cost incurred method which is estimated using labor hours, as this best depicts the satisfaction of our obligation in transferring control. The options and other upgrades that do not require significant installation effort transfer control upon delivery, depending on the Incoterms.</i></p> <p><i>As long as we are not able to make a reliable estimate of the total efforts needed to complete the upgrade, we only recognize revenue to cover costs incurred. Margin will be realized at the earlier of us being able to make a reliable estimate or completion of the upgrade.</i></p>
<i>New product introduction</i>	<p><i>New product introductions are typically newly developed options to be used within our systems. Transfer of control and revenue recognition for new product introductions occurs upon customer acceptance (generally at SAT). Once there is an established history of successful installation and customer acceptance, revenue will be recognized consistent with other systems and goods after transfer of control.</i></p>
<i>Installation</i>	<p><i>Installation is provided within the selling price of a system. Installation is considered to be distinct as it does not significantly modify the system being purchased and the customer or a third party could be capable of performing the installation themselves if desired. Transfer of control takes place over the period of installation from delivery through SAT, measured on a straight-line basis, as our performance is satisfied evenly over this period of time.</i></p> <p><i>As long as we are not able to make a reliable estimate of the total efforts needed to complete the installation, we only recognize revenue to cover costs incurred. Margin will be realized at the earlier of us being able to make a reliable estimate or installation completion.</i></p>
<i>Warranties</i>	<p><i>We provide standard warranty coverage on our systems for 12 months and on certain optic parts for 60 months, providing labor and non-consumable parts necessary to repair our systems during these warranty periods. These standard warranties cannot be purchased and do not provide a service in addition to the general assurance the system will perform as promised. As a result, no revenue is allocated to these standard warranties.</i></p> <p><i>Both the extended and enhanced (optic) warranties on our systems are accounted for as a separate performance obligation, with transfer of control taking place over the warranty period, measured on a straight-line basis, as this is a stand-ready obligation.</i></p>
<i>Time-based licenses and related service</i>	<p><i>Time-based licenses relate to software licenses and the related service which are sold for a period of time. The licenses and the related service are not considered to be individually distinct and the transfer of control takes place over the license term, measured on a straight-line basis, as our performance is satisfied evenly over this period of time. Payments are made in installments throughout the license term.</i></p>

Goods or services	Nature, timing of satisfying the performance obligations, and significant payment terms
Application projects	<p>Application projects are node transition and consulting projects which at times may be provided as free service within a volume purchase agreement. Measuring satisfaction of this performance obligation is performed through an input method based on the labor hours expended relative to the estimated total labor hours as this best depicts the transfer of control of these kind of services.</p> <p>As long as we are not able to make a reliable estimate of the total efforts needed to complete these kind of projects, we only recognize revenue to cover costs incurred. Margin will be realized at the earlier of us being able to make a reliable estimate or project completion.</p>
Service contracts	<p>Service contracts are entered into with our customers to support our systems used in their ongoing operations during the systems lifecycle, typically in the form of full-service agreements, limited manpower agreements, other labor agreements, parts availability or parts usage agreements. These services are typically for a specified period of time. Control transfers over this period of time, measured on a straight-line basis, as these are stand-ready obligations, with an exception for the labor hour pool service contracts for which we recognize revenue in line with invoicing, using the practical expedient in ASC 606-10-55-18. Invoicing is typically performed monthly or quarterly throughout the service period, typically payable within 15-45 days.</p>
Billable parts and labor	<p>Billable labor represents maintenance services to our systems installed in the customer's factories while in operation, through purchase orders from our customer. Control over these services is transferred to the customer upon receipt of customer sign-off.</p> <p>Billable parts represent spare parts including optical components relating to our systems installed in the customer's factories while in operation, through purchase orders from our customer.</p> <p>Billable parts can be:</p> <ul style="list-style-type: none"> • Sold as direct spare parts, for which control transfers upon the relevant Incoterms; or • Sold as part of maintenance services, for which control transfers upon receipt of customer sign-off.
Field projects (relocations)	<p>Field projects represent mainly relocation services. Measuring satisfaction of this performance obligation is performed through an input method based on the labor hours expended relative to the estimated total labor hours as this best depicts the transfer of control of our service.</p>
OnPulse Maintenance	<p>OnPulse maintenance services are provided over a specified period of time on our light source systems. Payment is determined by the amount of pulses counted from each light source system, which is variable. Invoicing is monthly based on the pulses counted. Revenue is recognized in line with invoicing using the practical expedient in ASC 606-10-55-18.</p>

Accounting policy - Revenue from lessor agreements

We classify a lease as a sales-type when the lease meets any of the following criteria at lease commencement:

- The lease transfers ownership of the underlying asset to the lessee by the end of the lease term;
- The lease grants the lessee an option to purchase the underlying asset, that the lessee is reasonably certain to exercise;
- The lease term is for the major part of the remaining economic life of the underlying asset. However, if the commencement date falls at or near the end of the economic life of the underlying asset, this criterion shall not be used for purposes of classifying the lease;
- The present value of the sum of the lease payments and any residual value guaranteed by the lessee that is not already reflected in the lease payments equals or exceeds substantially all of the fair value of the underlying asset; or
- The underlying asset is of such a specialized nature that it is expected to have no alternative use to the lessor at the end of the lease term.

Leases where substantially all the risks and rewards incidental to ownership of an asset are transferred to the lessee are classified as sales-type lease arrangements. If we have offered the customer a sales-type lease arrangement, revenue is recognized at commencement of the lease term. The difference between the gross finance receivable and the present value of the minimum lease payments is initially recognized as unearned interest and presented as a deduction to the gross finance receivable. Interest income is recognized in the Consolidated Statements of Operations over the term of the lease contract using the effective interest method.

Leases whereby all the risks and rewards incidental to ownership are not transferred to the lessee are classified as operating lease arrangements. If we have offered the customer an operating lease arrangement, the system is included in property, plant and equipment upon commencement of the lease. Revenue from operating lease arrangements is recognized in the Consolidated Statements of Operations on a straight-line basis over the term of the lease contract.

Disaggregation of revenue

Our revenue from contracts with customers, on a disaggregated basis, aligns with our reportable segment disclosures with the addition of disaggregation of net system sales per technology and per end-use.

Net system sales per technology were as follows:

Year ended December 31	Net system sales in units	Net system sales in € millions
2019		
EUV	26	2,799.7
ArFi	82	4,707.7
ArF dry	22	401.2
KrF	65	679.7
i-line	34	133.5
Metrology & Inspection	115	274.4
Total	344	8,996.2
2018		
EUV	18	1,880.1
ArFi	86	4,806.9
ArF dry	16	274.3
KrF	78	860.1
i-line	26	98.6
Metrology & Inspection	114	339.1
Total	338	8,259.1
2017		
EUV	11	1,084.2
ArFi	76	4,028.7
ArF dry	13	186.4
KrF	71	743.5
i-line	26	99.7
Metrology & Inspection	95	281.9
Total	292	6,424.4

Net system sales per end-use were as follows:

Year ended December 31	Net system sales in units	Net system sales in € millions
2019		
Logic	238	6,565.3
Memory	106	2,430.9
Total	344	8,996.2
2018		
Logic	125	3,713.7
Memory	213	4,545.4
Total	338	8,259.1
2017		
Logic	145	3,456.7
Memory	147	2,967.7
Total	292	6,424.4

Contract assets and liabilities

The contract assets primarily relate to our rights to a consideration for goods or services delivered but not invoiced at the reporting date. The contract assets are transferred to the receivables when the receivables become unconditional. The contract liabilities primarily relate to remaining performance obligations for which consideration has been received such as down payments received for systems to be delivered, as well as deferred revenue from system shipments, based on the allocation of the consideration to the related performance obligations in the contract. This deferred revenue mainly consists of extended and enhanced warranties, installation and free goods or services provided as part of a volume purchase agreement.

The majority of our customer contracts contain both asset and liability positions. At the end of each reporting period, these positions are netted on a contract basis and presented as either an asset or a liability in the Consolidated Balance Sheets. Consequently, a contract balance can change between periods from a net contract asset balance to a net contract liability balance in the balance sheet.

Significant changes in the contract assets and the contract liabilities balances during the periods are as follows.

Year ended December 31 (in millions)	2018		2019	
	€		€	
	Contract Assets	Contract Liabilities	Contract Assets	Contract Liabilities
Balance at beginning of the year	270.4	2,152.0	95.9	2,953.2
Transferred to receivables from contract assets from the beginning of the period	(456.2)	—	(167.4)	—
Revenues recognized during the year, to be invoiced	192.3	—	68.7	—
Revenue recognition that was included in the contract liability balance at the beginning of the period	—	(1,306.3)	—	(1,528.4)
Changes as a result of cumulative catch-up adjustments arising from changes in estimates	—	(64.4)	—	(133.4)
Remaining performance obligations for which considerations have been received	—	2,082.5	—	2,760.8
Transfer between contract assets and liabilities	89.4	89.4	233.8	233.8
Total	95.9	2,953.2	231.0	4,286.0

The increase in the net contract liability to €4,055.0 million as of December 31, 2019 compared to €2,857.3 million as of December 31, 2018 was mainly caused by an increase in contract liabilities related to the recognition of down payments related to unconditional receivables as well as regular down payments for systems to be shipped in 2020 or later. The cumulative catch-up adjustments recognized as revenues in 2019 mainly relate to changed estimates impacting discounts and credits related to system volumes as part of a volume purchase agreement that ended in 2019.

Remaining performance obligations

Our customers generally commit to purchase systems, service, or field options through separate sales orders and service contracts. Typically the terms and conditions of these sales orders come from volume purchase agreements with our customers which can cover up to 5 years. The revenues for each committed performance obligation are estimated based on the terms and conditions agreed through the volume purchase agreements.

When revenues will be recognized is mainly dependent on when systems are shipped or installed or service projects are performed and completed, all of which is estimated based on contract terms and communication with our customers, including the customer facility readiness to take delivery of our goods or services. The volume purchase agreements may be subject to modifications, impacting the amount and timing of revenue recognition for the anticipated revenues.

As of December 31, 2019 the remaining performance obligations amount to €13.2 billion (December 31, 2018: €10.0 billion¹). We estimate 55% (December 31, 2018: 66%) of these anticipated revenues is expected to be recognized during the next 12 months. The remaining anticipated revenues mainly include orders related to NXE:3400C and our next-generation EUV platform, High-NA. We target to start shipping High-NA to our customers early 2022.

1. The remaining performance obligations as of December 31, 2018 have been increased by €1.5 billion to reflect commitments not included in our 2018 Consolidated Financial Statements. The adjustment does not have an impact on the Consolidated Statements of Operations, Consolidated Statements of Comprehensive Income, Consolidated Balance Sheets, Consolidated Statements of Shareholders' Equity or Consolidated Statements of Cash Flows.

3. Segment disclosure

ASML has one reportable segment, for the development, production, marketing, sales, upgrading and servicing of advanced semiconductor equipment systems, consisting of lithography, metrology and inspection systems. Its operating results are regularly reviewed by the Chief Operating Decision Maker in order to make decisions about resource allocation and assess performance.

Management reporting includes net system sales figures of new and used systems, sales per technology and sales per end-use. For the sales per technology and end-use, see Note 2 Revenue from contracts with customers.

Net system sales for new and used systems were as follows:

Year ended December 31 (in millions)	2017 €	2018 €	2019 €
New systems	6,332.9	8,115.6	8,807.1
Used systems	91.5	143.5	189.1
Net system sales	6,424.4	8,259.1	8,996.2

For geographical reporting, total net sales are attributed to the geographic location in which the customers' facilities are located. Long-lived assets are attributed to the geographic location in which these assets are located.

Total net sales and long-lived assets (consisting of property, plant and equipment) by geographic region were as follows:

Year ended December 31 (in millions)	Total net sales €	Long-lived assets €
2019		
Japan	463.2	6.5
Korea	2,202.1	24.1
Singapore	120.0	1.6
Taiwan	5,357.0	131.6
China	1,377.7	21.3
Rest of Asia	2.6	0.5
Netherlands	2.6	1,396.0
EMEA	314.6	4.3
United States	1,980.2	413.4
Total	11,820.0	1,999.3
2018		
Japan	567.6	8.2
Korea	3,725.1	24.6
Singapore	222.5	1.1
Taiwan	1,989.5	96.5
China	1,842.8	16.2
Rest of Asia	1.9	0.4
Netherlands	1.2	1,113.8
EMEA	631.7	5.1
United States	1,961.7	323.6
Total	10,944.0	1,589.5
2017		
Japan	404.3	3.4
Korea	3,031.4	23.2
Singapore	163.7	0.8
Taiwan	2,096.7	88.1
China	919.5	4.1
Rest of Asia	3.5	3.0
Netherlands	4.0	1,186.0
EMEA	921.5	5.0
United States	1,418.1	287.2
Total	8,962.7	1,600.8

In 2019, total net sales to the largest customer accounted for €4,688.6 million, or 39.7%, of total net sales (2018: €2,476.8 million, or 22.6%, of total net sales; 2017: €2,454.4 million, or 27.4%, of total net sales). Our three largest customers (based on total net sales) accounted for €2,191.8 million, or 77.2%, of accounts receivable and finance receivables at December 31, 2019, compared with €1,491.3 million, or 58.8%, at December 31, 2018.

Substantially all of our sales were export sales in 2019, 2018 and 2017.

The increase in total net sales of €876.0 million, or 8.0%, to €11,820.0 million in 2019 from €10,944.0 million in 2018 (2017: €8,962.7 million) is driven by the increase in EUV, both in the number of units and also in the transition to the high productivity NXE:3400C model that has a higher ASP. The Logic sector was the largest end-user growth driver, as well as the largest consumer of our most advanced EUV systems. In addition to the growth in EUV, Logic was also the key driver for the DUV business in 2019, although DUV net sales were consistent from 2018 to 2019. This is due to net sales to the Memory sector decreasing significantly compared to 2018, as we saw our Memory customers digesting the capacity additions in 2017 and 2018 in order to keep demand and supply in balance. Taiwan saw the highest geographic sales growth at over 100% in support of multiple new factories. Similar to DUV, Metrology & Inspection net sales decreased from 2018 to 2019 in line with Memory demand.

4. Cash and cash equivalents and short-term investments

Accounting Policy

Cash and cash equivalents consist primarily of highly liquid investments, such as bank deposits, money market funds and interest-bearing bank accounts with insignificant interest rate risk and original maturities to the entity holding the investments of 3 months or less at the date of acquisition.

Investments with original maturities to the entity holding the investments longer than 3 months and less than 1 year at the date of acquisition are presented as short-term investments. Gains and losses other than impairments, interest income and foreign exchange results, are recognized in OCI until the short-term investments are derecognized. Upon derecognition, the cumulative gain or loss recognized in OCI, is recognized in the Consolidated Statements of Operations. Short-term investments have insignificant interest rate risk.

Cash and cash equivalents and short-term investments consist of the following:

	Year ended December 31 (in millions)	2018 €	2019 €
Deposits with financial institutions		188.2	434.8
Investments in money market funds		2,342.6	2,139.7
Interest-bearing bank accounts		590.3	957.8
Cash and cash equivalents		3,121.1	3,532.3
Deposits with financial institutions		913.3	1,185.8
Short-term investments		913.3	1,185.8

The deposits with financial institutions and investments in money market funds have an investment grade credit rating. Our cash and cash equivalents are predominantly denominated in euros and partly in US dollars and Taiwanese dollars.

At December 31, 2019 no restrictions on usage of cash and cash equivalents exist (2018: no restrictions). The carrying amount of these assets approximates their fair value.

5. Accounts receivable, net

Accounting Policy

Accounts receivable are measured at fair value and are subsequently measured at amortized cost, less allowance for credit losses. The carrying amount of the accounts receivable approximates the fair value. We perform ongoing credit evaluations on our customers' financial condition. We periodically review whether an allowance for credit losses is needed by considering factors such as historical payment experience, credit quality, aging of the accounts receivable balances, expected lifetime losses, and current economic conditions that may affect a customer's ability to pay.

When entering into arrangements to sell our receivable, we de-recognize the receivable only in case the receivable is isolated, the transferred receivable includes the right to pledge or exchange, and we transfer control over the receivable.

Accounts receivable consist of the following:

	As of December 31 (in millions)	2018 €	2019 €
Accounts receivable, gross		1,504.9	1,791.9
Allowance for credit losses		(6.7)	(5.1)
Accounts receivable, net		1,498.2	1,786.8

The increase in accounts receivable as of December 31, 2019 compared to December 31, 2018 is mainly due to the increase in our sales. The increase is partly offset by sales of Accounts receivable through a factoring arrangement totaling €1.3 billion, of which €0.7 billion relates to unconditional accounts receivable for down payments on systems to be shipped in 2020. The total receivables amount sold has been derecognized and treated as an operating cash flow within the Consolidated Statements of Cash Flows as all transferred receivables were determined to be isolated, contain a right to pledge, and as we transferred control over the receivable.

6. Finance receivables, net

Accounting Policy

Finance receivables consist of receivables in relation to sales-type leases. We perform ongoing credit evaluations of our customers' financial condition. We periodically review whether an allowance for credit losses is needed by considering factors such as historical payment experience, credit quality, the aging of the finance receivables balances, expected lifetime losses, and current economic conditions that may affect a customer's ability to pay.

The following table lists the components of the finance receivables as of December 31, 2019 and 2018:

	As of December 31 (in millions)	2018 €	2019 €
Finance receivables, gross		893.7	994.4
Unearned interest		(7.5)	(8.8)
Finance receivables, net		886.2	985.6
Current portion of finance receivables, gross		613.3	568.4
Current portion of unearned interest		(2.2)	(3.9)
Non-current portion of finance receivables, net		275.1	421.1

The increase in finance receivables as of December 31, 2019 compared to December 31, 2018 is mainly due to free-use periods and support of capacity ramp-up of high-end systems which are part of the early-insertion lifecycle of the technology.

At December 31, 2019, finance receivables, gross due for payment in each of the next 5 years and thereafter are as follows:

	(in millions)	€
2020		568.4
2021		257.7
2022		168.3
2023		—
2024		—
Thereafter		—
Finance receivables, gross		994.4

Gross profit recognized at the commencement date of the lease for our sales-type leases amounts to €343.9 million during 2019 (2018: €446.5 million; 2017: €247.4 million). Interest income for our sales-type leases in 2019 amounts to €4.7 million (2018: €4.9 million; 2017: €4.0 million).

In 2019, 2018 and 2017 we did not record any expected credit losses from finance receivables. As of December 31, 2019, the finance receivables were neither past due nor impaired.

7. Inventories, net

Accounting Policy

Inventories cost are computed on a first-in, first-out basis. Our inventory values are comprised of purchased materials, freight expenses and customs duties, production labor and overhead. The valuation of inventory includes determining which fixed costs can be included in inventory based on normal capacity of our manufacturing and assembly facilities. If factory usage is below the established normal capacity level a portion of our fixed production overhead costs are not included in the cost of inventory; instead, they are recognized as cost of sales in the current period. Inventory is valued at the lower of cost or net realizable value, based on assumptions about future demand and market conditions.

Valuation of inventory also requires us to estimate inventory that is defective, obsolete or in excess (Inventory Reserves). We use our demand forecast to develop manufacturing plans and utilize this information to compare against raw materials, work in progress and finished product levels to determine the amount of defective, obsolete or excess inventory.

Inventories consist of the following:

	As of December 31 (in millions)	2018 €	2019 €
Raw materials ¹		1,550.3	2,026.3
Work-in-process		1,537.5	1,505.9
Finished products ¹		793.0	771.3
Inventories, gross		3,880.8	4,303.5
Inventory reserves		(441.3)	(494.3)
Inventories, net		3,439.5	3,809.2

1. In 2019, the presentation of service parts needing to be reworked has been adjusted from Finished products to Raw materials as they are not able to be used in sale of goods or services in their current state. As a result, we have reclassified €312.0 million from Finished products to Raw materials for the previously reported December 31, 2018 balances. The reclassification does not have an impact on the Consolidated Statements of Operations, Consolidated Statements of Comprehensive Income, Consolidated Balance Sheets, Consolidated Statements of Shareholders' Equity or Consolidated Statements of Cash Flows.

The increase in inventory in 2019 compared to 2018 is driven by our growing business.

A summary of activity in the inventory reserves is as follows:

	Year ended December 31 (in millions)	2018 €	2019 €
Balance at beginning of year		(349.9)	(441.3)
Additions for the year		(218.2)	(221.5)
Effect of changes in exchange rates		4.2	(0.5)
Utilization of the reserve		122.6	169.0
Balance at end of year		(441.3)	(494.3)

In 2019, the addition for the year is recorded between cost of sales €221.5 million and R&D costs €0.0 million (2018: cost of sales €207.9 million and R&D costs €10.3 million, 2017: cost of sales €101.3 million and R&D costs €18.8 million). In 2019, the additions for the year mainly relates to inventory items which became obsolete due to technological developments and design changes.

8. Other assets

Other current and non-current assets consist of the following:

	As of December 31 (in millions)	2018 €	2019 €
Advance payments to Carl Zeiss SMT GmbH		231.1	215.2
Prepaid expenses		299.6	372.5
Derivative financial instruments ¹		42.2	34.5
VAT		116.0	89.5
Other assets		83.7	131.1
Other current assets		772.6	842.8
Advance payments to Carl Zeiss SMT GmbH		533.4	585.3
Derivative financial instruments ¹		59.7	103.0
Compensation plan assets		43.1	55.1
Non-current accounts receivable		150.7	67.8
Other assets		19.2	19.2
Other non-current assets		806.1	830.4

1. For further details on derivative financial instruments see Note 24 Financial risk management.

ASML owns an indirect interest of 24.9% in Carl Zeiss SMT GmbH, who is our single supplier of optical columns and, from time to time, ASML makes non-interest bearing advance payments to Carl Zeiss SMT GmbH supporting their work-in-process, thereby securing lens and optical column deliveries to us. Amounts included in these advance payments are settled through future lens or optical column deliveries. The increase in this balance is due to our continued growth within our EUV business, as well as the support provided under the High-NA agreement. For more details, see Note 9 Equity method investments.

Prepaid expenses mainly include prepaid income taxes on intercompany profit not realized by the ASML group of €159.2 million (2018: €100.9 million) and the contract balance related to the joint development program with imec of €88.8 million as of December 31, 2019 (2018: €107.5 million). At the end of 2018 we started the new joint development program with imec under which we mainly deliver systems and services upfront and receive R&D services throughout the contract period up until 2024. The increase in prepaid expenses mainly relates to an increase in prepaid income taxes on intercompany profit, which is caused by an increase of intercompany inventory balances.

Non-current accounts receivable decreased as the majority of the balance as of December 31, 2019 is due in 2020 and as such moved to current accounts receivable.

9. Equity method investments

Accounting Policy

Equity investments which we are able to exercise significant influence but do not control, are accounted for using the equity method and presented on our Consolidated Balance Sheets within Equity method investments. The difference between the cost of our investment and our proportionate share of the carrying value of the investee's underlying net assets as of the acquisition date is the basis difference. The basis difference is allocated to the identifiable assets and liabilities based on their fair value as of the acquisition date (i.e., the date which we obtain significant influence), with the excess costs of the investment over our proportional fair value of the identifiable assets and liabilities being equity method goodwill.

We amortize the basis difference related to the other intangible assets over the estimated remaining useful lives of these assets that gave rise to this difference. The remaining weighted-average life of the finite-lived intangible assets acquired is 17.2 years and is amortized using a straight-line method. In-process R&D is initially capitalized at fair value as an intangible asset with an indefinite life. When the R&D project is complete, it is reclassified as an amortizable purchased intangible asset and is amortized over its estimated useful life. If the project is abandoned, we will record the full basis difference charge for the value of the related intangible asset in our Consolidated Statements of Operations in the period of abandonment. Equity method goodwill is not amortized or tested for impairment; instead the equity method investment is tested for impairment whenever events or changes in circumstances indicate that the carrying value of the investment may not be recoverable.

Under the equity method, after initial recognition at cost, our Equity method investments are adjusted for our proportionate share of the profit or loss and other comprehensive income of the investee, recognized on a one-quarter time lag and presented within Profit (loss) related to equity method investments. Our proportionate share of the profit or loss of the investee is adjusted for any differences in accounting principles and policies, basis difference adjustments and intra-entity profits. Receipt of dividends reduces our Equity method investments, which is presented as an operating cash flow based on the nature of the distributions.

Equity method investments consists of a 24.9% equity interest acquired on June 29, 2017 in Carl Zeiss SMT Holding GmbH & Co. KG, a limited partnership that owns Carl Zeiss SMT GmbH, our single supplier of optical columns. We have determined that Carl Zeiss SMT Holding GmbH & Co. KG is a variable interest entity because the entity was established without substantive voting rights since there is disparity between our voting rights and our economics, as well as substantially all of Carl Zeiss SMT Holding GmbH & Co. KG's activities involve or are conducted on our behalf. However, we are not the primary beneficiary of the variable interest entity because we lack the power, through voting rights or similar rights, to direct the activities that most significantly impact Carl Zeiss SMT Holding GmbH & Co. KG's economic performance.

For the year ended December 31, 2019, we recorded a profit from equity method investments of €18.2 million (2018: €6.2 million) in our Consolidated Statements of Operations. This profit includes the following components:

- Profit of €82.8 million (2018: €80.9 million) related to our share of Carl Zeiss SMT Holding GmbH & Co. KG's net income after accounting policy alignment
- Cost due to basis difference amortization related to intangible assets of €26.7 million (2018: €26.7 million)
- Cost due to intercompany profit elimination of €13.7 million (2018: €10.7 million)
- Cost due to dividend forfeiture of €24.2 million (2018: €0.0 million)
- Cost due to inventory step-up release of €0.0 million (2018: €37.3 million)

During 2019, we received dividends amounting to €99.9 million (2018: €89.2 million) from Carl Zeiss SMT Holding GmbH & Co. KG.

Carl Zeiss SMT Holding GmbH & Co. KG is a privately held company; therefore, quoted market prices for its stock are not available.

The following summarizes the total assets and liabilities related to our variable interest in Carl Zeiss SMT Holding GmbH & Co. KG as reflected in our Consolidated Balance Sheets, as well as our maximum exposure to losses as of December 31, 2019. Our maximum exposure to loss is limited to our equity method investment in Carl Zeiss SMT Holding GmbH & Co. KG and prepayments provided to the equity method investment.

As of December 31 (in millions)	2019 Assets	2019 Liabilities	Maximum exposure to loss
EUV Agreements	320.9	–	320.9
DUV Agreements	34.7	–	34.7
High-NA Agreement	566.5	(28.0)	566.5
Investment agreement for 24.9% equity	833.0	–	833.0

EUV and DUV Agreements

Carl Zeiss SMT GmbH is our single supplier of optical columns and, from time to time, receives non-interest bearing advance payments from us that support their work in-process, thereby securing lens and optical module deliveries to us. Amounts owed under these advance payments are settled through future lens, DUV or EUV optical component deliveries. Our maximum exposure related to this agreement is limited to the assets not settled as of the balance sheet date.

High-NA Agreement

On November 3, 2016 we agreed with Carl Zeiss SMT GmbH to support their R&D costs, capital expenditures and supply chain investments, in respect of High NA, for an amount initially estimated at €760.0 million. The current estimate as of December 31, 2019 is €1,242.2 million (2018: €1,229.9 million). As of December 31, 2019 our estimated remaining commitment to Carl Zeiss SMT GmbH is €524.8 million (2018: €795.3 million).

The table below summarizes support provided to Carl Zeiss SMT GmbH, by type:

For the year ended (in millions)	2017 €	2018 €	2019 €
Capital expenditures	89.1	191.8	184.1
R&D costs	55.8	74.8	94.2
Supply chain investments	2.6	8.5	4.5
Total support provided	147.5	275.1	282.8

Our maximum exposure related to this agreement is limited to the amount reimbursable from Carl Zeiss SMT GmbH as of the balance sheet date.

R&D and supply chain support costs are capitalized for 24.9% of this funding because it directly benefits us through our investment in Carl Zeiss SMT Holding GmbH & Co. KG. The amount capitalized is presented within equity method investments. The remainder of this support relating to supply chain support costs is charged to the cost of sales as incurred, the part related to R&D costs is charged to Research and development costs as incurred.

The support provided related to capital expenditures consists of tooling and facilities, which is determined to be a lease. As a result, prior to the asset being put into use, it is recorded in other assets and then transferred into ROU Assets - Finance when put into use.

10. Goodwill

Accounting Policy

Goodwill represents the excess of the costs of an acquisition over the fair value of the amounts assigned to assets acquired and liabilities incurred or assumed of the acquired subsidiary at the date of acquisition. Goodwill on acquisition of subsidiaries is allocated to reporting units for the purpose of impairment testing. The allocation is made to those reporting units that are expected to benefit from the business combination in which the goodwill arose. Goodwill is stated at cost less accumulated impairment losses.

Goodwill is tested for impairment annually or whenever events or changes in circumstances indicate that the carrying amount of the goodwill may not be recoverable. To determine whether it is necessary to perform the quantitative goodwill impairment test, we perform a step-zero qualitative assessment, annually. If we determine that it is more likely than not that the fair value of a reporting unit exceeds its carrying amount, we do not perform a quantitative goodwill impairment test.

Goodwill mainly results from the acquisitions of Cymer and HMI. The balance as of December 31, 2019 is €4,541.1 million (2018: €4,541.1 million).

We have identified two reporting units: Reporting Unit ASML and Reporting Unit Cymer Light Sources. As of December 31, 2019 the goodwill allocated to Reporting Unit ASML amounts to €4,078.8 million (2018: €4,078.8 million) and Reporting Unit Cymer Light Sources amounts to €462.3 million (2018: €462.3 million).

Based on our assessment during the annual goodwill impairment test, we believe it is more likely than not that the fair values of the reporting units exceed their carrying amounts, and therefore goodwill was not impaired as of December 31, 2019.

11. Other intangible assets, net

Accounting Policy

Other intangible assets include brands, intellectual property, developed technology, customer relationships, and other intangible assets not yet available for use. These finite-lived intangible assets are stated at cost, less accumulated amortization and accumulated impairment losses. Amortization is calculated using the straight-line method based on the estimated useful lives of the assets.

Finite-lived intangible assets are assessed for impairment whenever there is an indication that the balance sheet carrying amount may not be recoverable using cash flow projections for the useful life. The following table shows the respective useful lives for other intangible assets:

	Category	Estimated useful life
	Brands	20 years
	Intellectual property	3 - 10 years
	Developed technology	6 - 15 years
	Customer relationships	8 - 18 years
	Other	2 - 6 years

As of December 31, 2019 other intangible assets consist mainly of brands, intellectual property, developed technology, customer relationships obtained from the acquisitions of HMI (2016) and Cymer (2013):

(in millions)	Brands €	Intellectual property €	Developed technology €	Customer relationships €	Other €	Total €
Cost						
Balance at January 1, 2018	38.2	61.9	1,199.9	228.6	32.2	1,560.8
Additions	—	5.0	—	—	37.0	42.0
Disposals	—	—	—	—	—	—
Effect of changes in exchange rates	1.0	2.0	—	—	(3.0)	—
Balance at December 31, 2018	39.2	68.9	1,199.9	228.6	66.2	1,602.8
Additions	—	73.7	—	—	42.1	115.8
Disposals	—	—	—	—	(0.2)	(0.2)
Effect of changes in exchange rates	(0.3)	(0.2)	0.2	—	2.4	2.1
Balance at December 31, 2019	38.9	142.4	1,200.1	228.6	110.5	1,720.5
Accumulated amortization						
Balance at January 1, 2018	4.8	60.0	264.2	57.8	8.0	394.8
Amortization	1.9	1.2	82.1	12.7	5.8	103.7
Disposals	—	—	—	—	—	—
Effect of changes in exchange rates	0.7	1.6	0.2	—	(2.2)	0.3
Balance at December 31, 2018	7.4	62.8	346.5	70.5	11.6	498.8
Amortization	1.9	7.8	82.0	12.7	11.0	115.4
Disposals	—	—	—	—	(0.2)	(0.2)
Effect of changes in exchange rates	(0.1)	—	0.1	—	2.1	2.1
Balance at December 31, 2019	9.2	70.6	428.6	83.2	24.5	616.1
Carrying amount						
December 31, 2018	31.8	6.1	853.4	158.1	54.6	1,104.0
December 31, 2019	29.7	71.8	771.5	145.4	86.0	1,104.4

Additions in Intellectual property consist of intellectual property assets acquired from Mapper during 2019.

During 2019, we recorded amortization charges of €115.4 million (2018: €103.7 million; 2017: €105.5 million) which were recorded in cost of sales for €97.4 million (2018: €97.2 million; 2017: €99.7 million), in R&D costs for €7.5 million (2018: €1.3 million and 2017: €2.1 million) and in SG&A costs for €10.5 million (2018: €5.2 million and 2017: €3.7 million).

As of December 31, 2019, the other intangible assets not yet available for use amount to €14.9 million (2018: €37.0 million) and are allocated to Reporting Unit ASML.

During 2019 we recorded no impairment charges (2018: €0.0 million; 2017: €0.1 million).

As of December 31, 2019, the estimated amortization expenses for other intangible assets, for the next 5 years and thereafter, are as follows:

	(in millions)	€
	2020	120.0
	2021	120.0
	2022	117.0
	2023	109.0
	2024	102.0
	Thereafter	536.4
	Amortization expenses	1,104.4

12. Property, plant and equipment, net

Accounting Policy

Property, plant and equipment are stated at cost, less accumulated depreciation and accumulated impairment losses. Costs of assets manufactured by ASML include direct manufacturing costs, production overhead and interest costs incurred for qualifying assets during the construction period. Property, plant and equipment are depreciated on a straight-line basis in the Consolidated Statements of Operations over their estimated useful lives, except for land which is not depreciated.

The following table shows the respective useful lives for property, plant and equipment:

Category	Estimated useful life
Buildings and constructions	5 - 45 years
Machinery and equipment	1 - 7 years
Leasehold improvements	1 - 10 years
Furniture, fixtures and other equipment	3 - 5 years

Property, plant and equipment is assessed for impairment whenever there is an indication that the carrying amount may not be recoverable using cash flow projections for the useful life.

Property, plant and equipment consist of the following:

(in millions)	Land and buildings €	Machinery and equipment €	Leasehold improvements €	Furniture, fixtures and other equipment €	Total €
Cost					
Balance at January 1, 2018	1,641.8	1,159.9	256.6	375.6	3,433.9
Additions	119.6	196.4	21.5	44.6	382.1
Disposals	(57.2)	(16.0)	(3.4)	(4.9)	(81.5)
Net non-cash movements to/from Inventories	—	(38.9)	—	—	(38.9)
Effect of changes in exchange rates	5.6	3.7	0.5	0.9	10.7
Balance at December 31, 2018	1,709.8	1,305.1	275.2	416.2	3,706.3
Additions	321.0	261.1	26.7	64.6	673.4
Disposals	(0.3)	(17.5)	(1.4)	(103.4)	(122.6)
Net non-cash movements to/from Inventories	—	33.9	—	—	33.9
Effect of changes in exchange rates	6.0	5.2	0.5	0.3	12.0
Balance at December 31, 2019	2,036.5	1,587.8	301.0	377.7	4,303.0
Accumulated depreciation and impairment					
Balance at January 1, 2018	552.7	742.4	244.5	293.5	1,833.1
Depreciation	92.8	174.8	19.2	28.6	315.4
Impairment charges	1.0	14.4	—	—	15.4
Disposals	(2.5)	(13.3)	(3.0)	(4.5)	(23.3)
Net non-cash movements to/from Inventories	—	(27.8)	—	—	(27.8)
Effect of changes in exchange rates	2.0	1.5	0.2	0.3	4.0
Balance at December 31, 2018	646.0	892.0	260.9	317.9	2,116.8
Depreciation	98.5	166.7	21.3	38.8	325.3
Impairment charges	—	4.7	—	—	4.7
Disposals	(0.2)	(14.8)	(1.2)	(103.3)	(119.5)
Net non-cash movements to/from Inventories	—	(28.7)	—	—	(28.7)
Effect of changes in exchange rates	2.0	2.8	0.3	—	5.1
Balance at December 31, 2019	746.3	1,022.7	281.3	253.4	2,303.7
Carrying amount					
December 31, 2018	1,063.8	413.1	14.3	98.3	1,589.5
December 31, 2019	1,290.2	565.1	19.7	124.3	1,999.3

As of December 31, 2019, the carrying amount includes assets under construction for land and buildings of €286.6 million (2018: €79.0 million), machinery and equipment of €85.4 million (2018: €39.1 million), leasehold improvements of €4.5 million (2018: €7.8 million) and furniture, fixtures and other equipment of €7.8 million (2018: €9.3 million).

As of December 31, 2019, the carrying amount of land amounts to €105.7 million (2018: €94.6 million).

The majority of the additions in 2019 in land and buildings as well as furniture, fixtures and office equipment relates to construction of ASML's logistics facility, office space and parking garages at our headquarters in Veldhoven. Our Veldhoven campus expansion will support continued growth.

The majority of additions in 2019 in machinery and equipment relates to upgrade and expansion of production tooling and investment in prototypes, evaluation and training systems which are similar to those that ASML sells in its ordinary course of business. These systems are capitalized under property, plant and equipment because these are held for own use and for evaluation purposes. These are recorded at cost and depreciated over their expected useful life taking into consideration their residual value. From the time that these assets are no longer held for own use but intended for sale in the ordinary course of business, they are reclassified from property, plant and equipment to inventory at their carrying value.

Net non-cash movements to/from Inventories consists of systems, tooling and equipment which we build in our factory as inventory. When inventory is utilized by R&D, for more than 1 year, it is subsequently moved to PP&E for the period it is being utilized for research and development. When no longer required for R&D activities the equipment is transferred back to inventory at its current net book value and reworked to make ready for sale to our customers.

The Consolidated Statements of Operations include the following depreciation charges:

As of December 31 (in millions)	2017 €	2018 €	2019 €
Cost of Sales	195.7	191.6	196.1
R&D Costs	101.7	105.9	117.2
SG&A	10.8	17.9	12.0
Total Depreciation	308.2	315.4	325.3

13. Right-of-use assets and lease liabilities

Accounting Policy

We determine if an arrangement is a lease at inception. Operating leases are included in Right-of-use ("ROU") assets - Operating, accrued & other current liabilities, and accrued & other non-current liabilities in our consolidated balance sheets. Finance leases are included in Right-of-use ("ROU") assets - Finance, current portion of long-term debt, and Long-term debt in our consolidated balance sheets.

ROU assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. Lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. As our leases do not provide an implicit rate, we use our incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. The lease ROU asset also includes any lease payments made and is reduced by lease incentives. Our lease terms may include options to extend or terminate the lease when it is reasonably certain that we will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term.

We have lease agreements with lease and non-lease components, which are generally accounted for as a single lease component. For certain equipment and for leased warehouses we account for the lease and non-lease components separately. For warehouse leases the allocation of the consideration between lease and non-lease components is based on the relative stand-alone prices of lease components included in the lease contracts. Additionally, for car leases, we apply a portfolio approach to effectively account for the lease right-of-use assets and liabilities.

ASML owns the majority of real estate we utilize for manufacturing, supply chain management and general administration at our headquarter in Veldhoven, in the Netherlands. At our other locations, worldwide much of the properties we occupy are leased and therefore comprise the largest amount of our right-of-use assets. Additionally, we lease warehouse space at locations world-wide and cars for use of our employees.

Right-of-use assets consist of the following leases:

As of December 31 (in millions)	Operating		Finance	
	2018 €	2019 €	2018 €	2019 €
Properties	105.1	177.0	—	92.1
Cars	11.9	11.9	—	—
Equipment	—	—	—	26.4
Warehouses	14.5	8.7	—	—
Other	6.1	7.8	—	—
Right-of-use assets	137.6	205.4	—	118.5

For the year ended December 31, 2019, ROU Assets under an operating lease arrangement increased by €67.8 million, mainly due to the commencement of two new real estate lease contracts in the United States.

For the year ended December 31, 2019, we recognized ROU Assets under a finance lease arrangement in our Consolidated Balance Sheets. These ROU Assets consist of facilities and tooling related to our High-NA agreement with Carl Zeiss SMT, for which the funds are prepaid by ASML. As capital expenditures under this arrangement are placed into service, we derecognized our prepaid asset and recognized a ROU Asset under a finance lease arrangement. The agreed prepayments, and conversion to ROU Assets, are planned to continue through the year 2022. Previously, one immaterial finance lease was recorded within Property, plant and equipment, which is now moved to ROU Assets - Finance for the year ended December 31, 2019.

Lease liabilities are split between current and non-current:

As of December 31 (in millions)	Operating		Finance	
	2018	2019	2018	2019
	€	€	€	€
Current	46.3	55.6	—	—
Non-current	93.7	153.8	—	9.5
Lease liabilities	140.0	209.4	—	9.5

For the year ended December 31, 2019, Lease Liabilities under an operating lease arrangement increased by €69.4 million, mainly due to the commencement of two new real estate lease contracts in the United States.

The majority of our finance leases do not have an associated lease liability as the lease payments have been prepaid.

The Consolidated Statements of Operations include the following depreciation charges relating to these leases:

As of December 31 (in millions)	Operating			Finance		
	2017	2018	2019	2017	2018	2019
	€	€	€	€	€	€
Properties	29.9	40.2	48.2	—	—	2.8
Cars	7.1	7.4	8.1	—	—	—
Equipment	—	—	—	—	—	4.5
Warehouses	5.9	7.1	4.5	—	—	—
Other	11.6	12.4	12.4	—	—	—
Depreciation charge right-of-use assets	54.5	67.1	73.2	—	—	7.3

The total cash outflows relating to the lease liabilities are as follows:

As of December 31 (in millions)	Operating			Finance		
	2017	2018	2019	2017	2018	2019
	€	€	€	€	€	€
Total Cash Outflow	54.5	67.1	73.2	—	—	2.8

The weighted average remaining lease term and weighted average discount rate related to the leases are as follows:

As of December 31	Operating			Finance		
	2017	2018	2019	2017	2018	2019
	€	€	€	€	€	€
Weighted average remaining lease term (months)	57	60	70	0	0	230
Weighted average discount rate (%)	2.2%	2.1%	2.2%	—%	—%	0.7%

14. Accrued and other liabilities

Accrued and other liabilities consist of the following:

	As of December 31 (in millions)	2018 €	2019 €
Costs to be paid		154.8	252.1
Personnel related items		544.4	654.6
Derivative financial instruments ¹		47.4	3.9
Operating lease liabilities ²		140.0	209.4
Provisions		160.3	30.7
Standard warranty reserve		59.8	128.4
Other		6.4	1.8
Accrued and other liabilities		1,113.1	1,280.9
Less: non-current portion of accrued and other liabilities		201.7	241.0
Current portion of accrued and other liabilities		911.4	1,039.9

1. For further details on derivative financial instruments see Note 24 Financial risk management.

2. For further details on lease liabilities see Note 13 Right-of-use assets and lease liabilities.

Costs to be paid as of December 31, 2019 include accrued costs for unbilled services provided by suppliers including contracted labor, outsourced services and consultancy. In addition, the costs to be paid as of December 31, 2019 include the royalties owed as part of our cross-license agreement with Nikon for the full year.

Personnel related items mainly consist of accrued profit sharing, accrued management bonuses, accrued vacation days, accrued pension premiums, accrued wage tax and accrued vacation allowance. The increase in the accrued personnel related items compared to prior year is the result of the growth of our business which results in an increase in the number of our employees.

The provisions mainly relate to the settlement with Nikon, which was paid during the year. For more details refer to Note 16 Commitments, contingencies and guarantees.

The standard warranty reserve is based on historical product performance and total expected costs to fulfill our warranty obligation. Annually, we assess, and update if necessary, the standard warranty reserve based on the latest actual historical warranty costs and expected future warranty costs. The 2019 addition of the warranty reserve of €118.5 million is mainly due to new insights to determine our warranty, in light of the increase in installed base and the fact that EUV is now going into high-volume manufacturing. Total changes in standard warranty reserve for the years 2019 and 2018 are as follows:

	Year ended December 31 (in millions)	2018 €	2019 €
Balance at beginning of year		59.7	59.8
Additions for the year		61.9	118.5
Utilization of the reserve		(59.8)	(50.0)
Effect of exchange rates		(2.0)	0.1
Balance at end of year		59.8	128.4

15. Long-term debt and interest and other costs

Accounting policy

Long-term debt represents debt issued privately without registration with a government authority and is payable to others under the terms of a signed agreement. Long-term debt is initially recognized at fair value. Long-term debt is subsequently measured at amortized cost. Debt is qualified as long-term debt as long as the group has an unconditional right to defer settlement of the liability for at least 12 months after the reporting period.

Interest accruals and payments relating to Long-term debt are accounted for as part of the "Accrued and other liabilities".

Interest and other costs should be accrued and recorded with the passage of time over the agreed term, regardless of when the interest receipt or payment has taken place.

Long-term debt consists of the following:

	As of December 31 (in millions)	2018 €	2019 €
€500 million 0.625% senior notes due 2022, carrying amount		494.5	499.5
€750 million 3.375% senior notes due 2023, carrying amount		816.0	813.3
€1,000 million 1.375% senior notes due 2026, carrying amount		964.6	1,007.0
€750 million 1.625% senior notes due 2027, carrying amount		742.4	778.3
Other		9.0	10.2
	Long-term debt	3,026.5	3,108.3
	Less: current portion of long-term debt	—	—
	Non-current portion of long-term debt	3,026.5	3,108.3

Our obligations to make principal repayments under our Eurobonds and other borrowing arrangements excluding interest expense as of December 31, 2019:

	(in millions)	€
	2020	2.8
	2021	2.8
	2022	502.8
	2023	751.3
	2024	—
	Thereafter	1,750.0
	Long-term debt	3,009.7
	Less: current portion of long-term debt	2.8
	Non-current portion of long-term debt	3,006.9

For the years 2020 and 2021 the obligations relate to lease payments. The years thereafter mainly relate to repayments of principals under our Eurobonds.

Eurobonds

The following table summarizes the carrying amount of our outstanding Eurobonds, including the fair value of interest rate swaps used to hedge the change in the fair value of the Eurobonds:

	As of December 31 (in millions)	2018 €	2019 €
Amortized cost amount		2,980.0	2,983.2
Fair value interest rate swaps ¹		37.5	114.9
	Carrying amount	3,017.5	3,098.1

1. The fair value of the interest rate swaps excludes accrued interest.

In September 2013, we issued our €750 million 3.375% senior notes due 2023, with interest payable annually on September 19. The notes are redeemable at the option of ASML, in whole or in part, at any time by paying a make whole premium, and unless previously redeemed, will be redeemed at 100% of their principal amount on September 19, 2023.

In July 2016, we issued our €500 million 0.625% senior notes due 2022, with interest payable annually on July 7. The notes are redeemable at the option of ASML, in whole or in part, at any time by paying a make whole premium, and unless previously redeemed, will be redeemed at 100% of their principal amount on July 7, 2022.

In July 2016, we issued our €1,000 million 1.375% senior notes due 2026, with interest payable annually on July 7. The notes are redeemable at the option of ASML, in whole or in part, at any time by paying a make whole premium, and unless previously redeemed, will be redeemed at 100% of their principal amount on July 7, 2026.

In November 2016, we issued our €750 million 1.625% senior notes due 2027, with interest payable annually on May 28. The notes are redeemable at the option of ASML, in whole or in part, at any time by paying a make whole premium, and unless previously redeemed, will be redeemed at 100% of their principal amount on May 28, 2027.

The Eurobonds serve as hedged items in fair value hedge relationships in which we hedge the variability of changes in the fair value of our Eurobonds due to changes in market interest rates with interest rate swaps. The fair value changes of these interest rate swaps are recorded on the Consolidated Balance Sheets under derivative financial instruments (within other current assets, other non-current assets, current accrued and other liabilities and non-current accrued and other liabilities) and the carrying amount of the Eurobonds is adjusted for these fair value changes only.

The following table summarizes the estimated fair value of our Eurobonds:

	As of December 31 (in millions)	2018 €	2019 €
	Principal amount	3,000.0	3,000.0
	Carrying amount	3,017.5	3,098.1
	Fair value ¹	3,119.4	3,247.7

1. Source: Bloomberg Finance LP.

The fair value of our Eurobonds is estimated based on quoted market prices as of December 31, 2019. Due to changes in market interest rates and credit spreads since the issue of our Eurobonds which carry a fixed coupon interest rate, the fair value deviates from the principal amount.

Lines of credit

Our available committed credit facility, with a group of banks, is €700.0 million as of December 31, 2019 and as of December 31, 2018. No amounts were outstanding under the committed credit facility at the end of 2019 and 2018. This facility of €700.0 million was renegotiated on July 3, 2019, including the extension of the maturity date to July 3, 2024. The extension includes options for extension by two 1-year extension options on the first and the second anniversary of the facility (extending the maturity potentially to 2026), if agreed by both ASML and the lenders. Outstanding amounts under this credit facility will bear interest at EURIBOR or LIBOR plus a margin that depends on our credit rating and ESG score.

Interest and other, net

Interest and other consist mainly of interest income and interest expenses. In 2019, the interest expense component is €36.6 million (2018: €41.8 million and 2017: €57.5 million), related to interest expense on our Eurobonds, as well as related interest rate swaps and hedges, and amortized financing costs.

16. Commitments, contingencies and guarantees

Legal contingencies

ASML is party to various legal proceedings generally incidental to our business. ASML also faces exposures from other actual or potential claims and legal proceedings. In addition, ASML's customers may be subject to claims of infringement from third parties alleging that the ASML equipment used by those customers in the manufacture of semiconductor products, and / or the methods relating to use of the ASML equipment, infringes one or more patents issued to those third parties. If these claims were successful, ASML could be required to indemnify such customers for some or all of the losses incurred or damages assessed against them as a result of that infringement.

In connection with proceedings and claims, our management evaluates, based on the relevant facts and legal principles, the likelihood of an unfavorable (or favorable) outcome, and whether the amount of the loss (or gain) can be reasonably estimated. Significant subjective judgments are required in these evaluations, including judgments regarding the validity of asserted claims and the likely outcome of legal and administrative proceedings. The outcome of these proceedings, however, is subject to a number of factors beyond our control, most notably the uncertainty associated with predicting decisions by courts and administrative agencies. In addition, estimates of the potential costs (or gains) associated with legal and administrative proceedings frequently cannot be subjected to any sensitivity analysis, as damage estimates or settlement offers by claimants may bear little or no relation to the eventual outcome. Finally, in any particular proceeding, we may agree to settle or to terminate a claim or proceeding in which we believe that it would ultimately prevail where we believe that doing so, when taken together with other relevant commercial considerations, is more effective than engaging in an expensive and protracted litigation, the outcome of which is uncertain.

Management determined that either a loss (or gain) was not probable and/or was not reasonably estimable and in 2019, no losses or gains related to legal contingencies are charged to our Consolidated Statements of Operations (2018: €131.0 million and 2017: €0.0 million).

On January 23, 2019, ASML entered into a binding MOU with Nikon and Carl Zeiss SMT relating to a comprehensive settlement of all pending disputes between Nikon, ASML and Zeiss. On February 18, 2019, the parties executed the settlement and cross-license agreement contemplated by the MOU. The terms include a payment to Nikon by ASML and Zeiss of a total of €150.0 million and royalty payments of 0.8% by ASML and Zeiss to Nikon, and by Nikon to ASML and Zeiss, over the sales of their respective immersion lithography systems for 10 years from date of the agreement. As of December 31, 2018 we accrued an amount in the accrued and other liabilities of €131.0 million representing ASML's share of the €150.0 million, which was paid during the first half of 2019. See Note 14 Accrued and other liabilities.

Other commitments, contingencies and guarantees

We have various contractual obligations, some of which are required to be recorded as liabilities in our Consolidated Balance Sheets, including long- and short-term debt and lease commitments. Other contractual obligations, namely purchase obligations and guarantees, are generally not required to be recognized as liabilities but are required to be disclosed.

Our contractual obligations as of December 31, 2019 can be summarized as follows:

Payments due by period (in millions)	Total €	1 year €	2 year €	3 year €	4 year €	5 year €	After 5 years €
Long-Term Debt Obligations, including interest expense ¹	3,303.5	59.2	59.0	556.1	795.8	26.3	1,807.1
Lease Obligations ²	209.4	53.5	44.4	31.7	19.1	11.8	48.9
Purchase Obligations	4,562.7	3,947.8	384.6	149.0	56.8	17.5	7.0
Carl Zeiss SMT GmbH High NA Funding Commitment ³	524.8	304.3	214.4	6.1	—	—	—
Total Contractual Obligations ⁴	8,600.4	4,364.8	702.4	742.9	871.7	55.6	1,863.0

1. Long-term debt obligations mainly relate to principal amounts and interest payments of our Eurobonds. For the amounts excluding interest expenses and for further details see Note 15 Long-term debt and interest and other costs.
2. For further details see Note 13 Right-of-use assets and lease liabilities.
3. For further details see Note 9 Equity method investments.
4. We have excluded unrecognized tax benefits for an amount of €227.1 million as the amounts that will be settled in cash are not known and the timing of any payments is uncertain.

We have purchase commitments towards suppliers in the ordinary course of business. ASML expects that it will honor these purchase commitments to fulfill future sales, in line with the timing of those future sales. The general terms and conditions of the agreements relating to the major part of our purchase commitments as of December 31, 2019 contain clauses that enable us to delay or cancel delivery of ordered goods and services up to the dates specified in the corresponding purchase contracts. These terms and conditions that we typically agree with our supply chain partners give us additional flexibility to adapt our purchase commitments to our requirements in light of the cyclical and technological developments inherent in the industry in which we operate. We establish a provision for cancellation costs when the liability has been incurred and the amount of cancellation fees is reasonably estimable.

Our guarantees as of December 31, 2019 can be summarized as follows:

We have a non-committed guarantee facility of €85.0 million under which guarantees in the ordinary course of business can be provided to third parties.

As of January 1, 2019, ASML entered into a non-committed credit facility for our Chinese subsidiary of €130.0 million. The non-committed credit facility covers bank guarantees, standby letters of credit, as well as advances up to €75.0 million.

During the first half of 2019, ASML entered into a 10 year lease for real estate in San Jose, California for which ASML Holding N.V. executed a parental guarantee agreement with the landlord. The guarantee covers the associated rent and operating expenses our subsidiary is obliged to pay, up to €92.4 million. The parental guarantee serves as recourse in case of default by the subsidiary and cannot exceed the amounts stated above.

17. Share based compensation

Accounting Policy

Share-based payments

ASML has share based-payment plans for the company's employees. These plans consist of performance plans including services and service only plans. The performance plans contain 70% non-market based elements and a 30% market based element. The fair value of the market based element of the performance plans (30% Total Shareholder Return as compared to a specific peer group) is measured at the grant date incorporating the expected vesting and expected value at vesting, using a tailored Monte Carlo simulation model. The fair value of the non-market based element of the performance plans (ROAIC (40%), rating in technology index (20%) and sustainability (10%)) and the service plans (being service over specified period of time) is measured at the grant date at the share price less present value of expected dividends during the vesting period, as participants are not entitled to dividends payable and voting rights during the vesting period. The likelihood of the conditions being met for service and non-market performance plans is assessed as part of the company's best estimate of the number of equity instruments that will ultimately vest.

Participants are entitled to a conditional grant of company shares upon awarding. Performance plans are subject to cliff vesting and are accounted for on a straight line basis. Service only plans are subject to graded vesting. Each installment of the plan is therefore accounted as a separate grant with a separate fair value. This means that each installment will be separately measured and attributed to expense over the related vesting period. Expenses for the market based element are recognized during vesting at a fixed vesting level (as the vesting expectation is incorporated in the fair value) provided that all other performance conditions are met. Expenses for the non-market based elements and service plans are recognized during vesting at expected vesting levels, which are updated during vesting period as necessary, with a final update/adjustment at vesting date. All share based remuneration expenses are recognized as personnel expense, with a corresponding entry in equity, during the vesting period of the award. Share based remuneration expenses are included in the same income statement line or lines in the functional grouped consolidated statement of operations as the compensation paid to the employees receiving the stock-based awards.

Share-based compensation

The General Meeting approved the adoption of the most recent remuneration Policy for the Board of Management and the number of shares to be issued. The most recent remuneration policy includes the target and maximum levels of the LTI plans, the performance measures and pay-out zone percentages. The General Meeting also approved the restrictions and limits to the Board of Management for issuance/granting of ordinary shares, limits for restricting or excluding the preemption rights accruing to shareholder and the restrictions and limits to the Board of Management for repurchasing ordinary shares on behalf of the company.

Employee Umbrella Share Plan

The Employee Umbrella Share Plan, effective as of January 1, 2014 covers all employees. All grants under the Employee Umbrella Share Plan typically have a 3-year vesting period and are subject to the above mentioned performance or service criteria.

The assumptions for the calculation of the fair value of shares, which include a market based performance element (Total Shareholder Return) are set out in the following table:

Year ended December 31	2017	2018	2019
Share price in € at grant date	114.1	166.9	199.5
Expected volatility ASML	27.1 %	26.1 %	29.8 %
Expected volatility PHLX index	21.6 %	21.3 %	24.8 %
Vesting period	2.9 years	2.9 years	2.5 years
Dividend yield	1.1 %	0.8 %	1.1 %
Risk free interest rate (Eurozone)	(0.6)%	(0.4)%	(0.8)%
Risk free interest rate (US)	1.5 %	2.2 %	1.8 %

Expenses for share plans were as follows:

Year ended December 31 (in millions, except weighted average period)	2017 €	2018 €	2019 €
Total compensation expenses incurred for share based remuneration (including share-based payments to the BoM)	53.1	46.3	74.6
The tax benefit (excluding excess tax benefits) recognized related to the recognized share-based compensation costs in the US	8.7	5.6	5.9
Total compensation expenses to be incurred for share based remuneration (including share-based payments to the BoM) in future periods	78.5	94.2	95.8
Weighted average period in which compensation expenses (including share-based payments to the BoM) are expected to be recognized	1.8 years	1.7 years	1.6 years

Details with respect to shares granted and vested during the year are set out in the following table:

Year ended December 31	EUR-denominated			USD-denominated		
	2017	2018	2019	2017	2018	2019
Total fair value at vesting date of shares vested during the year (in millions)	49.9	46.4	58.7	53.3	61.6	54.9
Weighted average fair value of shares granted	125.16	161.63	190.33	130.77	187.98	206.90

A summary of the status of conditionally outstanding shares as of December 31, 2019, and changes during the year ended December 31, 2019, is presented below:

	EUR-denominated		USD-denominated	
	Number of shares	Weighted average fair value at grant date (€)	Number of shares	Weighted average fair value at grant date (USD)
Conditional shares outstanding at January 1, 2019	720,827	120.73	661,182	146.78
Granted	315,578	190.33	255,885	206.90
Vested	(304,322)	116.82	(282,971)	138.04
Forfeited	(50,054)	96.74	(55,597)	138.43
Conditional shares outstanding at December 31, 2019	682,029	157.48	578,499	179.22

Option plans

The grant-date fair value of stock options is estimated using a Black-Scholes option valuation model. This Black Scholes model requires the use of assumptions, including expected share price volatility, the estimated life of each award and the estimated dividend yield. The risk-free interest rate used in the model is determined, based on an index populated with euro denominated European government agency bond with high credit ratings and with a life equal to the expected life of the equity settled share-based payments. Our option plans typically vest over a 3-year service period with any unexercised stock options expiring 10 years after the grant date. Options granted have fixed exercise prices equal to the closing price of our shares listed at Euronext Amsterdam on grant date. As of 2017 we no longer grant options to our employees and all options issued are vested. We therefore no longer disclose the assumptions of the options since there are no changes compared to the Integrated Report 2018. Issuance of shares upon exercising the stock options are deducted from the treasury shares. The purchase of shares against the exercise price is settled with the employees involved through deductions on their salary.

Details with respect to stock options are set out in the following table:

Year ended December 31	EUR-denominated			USD-denominated		
	2017	2018	2019	2017	2018	2019
Weighted average share price at the exercise date of stock options	132.67	169.68	201.52	148.48	201.01	225.70
Aggregate intrinsic value of stock options exercised (in millions)	12.5	13.6	4.3	4.8	7.6	2.3
Weighted average remaining contractual term of currently exercisable options (in years)	3.80	4.76	4.16	4.49	5.20	4.40
Aggregate intrinsic value of exercisable stock options (in millions)	21.0	8.9	17.7	13.1	5.2	11.8
Aggregate intrinsic value of outstanding stock options (in millions)	21.2	9.0	17.7	13.2	5.2	11.8

The number and weighted average exercise prices of stock options as of December 31, 2019, and changes during the year then ended are presented below:

	EUR-denominated		USD-denominated	
	Number of options	Weighted average exercise price per ordinary share (EUR)	Number of options	Weighted average exercise price per ordinary share (USD)
Outstanding, January 1, 2019	116,692	60.49	70,299	81.43
Granted	—	—	—	—
Exercised	(27,952)	46.90	(14,750)	72.86
Forfeited	—	—	—	—
Expired	—	—	—	—
Outstanding, December 31, 2019	88,740	64.80	55,549	83.71
Exercisable, December 31, 2019	88,740	64.80	55,549	83.71

Details with respect to the stock options outstanding are set out in the following table:

EUR-denominated			USD-denominated		
Range of exercise prices (€)	Number of outstanding options at December 31, 2019	Weighted average remaining contractual life of outstanding options (years)	Range of exercise prices (USD)	Number of outstanding options at December 31, 2019	Weighted average remaining contractual life of outstanding options (years)
20 - 25	7,260	0.79	20 - 25	—	0.00
25 - 40	8,060	1.72	25 - 40	6,518	1.10
40 - 50	9,290	2.80	40 - 50	562	1.80
50 - 60	7,273	3.97	50 - 60	2,869	2.70
60 - 70	15,318	3.93	60 - 70	423	3.10
70 - 80	14,115	5.38	70 - 80	1,059	3.30
80 - 90	13,625	5.85	80 - 90	12,449	4.80
90 - 100	13,799	5.69	90 - 100	21,957	5.00
100 - 110	—	0.00	100 - 110	9,712	5.70
Total	88,740	4.16	Total	55,549	4.40

Employee purchase plan

Every quarter, we offer our worldwide payroll employees the opportunity to buy our shares against fair value using their net salary. The Board of Management is excluded from participation in this plan. The fair value for shares is based on the closing price of our shares listed at Euronext Amsterdam on grant date. The maximum net amount for which employees can participate in the plan amounts to 10.0% of their annual gross base salary. When employees retain the shares for a minimum of 12 months, we will pay out a 20.0% cash bonus on the initial participation amount.

18. Employee benefits

Bonus plans

We have a performance related short term incentive (STI) bonus plans for our employees. Under these plans, the amounts depend on company and / or individual performance. Within ASML, the STI for these employees (excluding the Board of Management) can range between 0% and 112.5% of their annual base salary, depending on the job levels and on which plan they are included. The performance targets are set for a whole year. The STI over 2019 is accrued for in the Consolidated Balance Sheets as part of the accrued and other liabilities as of December 31, 2019 and is expected to be paid in the first quarter of 2020.

STI expenses for the Board of Management and other employees were as follows:

	Year ended December 31 (in millions)	2017 €	2018 €	2019 €
Board of Management ¹		3.8	4.5	5.1
Other employees ²		218.0	233.7	269.1
Total bonus expenses		221.8	238.2	274.2

1. Includes all members that served on the Board of Management throughout the year.

2. Includes all variations of available STI bonus plans of which employees are eligible.

Deferred compensation plans

In July 2002, we adopted a non-qualified deferred compensation plan for our US employees that allows a select group of management or highly compensated employees to defer a portion of their salary, bonus, and commissions. The plan allows us to credit additional amounts to the participants' account balances. The participants divide their funds among the investments available in the plan. Participants elect to receive their funds in future periods after the earlier of their employment termination or their withdrawal election, at least 3 years after deferral. Expenses were close to nil relating to this plan in 2019, 2018 and 2017. Cymer has a similar non-qualified deferred compensation plan for a selected group of management level employees in the US in which the employee may elect to defer receipt of current compensation in order to provide retirement and other benefits on behalf of such employee backed by Cymer owned life insurance policies.

As of December 31, 2019, our liability under deferred compensation plans was €56.6 million (2018: €46.8 million). The related compensation plan assets are €55.1 million (2018: €43.1 million).

Pension plans

Accounting policy

Contributions to defined contribution retirement benefit plans are recognized as an expense when employees have rendered service entitling them to the contributions. Payments made to state-managed retirement benefit schemes are dealt with as payments to defined contribution plans where our obligations under the plans are equivalent to those arising in a defined contribution retirement benefit plan. ASML accounts for its multi-employer defined benefit plan as if it were a defined contribution plan for the following reasons:

- ASML is affiliated to an industry-wide pension fund and uses the pension scheme in common with other participating companies.
- Under the regulations of the pension plan, the only obligation these participating companies have towards the pension fund is to pay the annual premium liability. Participating companies are under no obligation whatsoever to pay off any deficits the pension plan may incur. Nor have they any claim to any potential surpluses.

We maintain one multi-employer union plan and various other pension plans (based on defined contribution) covering substantially all of our employees. Our pension and retirement expenses for all employees for the years ended December 31, 2019, 2018 and 2017 were:

Year ended December 31 (in millions)	2017 €	2018 €	2019 €
Pension plan based on multi-employer union plan	62.4	74.0	96.6
Pension plans based on defined contribution	38.4	48.0	55.9
Pension and retirement expenses	100.8	122.0	152.5

In accordance with the collective bargaining agreements effective for the industry in which we operate, which has no expiration date, there are 12,572 eligible employees in the Netherlands that participate in a multi-employer union plan. Our net periodic pension cost for this multi-employer union plan for any period is the amount of the required employer contribution for that period.

This multi-employer union plan is managed by PME and covers approximately 1,400 companies and approximately 161,000 contributing members. Every company participating in the PME contributes a premium calculated as a percentage of its total pensionable salaries, with each company subject to the same contribution rate. Although the premium can fluctuate yearly based on the coverage ratio of the multi-employer union plan, for 2019 the contribution percentage is 22.7% (2018: 23.0%). The pension rights of each employee are based upon the employee's average salary during employment. For the year ended December 31, 2019, our contribution to this multi-employer union plan (including premiums paid by employees), was 11.7% (December 31, 2018: 9.6%) of the total contribution to the plan. For next year we expect to contribute around €175.0 million to this multi-employer union plan (including premiums paid by employees).

The plan monitors its risks on a global basis, not by participating company or employee, and is subject to regulation by Dutch governmental authorities. By law (the Dutch Pension Act), a multi-employer union plan must be monitored against specific criteria, including the coverage ratio of the plan's assets to its obligations. The coverage percentage is calculated by dividing the funds capital by the total sum of pension liabilities and is based on actual market interest rates. The coverage ratio as per December 31, 2019 is 98.7% (December 31, 2018: 101.3%) and is below the legally required minimum coverage ratio of 104%. PME has initiated a recovery plan to increase the coverage ratio to its legally required minimum level. Based on this plan it is estimated that the coverage ratio will increase to the legally required minimum coverage ratio as of 2028, which is within the legally required maximum recovery period of ten years. We have however no obligation to pay off any deficits the pension fund may incur, nor do we have any claim to any potential surpluses.

We also participate in several other defined contribution pension plans (outside the Netherlands), with our expenses for these plans equaling the employer contributions made in the relevant period.

19. Personnel expenses and employee information

Personnel expenses for all payroll employees were as follows:

Year ended December 31 (in millions)	2017 €	2018 €	2019 €
Wages and salaries	1,492.8	1,777.9	2,124.4
Social security expenses	119.6	146.3	181.9
Pension and retirement expenses	100.8	122.0	152.5
Share-based payments	53.1	46.3	74.6
Personnel expenses	1,766.3	2,092.5	2,533.4

The average number of payroll employees in FTEs during 2019, 2018 and 2017 was 22,192, 18,204 and 15,136, respectively.

The average number of payroll employees in FTEs in our operations in the Netherlands during 2019, 2018 and 2017 was 11,376, 8,597 and 7,211, respectively. Both increases in 2019 compared to 2018 and in 2018 compared to 2017 in payroll employees in FTEs were in line with our business growth. In 2019 this increase was also the result of converting more temporary employees to payroll employees.

The total number of payroll and temporary employees as of December 31 in FTEs per sector was:

As of December 31 (in FTE)	2017	2018	2019
Customer Support	5,051	5,674	5,953
Manufacturing and Supply Chain Management	4,909	5,779	5,933
Strategic Supply Management	203	267	326
General & Administrative	1,517	1,701	1,898
Sales and Mature Products and Services	184	559	624
Research & Development	7,352	9,267	10,166
Total	19,216	23,247	24,900
Less: Temporary employees	2,997	3,203	1,681
Payroll employees	16,219	20,044	23,219

20. Income taxes

Accounting Policy

The asset and liability method is used in accounting for income taxes. Under this method, deferred tax assets and liabilities are recognized for the tax effect of incurred net operating losses and for tax consequences attributable to differences between the balance sheet carrying amounts of existing assets and liabilities and their respective tax bases. If it is more likely than not that the carrying amounts of deferred tax assets will not be realized, a valuation allowance is recorded for the differences. Tax expense includes current taxes on profit as well as actual or potential withholding taxes on current and expected income from group companies.

Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in the Consolidated Statements of Operations in the period that includes the enactment date.

We assess uncertain tax positions based on a two-step process. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained on audit, including resolution of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon settlement. While we believe we have appropriate support for the positions taken on our tax returns, we regularly assess the potential outcomes of examinations by tax authorities in determining the adequacy of our provision for income taxes, and adjust the income tax provision, income taxes payable and deferred taxes in the period in which the facts that give rise to a revision become known.

The components of the provision for income taxes are as follows:

Year ended December 31 (in millions)	2017 ¹ €	2018 ¹ €	2019 €
Netherlands	2,076.6	2,602.0	2,441.2
Foreign	312.8	335.0	324.6
Income before taxes	2,389.4	2,937.0	2,765.8
Provision for income taxes current	(349.3)	(433.5)	(305.5)
Provision for income taxes deferred	61.9	9.7	74.8
Provision for income taxes Netherlands	(287.4)	(423.8)	(230.7)
Provision for income taxes current	(35.3)	(210.1)	(118.4)
Provision for income taxes deferred	16.6	282.3	157.4
Provision for income taxes Foreign	(18.7)	72.2	39.0
Total provision for income taxes current	(384.5)	(643.5)	(423.9)
Total provision for income taxes deferred	78.5	291.9	232.2
Provision for income taxes	(306.0)	(351.6)	(191.7)

1. In 2017 and 2018, Provision for income taxes deferred included the tax expense related to changes in the uncertain tax positions, which has been corrected into Provision for income taxes current. The impact is a reclassification for 2018 of €57.0 million from Provision from income taxes deferred to Provision from income taxes current, which is split €50.4 million from Netherlands and €6.6 million from Foreign. The impact is a reclassification for 2017 of €17.5 million from Provision from income taxes deferred to Provision from income taxes current, which includes €6.3 million from Netherlands and €11.2 million from Foreign. The reclassification does not have an impact on the Consolidated Statements of Operations, Consolidated Statements of Comprehensive Income, Consolidated Balance Sheets, Consolidated Statements of Shareholders' Equity or Consolidated Statements of Cash Flows.

The Dutch statutory tax rate was 25.0% in 2019, 2018 and 2017. Tax amounts in other jurisdictions are calculated at the rates prevailing in the relevant jurisdictions.

The reconciliation of the provision for income taxes is as follows:

Year ended December 31 (in millions)	2017 €	% ¹	2018 €	% ¹	2019 €	% ¹
Income before income taxes	2,389.4	100.0 %	2,937.0	100.0 %	2,765.8	100.0 %
Income tax provision based on ASML's domestic rate	(597.4)	25.0 %	(734.3)	25.0 %	(691.4)	25.0 %
Effects of tax rates in foreign jurisdictions	21.0	(0.9)%	15.4	(0.5)%	5.0	(0.2)%
Adjustments in respect of tax exempt income	24.0	(1.0)%	6.2	(0.2)%	7.2	(0.3)%
Adjustments in respect of tax incentives	263.1	(11.0)%	311.8	(10.6)%	351.0	(12.7)%
Adjustments in respect of prior years' current taxes	(38.3)	1.6 %	(1.2)	— %	46.7	(1.7)%
Adjustments in respect of prior years' deferred taxes	40.9	(1.7)%	3.3	(0.1)%	9.8	(0.4)%
Movements in the liability for unrecognized tax benefits	(17.4)	0.7 %	(57.2)	1.9 %	(16.9)	0.6 %
Tax effects in respect to HMI restructuring	—	— %	115.3	(3.9)%	89.8	(3.2)%
Change in valuation allowance	(11.9)	0.5 %	(28.5)	1.0 %	7.6	(0.3)%
Equity method investments	—	— %	(14.5)	0.5 %	(19.7)	0.7 %
Other (credits) and non tax deductible items	10.0	(0.4)%	32.1	(1.1)%	19.2	(0.7)%
Provision for income taxes	(306.0)	12.8 %	(351.6)	12.0 %	(191.7)	6.9 %

1. As a percentage of income before income taxes.

Income tax provision based on ASML's domestic rate

The provision for income taxes based on ASML's domestic rate is based on the Dutch statutory income tax rate. It reflects the provision for income taxes that would have been applicable assuming that all of our income is taxable against the Dutch statutory tax rate and there are no permanent differences between taxable base and financial results and no Dutch tax incentives are applied.

Effects of tax rates in foreign jurisdictions

A portion of our results is realized in countries other than the Netherlands where different tax rates are applicable. The effect can differ from year to year depending on the profit before tax in foreign jurisdictions.

Adjustments in respect of tax exempt income

In certain jurisdictions part of the income generated is tax exempted. The higher effect in 2019 compared to 2018 is caused by a small increasing level of income reported at the level of ASML Hong Kong.

Adjustments in respect of tax incentives

Adjustments in respect of tax incentives mainly relates to a reduced tax rate as a result of application of the Dutch Innovation Box. The Innovation box is a facility under Dutch corporate tax law pursuant to which qualified income associated with R&D is subject to an effective tax rate of 7.0%. The innovation box benefit is determined according to Dutch laws and published tax policy, the application of which has been confirmed in an agreement among ASML and the Dutch tax authorities, which agreement applies for the years 2017 through 2023 assuming facts and circumstances do not change.

Furthermore this category includes the benefit of US Tax Reform through the Foreign Derived Intangible Income (FDII) deduction at the level of our US group companies. The FDII deduction is a facility under US corporate tax law which reduces the effective tax rate on qualifying income. The higher effect in 2019 compared to 2018 is mainly caused by an increase in the FDII deduction in the US.

Adjustments in respect of prior years' current taxes

The movements in the adjustments in respect of prior years' current taxes relate to differences between the initially estimated income taxes and final corporate income tax returns filed, which to a main extent are offset with corresponding adjustments in prior years' deferred taxes (movement in temporary differences). Other main driver for the 2019 movement is an increase in the FDII deduction as taken into account in our 2018 tax filing in the US.

Adjustments in respect of prior years' deferred taxes

The movements in the adjustments in respect of prior years' deferred taxes once again relate to differences between the initially estimated income taxes and final corporate income tax returns filed. Hereby the 2017 movement is explained by an agreement with the Dutch tax authorities to amortize certain IP over their useful life time rather than in the year of acquisition, which is mirrored in the adjustment in respect of 2017 prior years' current taxes. The 2019 movement is mainly driven by the capitalization of R&D expenses for tax purposes in the US, which is mirrored by an adjustment in prior years' current taxes.

Movements in the liability for unrecognized tax benefits

In 2019, similar to prior years 2018 and 2017, the effective tax rate was impacted by movements in the liability for unrecognized tax benefits.

Tax effects in respect to HMI restructuring

The 2019 and 2018 tax effects are driven by an internal restructuring of our HMI group companies. As a result of this internal restructuring the deferred tax liabilities on intangible assets that were initially included in the business combination accounting for HMI have been released during 2018. Furthermore a deferred tax asset has been recognized in 2019 for book to tax differences on intangible fixed assets transferred as part of the internal restructuring.

Change in valuation allowance

The higher effect in 2019 compared to 2018 is mainly caused by a release of a valuation allowance as initially recorded for tax credits at the level our group companies in the US.

Equity method investments

This line includes the income tax expense relating to our equity investment in Carl Zeiss SMT Holding GmbH & Co. KG. The higher effect in 2019 compared to 2018 is mainly caused by an increase of the profit before tax of the equity investment.

Other credits and non-tax deductible items

Other credits and non-tax deductible items reflect the impact on our statutory rates of permanent non-tax deductible items such as non-deductible interest expense, and non-deductible meals and entertainment expenses, as well as the impact of various tax credits on our provision for income taxes.

US Tax Reform

The 2017, 2018 and 2019 year-end tax positions calculated also reflect the regulations of US Tax Reform, thereby taking into account the most recent guidance issued by US government. In regard to GILTI and BEAT, an election has been made to treat this as a period permanent item.

Income taxes recognized directly in shareholders' equity

Income taxes recognized directly in shareholders' equity (including OCI) are as follows:

Income tax recognized in shareholders' equity (in millions)	2017 €	2018 €	2019 €
Current tax			
OCI (financial instruments)	(2.3)	(1.4)	(1.0)
Tax benefit from share-based payments	—	—	—
Deferred tax			
OCI (equity method investments)	—	(0.9)	(6.1)
Total income tax recognized in shareholders' equity	(2.3)	(2.3)	(7.1)

Liability for unrecognized tax benefits and deferred taxes

The liability for unrecognized tax benefits (including accrued interest and penalties) and total deferred tax position recorded on the Consolidated Balance Sheets is as follows:

	As of December 31 (in millions)	2018 €	2019 €
Liability for unrecognized tax benefits		(208.7)	(227.1)
Deferred tax position		193.8	438.0
Deferred and other tax assets (liabilities)		(14.9)	210.9

Liability for unrecognized tax benefits

We have operations in multiple jurisdictions, where we are subject to the application of complex tax laws. Application of these complex tax laws may lead to uncertainties on tax positions. We aim to resolve these uncertainties in discussions with the tax authorities. We reserve for unrecognized tax benefits in line with the requirements of ASC 740, which requires us to estimate the potential outcome of any uncertain tax position. Our estimate for the potential outcome of any uncertain tax position is highly judgmental. We believe that we have adequately provided for uncertain tax positions. However, settlement of these uncertain tax positions in a manner inconsistent with our expectations could have a material impact on our Consolidated Financial Statements.

Consistent with the requirements of ASC 740, as of December 31, 2019, the liability for unrecognized tax benefits including interest and penalties amounts to €227.1 million (2018: €208.7 million) which is classified as Deferred and other tax liabilities. If recognized, these tax benefits would affect our effective tax rate for approximately equal amounts.

Expected interest and penalties related to income tax liabilities have been accrued for and are included in the liability for unrecognized tax benefits and in the provision for income taxes. The balance of accrued interest and penalties recorded in the Consolidated Balance Sheets as of December 31, 2019 amounts to €76.6 million (2018: €68.5 million). Accrued interest and penalties recorded in the Consolidated Statements of Operations of 2019 amount to €9.0 million (2018: €32.6 million; 2017: €4.2 million).

A reconciliation of the beginning and ending balance of the liability for unrecognized tax benefits (excluding interest and penalties) is as follows:

	As of December 31 (in millions)	2018 €	2019 €
Balance, January 1		(113.9)	(140.4)
Gross increases – tax positions in prior period		(27.4)	(21.3)
Gross decreases – tax positions in prior period		10.3	2.2
Gross increases – tax positions in current period		(21.9)	(18.9)
Acquisitions through business combinations		—	—
Settlements		—	—
Lapse of statute of limitations		13.9	28.7
Effect of changes in exchange rates		(1.4)	(1.0)
Total liability for unrecognized tax benefits		(140.4)	(150.7)

We conclude our allowances for tax contingencies to be appropriate. Based on the information currently available, we estimate that the liability for unrecognized tax benefits will decrease by €34.0 million (excluding interest and penalties) within the next 12 months, mainly as a result of expiration of statute of limitations.

We file income tax returns with the Dutch tax authority, the U.S. federal government, various U.S. states, and various foreign jurisdictions throughout the world. Our Dutch tax returns are open to examination for the years 2014 to 2019. In addition our U.S. federal and state tax returns remain open to examination for the years 2015 through 2019. We are routinely subject to examinations and audits from tax and other authorities in the various jurisdictions in which we operate, including the US and the Netherlands. We are currently subject to an audit by Korean tax and customs authorities, the outcome of which we cannot predict at this time. We believe that adequate amounts of taxes and related interest and penalties have been provided for, and any adjustments as a result of examinations are not expected to have a material adverse effect.

Deferred taxes

The composition of total deferred tax assets and liabilities reconciled to the classification in the Consolidated Balance Sheets is as follows:

Deferred taxes (in millions)	January 1, 2019 €	Other €	Consolidated Statements of Operations €	Effect of changes in exchange rates €	Income tax recognized in shareholders' equity €	December 31, 2019 €
Deferred tax assets:						
Capitalized R&D expenditures	1.7	—	189.0	2.2	—	192.9
R&D & other credits	70.5	—	(11.1)	1.4	—	60.8
Inventories	52.9	—	(0.2)	(3.4)	—	49.3
Deferred revenue	150.3	—	(92.4)	(1.1)	—	56.8
Accrued and other liabilities	40.5	—	31.4	1.5	—	73.4
Installation and warranty reserve	13.3	—	(1.3)	0.3	—	12.3
Tax effect carry-forward losses	8.5	—	3.4	0.6	—	12.5
Property, plant and equipment	19.4	—	9.0	4.4	—	32.8
Lease liabilities	—	—	8.1	—	—	8.1
Intangible fixed assets	48.7	—	81.1	—	—	129.8
Restructuring and impairment	—	—	—	—	—	—
Alternative minimum tax credits	—	—	—	—	—	—
Share-based payments	7.7	—	0.6	0.2	—	8.5
Other temporary differences	21.7	—	(5.4)	(2.1)	6.1	20.3
Total deferred tax assets, gross	435.2	—	212.2	4.0	6.1	657.5
Valuation allowance ¹	(79.2)	—	7.6	(2.0)	—	(73.6)
Total deferred tax assets, net	356.0	—	219.8	2.0	6.1	583.9
Deferred tax liabilities:						
Intangible fixed assets	(119.8)	—	17.9	(2.3)	—	(104.2)
Goodwill	—	—	(6.6)	—	—	(6.6)
Right-of-use assets	—	—	(8.1)	—	—	(8.1)
Property, plant and equipment	(25.7)	—	9.8	0.6	—	(15.3)
Deferred revenue	(0.1)	—	(13.0)	—	—	(13.1)
Borrowing costs long-term debt	(1.5)	—	—	—	—	(1.5)
Other temporary differences	(15.1)	7.4	12.4	(1.8)	—	2.9
Total deferred tax liabilities	(162.2)	7.4	12.4	(3.5)	—	(145.9)
Net deferred tax assets (liabilities)	193.8	7.4	232.2	(1.5)	6.1	438.0
Classified as:						
Deferred tax assets – non-current	236.3					445.3
Deferred tax liabilities – non-current	(42.5)					(7.3)
Net deferred tax assets (liabilities)	193.8					438.0

1. The valuation allowance disclosed above relates to R&D credits and Tax effect carry-forward losses that may not be realized.

Deferred taxes (in millions)	January 1, 2018 €	Effects of changes in accounting principles €	Consolidated Statements of Operations €	Effect of changes in exchange rates €	Income tax recognized in shareholders' equity €	December 31, 2018 €
Deferred tax assets:						
Capitalized R&D expenditures	3.2	—	(1.6)	0.1	—	1.7
R&D & other credits	44.1	—	25.2	1.2	—	70.5
Inventories	46.5	—	4.6	1.8	—	52.9
Deferred revenue	21.0	—	128.7	0.6	—	150.3
Accrued and other liabilities	42.7	—	(4.4)	2.2	—	40.5
Installation and warranty reserve	11.1	—	1.6	0.6	—	13.3
Tax effect carry-forward losses	5.7	—	2.8	—	—	8.5
Property, plant and equipment	9.2	8.2	1.8	0.2	—	19.4
Intangible fixed assets	—	51.7	(3.0)	—	—	48.7
Restructuring and impairment	—	—	—	—	—	—
Alternative minimum tax credits	4.5	—	(4.5)	—	—	—
Share-based payments	7.7	—	(0.3)	0.3	—	7.7
Other temporary differences	20.1	2.6	(2.3)	0.4	0.9	21.7
Total deferred tax assets, gross	215.8	62.5	148.6	7.4	0.9	435.2
Valuation allowance ¹	(49.5)	—	(28.5)	(1.2)	—	(79.2)
Total deferred tax assets, net	166.3	62.5	120.1	6.2	0.9	356.0
Deferred tax liabilities:						
Intangible fixed assets	(265.1)	—	149.7	(4.4)	—	(119.8)
Property, plant and equipment	(37.9)	—	13.3	(1.1)	—	(25.7)
Deferred revenue	(13.2)	—	13.1	—	—	(0.1)
Borrowing costs	(1.7)	—	0.2	—	—	(1.5)
Other temporary differences	(9.0)	—	(4.5)	(1.6)	—	(15.1)
Total deferred tax liabilities	(326.9)	—	171.8	(7.1)	—	(162.2)
Net deferred tax assets (liabilities)	(160.6)	62.5	291.9	(0.9)	0.9	193.8
Classified as:						
Deferred tax assets – non-current	31.7					236.3
Deferred tax liabilities – non-current	(192.3)					(42.5)
Net deferred tax assets (liabilities)	(160.6)					193.8

1. The valuation allowance disclosed above relates to R&D credits and Tax effect carry-forward losses that may not be realized.

Tax effect carry-forward losses and R&D credits

The deferred tax assets from carry-forward losses and R&D credits recognized as per December 31, 2019 are almost fully reserved. R&D credits for the amount of €40.0 million have no expiration date. The remaining R&D credits of €20.8 million have an expiration date between 2022 and 2034. The carry-forward losses of €106.4 million have an expiration date between 2021 and 2027.

Unrecognized Deferred Tax Liability Related to Investments in Foreign Subsidiaries

In general, it is our practice and intention to reinvest the earnings of our non-Dutch subsidiaries in those operations and distribute only when necessary or opportune by law. The tax implications of distributions by such non-Dutch subsidiaries are dependent on local tax and accounting regulations applying at the moment of actual distribution. As these cannot practicably be determined as of December 31, 2019, no deferred tax liability has been recognized in respect of undistributed profit reserves of the foreign subsidiaries. As of December 31, 2019 the unrecognized temporary difference approximately amounts to €193.7 million.

21. Shareholders' equity

Share capital

ASML's authorized share capital amounts to €126.0 million and is divided into:

- 700,000,000 Cumulative Preference Shares with a nominal value of €0.09 each.
- 699,999,000 Ordinary Shares with a nominal value of €0.09 each.
- 9,000 Ordinary Shares B with a nominal value of €0.01 each.

As of December 31, 2019, 425,659,704 ordinary shares with a nominal value of €0.09 each were issued and fully paid up; this includes 419,810,706 outstanding shares and 5,848,998 treasury shares. As of December 31, 2018, 431,465,767 ordinary shares with a nominal value of €0.09 each were issued and fully paid up; this includes 421,097,729 outstanding shares and 10,368,038 treasury shares. As of December 31, 2017, 431,464,705 ordinary shares with a nominal value of €0.09 each were issued and fully paid up; this includes 427,393,592 outstanding shares and 4,071,113 treasury shares. No ordinary shares B and no cumulative preference shares have been issued.

Our Board of Management has the power to issue ordinary shares and cumulative preference shares insofar as the Board of Management has been authorized to do so by the General Meeting. The Board of Management requires approval of the Supervisory Board for such an issue. The authorization by the General Meeting can only be granted for a certain period not exceeding 5 years and may be extended for no longer than 5 years on each occasion. If the General Meeting has not authorized the Board of Management to issue shares, the General Meeting will be authorized to issue shares on the Board of Management's proposal, provided that the Supervisory Board has approved such proposal.

Ordinary shares

An ordinary share entitles the holder thereof to cast nine votes at the General Meeting. Each ordinary share consists of 900 fractional shares. Fractional shares entitle the holder thereof to a fractional dividend, but do not entitle the holder thereof to voting rights. Only those persons who hold shares directly in the share register in the Netherlands, held by us at our address at 5504 DR Veldhoven, de Run 6501, the Netherlands, or in the New York share register, held by JP Morgan Chase Bank, N.A., P.O. Box 64506, St. Paul, MN 55164-0506, United States, can hold fractional shares. Those who hold ordinary shares through the deposit system under the Dutch Securities Bank Giro Transactions Act ('Wet giraal effectenverkeer'; the Giro Act) maintained by the Dutch central securities depository Euroclear Nederland or through the Depository Trust Company cannot hold fractional shares. At our 2019 AGM, the Board of Management was authorized from April 24, 2019 through October 24, 2020, subject to the approval of the Supervisory Board, to issue shares and / or rights thereto representing up to a maximum of 5.0% of our issued share capital at April 24, 2019, plus an additional 5.0% of our issued share capital at April 24, 2019 that may be issued in connection with mergers, acquisitions and / or (strategic) alliances. Incremental costs directly attributable to the issuance of new shares or options are shown in equity as a deduction, net of income taxes, from the proceeds.

Holders of ASML's ordinary shares have a preemptive right, in proportion to the aggregate nominal amount of the ordinary shares held by them. This preemptive right may be restricted or excluded. Holders of ordinary shares do not have preemptive right with respect to any ordinary shares issued for consideration other than cash or ordinary shares issued to employees. If authorized for this purpose by the General Meeting, the Board of Management has the power, subject to approval of the Supervisory Board, to restrict or exclude the preemptive rights of holders of ordinary shares. At our 2019 AGM, our shareholders authorized the Board of Management through October 24, 2020, subject to approval of the Supervisory Board, to restrict or exclude preemptive rights with respect to holders of ordinary shares up to a maximum of 10.0% of our issued share capital.

We may repurchase our issued ordinary shares at any time, subject to compliance with the requirements of Dutch law and our Articles of Association. Any such repurchases are and remain subject to the approval of the Supervisory Board and the authorization by the General Meeting, which authorization may not be for more than 18 months. At the 2019 AGM, the Board of Management has been authorized, subject to Supervisory Board approval, to repurchase through October 24, 2020, up to a maximum of two times 10.0% of our issued share capital at April 24, 2019, at a price between the nominal value of the ordinary shares purchased and 110.0% of the market price of these securities on Euronext Amsterdam or NASDAQ.

Ordinary shares B

Our Articles of Association provide for 9,000 ordinary shares B with a nominal value of €0.01. Each ordinary share B entitles the holder thereof to cast one vote at the General Meeting. No ordinary shares B have been issued.

Cumulative preference shares

In 1998, we granted the Preference Share Option to the Foundation. This option was amended and extended in 2003 and 2007. A third amendment to the option agreement between the Foundation and ASML became effective on January 1, 2009, to clarify the procedure for the repurchase and cancellation of the preference shares when issued.

The nominal value of the cumulative preference shares amounts to €0.09 and the number of cumulative preference shares included in the authorized share capital is 700,000,000. A cumulative preference share entitles the holder thereof to cast nine votes in the General Meeting.

The Foundation may exercise the Preference Share Option in situations where, in the opinion of the Board of Directors of the Foundation, ASML's interests, ASML's business or the interests of ASML's stakeholders are at stake. This may be the case if a public bid for ASML's shares has been announced or has been made, or the justified expectation exists that such a bid will be made without any agreement having been reached in relation to such a bid with ASML. The same may apply if one shareholder, or more shareholders acting in concert, acquire or hold a substantial percentage of ASML's issued ordinary shares without making an offer to acquire all outstanding shares or if, in the opinion of the Board of Directors of the Foundation, the (attempted) exercise of the voting rights by one shareholder or more shareholders, acting in concert, is materially in conflict with ASML's interests, ASML's business or ASML's stakeholders.

The objectives of the Foundation are to look after the interests of ASML and of the enterprises maintained by ASML and of the companies which are affiliated in a group with ASML, in such a way that the interests of ASML, of those enterprises and of all parties concerned are safeguarded in the best possible way, and influences in conflict with these interests which might affect the independence or the identity of ASML and those companies are deterred to the best of the Foundation's ability, and everything related to the above or possibly conducive thereto. The Foundation seeks to realize its objects by the acquiring and holding of cumulative preference shares in the capital of ASML and by exercising the rights attached to these shares, particularly the voting rights attached to these shares.

The Preference Share Option gives the Foundation the right to acquire a number of cumulative preference shares as the Foundation will require, provided that the aggregate nominal value of such number of cumulative preference shares shall not exceed the aggregate nominal value of the ordinary shares that have been issued at the time of exercise of the Preference Share Option for a subscription price equal to their nominal value. Only one-fourth of the subscription price would be payable at the time of initial issuance of the cumulative preference shares, with the other three-fourths of the nominal value only being payable when we call up this amount. Exercise of the Preference Share Option could effectively dilute the voting power of the outstanding ordinary shares by one-half.

Cancellation and repayment of the issued cumulative preference shares by ASML requires the authorization by the General Meeting of a proposal to do so by the Board of Management approved by the Supervisory Board. If the Preference Share Option is exercised and as a result cumulative preference shares are issued, ASML, at the request of the Foundation, will initiate the repurchase or cancellation of all cumulative preference shares held by the Foundation. In that case ASML is obliged to effect the repurchase and cancellation respectively as soon as possible. A cancellation will result in a repayment of the amount paid and exemption from the obligation to pay up on the cumulative preference shares. A repurchase of the cumulative preference shares can only take place when such shares are fully paid up.

If the Foundation does not request ASML to repurchase or cancel all cumulative preference shares held by the Foundation within 20 months after issuance of these shares, we will be obliged to convene a General Meeting in order to decide on a repurchase or cancellation of these shares.

The Foundation is independent of ASML. The Board of Directors of the Foundation comprises four independent members from the Netherlands' business and academic communities. The current members of the Foundation's Board of Directors are: Mr A.P.M. van der Poel, Mr S. Perrick, Mr J.M. de Jong and Mr A.H. Lundqvist.

Dividend policy

ASML aims to distribute a dividend that will be growing over time, paid semi-annually. On an annual basis, the Board of Management, upon prior approval from the Supervisory Board, submits a proposal to the AGM with respect to the amount of dividend to be declared with respect to the prior year, taking into account any interim dividend distributions. The dividend proposal and amount of share buybacks in any given year will be subject to the availability of distributable profits, retained earnings and cash, and may be affected by, among other factors, the Board of Management'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 for acquisition opportunities that may arise from time to time, and by future changes in applicable income tax and corporate laws. We may also suspend buyback programs from time to time, which would reduce the amount of cash we are able to return to shareholders. Accordingly, the Board of Management may decide to propose not to pay a dividend or pay a lower dividend and may suspend, adjust the amount of or discontinue share buyback programs or we may otherwise fail to complete buyback programs. For 2019, the proposal to declare a final dividend of €1.35 per ordinary share of €0.09 nominal value will be submitted to the 2020 AGM.

Supported by our long-term business plan, we will submit a proposal at the 2020 Annual General Meeting to declare a total dividend for 2019 of €2.40 per ordinary share. Recognizing the interim dividend of €1.05 per share paid November 15, 2019, this leads to a final dividend of €1.35 per share. The total dividend for 2018 was €2.10 per share.

Dividends on ordinary shares are payable out of net income or retained earnings as shown in our Financial Statements as adopted by our AGM, after payment first of (accumulated) dividends out of net income on any issued cumulative preference shares.

Purchase of equity securities

In addition to dividend payments, we intend to return cash to our shareholders on a regular basis through share buybacks or capital repayment, subject to our actual and anticipated level of liquidity requirements and other relevant factors.

On January 17, 2018, we announced a share buyback program amounting to €2.5 billion, to be executed within the 2018-2019 time frame. The shares to be repurchased under this program were intended to be canceled, with the exception of up to 2.4 million shares, which would be used to cover employee share plans.

In 2018, we repurchased 2,400,000 shares to cover employee share plans and 4,644,389 shares for cancellation for a total consideration of €1,146.2 million. No shares were canceled in 2018.

In January 2019, 5,806,366 ordinary shares were canceled, of which 3,468,737 shares were repurchased under the 2016-2017 program. In 2019, we repurchased 1,948,808 shares for cancellation for a total consideration of 410.0 million. The total number of repurchased shares under the 2018-2019 program was 8,993,197 shares for a total amount of €1,556.1 million and therefore the 2018-2019 program was not completed for the full amount.

The remainder of the shares bought back under the 2018-2019 program is intended to be canceled in 2020, with the exception of up to 2.4 million shares, which were used to cover employee share plans. The share buyback program may be suspended, modified or discontinued at any time.

The following table provides a summary of shares repurchased by ASML in 2019:

Period	Total number of shares purchased	Average price paid per Share (€)	Total number of shares purchased as part of publicly announced plans or programs	Maximum value of shares that may yet be purchased under the program (€ millions)
January 24 - 31, 2019	47,400	151.63	47,400	1,346.7
February 1 - 28, 2019	145,001	160.67	192,401	1,323.4
March 1 - 31, 2019	150,956	163.68	343,357	1,298.7
April 1 - 30, 2019	83,791	176.71	427,148	1,283.9
May 1 - 31, 2019	—	—	427,148	1,283.9
June 1 - 30, 2019	—	—	427,148	1,283.9
July 1 - 31, 2019	145,094	204.60	572,242	1,254.2
August 1 - 31, 2019	336,141	194.30	908,383	1,188.9
September 1 - 30, 2019	284,335	219.26	1,192,718	1,126.5
October 1 - 31, 2019	293,486	230.89	1,486,204	1,058.8
November 1 - 30, 2019	274,093	244.52	1,760,297	991.7
December 1 - 20, 2019	188,511	253.95	1,948,808	943.9
Total	1,948,808	210.38		

22. Net income per ordinary share

Basic net income per ordinary share is calculated by:

- Dividing net income by the weighted average number of ordinary shares outstanding for that period;

The dilutive effect is calculated using the treasury stock method by:

- Dividing net income by the weighted average number of ordinary shares outstanding for that period plus shares applicable to options and conditional shares

Excluded from the diluted weighted average number of shares outstanding calculation are cumulative preference shares contingently issuable to the preference share foundation, since they represent a different class of stock than the ordinary shares.

The basic and diluted net income per ordinary share has been calculated as follows:

Year ended December 31 (in millions, except per share data)	2017 €	2018 €	2019 €
Net income	2,066.7	2,591.6	2,592.3
Weighted average number of shares outstanding	429.8	424.9	420.8
Basic net income per ordinary share	4.81	6.10	6.16
Weighted average number of shares outstanding	429.8	424.9	420.8
Plus shares applicable to Options and conditional shares	1.8	1.5	0.9
Dilutive potential ordinary shares	1.8	1.5	0.9
Diluted weighted average number of shares	431.6	426.4	421.6
Diluted net income per ordinary share ¹	4.79	6.08	6.15

1. The calculation of diluted net income per ordinary share assumes the exercise of options issued under our stock option plans and the issuance of shares under our share plans for periods in which exercises or issuances would have a dilutive effect. The calculation of diluted net income per ordinary share does not assume exercise of options when exercise would be anti-dilutive.

23. Vulnerability due to certain concentrations

We rely on outside vendors for components and subassemblies used in our systems including the design thereof, each of which is obtained from a single supplier or a limited number of suppliers. Our reliance on a limited group of suppliers involves several risks, including a potential inability to obtain an adequate supply of required components, reduced control over pricing and the risk of untimely delivery of these components and subassemblies.

Carl Zeiss SMT GmbH, in which ASML owns an indirect interest of 24.9%, is our single supplier, and we are their single customer, of Optical Columns for lithography systems. Carl Zeiss SMT GmbH is capable of developing and producing these items only in limited numbers and only through the use of manufacturing and testing facilities in Oberkochen and Wetzlar, Germany.

In 2019, 28.3% of our aggregate cost of system sales was purchased from Carl Zeiss SMT GmbH (2018: 28.3%; 2017: 26.6%).

Our relationship with Carl Zeiss AG is structured as a strategic alliance pursuant to several agreements executed in 1997 and subsequent years. These agreements define a framework in all areas of our business relationship. The partnership between ASML and Carl Zeiss AG is run under the principle of 'two companies, one business' and is focused on continuous improvement of operational excellence. Pursuant to these agreements, ASML and Carl Zeiss AG have agreed to continue their strategic alliance until either party provides at least three years notice of its intent to terminate.

A constraint in the production could result in limited availability of Optical Columns. During 2019, our production was not limited by the deliveries from Carl Zeiss SMT GmbH.

For further information on the relationship between ASML and Carl Zeiss SMT GmbH, see Note 9 Equity method investments and Note 25 Related party transactions.

24. Financial risk management

Risk management program

We are exposed to certain financial risks such as foreign currency risk, interest rate risk, credit risk, liquidity risk and capital risk. Our overall risk management program focuses on the unpredictability of financial markets and seeks to minimize potentially adverse effects on our financial performance. Our risk management program focuses appropriately on the current environment of uncertainty in the financial markets.

A key element within our risk management program is our long held conservative financing policy, which is based on three foundational elements:

- **Liquidity:** Maintain financial stability with a target to keep our Cash & cash equivalents, together with Short-term investments, above a minimum range of €2.0 to €2.5 billion
- **Capital structure:** Maintain a capital structure that targets a solid investment grade credit rating
- **Cash return:** Provide a sustainable dividend per share that will grow over time, paid semi-annually, while returning structural excess cash to shareholders on a regular basis through share buybacks or capital repayment

We use derivative financial instruments to hedge certain risk exposures. None of these transactions are entered into for trading or speculative purposes. We believe that market information is the most reliable and transparent measure for our derivative financial instruments that are measured at fair value.

Foreign currency risk management

We are exposed to currency risks. Our Financial Statements are expressed in euros. Accordingly, our results of operations are exposed to fluctuations in exchange rates between the euro and such other currencies, and 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 Korean won and the Taiwanese dollar 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, yen, US dollar or Taiwanese dollar.

Foreign currency sensitivity

We are mainly exposed to fluctuations in exchange rates between the euro and the US dollar, the euro and Taiwanese dollar and the euro and the Japanese yen. The following table details our sensitivity to a 10.0% strengthening of foreign currencies against the euro. The sensitivity analysis includes foreign currency denominated monetary items outstanding and adjusts their translation at the period end for a 10.0% strengthening in foreign currency rates. A positive amount indicates an increase in net income or equity, as shown.

The following table represent the foreign currency sensitivity on net income and equity:

(in millions)	2018		2019	
	Impact on net income €	Impact on equity €	Impact on net income €	Impact on equity €
US dollar	(8.7)	28.2	(11.5)	30.2
Japanese yen	(1.7)	(4.0)	4.2	(0.9)
Taiwanese dollar	(6.5)	(12.7)	(6.2)	—
Other currencies	(5.9)	—	(4.0)	—
Total	(22.8)	11.5	(17.5)	29.3

It is our policy to limit the effects of currency exchange rate fluctuations on our Consolidated Statements of Operations. The decreased effect on net income in 2019 compared with 2018 reflects our lower net exposure to currencies other than the euro at year-end 2019. The negative effect on net income as presented in the table above for 2019 is mainly attributable to timing differences between the arising and hedging of exposures.

The effects of the fair value movements of cash flow hedges, entered into for US dollar and Japanese yen transactions are recognized in equity. The US dollar and Japanese yen effect on equity in 2019 compared with 2018 is the result of an increase in outstanding purchase hedges and decrease in outstanding sales hedges.

The effects of the fair value movements of net investment hedges, entered into for Taiwanese dollar transactions are recognized in equity in 2018. This effect is offset by the translation adjustment on the net investment also recorded in equity. This offset is not included in the table above.

For a 10.0% weakening of the foreign currencies against the euro, there would be approximately an equal but opposite effect on net income and equity.

Foreign currency risk policy

It is our policy to hedge material transaction exposures, such as forecasted sales and purchase transactions, and material net remeasurement exposures, such as accounts receivable and payable. We hedge these exposures through the use of foreign exchange contracts.

Foreign exchange contracts

The notional principal amounts of the outstanding forward foreign exchange contracts in the main currencies US dollar, Japanese yen and Taiwanese dollar at December 31, 2019 are USD 219.5 million, JPY 8.6 billion and TWD 3.8 billion (2018: USD 348.6 million, JPY 6.0 billion and TWD 8.8 billion).

The hedged highly probable forecasted transactions denominated in foreign currency are expected to occur at various dates during the coming 12 months. Gains and losses recognized in OCI on forward foreign exchange contracts included in a hedge relationship will be recognized in the Consolidated Statements of Operations in the period during which the hedged forecasted transactions affect the Consolidated Statements of Operations.

In 2019, we recognized a net amount of €10.7 million gain (2018: €11.8 million loss; 2017: €3.1 million gain) in the Consolidated Statements of Operations resulting from effective cash flow hedges for forecasted sales and purchase transactions that occurred in the year. Furthermore, we recognized a net amount of €12.0 million loss in the Consolidated Statements of Operations resulting from derivative financial instruments measured at fair value through profit or loss (2018: €24.2 million gain; 2017: €126.4 million gain), which is almost fully offset by the revaluation of the hedged monetary items.

As of December 31, 2019, accumulated OCI includes €2.1 million representing the total anticipated gain to be released to cost of sales (2018: gain €10.9 million and 2017: loss €12.5 million) (net of taxes: 2019: gain €1.8 million; 2018: gain €9.7 million; 2017: loss €11.2 million), which will offset the euro equivalent of foreign currency denominated forecasted purchase transactions. All amounts are expected to be released over the next 12 months. As of December 31, 2019, accumulated OCI includes loss €1.2 million (2018: loss €1.4 million; 2017: nil), representing the total anticipated gain to be released to sales. The effectiveness of all contracts for which we apply hedge accounting is monitored on a quarterly basis throughout the life of the hedges. During 2019, 2018 and 2017, no ineffective hedge relationships were recognized.

As of December 31, 2019, €0.0 million (2018: loss €11.9 million) representing the effective portion of hedges on net investments was recognized in accumulated OCI.

Interest rate risk management

We have interest-bearing assets and liabilities that expose us to fluctuations in market interest rates. We use interest rate swaps to align the interest-typical terms of interest-bearing liabilities with the interest-typical terms of interest-bearing assets. There may be residual interest rate risk to the extent the asset and liability positions do not fully offset.

Interest rate sensitivity

The sensitivity analysis below has been determined based on the exposure to interest rates for both derivative financial and non-derivative financial instruments at the balance sheet date with the stipulated change taking place at the beginning of the financial year and held constant throughout the reporting period. The table below shows the effect of a 1.0 percentage point increase in interest rates on our net income and equity. A positive amount indicates an increase in net income and equity.

The following table represent the interest rate sensitivity on net income and equity:

(in millions)	2018		2019	
	Impact on net income €	Impact on equity €	Impact on net income €	Impact on equity €
Effect of a 1.0% point increase in interest rates	10.3	—	17.2	—

The positive effect on net income mainly relates to our total amount of cash and cash equivalents and short-term investments being higher than our total floating debt position.

For a 1.0 percentage point decrease in interest rates there would be approximately an equal but opposite effect on net income and equity.

Hedging policy interest rates

As part of our hedging policy, we use interest rate swaps to hedge changes in fair value of our Eurobonds due to changes in market interest rates, thereby offsetting the variability of future interest receipts on part of our cash and cash equivalents. During 2019, these hedges were highly effective in hedging the fair value exposure to interest rate movements. The changes in fair value of the Eurobonds were included in the Consolidated Statements of Operations in the same period as the changes in the fair value of the interest rate swaps.

Furthermore, as part of our hedging policy, we use interest rate swaps to hedge the variability of future interest cash flows relating to certain of our operating lease obligations. In June 2018, these interest rate swaps matured together with the related operating lease obligation. Over the lifetime of the hedge relationship the hedge was highly effective in hedging the cash flow exposure to interest rate movements.

Interest rate swaps

The notional principal amount of the outstanding interest rate swap contracts as of December 31, 2019 was €3.0 billion (2018: €3.0 billion).

Credit risk management

Financial instruments that potentially subject us to significant concentration of credit risk consist principally of cash and cash equivalents, short-term investments, derivative financial instruments used for hedging activities, accounts receivable and finance receivables and prepayments to suppliers.

Cash and cash equivalents, short-term investments and derivative financial instruments contain an element of risk of the counterparties being unable to meet their obligations. Our risk management program focuses appropriately on the current environment of uncertainty in the financial markets. We invest our cash and cash equivalents and short-term investments in short-term deposits with financial institutions that have investment grade credit ratings and in money market and other investment funds that invest in high-rated debt securities. To mitigate the risk that our counterparties in hedging transactions are unable to meet their obligations, we enter into transactions with a limited number of major financial institutions that have investment grade credit ratings and closely monitor their creditworthiness. Concentration risk is mitigated by limiting the exposure to each of the individual counterparties.

Our customers consist of IC manufacturers located throughout the world. We perform ongoing credit evaluations of our customers' financial condition. We mitigate credit risk through additional measures, including the use of down payments, letters of credit, and contractual ownership retention provisions. Retention of ownership enables us to recover the systems in the event a customer defaults on payment.

Liquidity risk management

Our principal sources of liquidity consist of Cash and cash equivalents, Short-term investments and available credit facilities with a target to keep our Cash & cash equivalents, together with Short-term investments, above a minimum range of €2.0 to €2.5 billion. In addition, we may from time to time raise additional funding in debt and equity markets. We seek to ensure that our principal sources of liquidity will be sufficient to satisfy our liquidity requirements at all times.

Our liquidity needs are affected by many factors, some of which are based on the normal on-going operations of the business, and others that relate to the uncertainties of the global economy and the semiconductor industry. Although our cash requirements fluctuate based on the timing and extent of these factors, we believe that cash generated from operations, together with our other sources of liquidity are sufficient to satisfy our current requirements, including our expected capital expenditures and debt servicing.

We invest our cash and cash equivalents and short-term investments in short-term deposits with financial institutions that have investment grade credit ratings and in money market and other investment funds that invest in high-rated short and medium-term debt securities. Our investments are mainly denominated in euros and to some extent in US dollars and Taiwanese dollars.

We intend to return cash to our shareholders on a regular basis in the form of dividend payments and, subject to our actual and anticipated liquidity requirements and other relevant factors, share buybacks or capital repayments.

Capital risk management

Our objectives when managing our capital structure are to safeguard our ability to satisfy our capital providers by maintaining a capital structure that ensures liquidity and supports a solid investment grade credit rating. The capital structure includes both debt and the components of equity, in accordance with both US GAAP and IFRS. The capital structure is mainly altered by, among other things, adjusting the amount of dividends paid to shareholders, the amount of share buybacks or capital repayment, and any changes in the level of debt. Our capital structure is formally reviewed with the Supervisory Board each year in connection with our updated long term financial plan and relevant scenarios. The outcome of this year's review confirmed to maintain our historical financing policy in relation to our capital structure.

Our current credit rating from Moody's is A3 (stable) and from Fitch is A- (stable), which is consistent with the credit ratings as of December 31, 2018.

Financial instruments

Accounting Policy

Derivative financial instruments and hedging activities

We use derivative financial instruments for the management of foreign currency risks and interest rate risks. We measure all derivative financial instruments based on fair values derived from market prices of the instruments. We adopt hedge accounting for hedges that are highly effective in offsetting the identified hedged risks taking into account required effectiveness criteria.

Derivatives are initially recognized at fair value on the date a derivative contract is entered into and subsequently remeasured. The method of recognizing the resulting gain or loss depends on whether the derivative is designated as a hedging instrument, and if so, the nature of the item being hedged. We designate derivatives as one of the following:

- A hedge of an exposure relating to changes in the fair value of a recognized asset or liability, that is attributable to a particular risk (fair value hedge).*
- A hedge of an exposure relating to the variability in the cash flows of a recognized asset or liability, or of a forecasted transaction, that is attributable to a particular risk (cash flow hedge).*
- A hedge of the foreign currency exposure relating to a net investment in a foreign operation (net investment hedge).*

We document at the inception of the transaction the relationship between hedging instruments and hedged items, as well as our risk management objectives and strategy for undertaking various hedging transactions. We also document, both at hedge inception and on an ongoing basis, whether derivatives that are used in hedging transactions are highly effective in offsetting changes in fair values or cash flows of hedged items. The cash flows resulting from the derivative financial instruments are classified in the Consolidated Statements of Cash Flows according to the nature of the hedged item.

Fair value hedge

Changes in the fair value of a derivative financial instrument, that is designated and qualified as a fair value hedge, along with the gain or loss on the hedged asset or liability that is attributable to the hedged risk, are recorded in the Consolidated Statements of Operations.

Hedge accounting is discontinued when we revoke the hedging relationship, the hedging instrument expires or is sold, terminated or exercised, or no longer qualifies for hedge accounting. The adjustment to the carrying amount of the hedged item arising from the hedged risk is amortized to the Consolidated Statements of Operations from that date.

Interest rate swaps that are being used to hedge the fair value of fixed loan coupons payable are designated as fair value hedges. The change in fair value is intended to offset the change in the fair value of the underlying fixed loan coupons, which is recorded accordingly. The gain or loss relating to the ineffective portion of interest rate swaps hedging fixed loan coupons payable is recognized in the Consolidated Statements of Operations as interest and other, net.

Cash flow hedge

Changes in the fair value of a derivative that is designated and qualified as a cash flow hedge are recorded in OCI, net of taxes, until the underlying hedged transaction is recognized in the Consolidated Statements of Operations. In the event that the underlying hedge transaction will not occur within the specified time period, the gain or loss on the related cash flow hedge is released from OCI and included in the Consolidated Statements of Operations, unless extenuating circumstances exist that are related to the nature of the forecasted transaction and are outside our control or influence and which cause the forecasted transaction to be probable of occurring on a date that is beyond the specified time period.

Foreign currency hedging instruments that are being used to hedge cash flows related to forecasted sales or purchase transactions in non-functional currencies are designated as cash flow hedges. The gain or loss relating to the ineffective portion of the foreign currency hedging instruments is recognized in the Consolidated Statements of Operations in net sales or cost of sales.

Fair values of the derivatives

The following table summarizes the notional amounts and estimated fair values of our derivative financial instruments:

As of December 31 (in millions)	2018		2019	
	Notional amount €	Fair Value €	Notional amount €	Fair Value €
Forward foreign exchange contracts	134.1	(2.0)	142.6	(0.7)
Interest rate swaps	3,000.0	56.5	3,000.0	134.3

The following table summarizes our derivative financial instruments per category:

As of December 31 (in millions)	2018		2019	
	Assets €	Liabilities €	Assets €	Liabilities €
Interest rate swaps — cash flow hedges	—	—	—	—
Interest rate swaps — fair value hedges	88.5	32.0	134.3	—
Forward foreign exchange contracts — cash flow hedges	6.5	0.9	2.4	0.6
Forward foreign exchange contracts — net investment hedge	—	2.6	—	—
Forward foreign exchange contracts — no hedge accounting	6.9	11.9	0.8	3.3
Total	101.9	47.4	137.5	3.9
Less non-current portion:				
Interest rate swaps — fair value hedges	59.7	32.0	103.0	—
Total non-current portion	59.7	32.0	103.0	—
Total current portion	42.2	15.4	34.5	3.9

The fair value part of a hedging derivative financial instrument that has a remaining term of 12 months or less after balance sheet date is classified as current asset or liability. When the fair value part of a hedging derivative has a term of more than 12 months after balance sheet date, it is classified as non-current asset or liability. The current portion of derivative financial instruments is included in other current assets and current accrued and other liabilities in the Consolidated Balance Sheets. The non-current portion of derivative financial instruments is included in other non-current assets and non-current accrued and other liabilities in the Consolidated Balance Sheets.

Fair value measurements

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement hierarchy prioritizes the inputs to valuation techniques used to measure fair value as follows:

- Level 1: Valuations based on inputs such as quoted prices for identical assets or liabilities in active markets that the entity has the ability to access.
- Level 2: Valuations based on inputs other than level 1 inputs such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable data for substantially the full term of the assets or liabilities.
- Level 3: Valuations based on inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

The fair value hierarchy gives the highest priority to quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). A financial instrument's fair value classification is based on the lowest level of any input that is significant in the fair value measurement hierarchy.

Financial assets and financial liabilities measured at fair value on a recurring basis

Investments in money market funds (as part of our cash and cash equivalents) have fair value measurements which are all based on quoted prices for identical assets or liabilities.

Our short-term investments consist of deposits with original maturities to the entity holding the investments longer than 3 months and less than one year at the date of acquisition with financial institutions that have investment grade credit ratings. The fair value of the deposits is determined with reference to quoted market prices in an active market for similar assets or discounted cash flow analysis.

The principal market in which we execute our derivative contracts is the institutional market in an over-the-counter environment with a high level of price transparency. The market participants usually are large commercial banks. The valuation inputs for our derivative contracts are based on quoted prices and quoting pricing intervals from public data sources; they do not involve management judgment.

The valuation technique used to determine the fair value of forward foreign exchange contracts (used for hedging purposes) approximates the net present value technique which is the estimated amount that a bank would receive or pay to terminate the forward foreign exchange contracts at the reporting date, taking into account current interest rates and current exchange rates.

The valuation technique used to determine the fair value of interest rate swaps (used for hedging purposes) is the net present value technique, which is the estimated amount that a bank would receive or pay to terminate the swap agreements at the reporting date, taking into account current interest rates.

Our Eurobonds serve as hedged items in fair value hedge relationships in which we hedge the variability of changes in the fair value of our Eurobonds due to changes in market interest rates with interest rate swaps. The fair value changes of these interest rate swaps are recorded on the Consolidated Balance Sheets under derivative financial instruments (within other current and non-current assets and other current and non-current liabilities) and the carrying amounts of the Eurobonds are adjusted for the effective portion of these fair value changes only. For the actual aggregate carrying amount and the fair value of our Eurobonds, see Note 15 Long-term debt and interest and other costs.

The following tables present our financial assets and financial liabilities that are measured at fair value on a recurring basis:

As of December 31, 2019 (in millions)	Level 1 €	Level 2 €	Level 3 €	Total €
Assets measured at fair value				
Derivative financial instruments ¹	—	137.5	—	137.5
Money market funds ²	2,139.7	—	—	2,139.7
Short-term investments ³	—	1,185.8	—	1,185.8
Total	2,139.7	1,323.3	—	3,463.0
Liabilities measured at fair value				
Derivative financial instruments ¹	—	3.9	—	3.9
Assets and Liabilities for which fair values are disclosed				
Long-term debt ⁴	3,247.7	—	—	3,247.7

1. Derivative financial instruments consist of forward foreign exchange contracts and interest rate swaps.
2. Money market funds are part of our cash and cash equivalents. See Note 4 Cash and cash equivalents and short-term investments.
3. Short-term investments consist of deposits with original maturities to the entity holding the investments longer than three months, but less than one year at the date of acquisition. See Note 4 Cash and cash equivalents and short-term investments.
4. Long-term debt relates to Eurobonds. See Note 15 Long-term debt and interest and other costs.

As of December 31, 2018 (in millions)	Level 1 €	Level 2 €	Level 3 €	Total €
Assets measured at fair value				
Derivative financial instruments ¹	—	101.9	—	101.9
Money market funds ²	2,342.6	—	—	2,342.6
Short-term investments ³	—	913.3	—	913.3
Total	2,342.6	1,015.2	—	3,357.8
Liabilities measured at fair value				
Derivative financial instruments ¹	—	47.4	—	47.4
Assets and Liabilities for which fair values are disclosed				
Long-term debt ⁴	3,119.4	—	—	3,119.4

1. Derivative financial instruments consist of forward foreign exchange contracts and interest rate swaps.
2. Money market funds are part of our cash and cash equivalents. See Note 4 Cash and cash equivalents and short-term investments.
3. Short-term investments consist of deposits with original maturities to the entity holding the investments longer than three months, but less than one year at the date of acquisition. See Note 4 Cash and cash equivalents and short-term investments.
4. Long-term debt relates to Eurobonds. See Note 15 Long-term debt and interest and other costs.

There were no transfers between levels during the years ended December 31, 2019 and December 31, 2018.

Financial assets and financial liabilities that are not measured at fair value

The carrying amount of cash and cash equivalents, accounts payable, and other current financial assets and liabilities approximate their fair value because of the short-term nature of these instruments.

Money market and investment funds measurement

The money market and investment funds qualify as available for sale securities. The fair value is close to the carrying value due to short term nature and since related to investment with investment grade credit ratings. Allowances for credit losses and total unrealized gains and losses are close to nil. These money market funds can be called on a daily basis. Investments in money market funds are managed on a daily basis based triggered through excess cash balances. Realized gain and losses on these money market funds are close to nil given low interest rates and high credit ratings. Costs of securities were close to nil. ASML does not have trading securities as of December 31, 2019.

Deposits measurement

The deposits as part of the short term investments and cash and cash equivalents qualify as securities held to maturity. The amortized cost value is close to the fair value and carrying value due to short term nature and since related to investment with investment grade credit ratings. Allowance for credit losses and total unrealized gains and losses are close to nil. Maturities are shorter than one year. No held to maturity securities were sold before expiration date.

Assets and liabilities measured at fair value on a non-recurring basis

In 2018 and 2019, we had no significant fair value measurements on a non-recurring basis. We did not recognize any impairment charges for goodwill and other intangible assets during 2018 and 2019. See Note 10 Goodwill and Note 11 Other intangible assets, net for more information.

25. Related party transactions

On June 29, 2017, we acquired of a 24.9% interest in Carl Zeiss SMT Holding GmbH & Co. KG, which owns 100% of the shares in Carl Zeiss SMT GmbH, to strengthen the long-standing and successful partnership and to facilitate the development of the future generation of EUV lithography systems. Based on the 24.9% investment and our relationship with Carl Zeiss SMT GmbH being our single supplier of optical columns essential to our chip-making systems, Carl Zeiss SMT Holding GmbH & Co. KG and its subsidiaries are considered related parties of ASML as of June 29, 2017.

On November 3, 2016 we agreed with Carl Zeiss SMT GmbH to support their R&D costs, capital expenditures and supply chain investments, in respect of High NA, for an amount initially estimated at €760.0 million. The current estimate as of December 31, 2019 is €1,242.2 million (2018: €1,229.9 million). As of December 31, 2019 our estimated remaining commitment to Carl Zeiss SMT GmbH is €524.8 million (2018: €795.3 million).

The table below summarizes support provided to Carl Zeiss SMT GmbH, by type:

For the year ended	2017	2018	2019
(in millions)	€	€	€
Capital expenditures	89.1	191.8	184.1
R&D costs	55.8	74.8	94.2
Supply chain investments	2.6	8.5	4.5
Total support provided	147.5	275.1	282.8

From time to time, ASML makes non-interest bearing advance payments to Carl Zeiss SMT GmbH supporting their work-in-process, thereby securing lens and optical column deliveries to us. Amounts included in these advance payments are settled through future lens or optical column deliveries. The increase in this balance is due to our continued growth within our EUV business, as well as the support provided under the High-NA agreement. For more details, see Note 9 Equity method investments.

In 2018, ASML and Carl Zeiss SMT GmbH entered into an agreement for ASML to support the development and integration of certain tooling to be used in future production of High NA optical columns, for which Carl Zeiss SMT GmbH has agreed to reimburse all costs to ASML. Receivable amounts from Carl Zeiss SMT GmbH are presented within Other Assets.

The total purchases and outstanding balances with Carl Zeiss SMT Holding GmbH & Co. KG and its subsidiaries:

Year ended December 31	2017	2018	2019
(in millions)	€	€	€
Total purchases	1,141.6	1,401.0	1,502.3

As of December 31	2018	2019
(in millions)	€	€
Advance payments and High-NA capital expenditure support	768.1	814.5
Right-of-use assets - Finance	—	107.6
Accounts payable	60.2	127.4

For more details in relation to our 24.9% interest in Carl Zeiss SMT Holding GmbH & Co. KG see Note 9 Equity method investments.

There have been no transactions during our most recent fiscal year, and there are currently no transactions, between ASML or any of its subsidiaries, and any other significant shareholder, and any director or officer or any relative or spouse thereof other than ordinary course (compensation) arrangements. During our most recent fiscal year, there has been no, and at present there is no, outstanding indebtedness to ASML owed by or owing to any director or officer of ASML or any associate thereof, other than the virtual financing arrangement with respect to shares described under Note 18 Employee benefits. Furthermore, ASML has not granted any personal loans, guarantees, or the like to members of the Board of Management or Supervisory Board.

26. Subsequent events

Subsequent events were evaluated up to February 11, 2020, which is the date the Financial Statements included in this Integrated Report were approved. There are no events to report.

Veldhoven, the Netherlands

February 11, 2020

/s/ Peter T.F.M. Wennink

Peter T.F.M. Wennink

President, CEO and member of the Board of Management

/s/ Roger J.M. Dassen

Roger J.M. Dassen

Executive Vice President, CFO and member of the Board of Management

Non-financial statements

Assurance Report of the Independent Auditor

To the Shareholders and the Supervisory Board of ASML Holding N.V.:

Our conclusion

We have reviewed the non-financial information of the 'Integrated report 2019' of ASML Holding N.V. (hereafter: the Company), in accordance with U.S. generally accepted accounting principles (hereafter: the integrated report). This engagement is aimed to obtain a limited level of assurance.

Based on our procedures performed, nothing has come to our attention that causes us to believe that the sustainability information is not prepared, in all material respects, in accordance with the reporting criteria as included in the section 'reporting criteria'.

The non-financial information consists of: 2019 at a glance (page 5 to 8), Who we are and what we do (pages 9-20), What we achieved in 2019 (pages 21-61), How we manage risk (pages 74-90) and the Non-financial statements (pages 184-201).

Basis for our conclusion

We have performed our review on the non-financial information in accordance with Dutch law, including Dutch Standard 3810N: "Assurance engagements relating to sustainability reports", which is a specified Dutch standard that is based on the International Standard on Assurance Engagements (ISAE) 3000A: "Assurance Engagements other than Audits or Reviews of Historical Financial Information (Attestation engagements)".

Our responsibilities under this standard are further described in the section 'Our responsibilities for the review of the non-financial information' below.

We are independent of ASML Holding N.V. in accordance with the 'Verordening inzake de onafhankelijkheid van accountants bij assurance-opdrachten' (ViO, Code of Ethics for Professional Accountants, a regulation with respect to independence) and other relevant independence regulations in the Netherlands. Furthermore, we have complied with the 'Verordening gedrags- en beroepsregels accountants' (VGBA, Dutch Code of Ethics).

We believe that the assurance evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Reporting criteria

The non-financial information needs to be read and understood together with the reporting criteria. The Company is solely responsible for selecting and applying these reporting criteria, taking into account applicable law and regulations related to reporting.

The reporting criteria used for the preparation of the sustainability information are the Sustainability Reporting Standards of the Global Reporting Initiative (GRI) and the applied supplemental reporting criteria as disclosed in section 'About the non-financial Information' of the integrated report.

Scope of the group review

ASML Holding N.V. is the parent company of a group of entities. The non-financial information incorporates the consolidated information of this group of entities to the extent as specified in 'About the non-financial Information' in the integrated report.

Our procedures consisted of both procedures at ASML group level and at local entity level. Our selection of entities in scope of our procedures is primarily based on the entity's individual contribution to the consolidated information.

By performing our procedures at local entity level, together with additional procedures at group level, we have been able to obtain sufficient and appropriate assurance evidence about the group's reported information to provide a conclusion about the non-financial information.

Limitations to the scope of our review

The non-financial information includes prospective information such as ambitions, strategy, plans, expectations and estimates. Inherently the actual future results are uncertain. We do not provide any assurance on the assumptions and achievability of prospective information in the non-financial information.

The references to external sources or websites in the non-financial information are not part of the non-financial information itself as reviewed by us. We therefore do not provide assurance on this information.

Consistency with other non-financial information included in other parts of the integrated report

In addition to the non-financial information and our assurance report thereon, the integrated report contains other non-financial information.

Based on the following procedures performed, we conclude that the other information is consistent with the non-financial information reviewed and does not contain material misstatements.

We have read the other information. Based on our knowledge and understanding obtained through our review of the non-financial Information, we have considered whether the other information in the integrated report contains material misstatements.

The scope of the procedures performed is substantially less than the scope of those performed in our review of the non-financial Information.

Board of Management's responsibilities

The Board of Management of the Company is responsible for the preparation of the non-financial information in accordance with the reporting criteria as included in the section 'Reporting criteria', including the identification of stakeholders and the definition of material matters. The choices made by the Board of Management regarding the scope of the non-financial information and the reporting policy are summarized in chapter 'About the non-financial Information' of the integrated report.

The Board of Management is also responsible for such internal control as it determines is necessary to enable the preparation of the non-financial information that is free from material misstatement, whether due to fraud or error.

Auditor's responsibilities

Our responsibility is to plan and perform the assurance engagement in a manner that allows us to obtain sufficient and appropriate assurance evidence for our conclusion.

Procedures performed in an assurance engagement to obtain a limited level of assurance are aimed at determining the plausibility of information and are less extensive than a reasonable assurance engagement. The level of assurance obtained in review engagements is therefore substantially less than the level of assurance would have been obtained had a reasonable assurance engagement been performed.

Misstatements can arise from fraud or errors and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of users taken on the basis of the non-financial Information. The materiality affects the nature, timing and extent of our review procedures and the evaluation of the effect of identified misstatements on our conclusion.

We apply the 'Nadere voorschriften Kwaliteitssystemen' (NVKS, Regulations for quality management systems) and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have exercised professional judgement and have maintained professional scepticism throughout the review, in accordance with the Dutch Standard 3810N, ethical requirements and independence requirements.

Our review engagement included:

- Performing an analysis of the external environment and obtaining an understanding of relevant social themes and issues, and the characteristics of the organization;
- Evaluating the consistent application of the reporting criteria, including the evaluation of the results of the stakeholders' dialogue and the plausibility of estimates made by management and related disclosures in the non-financial Information;
- Obtaining an understanding of the reporting processes for the sustainability information, including obtaining a general understanding of internal controls relevant to our review;
- Identifying areas of the sustainability information with a higher risk of misleading or unbalanced information or material misstatements, whether due to fraud or error. Designing and performing further assurance procedures aimed at determining the plausibility of the sustainability information responsive to this risk analysis. These procedures included among others:
 - Interviewing relevant staff at corporate level responsible for the corporate social responsibility strategy and policy;
 - Interviews with relevant staff responsible for providing the information in the non-financial Information, carrying out internal control procedures on the data and consolidating the data in the non-financial Information;
 - Obtaining assurance information that the sustainability information reconciles with underlying records of the company;
 - Reviewing, on a limited test basis, relevant internal and external documentation;
 - Analytical reviews of the data and trends submitted for consolidation at corporate level.
- Evaluating the presentation, structure and content of the sustainability information;
- To consider whether the sustainability information as a whole, including the disclosures, reflects the purpose of the reporting criteria used.

We communicate with the Supervisory Board regarding, among other matters, the planned scope and timing of the review and significant findings, including any significant findings in internal control that we identify during our review.

Rotterdam, February 11, 2020

KPMG Accountants N.V.

J. van Delden RA

About the non-financial information

Reporting scope

The content disclosed in this Integrated Report¹ is based on the material topics identified for both ASML and our stakeholders by the comprehensive materiality assessment conducted in 2018. As part of the materiality assessment, we asked internal and external stakeholders to identify where in the value chain the theme has an impact (see table in section What we achieved in 2019 - Materiality: assessing our impact, where we include the boundaries as required by the GRI Standards). For more information on the materiality assessment process, see What we achieved in 2019 - Materiality: assessing our impact.

The materiality assessment was used as input for the new sustainability strategy setting for the period 2019-2025. New (key) performance indicators have been determined to report on our performance in the area of sustainability. No comparative results for 2017 and 2018 are shown for new indicators not previously disclosed.

The Reporting scope table (see next page) clarifies the scope of the data reported per theme and explains where the scope of the data provided differs from the scope of the report's content.

This Integrated Report generally covers the performance of ASML from January 1, 2019 to December 31, 2019. Please see Who we are and what we do - Our company for significant changes regarding the size, structure, or ownership of the organization or its supply chain.

The financial performance information in this report is derived from our Financial Statements that are in accordance with US GAAP. The reporting basis for the information in this report on our performance in the area of sustainability is prepared in accordance with the GRI Sustainability Reporting Standards and is presented in accordance with the 'core' option. Details of our compliance with the GRI standards (GRI content index) can be found in a separate Reporting Supplement available on the Website. We have also included disclosures required as part of the EU Directive on disclosure of non-financial information and diversity information, which was implemented in 2017 and is decreed as part of the Dutch Civil Code.

Reporting process

Each theme has an owner who is responsible for the theme ambition, strategy and relevant performance indicators, as well as the timely delivery of content and relevant data for reporting and monitoring the execution of the strategy. The data is reviewed and consolidated by Finance. Finance is also responsible for the reporting and planning process for the Integrated Report.

Reporting indicators

The Consolidated Financial Statements included in this report are audited. Please see Consolidated Financial Statements - Report of Independent Registered Public Accounting Firm.

The non-financial data disclosed in this report is derived from various sources. The nature of certain data and the different data processes within our operating subsidiaries, means that some data is subject to a degree of uncertainty caused by limitations in measuring and estimating data. We continue to work on improving our sustainability control environment and data collection processes.

Scope 3 emissions

One of our reporting indicators is scope 3 emissions. See What we achieved in 2019 - Our operations - CO₂ emissions. The calculation of the scope 3 emissions was done by a third party using a quantitative assessment based on 2018 data. The emissions reported are in line with the Greenhouse Gas (GHG) Protocol and are calculated for nine categories, as described in the Scope 3 Accounting and Reporting Standard issued by GHG Protocol, which are deemed relevant to us and our value chain. The categories are: Cat.1 Purchased goods and services, Cat.2 Capital goods, Cat.3 Fuel- and energy- related activities, Cat.4 and Cat.9 Upstream / Downstream transportation & distribution, Cat.5 Waste generated in operations, Cat.6 Business travel, Cat.7 Employee commuting, Cat.11 Use of sold products, and Cat.12 End-of-life treatment of sold products. The remaining five categories are deemed irrelevant or immaterial to ASML and our value chain. Therefore we exclude these categories from our Scope 3 emissions assessment.

The applied emission factors used to calculate our value chain carbon footprint are from the latest DEFRA (UK Department for Environment, Food & Rural Affairs) 2018 emission factors.

Data reliability: The basis for the calculation method applied for scope 3, Cat.1 Purchased goods and services is based on spend. As a result, it relies on expenditure-based emission factors, which is an indirect measure of GHG intensity of goods and services. In addition, we have gathered actual emissions data from our suppliers for Cat.4 Upstream transportation & distribution and Cat.6 Business travel, which accounts for around 5% of total Scope 3 emissions.

1. We publish two versions of the Integrated Report: one version containing Financial Statements based on US GAAP and one version containing Financial Statements based on EU-IFRS.

	Reported data scope			Applicable to a subset of the reporting scope (where relevant) or where indicators do not fit the reporting scope		Exceptions
	ASML world-wide	ASML world-wide excluding HMI	ASML worldwide excluding Cymer Light Sources & HMI	ASML main manufacturing locations (Veldhoven, Linkou, Wilton and San Diego)	ASML products	
Technology and Innovation ecosystem						
Innovation	<input checked="" type="checkbox"/>					
Investments in R&D partners			<input checked="" type="checkbox"/>			
Product safety					<input checked="" type="checkbox"/>	
Supporting Start-ups and Scale-ups	<input type="checkbox"/>					Scope of indicators is ASML Netherlands only.
Customer Intimacy	<input checked="" type="checkbox"/>					The survey scope is largest and most strategic customers (and industry customers (only for VLSI)).
Our people						
Employee Engagement	<input checked="" type="checkbox"/>					The indicator 'Absenteeism' is excluding Cymer and HMI. The scope for 'Number of scholarships' is ASML Netherlands only The scope for indicator Open positions filled by internal candidates (in %) excludes ASML US.
Building a Strong Employer Brand	<input checked="" type="checkbox"/>					
Promoting Diversity and inclusion	<input checked="" type="checkbox"/>					
Employee Safety	<input checked="" type="checkbox"/>					
Labor relations and fair remuneration	<input checked="" type="checkbox"/>					
Community involvement	<input type="checkbox"/>					The scope is ASML The Netherlands for all, except for Time investment of volunteers (in hours) - Community Involvement and Total costs of volunteering, which is ASML worldwide excluding HMI.
Our supply chain						
Our Supply Chain			<input checked="" type="checkbox"/>			
Responsible Supply Chain			<input checked="" type="checkbox"/>			
Our operations						
Reduce Waste				<input checked="" type="checkbox"/>		
Lifetime Extension of Mature Products					<input checked="" type="checkbox"/>	
Energy efficiency of Products					<input checked="" type="checkbox"/>	
CO ₂ Emissions				<input checked="" type="checkbox"/>		
Water Management				<input type="checkbox"/>		Scope is all main manufacturing locations, except for Total Ultra-pure water consumption and Total water recycled and reused, which is Veldhoven only.
Governance						
Business ethics and compliance	<input checked="" type="checkbox"/>					
Financial performance indicators						
	<input checked="" type="checkbox"/>					

Scope covers all indicators - Scope contains exceptions for some indicators

Scope changes

Compared to the 2018 Integrated Report, the following scope changes have been made:

- Employee engagement: FTE's in sectors Manufacturing and Supply Chain Management, Customer Support and R&D are in scope for the calculation of the indicator Number of technical training hours per technical FTE. In 2018, the scope was limited to employees within Design & Engineering (D&E) which is part of the R&D sector.
- Employee engagement: Cymer and HMI are included in the scope of the following indicators:
 - Promotion rate of high performers
 - Attrition rate of high performers
 - Number of technical training hours per technical FTE
 - Number of non-product related training hours per FTE
- Fair remuneration: Cymer and HMI are included in the scope of the indicators.
- Employee safety: HMI is included in the scope of the indicators.

Reporting adjustments

One adjustment has been made to the non-financial information provided in the Integrated Report 2018:

- In 2019, we investigated our waste streams based on the definition of waste from the European Waste directive. Based on this investigation we concluded that some packaging material, which is taken back by one of our suppliers for recycling purposes, needs to be classified as waste generated by ASML. However, this waste stream was not included in the number reported for total waste generated in previous years. Therefore, we restated the number of total waste generated in 2018 as disclosed in this report. Unfortunately, it is not possible to restate the number for 2017, because the necessary information to determine the restatement cannot be delivered anymore by our waste supplier.

Verification of this report

As requested by our Board of Management, our non-financial information has been independently reviewed. Our external auditor (KPMG) was asked to provide this assurance. For KPMG's assurance report, including details of the work they carried out, see Non-financial statements - Assurance Report of the Independent Auditor.

Non-financial indicators

Please note that the non-financial Key Performance Indicators (KPIs) are reported in the different chapters of our sustainability reporting. See What we achieved in 2019. The other non-financial performance indicators (PIs) are reported in the tables below. No comparative results for 2017 and 2018 are shown for new indicators not previously disclosed.

Our people

Theme	Description	Total ASML			Asia			Europe			US		
Employee engagement	Number of FTEs (payroll and temporary)	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
	Payroll employees (in FTE)	16,219	20,044	23,219	4,291	5,305	5,664	7,872	9,950	12,393	4,056	4,789	5,162
	Female (in %)	14	16	16	15	16	16	14	16	16	15	16	17
	Male (in %)	86	84	84	85	84	84	86	84	84	85	84	83
	Temporary employees (in FTE) ¹	2,997	3,203	1,681	40	85	68	2,665	2,752	1,339	292	366	274
	Female (in %)	15	15	17	48	36	34	14	14	17	18	12	11
	Male (in %)	85	85	83	52	64	66	86	86	83	82	88	89
	Total ²	19,216	23,247	24,900	4,331	5,390	5,732	10,537	12,702	13,732	4,348	5,155	5,436
Employee engagement	Number of FTEs (by age group)	Total ASML			Asia			Europe			US		
		2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
	< 30	3,447	4,820	4,894	1,277	1,670	1,628	1,628	2,346	2,378	542	804	888
	30 - 50	12,216	14,338	15,606	2,912	3,556	3,902	7,060	8,197	8,924	2,244	2,584	2,780
	> 50	3,265	3,730	4,130	139	164	201	1,849	2,159	2,430	1,277	1,408	1,499
	Unknown ³	288	359	270	3	0	1	0	0	0	285	359	269
	Total	19,216	23,247	24,900	4,331	5,390	5,732	10,537	12,702	13,732	4,348	5,155	5,436
Employee engagement	Number of payroll FTEs (split in full-time and part-time)	Total ASML			Asia			Europe			US		
		2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
	Full-time payroll FTEs (by age group)												
	< 30	2,497	3,737	4,397	1,265	1,635	1,612	691	1,300	1,898	541	802	887
	30 - 50	9,921	11,831	13,567	2,888	3,506	3,856	4,796	5,747	6,937	2,237	2,578	2,774
	> 50	2,755	3,193	3,674	135	159	193	1,347	1,634	1,988	1,273	1,400	1,493
	Total	15,173	18,761	21,638	4,288	5,300	5,661	6,834	8,681	10,823	4,051	4,780	5,154
	Full-time payroll FTEs (by gender)												
	Female (in %)	13	14	15	15	16	16	10	13	14	15	16	17
	Male (in %)	87	86	85	85	84	84	90	87	86	85	84	83
	Part-time payroll FTEs (by age group)												
	< 30	26	33	41	0	1	0	26	32	41	0	0	0
	30 - 50	856	1,035	1,264	1	3	1	853	1,030	1,259	2	3	4
	> 50	164	214	276	2	2	2	159	207	270	3	6	4
	Total	1,046	1,283	1,581	3	5	3	1,038	1,269	1,570	5	9	8
	Part-time payroll FTEs (by gender)												
	Female (in %)	36	37	37	0	10	17	36	37	37	57	54	62
	Male (in %)	64	63	63	100	90	83	64	63	63	43	46	38

1. For US 2017, 36 gender unknown, as in the US temporary employees are not required to provide their gender. For US 2018 and 2019, 0 gender unknown.
2. Our employees work primarily in Manufacturing and Supply Chain Management, Customer Support and in R&D.
3. In the US, it is not mandatory to register the age for temporary employees.

Our people

Theme	Description	Total ASML			Asia			Europe			US		
Employee engagement	Employee attrition (in FTE)	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
	Number of involuntary employee attrition	179	153	177	46	35	40	70	69	80	63	49	57
	Number of voluntary employee attrition	472	679	761	157	232	198	112	176	257	203	271	306
	Total	651	832	938	203	267	238	182	245	337	266	320	363
	Gender												
	Female	129	151	196	40	45	55	39	48	72	50	58	69
	Male	522	681	742	163	222	183	143	197	265	216	262	294
	Total	651	832	938	203	267	238	182	245	337	266	320	363
	Age group												
	< 30	121	183	219	59	104	78	20	29	61	42	50	80
	30 - 50	383	478	519	138	149	144	112	158	198	133	171	177
	> 50	147	171	200	6	14	16	50	58	78	91	99	106
	Total	651	832	938	203	267	238	182	245	337	266	320	363

Our people

Theme	Description	Total ASML			Asia			Europe			US		
Employee engagement	Number of new hires payroll employees (in FTEs)	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
	Number of new hires	3,010	3,479	2,219	1,595	1,299	558	644	1,348	1,102	771	832	559
	Rate of new hires (in %)	19	17	10	37	24	10	8	14	9	19	17	11
	Gender												
	Female	592	746	542	295	234	123	140	332	280	157	180	139
	Male	2,418	2,733	1,677	1,300	1,065	435	504	1,016	822	614	652	420
	Total	3,010	3,479	2,219	1,595	1,299	558	644	1,348	1,102	771	832	559
	Age group												
	< 30	1,267	1,666	923	781	783	318	224	522	380	262	361	225
	30 - 50	1,574	1,636	1,136	794	508	233	394	750	643	386	378	260
	> 50	169	177	160	20	8	7	26	76	79	123	93	74
	Total	3,010	3,479	2,219	1,595	1,299	558	644	1,348	1,102	771	832	559

Our people

Theme	Description	2017	2018	2019	Comments
Employee engagement	Employee Attrition (in %)	4.4	4.7	4.3	
	Attrition rate of high performers (in %)	1.8	2.2	2.4	A high performer is an employee with the merit classification 'exceptional' or 'exceeds expectations' from the annual employee performance evaluation.
	Promotion rate - Overall (in %)	13	14	14	
	Promotion rate of high performers (in %)	37	40	38	
Employee engagement	Absenteeism (in %)				
	Asia ¹	0.4	0.3	0.4	
	Europe	2.4	2.5	2.6	
	US	1.4	1.5	1.6	

1. In some Asian countries sick leave is regarded as annual leave, hence illness-related absenteeism is recorded as 0%.

Our people

Theme	Description	2017	2018	2019	Comments
Employee engagement	Open positions filled by internal candidates (in %)	—	—	36	This is the worldwide average for Asia and Europe. US is excluded because the data is not yet available.
	Rotation ratio (in %)	—	—	18	
	Human Capital Return On Investment (ROI) ¹	—	—	2.1	This number shows the degree to which economic value is derived from profitability in relation to human capital costs.
Employee engagement	People Performance Management process completion (in %)	98	96	97	
	Development Action Plan completion (in %)	89	81	76	
Employee engagement	Number of scholarships	50	53	53	

1. Human Capital Return on Investment is calculated as total net sales minus total operating expenses excluding total employee salaries & benefits, divided by total employee salaries & benefits.

Our people

Theme	Description	2017	2018	2019	Comments
Employee engagement	Total training expenses (in million €)	—	—	19	Out-of-pocket expenses for technical and non-product related trainings.
	Average spent on training and development per FTE (€)	—	—	836	
Employee engagement	Number of total training hours per FTE				New indicator for 2019 reporting. Total training hours include technical- and non-product related training hours (including nomination courses).
	Female	—	—	41	
	Male	—	—	46	
	Total	—	—	45	
Employee engagement	Number of technical training hours per technical FTE ¹				The scope is extended for 2019 reporting to include all eligible sectors (Manufacturing and Supply Chain Management, Customer Support and R&D). For more information see About the Non-Financial Information.
	Female	23	44	35	
	Male	18	30	41	
	Total	18	31	40	
Employee engagement	Number of non-product related training hours per FTE				Excluding nomination courses (leadership development programs).
	Female	11	12	13	
	Male	9	8	8	
	Total	9	9	9	
Employee engagement	Nomination courses: Leadership Development Programs				
	Number of training hours	37,588	24,738	33,715	
	Number of employees attending (unique)	431	331	387	

1. The number of technical training hours per FTE is calculated as the total technical training hours divided by the total payroll FTEs working in technical departments within Operations and R&D.

Our people

Theme	Description	2017	2018	2019	Comments
Employee engagement	Engagement score We@ASML by gender				
	Female	—	—	75%	
	Male	—	—	77%	

Our people

Theme	Description	Gender			Age group			
Diversity & inclusion	Male/female in managerial positions and in Supervisory Board (in headcount) ¹	Female	Male	Total	< 30	30 - 50	>50	Total
	Supervisory Board	3	5	8	0	0	8	8
	Board of Management	0	6	6	0	1	5	6
	Senior Management	49	461	510	0	230	280	510
	Middle Management	268	2,117	2,385	1	1,520	864	2,385
	Junior Management	179	1,024	1,203	24	1,020	159	1,203
	Other	3,492	16,018	19,510	4,433	12,368	2,709	19,510
	Total	3,991	19,631	23,622	4,458	15,139	4,025	23,622

Theme	Description	Gender		
Diversity & inclusion	Male/female split by sector (in FTE)	Female	Male	Total
	Customer Support	624	5,329	5,953
	Manufacturing and Supply Chain Management	1,094	4,839	5,933
	Research & Development	1,416	8,750	10,166
	General & Administrative	759	1,139	1,898
	Sales and Mature Product Services	105	519	624
	Strategic Supply Management	87	239	326
	Total	4,085	20,815	24,900

1. Temporary employees are not included in the headcount numbers.

Our people

Theme	Description	2017	2018	2019	Comments
Diversity & inclusion	Workforce by gender male / female (in %)				
	Female	14	16	16	
	Male	86	84	84	
	Total	100	100	100	
Diversity & inclusion	Number of nationalities working for ASML				
	Asia	25	34	36	
	Europe	94	105	103	
	US	76	84	82	
	Total	115	123	118	
Diversity & inclusion	Foreign nationals working for ASML (in %) ¹				
	Asia	4	5	6	
	Europe	24	29	31	
	US	26	29	29	
	Total	20	24	25	

1. Foreign nationals working for ASML (in%) is the percentage of payroll and temporary employees with another nationality than the country in which the employee is working.

Our people

Theme	Description	2017	2018	2019	Comments
Labor relations	Percentage of employees covered by collective bargaining agreements	46%	48%	52%	
Fair remuneration	Ratio of base salary of women to men				
	Senior Management	106%	107%	103%	
	Middle Management	97%	99%	99%	
	Non-management	99%	100%	98%	
Fair remuneration	Ratio of total cash of women to men				
	Senior Management	—	—	102%	Total cash is base salary plus short-term incentive.
	Middle Management	96%	98%	98%	
	Non-Management	—	—	98%	
Fair remuneration	Internal pay ratio (CEO versus employee remuneration)	32	32	41	For more information, see Leadership and governance - Remuneration Report.
Community involvement	Number of students met	7,299	11,694	8,998	
	Time investment of volunteers (in hours) - Technology promotion and Campus promotion	4,533	5,257	5,445	
	Time investment of volunteers (in hours) - Community Involvement	4,545	5,434	7,664	
	Cash commitments - Charity (x €1,000)	749	700	705	
	Cash commitments - Sponsorship (x €1,000)	620	784	3,416	
	Total cost of volunteering (x €1,000)	—	—	772	

Our people

Theme	Description	2017	2018	2019	Comments
Employee safety	ASML recordable incident rate	0.26	0.24	0.28	
	Number of recordable incidents	45	49	66	
	Number of fatalities	0	0	0	
Employee safety	Number of recordable incidents by region:				
	Asia	—	—	12	
	Europe	—	—	26	
	US	—	—	28	
Employee safety	Number of first-aid incidents per body part affected:				
	Head	—	—	45	
	Eyes	—	—	4	
	Shoulder	—	—	4	
	Chest	—	—	2	
	Back	—	—	17	
	Arm	—	—	19	
	Hand	—	—	80	
	Leg	—	—	29	
	Foot	—	—	12	
	Other	—	—	29	
		Total	—	—	241
Employee safety	Number of first-aid incidents per region:				
	Asia	—	—	44	
	Europe	—	—	143	
	US	—	—	54	
	Total	—	—	241	
Employee safety	Number of near misses by region:				
	Asia	—	—	1,031	A near miss is an unplanned event which did not result in injury, illness, or damage, but had the potential to do so.
	Europe	—	—	1,498	
	US	—	—	718	
		Total	—	—	

Our supply chain

Theme	Description	2017	2018	2019	Comments
Responsible supply chain	RBA Code of Conduct compliance contract clause for LTSA suppliers (in %)	—	—	59%	
	Timely closure of sustainability gaps (in %) ¹	—	—	43%	
Responsible supply chain	Suppliers assessed on sustainability (in #) split by:				
	Audits	10	2	12	
	RBA Self-Assessment Questionnaire (SAQ)	—	—	29	
Responsible supply chain	Suppliers identified with overall risk level 'high' on all sustainability elements (in #)	—	—	0	The risk level is determined by means of the RBA SAQ, applied to major product-related suppliers.
Responsible supply chain	High sustainability risks identified (in #) split by sustainability elements:				See comment above.
	Ethics	—	—	3	
	Labor	—	—	3	
	Health and safety	—	—	0	
	Environment	—	—	1	
Responsible supply chain	Improvement plan in place for suppliers with high risk on one of the sustainability elements (in #)	—	—	1	See comment above.
Responsible supply chain	Percentage of suppliers identified as having significant actual and potential negative environmental impacts with which improvements were agreed upon.	—	—	100%	One high risk supplier was identified with potential negative environmental impacts. A follow-up plan is agreed with this supplier.
	Percentage of suppliers identified as having significant actual and potential negative social impacts with which improvements were agreed upon.	—	—	0%	Three high risk suppliers were identified with potential negative social impacts. We are engaging with the suppliers to develop plans for improvements.
	Percentage of suppliers identified as having significant actual and potential negative environmental impacts with which relationships were terminated .	—	—	0%	
	Percentage of suppliers identified as having significant actual and potential negative social impacts with which relationships were terminated .	—	—	0%	

1. This indicator measures whether improvement plans are closed before the due date agreed with the supplier. The improvement plans are initiated in prior or current reporting period(s) based on RBA SAQs or Audits.

Our supply chain

Theme	Description	2017	2018	2019	Comments
Our supply chain	Total number of suppliers	4,800	5,000	5,003	
Our supply chain	Number of suppliers, split by region:				
	Asia	—	1,400	1,356	
	EMEA (excl. Netherlands)	—	700	700	
	Netherlands	—	1,500	1,620	
	North-America	—	1,400	1,327	
	Total	—	5,000	5,003	
Our supply chain	Number of suppliers, split by:				
	Product related	—	—	790	
	Non-product related	—	—	4,213	
	Total	—	—	5,003	Only Tier 1 suppliers.
Our supply chain	Number of suppliers, split by:				
	Critical	—	—	221	Critical suppliers are suppliers of strategic importance.
	Non-critical	—	—	4,782	
	Total	—	—	5,003	
Our supply chain	Number of critical suppliers, split by:				
	Product related	—	—	198	
	Non-product related	—	—	23	
	Total	—	—	221	
Our supply chain	Number of suppliers in scope for risk management	—	—	212	

Our supply chain

Theme	Description	2017	2018	2019	Comments
Our supply chain	Total sourcing spend (in million €)	—	—	6,683	
Our supply chain	Sourcing spend per supplier group (in %)				
	Product related	—	—	66%	
	Non-product related	—	—	34%	
Our supply chain	Proportion of spending on local suppliers (in %) ¹				
	Veldhoven	—	44%	46%	A relatively large amount of the total supplier spend for Veldhoven relates to Carl Zeiss (non-local).
	Linkou	—	51%	46%	
	San Diego	—	93%	89%	
	Wilton	—	64%	66%	

1. We define 'local' as the country in which a significant location of operation is located. The significant locations of operations are the main manufacturing sites of ASML, which are located in Veldhoven, The Netherlands, in Linkou, Taiwan, in San Diego and in Wilton, both in the United States.

Our operations - Climate and Energy

Theme	Description	2017	2018	2019	Comments
Energy	Energy consumption (in TJ)	1,321	1,355	1,367	
	Energy savings worldwide through projects (in TJ) ¹	49	77	80	
Energy	Electricity purchased per location (in TJ)				
	Veldhoven	687	712	751	
	Wilton	97	102	102	
	Linkou	37	37	36	
	San Diego	158	177	162	
	Total	979	1,028	1,051	
Energy	Fossil fuels consumed from non-renewable sources (in TJ) ²				Fossil fuels consumed consists of only natural gas.
	Veldhoven	—	—	159	
	Wilton	—	—	111	
	Linkou	—	—	0	
	San Diego	—	—	46	
	Total	—	—	316	
	Fossil fuels consumed from renewable sources (in TJ)	—	—	0	
Energy efficiency of products	System energy efficiency NXT				
	System	NXT: 2000i	—	—	No new NXT system was introduced in 2018 and 2019. Therefore there are no measurements in these years.
	Throughput	275	—	—	
	Measured energy efficiency (kWh / wafer pass) ³	0.51	—	—	See comment above.
CO ₂ Emissions	Emission intensity ⁴	—	—	0.01	
CO ₂ Emissions	Type of Energy Attribute Certificates (in TJ)				
	Guarantee of Origins (GOs)	—	—	751	
	Renewable Energy Certificates (RECs)	—	—	264	
CO ₂ Emissions	Type of Energy Attribute Certificates (in kton)				
	Guarantee of Origins (GOs)	—	—	116	
	Renewable Energy Certificates (RECs)	—	—	21	

- In 2016 we started a master-plan period with a target to achieve 111 TJ energy savings by the end of 2020. The savings reported are cumulated compared to base year 2015. The savings are realized by projects resulting in improved technical installation or by projects resulting in an improved production process. Types of energy included in savings: fuel and electricity.
- The sources of the conversion factors used are the Dutch Emissions Authority and the US Energy Information Administration.
- System energy efficiency is measured according to the SEMI S23 standard, and scaled to 100% availability of our systems. The measurement for the NXT:2000i excludes the laser.
- Emission intensity is calculated as gross scope 1 and scope 2 emissions (in kton) divided by total revenue (in millions).

Our operations - Circular economy

Theme	Description	2017 ³	2018 ³	2019	Comments
Waste	Total waste generated (in 1,000 kg)				
	Waste from operations	—	—	4,927	
	Construction waste ¹	—	—	608	
	Total	3,935	5,292	5,535	
Waste	Total hazardous waste (in 1,000 kg) ²				
	Recycling	—	—	336	
	Recovery, including energy recovery	—	—	9	
	Incineration (mass burn)	—	—	15	
	Landfill	—	—	2	
	Total	333	347	362	
Waste	Total non-hazardous waste (in 1,000 kg) ²				
	Recycling	—	—	3,618	
	Recovery, including energy recovery	—	—	567	
	Incineration (mass burn)	—	—	37	
	Landfill	—	—	343	
	Total	3,602	4,945	4,565	
Waste	Total construction waste (in 1,000 kg) ^{1,2}				
	Recycling	—	—	578	
	Recovery, including energy recovery	—	—	20	
	Landfill	—	—	10	
	Total	—	—	608	
Waste	Total waste disposed (% of total waste from operations)				
	Incineration without energy recovery	—	—	1%	
	Landfill	—	—	7%	
	Total	—	—	8%	
Lifetime extension of mature systems	Used lithography systems sold	24	17	26	

- From 2019 construction waste is reported as a separate category. In previous years, construction waste was reported as part of total non-hazardous waste. Construction waste is reported as a separate category, because this waste does not result from daily operations of ASML. Amounts of construction waste tend to fluctuate a lot over the years. Therefore this type of waste is excluded from the waste numbers that are used in the calculation of the other (key) performance indicators for waste reporting.
- The waste disposal methods are determined by information provided by the waste disposal contractor.
- The total waste generated in 2018 is restated and therefore differs from the number disclosed in the Integrated Report 2018. The total waste generated in 2017 is understated because the information that is needed to calculate the restatement for 2017 is not available. See Non-financial statements - About the non-financial information for more information.

Our operations - Water Management

Theme	Description	2017	2018	2019	Comments
Water management	Water consumption (in 1,000 m³)				
	Veldhoven	—	—	628	
	San Diego	—	—	90	
	Wilton	—	—	90	
	Linkou	—	—	30	
	Total	874	895	838	Municipal water supply
Water management	Total Ultra-pure water consumption (in 1,000 m ³) ¹	—	—	115	Only Veldhoven in scope for this indicator.
	Total water recycled and reused (in %) ¹	—	—	2.4%	Only Veldhoven in scope for this indicator.
	Water intensity ²	—	—	71	

- Veldhoven is in scope for this indicator. Linkou, San Diego and Wilton are excluded from the scope because the data to report on the indicator is not yet available.
- Water intensity is calculated as total water consumption (in m³) divided by total revenue (in millions).

Technology and Innovation Ecosystem - Product Safety

Theme	Description	2017	2018	2019	Comments
Product safety	Percentage of product types shipped that have a SEMI S2 Safety Guidelines compliance report	100.0%	100.0%	100.0%	
	Number of (significant) fines for non-compliance with product design related laws and regulations	0	0	0	
Product safety	% RoHS compliant parts	89.0%	91.6%	95.4%	
	% RoHS non-compliant parts	1.0%	0.8%	0.4%	
	% RoHS unknown	10.0%	7.6%	4.2%	
Total		100.0%	100.0%	100.0%	

Business Ethics and Compliance

Theme	Description	2017	2018	2019	Comments
Business ethics and compliance	Total number of Speak Up messages	230	266	255	
	Anti-corruption & bribery Speak Up messages ¹	24	33	16	
	Human rights Speak Up messages	44	63	58	
	% Completion of Code of Conduct online training	—	—	86%	

1. None of the Speak Up messages lead to any indication of violation of anti-corruption laws.

Stakeholder engagement

Continuous stakeholder engagement, in which we embrace open dialogue and knowledge-sharing, are important in an innovation-driven industry and helps us to identify the areas of improvement. We communicate with our stakeholders through various channels and at a variety of levels. The following table is an overview of our main stakeholder groups, the way we communicate with them and an overview of the topics most relevant to them.

Stakeholder	Main communication channels	Most relevant themes
Customers	<ul style="list-style-type: none"> Customer Loyalty Survey Direct interaction via account teams and zone quality managers Voice of the customer auditorium sessions Bi-annual Technology Review Meetings (between our major customers, ASML's CTO, product managers and other ASML executives) and Executive Review Meetings (between ASML executives and major clients) Different technology symposia and special events 	<ul style="list-style-type: none"> Technology and innovation ecosystem Employee engagement Operational excellence Customer intimacy Climate and energy - our products
Shareholders	<ul style="list-style-type: none"> Direct interaction with the Investor Relations department (e.g. financial results conference calls, investor visits to ASML, visits to investors during roadshows) AGM Investor Day (scheduled as needed, usually every other year) Different investor conferences Various sustainability self-assessments and survey feedback 	<ul style="list-style-type: none"> Financial performance Technology and innovation ecosystem Our people Business risk & business continuity Business ethics & compliance Our supply chain
Employees ¹	<ul style="list-style-type: none"> Employee satisfaction survey Feedback from online training programs (e.g. ethics/Code of Conduct) ASML Speak up service Works Council Young ASML ², Women@ASML, Seniors@ASML, Pink ASML ³ Intranet articles Onboarding sessions for new employees Lunches with board members All-employee meeting Senior Management meetings Departmental meetings 	<ul style="list-style-type: none"> Our people - diversity & inclusion Climate and energy - our operations Technology and innovation ecosystem Climate and energy - our products Circular economy Our people - employee development
Suppliers	<ul style="list-style-type: none"> ASML's supplier days Supplier Relationship Satisfaction Survey Direct interaction via supplier account teams / procurement account managers Supplier audits ASML Speak up service 	<ul style="list-style-type: none"> Our supply chain Customer intimacy Technology and innovation ecosystem Business risk & continuity
Society		
a. Industry peers	<ul style="list-style-type: none"> SEMI meetings Responsible Business Alliance meetings and workgroups FME⁴ events and meetings 	<ul style="list-style-type: none"> Our people - employee development Community involvement Technology and innovation ecosystem Climate and energy - our operations Business ethics - human rights Our supply chain - human rights
b. Governments ⁵	<ul style="list-style-type: none"> Meetings with municipalities and regional and national government officials EU joint technology initiatives 	
c. Universities	<ul style="list-style-type: none"> ASML scholarship programs Internships Partnerships with universities and institutes (e.g. in the Netherlands, Korea, Taiwan) Labor market communication program 	
d. Local Communities & Other	<ul style="list-style-type: none"> Neighbor Evening Brainport ⁶ HighTechXL ⁷ Make Next Platform ⁸ Jet-Net Dutch technology week Company visits Meetings with various schools and local cultural institutions (e.g. in the Netherlands and U.S.) ASML Speak up service 	

- Including Works Council and unions.
- Internal platform that aims to connect, develop, and support young professionals within ASML via social and professional initiatives.
- Internal platform that aims to contribute to making ASML a safe and great place to work, which explicitly welcomes diversity in gender expression and sexual orientation.
- FME is a Dutch organization that represents employers and businesses in the technology industry.
- Including regulatory bodies in the countries where ASML operates and municipalities.
- Brainport Eindhoven Region (the Netherlands) is an innovative technology region, home to world-class businesses, knowledge institutes, and research institutions.
- HighTechXL is a European hub for high-tech hardware startups.
- The Platform provides the future generation of manufacturing companies with the unique opportunity to gain access to the networks, knowledge and expertise of leading Dutch companies.

Other appendices

Appendix - Selected financial data

The following selected consolidated financial data should be read in conjunction with our Consolidated Financial Statements.

Five-year financial summary

Year ended December 31 (in millions, except per share data)	2015 ¹ €	2016 €	2017 €	2018 €	2019 €
Consolidated Statements of Operations data					
Net sales	6,287.4	6,875.1	8,962.7	10,944.0	11,820.0
Cost of sales	(3,391.7)	(3,729.8)	(4,942.5)	(5,914.8)	(6,540.2)
Gross profit	2,895.7	3,145.3	4,020.2	5,029.2	5,279.8
Other income	83.2	93.8	95.8	—	—
Research and development costs	(1,068.1)	(1,105.8)	(1,259.7)	(1,575.9)	(1,968.5)
Selling, general and administrative costs	(345.7)	(374.8)	(416.6)	(488.0)	(520.5)
Income from operations	1,565.1	1,758.5	2,439.7	2,965.3	2,790.8
Interest and other, net	(16.5)	33.7	(50.3)	(28.3)	(25.0)
Income before income taxes	1,548.6	1,792.2	2,389.4	2,937.0	2,765.8
Provision for income taxes	(161.4)	(234.4)	(306.0)	(351.6)	(191.7)
Income after income taxes	1,387.2	1,557.8	2,083.4	2,585.4	2,574.1
Profit (loss) related to equity method investments	—	—	(16.7)	6.2	18.2
Net income	1,387.2	1,557.8	2,066.7	2,591.6	2,592.3
Earnings per share data					
Basic net income per ordinary share	3.22	3.66	4.81	6.10	6.16
Diluted net income per ordinary share	3.21	3.64	4.79	6.08	6.15
Number of ordinary shares used in computing per share amounts (in millions)					
Basic	430.6	425.6	429.8	424.9	420.8
Diluted	432.6	427.7	431.6	426.4	421.6

1. As of January 1, 2018, ASML has adopted the new Revenue Recognition Standard (ASC 606) and Lease Standard (ASC 842). The comparative numbers of 2015 have not been adjusted to reflect these changes in accounting policy.

Five-year financial summary

As of and for the year ended December 31 (in millions)	2015 ¹ €	2016 €	2017 €	2018 €	2019 €
Consolidated Balance Sheets data					
Cash and cash equivalents	2,458.7	2,906.9	2,259.0	3,121.1	3,532.3
Short-term investments	950.0	1,150.0	1,029.3	913.3	1,185.8
Working capital ²	4,600.4	5,434.9	5,715.8	6,739.5	7,437.0
Total assets	13,295.0	17,155.0	18,188.9	20,136.9	22,629.6
Long-term debt ³	1,129.7	3,319.5	3,025.3	3,026.5	3,108.3
Shareholders' equity	8,388.8	9,972.4	10,776.4	11,641.0	12,592.2
Issued and outstanding shares	38.8	39.4	38.8	38.6	38.2
Consolidated Statements of Cash Flows data					
Depreciation and amortization ⁴	296.9	356.9	417.5	422.7	448.5
Impairment	2.3	3.5	9.0	15.4	4.7
Net cash provided by operating activities	2,025.5	1,665.9	1,818.3	3,072.7	3,276.4
Purchase of property, plant and equipment ⁵	(371.8)	(316.3)	(338.9)	(574.0)	(766.6)
Purchase of intangible assets	(1.1)	(8.4)	(19.1)	(35.5)	(119.3)
Purchase of short-term investments	(950.0)	(2,520.0)	(1,129.3)	(918.1)	(1,291.5)
Maturity of short-term investments	334.9	2,320.0	1,250.0	1,034.1	1,019.0
Cash from (used for) derivative financial instruments	(171.9)	(15.0)	27.0	(2.4)	—
Loans issued and other investments	—	(7.4)	(0.6)	(1.0)	—
Repayment on loans	—	—	1.6	5.4	0.9
Acquisition of equity method investments	—	—	(1,019.7)	—	—
Acquisition of subsidiary (net of cash acquired)	—	(2,641.3)	—	—	—
Net cash used in investing activities	(1,159.9)	(3,188.4)	(1,229.0)	(491.5)	(1,157.5)
Dividend paid	(302.3)	(445.9)	(516.7)	(597.1)	(1,325.7)
Purchase of treasury shares	(564.9)	(400.0)	(500.0)	(1,146.2)	(410.0)
Net proceeds from issuance of shares	33.2	582.7 ⁶	50.6	21.8	27.2
Net proceeds from issuance of notes	—	2,230.6 ⁷	—	—	—
Repayment of debt	(3.6)	(4.7)	(243.0)	(2.8)	(3.8)
Tax benefit (deficit) from share-based payments	3.7	0.9	—	—	—
Net cash from (used in) financing activities	(833.9)	1,963.6	(1,209.1)	(1,724.3)	(1,712.3)
Net increase (decrease) in cash and cash equivalents	39.2	448.2	(647.9)	862.1	411.2

1. As of January 1, 2018, ASML has adopted the new Revenue Recognition Standard (ASC 606) and Lease Standard (ASC 842). The comparative numbers of 2015 have not been adjusted to reflect these changes in accounting policy.

2. Working capital is calculated as the difference between total current assets and total current liabilities.

3. Long-term debt includes the current portion of long-term debt.

4. Depreciation and amortization includes depreciation of property, plant and equipment, amortization of intangible assets, and amortization of underwriting commissions and discount related to the bonds and credit facility.

5. In 2016, net proceeds from issuance of shares include an amount of €536.6 million which is included in the consideration transferred for the acquisition of HMI.

6. In 2016, net proceeds from issuance of notes relate to the total cash proceeds of €2,230.6 million (net of incurred transaction costs) from the issuance of our €500 million 0.625% senior notes due 2022, our €1,000 million 1.375% senior notes due 2026 and our €750 million 1.625% senior notes due 2027.

Five-year financial summary

As of and for the year ended December 31	2015 ¹	2016	2017	2018	2019
Ratios and other data					
Gross profit as a percentage of net sales	46.1	45.7	44.9	46.0	44.7
Income from operations as a percentage of net sales	24.9	25.6	27.2	27.1	23.6
Net income as a percentage of net sales	22.1	22.7	23.1	23.7	21.9
Shareholders' equity as a percentage of total assets	63.1	58.1	59.6	57.8	55.6
Income taxes as a percentage of income before income taxes	10.4	13.1	12.8	12.0	6.9
Sales of lithography systems (in units) ²	169	154	197	224	229
Value of booked systems (in millions €) ^{3,4}	4,639.0	5,396.3	9,357.2	8,180.7	11,741.0
Net bookings lithography systems (in units) ^{2,3,4}	165	160	255	241	236
Number of payroll employees (in FTEs)	12,168	13,991	16,219	20,044	23,219
Number of temporary employees (in FTEs)	2,513	2,656	2,997	3,203	1,681
Increase (decrease) net sales in percentage	7.4	9.3	30.4	22.1	8.0
Number of ordinary shares issued and outstanding (in millions)	428.0	429.9	427.4	421.1	419.8
Closing ASML share price on Euronext Amsterdam (in €)	82.55	106.65	145.15	137.16	263.70
Volatility 260 days as percentage of our shares listed on Euronext Amsterdam (in €) ⁵	33.62	25.47	18.84	29.60	26.15
Closing ASML share price on NASDAQ (in USD)	88.77	112.20	173.82	155.62	295.94
Volatility 260 days as percentage of our shares listed on NASDAQ (in USD) ⁶	28.94	26.85	21.80	35.74	28.06
Dividend per ordinary share (in €)	1.05	1.20	1.40	2.10	2.40
Dividend per ordinary share (in USD)	1.21	1.28	1.74	2.34	2.65

- As of January 1, 2018, ASML has adopted the new Revenue Recognition Standard (ASC 606) and Lease Standard (ASC 842). The comparative numbers of 2015 have not been adjusted to reflect these changes in accounting policy.
- Lithography systems do not include metrology and inspection systems.
- Our systems net bookings include all system sales orders for which written authorizations have been accepted (for EUV starting with the NXE:3350B and excluding the High-NA systems).
- Our systems net bookings values for 2015, 2016, and 2017 have been calculated without taking into consideration the adoption of the new Revenue Recognition Standard (ASC 606) and Lease Standard (ASC 842) which ASML adopted effective January 1, 2018.
- Volatility represents the variability in our share price on Euronext Amsterdam as measured over the 260 business days of each year presented (source: Bloomberg Finance LP).
- Volatility represents the variability in our share price on NASDAQ as measured over the 260 business days of each year presented (source: Bloomberg Finance LP).
- Subject to approval of the AGM to be held on April 22, 2020.
- The dividend per ordinary share in USD has been adjusted compared to the relevant Integrated Report based on US GAAP in order to reflect the actual exchange rate at the time of each year's dividend payment.
- The exchange rate used to express the interim and final proposed dividend per ordinary share in USD is the exchange rate of USD/€1.10 as of January 27, 2020.

Appendix - Principal accountant fees and services

KPMG has served as our independent registered public accounting firm for the years ending December 31, 2019 and 2018. The following table sets out the aggregate fees for professional audit services and other services rendered by KPMG and their member firms and / or affiliates in 2019 and 2018:

Year ended December 31 (in thousands)	2018			2019		
	KPMG Accountants N.V. €	KPMG Network €	Total ¹ €	KPMG Accountants N.V. €	KPMG Network €	Total €
Audit fees	1,602	649	2,251	2,086	815	2,901
Audit-related fees	70	—	70	70	—	70
Tax fees	—	—	—	—	—	—
All other fees	24	—	24	9	—	9
Principal accountant fees	1,696	649	2,345	2,165	815	2,980

1. The fees for 2018 have been adjusted to include an additional amount of €131 thousand relating to audit procedures over the financial year 2018 that were agreed after the publication of the 2018 Integrated Report.

Audit fees and audit-related fees

Audit fees relate to the audit of the Financial Statements as set out in this Integrated Report, certain procedures on our quarterly results, procedures performed on a Form S-8 filing and services related to our statutory and regulatory filings of our subsidiaries. Other audit-related fees are related to assurance services on non-financial information.

Other (non-audit) services relate to certain agreed-upon procedures on the targets achieved in order for the Remuneration Committee to assess compliance with the Remuneration Policy.

The Audit Committee pre-approved the external audit plan and audit fees for the years 2019 and 2018.

The Audit Committee monitors compliance with the Dutch, EU regulation and SEC rules on non-audit services provided by an independent registered public accounting firm, which outlines strict separation of audit and advisory services for Dutch public interest entities.

Appendix - Property, plant and equipment

We lease a number of our facilities under operating leases. We also own a number of buildings, mainly consisting of production facilities in Veldhoven, the Netherlands, in Wilton, Connecticut, and San Diego, California, both in the US, in Linkou and Tainan, both in Taiwan and in Pyeongtaek, South-Korea. The book value of land and buildings owned amounts to €1,290.2 million as of December 31, 2019 compared with €1,063.8 million as of December 31, 2018. See Consolidated Financial Statements - Notes to the Consolidated Financial Statements - Note 12 Property, plant and equipment, net.

Our capital expenditures (purchases of property, plant and equipment, see the Consolidated Statements of Cash Flows as recorded in the Consolidated Financial Statements) for 2019, 2018 and 2017 amounted to €766.6 million, €574.0 million and €338.9 million, respectively. The increased capital expenditures in 2019 compared to 2018 relates to the expansion and upgrades of facilities, prototypes, evaluation and training systems.

Subject to market conditions, we expect that our capital expenditures (purchases of property, plant and equipment) in 2020 will be approximately €1.1 billion. These expenditures will mainly consist of further expansion and upgrades of facilities. We expect to finance these capital expenditures through cash generated by operations and existing cash and cash equivalents.

Facilities in Europe

Our headquarters, main manufacturing and R&D facilities are located at a single site in Veldhoven, the Netherlands. This state-of-the-art facility includes 66 thousand square meters of office space and 50 thousand square meters of cleanroom used for manufacturing and R&D activities and 24 thousand square meters of warehouses. Our facilities in Veldhoven, the Netherlands are partly owned and partly leased. We also lease several sales and service facilities at locations across Europe.

Facilities in the US

Our US head office is located in a 5,000 square meter office building in Chandler, Arizona. We maintain R&D and manufacturing operations in a 28,000 square meter facility in Wilton, Connecticut, and a 9,000 square meter facility in San Jose, California. Furthermore, our facilities in San Diego include 25,000 square meters of buildings used for manufacturing and office space, 19,000 square meters of buildings used for engineering and R&D activities and 7,000 square meters of buildings used for warehousing. As a result of the HMI acquisition, our facilities in San Jose, California expanded by approximately 34,000 square meters for R&D and local sales and service activities.

Facilities in Asia

Our Asian headquarters is located in Hong Kong, The People's Republic of China. In addition, our facility in Linkou, Taiwan comprises a cleanroom (approximately 3,000 square meters) and office space (approximately 6,000 square meters). Our facility in Korea comprises of a cleanroom (approximately 700 square meters) and office space (approximately 6,000 square meters). We also lease and own several sales, service and training facilities at locations across Asia. As a result of the Cymer acquisition, we acquired a manufacturing facility in Pyeongtaek, South Korea, mainly used for refurbishment activities of light sources. As a result of the HMI acquisition, we acquired manufacturing facilities in Tainan, Taiwan (approximately 8,000 square meters) and Beijing, China (approximately 4,000 square meters) and office space in Hsinchu, Taiwan (approximately 2,000 square meters). Additionally, both Cymer and HMI lease various smaller locations across Asia which are mainly used for local sales and service activities.

Appendix - Dutch taxation

The statements below represent a summary of current Dutch tax laws, regulations and judicial interpretations thereof. The description is limited to the material tax implications for a holder of ordinary shares who is not, and / or is not deemed to be, a resident of the Netherlands for Dutch tax purposes ('Non-Resident Holder'). This summary does not address special rules that may apply to special classes of holders of ordinary shares and should not be read as extending by implication to matters not specifically referred to herein. As to individual tax consequences, each investor in our ordinary shares should consult his or her tax counsel.

General

The acquisition of ordinary shares by a non-resident of the Netherlands should in itself not be treated as a taxable event for Dutch tax purposes. The material tax consequences in connection with owning and disposing of our ordinary shares are discussed below.

Substantial interest

A person that, (inter alia) directly or indirectly, and either independently or jointly with his partner (as defined in the Dutch Personal Income Tax Act 2001), owns 5.0% or more of our share capital, owns profit participating rights that correspond to at least 5.0% of the annual profits of a Dutch company or to at least 5.0% of the liquidation proceeds of such company or holds options to purchase 5.0% or more of our share capital, is deemed to have a substantial interest in our shares, or our options, as applicable. Specific rules apply in case certain family members of the Non-Resident Holder hold a substantial interest. A deemed substantial interest also exists if (part of) a substantial interest has been disposed of, or is deemed to be disposed of, in a transaction where no taxable gain has been recognized. Specific attribution rules exist in determining the presence of a substantial interest.

Income tax consequences for individual non-resident holders on owning and disposing of the ordinary shares

An individual who is a Non-Resident Holder will not be subject to Dutch income tax on received income in respect of our ordinary shares or capital gains derived from the sale, exchange or other disposition of our ordinary shares, provided that such holder:

- Does not carry on and has not carried on a business in the Netherlands through a (deemed) permanent establishment or a permanent representative to which the ordinary shares are attributable;
- Does not hold and has not held a (deemed) substantial interest in our share capital or, in the event the Non-Resident Holder holds or has held a (deemed) substantial interest in our share capital, such interest is, or was, a business asset in the hands of the holder;
- Does not share and has not shared directly (through the beneficial ownership of ordinary shares or similar securities) in the profits of an enterprise managed and controlled in the Netherlands which (is deemed to) own(s), or (is deemed to have) has owned, our ordinary shares; and
- Does not carry out and has not carried out any activities which generate taxable profit in the Netherlands or taxable income in the Netherlands to which the holding of our ordinary shares was connected.

Corporate income tax consequences for corporate non-resident holders

Income derived from ordinary shares or capital gains derived from the sale, exchange or disposition of ordinary shares by a corporate Non-Resident Holder is taxable if:

- The holder carries on a business in the Netherlands through a permanent establishment or a permanent representative in the Netherlands (Dutch enterprise) and the ordinary shares are attributable to this permanent establishment or permanent representative, unless the participation exemption (discussed below) applies; or
- The holder has a substantial interest in our share capital, which is held with the primary aim or one of the primary aims to evade the levy of income tax at the level of another person and which is not put into place with valid commercial reasons that reflect economic reality; or
- The holder is a resident of Aruba, Curacao or Saint Martin with a permanent establishment or permanent representative in Bonaire, Eustatius or Saba to which our ordinary shares are attributable and certain conditions are met; or
- Certain assets of the holder are deemed to be treated as a Dutch enterprise under Dutch tax law and the ordinary shares are attributable to this Dutch enterprise.

To qualify for the Dutch participation exemption, the holder must generally hold at least 5.0% of our nominal paid-in capital and meet certain other requirements.

Dividend withholding tax

In general, a dividend distributed by us in respect of our ordinary shares will be subject to a withholding tax imposed by the Netherlands at the statutory rate of 15.0%.

Dividends include:

- Dividends in cash and in kind;
- Deemed and constructive dividends;
- Consideration for the repurchase or redemption of ordinary shares (including a purchase by a direct or indirect ASML subsidiary) in excess of qualifying average paid-in capital unless such repurchase is made for temporary investment purposes or is exempt by law;

- Stock dividends up to their nominal value (unless distributed out of qualifying paid-in capital);
- Any (partial) repayment of paid-in capital not qualifying as capital for Dutch dividend withholding tax purposes; and
- Liquidation proceeds in excess of qualifying average paid-in capital for Dutch dividend withholding tax purposes.

Under certain circumstances, a reduction of Dutch dividend withholding tax can be obtained:

- An exemption at source is available if the participation exemption applies and the ordinary shares are attributable to a business carried out in the Netherlands;
- An exemption at source is available for dividend distributions to certain qualifying EU/EEA resident corporate holders, unless such holder holds our ordinary shares with the primary aim or one of the primary aims to evade the levy of Dutch dividend withholding tax at the level of another person and our ordinary shares are not held for valid commercial reasons that reflect economic reality;
- An exemption at source is available for dividend distributions to certain qualifying corporate holders that are a resident of a non-EU/EEA jurisdiction with which the Netherlands has concluded a tax treaty that includes a dividend article, unless such holder holds our ordinary shares with the primary aim or one of the primary aims to evade the levy of Dutch dividend withholding tax at the level of another person and our ordinary shares are not held for valid commercial reasons that reflect economic reality;
- Certain tax exempt organizations (e.g. pension funds and excluding collective investment vehicles) resident in EU/EEA member states or in qualifying non-EU/EEA states may be eligible for a refund of Dutch dividend withholding tax upon their request. Based on domestic law not yet entered into force, in those circumstances, an exemption at source may also become available upon request;
- Upon request and under certain conditions, certain qualifying Non-Resident Individual and Corporate Holders of ordinary shares resident in EU/EEA member states or in a qualifying non-EU/EEA state may be eligible for a refund of Dutch dividend withholding tax insofar the withholding tax levied is higher than the personal and corporate income tax which would have been due if they were resident of the Netherlands.

Furthermore, a Non-Resident Holder of ordinary shares can be eligible for a partial or complete exemption or refund of all or a portion of the above withholding tax under a tax treaty that is in effect between the Netherlands and the Non-Resident Holder's country of residence. The Netherlands has concluded such treaties with the US, Canada, Switzerland, Japan, most EU member states, as well as many other countries. Under the treaty between the US and the Netherlands for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income (the 'US Tax Treaty'), dividends paid by us to a Non-Resident Holder that is a resident of the US as defined in the US Tax Treaty (other than an exempt organization or exempt pension trust, as discussed below) are generally liable to 15.0% Dutch withholding tax or, in the case of certain US corporate shareholders owning directly at least 10.0% of our voting power, a reduction to 5.0%, provided that the Holder is the beneficial owner of the dividends received and does not have an enterprise or an interest in an enterprise that is, in whole or in part, carried on through a permanent establishment or permanent representative in the Netherlands to which the dividends are attributable. The US Tax Treaty also provides for a dividend withholding tax exemption on dividends, but only for a shareholder owning directly at least 80.0% of our voting power and meeting all other requirements. The US Tax Treaty provides for a complete exemption from tax on dividends received by exempt pension trusts and exempt organizations, as defined therein. Except in the case of exempt organizations, the reduced dividend withholding tax rate (or exemption from withholding) can be applied at the source upon payment of the dividends, provided that the proper forms have been filed in advance of the payment. Exempt organizations, in principle, remain subject to the statutory withholding rate of 15.0% and are required to file for a refund of such withholding, however such organizations may become eligible for the exemption at source when the domestic law as described above has entered into force.

A Non-Resident Holder may not claim the benefits of the US Tax Treaty unless (i) he/she is a resident of the US as defined therein, or (ii) he/she is deemed to be a resident on the basis of the provisions of article 24(4) of the US Tax Treaty, and (iii) his or her entitlement to those benefits is not limited by the provisions of article 26 (limitation on benefits) of the US Tax Treaty.

Dividend stripping rules

Under Dutch tax legislation regarding anti-dividend stripping, no exemption from, or refund of, Dutch dividend withholding tax is granted if the recipient of dividends paid by us is not considered the beneficial owner of such dividends.

Gift or inheritance taxes

Dutch gift or inheritance taxes will not be levied on the transfer of ordinary shares by way of gift or upon the death of a Non-Resident Holder, unless the transfer is construed as an inheritance or as a gift made by or on behalf of a person, who at the time of the gift or death, is deemed to be resident of the Netherlands.

Gift tax and inheritance tax are levied on the beneficiary. For purposes of Dutch gift and inheritance tax, an individual of Dutch nationality is deemed to be a resident of the Netherlands if he/she has been a resident thereof at any time during the ten years preceding the time of the gift or death. For purposes of Dutch gift tax, a person not possessing Dutch nationality is deemed to be a resident of the Netherlands if he / she has resided therein at any time in the twelve months preceding the gift.

Value added tax

No Dutch VAT is imposed on dividends in respect of our ordinary shares or on the transfer of our shares.

Residence

A Non-Resident Holder will not become resident, or be deemed to be resident, in the Netherlands solely as a result of holding our ordinary shares or of the execution, performance, delivery and / or enforcement of rights in respect of our ordinary shares.

US taxation

The following is a discussion of the material US federal income tax consequences relating to the acquisition, ownership and disposition of ordinary shares by a United States Holder (as defined below) acting in the capacity of a beneficial owner who is not a tax resident of the Netherlands. This discussion deals only with ordinary shares held as capital assets and does not deal with the tax consequences applicable to all categories of investors, some of which (such as tax-exempt entities, financial institutions, regulated investment companies, dealers in securities/traders in securities that elect a mark-to-market method of accounting for securities holdings, insurance companies, investors owning directly, indirectly or constructively 10.0% or more of our outstanding voting shares, investors who hold ordinary shares as part of hedging or conversion transactions and investors whose functional currency is not the US dollar) may be subject to special rules. In addition, the discussion does not address any alternative minimum tax or any state, local, Foreign Investment in Real Property Tax Act-related US federal income tax consequences, or non-US tax consequences.

This discussion is based on the US-Netherlands Income tax treaty, the Internal Revenue Code of 1986, as amended to the date hereof, final, temporary and proposed Treasury Department regulations promulgated, and administrative and judicial interpretations thereof, changes to any of which subsequent to the date hereof, possibly with retroactive effect, may affect the tax consequences described herein. In addition, there can be no assurance that the IRS will not challenge one or more of the tax consequences described herein, and we have not obtained, nor do we intend to obtain, a ruling from the IRS or an opinion of counsel with respect to the US federal income tax consequences of acquiring or holding shares. Prospective purchasers of ordinary shares are advised to consult their tax advisers with respect to their particular circumstances and with respect to the effects of US federal, state, local or non-US tax laws to which they may be subject.

As used herein, the term 'United States Holder' means a beneficial owner of ordinary shares for US federal income tax purposes whose holding of such ordinary shares does not form part of the business property or assets of a permanent establishment or fixed base in the Netherlands; who is fully entitled to the benefits of the treaty in respect of such ordinary shares; and is:

- An individual citizen or tax resident of the US; or
- A corporation or other entity treated as a corporation for US federal income tax purposes created or organized in or under the laws of the US or of any political subdivision thereof; or
- An estate of which the income is subject to US federal income taxation regardless of its source; or
- A trust whose administration is subject to the primary supervision of a court within the US and which has one or more US persons who have the authority to control all of its substantial decisions.

If an entity treated as a partnership for US federal income tax purposes owns ordinary shares, the US federal income tax treatment of a partner in such partnership will generally depend upon the status and tax residency of the partner and the activities of the partnership. A partnership that owns ordinary shares and the partners in such partnership should consult their tax advisors about the US federal income tax consequences of holding and disposing of the ordinary shares.

Passive Foreign Investment Company considerations

We believe we were not a passive foreign investment company for US federal income tax purposes in 2019 and that we will not be a passive foreign investment company in 2020. However, as passive foreign investment company status is a factual matter that must be determined annually at the close of each taxable year, there can be no certainty as to our actual passive foreign investment company status in any particular year until the close of the taxable year in question. We have not conducted a detailed study at this time to confirm our non-passive foreign investment company status. If we were treated as a passive foreign investment company in any year during which a United States Holder owned common shares, certain adverse tax consequences could apply. Investors should consult their tax advisors with respect to any passive foreign investment company considerations.

Taxation of dividends

United States Holders should generally include in gross income, as foreign-source dividend income the gross amount of any non-liquidating distribution (before reduction for Dutch withholding taxes) we make out of our current or accumulated earnings and profits (as determined for US federal income tax purposes) when the distribution is actually or constructively received by the United States Holder. Distributions will not be eligible for the dividends-received deduction generally allowed to US corporations in respect of dividends received from other US corporations. The amount of the dividend distribution includible in income of a United States Holder should be the US dollar value of the foreign currency (e.g. euros) paid, determined by the spot rate of exchange on the date of the distribution, regardless of whether the payment is in fact converted into US dollars. Distributions in excess of current and accumulated earnings and profits, as determined for US federal income tax purposes, will be treated as a non-taxable return of capital to the extent of the United States Holder's US tax basis in the ordinary shares and thereafter as taxable capital gain. We presently do not maintain calculations of our earnings and profits under US federal income tax principles. If we do not report to a United States Holder the portion of a distribution that exceeds earnings and profits, the distribution will generally be taxable as a dividend even if that distribution would otherwise be treated as a non-taxable return of capital or as capital gain under the rules described above.

Subject to limitations provided in the US Internal Revenue Code, a United States Holder may generally deduct from its US federal taxable income, or credit against its US federal income tax liability, the amount of qualified Dutch withholding taxes. However, Dutch withholding tax may be credited only if the United States Holder does not claim a deduction for any Dutch or other non-US taxes paid or accrued in that year. In addition, Dutch dividend withholding taxes will likely not be creditable against the United States Holder's US tax liability to the extent we are not required to pay over the amount withheld to the Dutch Tax Administration. Currently, a Dutch corporation that receives dividends from qualifying non-Dutch subsidiaries may credit source country tax withheld from those dividends against Dutch withholding tax imposed on a dividend paid by a Dutch corporation, up to a maximum of 3.0% of the dividend paid by the Dutch corporation. The credit reduces the amount of dividend withholding that we are required to pay to the Dutch Tax Administration but does not reduce the amount of tax we are required to withhold from dividends.

For US foreign tax credit purposes, dividends paid by us generally will be treated as foreign-source income and as 'passive category income' (or in the case of certain holders, as 'general category income'). Gains or losses realized by a United States Holder on the sale or exchange of ordinary shares generally will be treated as US-source gain or loss. The rules governing the foreign tax credit are complex and we suggest that each United States Holder consult his or her own tax advisor to determine whether, and to what extent, a foreign tax credit will be available.

Dividends received by a United States Holder will generally be taxed at ordinary income tax rates. However, the Jobs and Growth Tax Relief Reconciliation Act of 2003, as amended by the Working Families Tax Relief Act of 2004, the American Jobs Creation Act of 2004, the American Taxpayer Relief Act of 2012, and most recently the 2017 tax reform act (Public Law No. 115-97) reduces to 20.0% the maximum tax rate for certain dividends received by individuals, so long as certain exclusions do not apply and the stock has been held for at least 60 days during the 121-day period beginning 60 days before the ex-dividend date. Dividends received from 'qualified foreign corporations' generally qualify for the reduced rate. A non-US corporation (other than a passive foreign investment company) generally will be considered to be a qualified foreign corporation if: (i) the shares of the non-US corporation are readily tradable on an established securities market in the US or (ii) the non-US corporation is eligible for the benefits of a comprehensive income tax treaty with the US that has been identified as a qualifying treaty and contains an exchange of information program. In addition, subject to income limitations, dividends received by US individuals and US residents, estates and trusts will be subject to a Net Investment Income Tax (NIIT) assessed at the rate of 3.8%. Individual United States Holders should consult their tax advisors regarding the impact of this provision on their particular situations.

Dividends paid by us generally will constitute 'portfolio income' for purposes of the limitations on the use of passive activity losses (and, therefore, generally may not be offset by passive activity losses) and as 'investment income' for purposes of the limitation on the deduction of investment interest expense.

Taxation on sale or other disposition of ordinary shares

Upon a sale or other disposition of ordinary shares, a United States Holder will generally recognize capital gain or loss for US federal income tax purposes in an amount equal to the difference between the amount realized, if paid in US dollars, or the US dollar value of the amount realized (determined at the spot rate on the settlement date of the sale) if proceeds are paid in currency other than the US dollar, as the case may be, and the United States Holder's US tax basis (determined in US dollars) in such ordinary shares. Generally, the capital gain or loss will be long-term capital gain or loss if the holding period of the United States Holder in the ordinary shares exceeds one year at the time of the sale or other disposition. The deductibility of capital losses is subject to limitations for US federal income tax purposes. Gain or loss from the sale or other disposition of ordinary shares generally will be treated as US source income or loss for US foreign tax credit purposes. Generally, any gain or loss resulting from currency fluctuations during the period between the date of the sale of the ordinary shares and the date the sale proceeds are converted into US dollars will be treated as ordinary income or loss from sources within the US. Each United States Holder should consult his or her tax advisor with regard to the translation rules applicable when computing its adjusted US tax basis and the amount realized upon a sale or other disposition of its ordinary shares if purchased in, or sold or disposed of for, a currency other than US dollar.

Information reporting and backup withholding

Information returns may be filed with the IRS in connection with payments on the ordinary shares or proceeds from a sale, redemption or other disposition of the ordinary shares. A 'backup withholding' tax may be applied to, and withheld from, these payments if the beneficial owner fails to provide a correct taxpayer identification number to the paying agent and to comply with certain certification procedures or otherwise establish an exemption from backup withholding. Any amounts withheld under the backup withholding rules might be refunded (or credited against the beneficial owner's US federal income tax liability, if any) depending on the facts and provided that the required information is furnished to the IRS.

The discussion set out above is included for general information only and may not be applicable depending upon a holder's particular situation. Holders should consult their tax advisors with respect to the tax consequences to them of the purchase, ownership and disposition of shares including the tax consequences under state, local and other tax laws and the possible effects of changes in US federal and other tax laws.

Appendix - Competition

The semiconductor equipment industry and the related services industries are highly competitive. The principal elements of competition in our market are:

- The ability to develop new and enhanced semiconductor equipment and services that are competitively priced and introduced on a timely basis;
- The technical performance characteristics of a lithography system;
- The productivity, cost-effectiveness and level of technical support of semiconductor-related services;
- The cost of ownership of lithography systems based on purchase price, maintenance costs, availability, productivity, and customer service and support costs;
- The ability to effectively service the installed base of our systems;
- The ability to successfully introduce new technology systems and manage technology roadmaps to high-volume manufacturing;
- The exchange rate of the euro against the functional currency of our competitors and our customers, particularly against the Japanese yen;
- The strength and breadth of our portfolio of patents and other intellectual property rights and the ability to protect and defend patents; and
- Our customers' desire to obtain lithography equipment and related services from more than one supplier.

Appendix - Government regulation

Our business is subject to direct and indirect regulations in each of the countries in which our customers or we do business, and changes in various types of regulations can affect our business adversely. As our business has expanded, we have become subject to increasing and increasingly complex regulation. The implementation of new safety, environmental or legal requirements, including export controls and required permits and licenses or changes in interpretation, implementation or enforcement of such regulations and requirements, could impact our products, our manufacturing or distribution processes or location of sales, and could affect the timing of product introductions, the cost of our production, and products as well as their commercial success in each market in which we operate. The impact of these regulations could adversely affect our business, financial condition and our results of operations even where the specific regulations do not directly apply to us or to our products. See How we manage risk - Risk factors - Legal and compliance - We are subject to increasing and increasingly complex regulatory and compliance obligations.

Appendix - Offer and listing details

Our ordinary shares are listed for trading in the form of registered ASML NASDAQ shares and in the form of registered ASML Euronext Amsterdam shares. The principal trading market of our ordinary shares is Euronext Amsterdam (trading symbol: ASML). Our ordinary shares also trade on NASDAQ (trading symbol: ASML).

Our shares listed on NASDAQ are registered with JPMorgan Chase Bank N.A., our New York Transfer Agent, pursuant to the terms of the Transfer Agent Agreement between ASML and JPMorgan Chase Bank N.A. Our shares listed on Euronext Amsterdam are held in dematerialized form through the facilities of Euroclear Nederland, the Dutch centralized securities custody and administration system. The New York Transfer Agent charges shareholders a fee of up to USD 5.00 per 100 shares for the exchange of our shares listed at NASDAQ for our shares listed at Euronext Amsterdam and vice versa.

Dividends payable on our shares listed at NASDAQ are declared in euro and converted to US dollars at the rate of exchange at the close of business on the date determined by the Board of Management. The resulting amounts are distributed through the New York Transfer Agent and no charge is payable by holders of our shares listed at NASDAQ in connection with this conversion or distribution.

Pursuant to the terms of the Transfer Agent Agreement, we have agreed to reimburse the New York Transfer Agent for certain out of pocket expenses, including in connection with any mailing of notices, reports or other communications made generally available by ASML to holders of ordinary shares. The New York Transfer Agent has waived its fees associated with routine services to ASML associated with our shares listed at NASDAQ. In addition, the New York Transfer Agent in consideration of its acting as Transfer Agent has agreed to make a contribution towards covering certain expenses incurred by ASML in connection with the issuance and transfer of our shares listed on NASDAQ. In the year ended December 31, 2019, the Transfer Agent contributed USD 0.5 million towards coverage of expenses incurred by ASML (which mainly comprised of audit, advisory, legal and listing fees incurred due to the existence of our share listing on NASDAQ).

Appendix - Material contracts

Settlement and Cross License Agreement Among ASML, Zeiss and Nikon

In February 2019, ASML entered into a settlement and license agreement with Nikon Corporation and Carl Zeiss SMT, and for purposes of certain provisions Carl Zeiss AG. The agreement settles all pending litigation between ASML and Zeiss on the one hand and Nikon on the other hand and provides for a patent cross license between ASML, Zeiss and Nikon. The key terms of the cross-license are set forth below.

Scope of License

Pursuant to the settlement and license agreement:

- (i) ASML and Zeiss grant Nikon a worldwide, non-exclusive license under all patents owned or licensable ("Licensed Patents") by ASML and Zeiss to make, use and sell lithography equipment and components as well as digital cameras, but excluding EUV lithography products and laser sources ("Nikon Licensed Products");
- (ii) Nikon grants ASML a worldwide, non-exclusive license under all Nikon Licensed Patents to make, use and sell lithography equipment and components, but excluding FPD/large area substrate products ("ASML Licensed Products"); and
- (iii) Nikon grants Zeiss a worldwide, non-exclusive license under all Nikon Licensed Patents to make, use and sell a) components for use in lithography equipment and b) certain digital cameras developed and marketed by Zeiss, but excluding FPD/large area substrate products ("Zeiss Licensed Products").

These license grants cover existing patents, as well as additional patents that issue worldwide before the end of the term of the cross-license.

Term of License

The term of the cross-license is 10 years from the date of the cross-license agreement, February 18, 2019. ASML and Zeiss, jointly on the one hand and Nikon on the other hand, each have the right to convert up to 20 Licensed Patent families of the other side into permanently Licensed Patents.

Post-Term

After the term of the cross-license, remedies for any party's infringement of any patents with an effective application date before the end of the term of the cross-license are limited to damages in the form of a reasonable royalty applied against a royalty base that is apportioned to reflect the value of such patent features and excluding from the base value attributable to unpatented features. Whether a Licensed Product infringes a Licensed Patent, all defenses to such a claim, and any such reasonable royalty in the event liability is found shall be determined by a court mutually agreed by the parties.

Certain Releases

The parties have granted each other releases for claims of infringement of Licensed Patents based on acts prior to the date of the agreement.

Immunity

ASML and Nikon have granted each other certain immunities from patent suits by the other party in respect of covered entities, including customers, subject to certain defensive rights.

Payments

ASML and Zeiss agreed that ASML pays a total of €150.0 million to Nikon.

ASML and Zeiss agreed that ASML pays Nikon a royalty of 0.8% of the net sales price of entire immersion lithography systems (on the first sale of each system) that are ASML Licensed Products sold during the term of the agreement.

Nikon agreed to pay ASML a royalty of 0.8% of the net sales price of entire immersion lithography systems (on the first sale of each system) that are Nikon Licensed Products sold during the term of the agreement.

Appendix - Exchange controls

Cash distributions, if any, payable in euros on our shares listed at Euronext Amsterdam may be officially transferred by a bank from the Netherlands and converted into any other currency without being subject to any Dutch legal restrictions. However, for statistical purposes, such payments and transactions must be reported by ASML to the Dutch Central Bank. Furthermore, no payments, including dividend payments, may be made to jurisdictions subject to certain sanctions, adopted by the government of the Netherlands, implementing resolutions of the Security Council of the United Nations. Cash distributions, if any, on our shares listed at NASDAQ shall be declared in euros but paid in US dollars, converted at the rate of exchange at the close of business on the date fixed for that purpose by the Board of Management in accordance with the Articles of Association.

Appendix - Documents on display

We are subject to certain reporting requirements of the Exchange Act. As a "foreign private issuer", we are exempt from the rules under the Exchange Act prescribing certain disclosure and procedural requirements for proxy solicitations, and our officers, directors and principal shareholders are exempt from the reporting and "short-swing" profit recovery provisions contained in Section 16 of the Exchange Act, with respect to their purchases and sales of shares. In addition, we are not required to file reports and financial statements with the SEC as frequently or as promptly as companies whose securities are registered under the Exchange Act that are not foreign private issuers. However, we are required to file with the SEC, within 4 months after the end of each fiscal year, an Annual Report on Form 20-F containing financial statements audited by an independent accounting firm and interactive data comprising financial statements in extensible business reporting language. We publish unaudited interim financial information in accordance with U.S. GAAP after the end of each quarter. We furnish this quarterly financial information to the SEC under cover of a Form 6-K.

Documents we file with the SEC are publicly available on the SEC's website, which contains reports and other information regarding registrants that are required to file electronically with the SEC. The address of this website is <http://www.sec.gov>.

Appendix - Controls and procedures

Disclosure controls and procedures

As of December 31, 2019, ASML's senior management conducted an evaluation, under the supervision and with the participation of ASML's CEO and CFO, of the effectiveness of the design and operation of ASML's disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act). Based on such evaluation, ASML's CEO and CFO have concluded that, as of December 31, 2019, ASML's disclosure controls and procedures are effective in recording, processing, summarizing and reporting, on a timely basis, information required to be disclosed by ASML in the reports that it files or submits under the Exchange Act and are effective in ensuring that information required to be disclosed by ASML is accumulated and communicated to ASML's management, including ASML's CEO and CFO, as appropriate to allow timely decisions regarding required disclosure.

Management's report on internal control over financial reporting

ASML's management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rule 13a-15(f) under the Exchange Act. Under the supervision and with the participation of ASML's CEO and CFO, ASML's management conducted an evaluation of the effectiveness of ASML's internal control over financial reporting as of December 31, 2019 based upon the framework in "Internal Control – Integrated Framework" (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on that evaluation, management has concluded that ASML's internal control over financial reporting was effective as of December 31, 2019 at providing reasonable assurance regarding the reliability of financial reporting and the preparation of the Financial Statements for external purposes in conformity with US GAAP.

KPMG Accountants N.V., an independent registered public accounting firm, have audited the Financial Statements as included in this Integrated Report and, have also audited and issued a report, included herein, on the effectiveness of ASML's internal control over financial reporting.

Changes in internal control over financial reporting

During the year ended December 31, 2019, there have been no changes in our internal control over financial reporting that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent limitations of disclosure controls and procedures in internal control over financial reporting

It should be noted that any system of controls, however well-designed and operated, can provide only reasonable, and not absolute, assurance that the objectives of the system will be met. In addition, the design of any control system is based in part upon certain assumptions about the likelihood of future events.

Appendix - Financial calendar and investor relations

Financial Calendar

April 15, 2020

Announcement of First Quarter results for 2020

April 22, 2020

Annual General Meeting

July 15, 2020

Announcement of Second Quarter results for 2020

October 14, 2020

Announcement of Third Quarter results for 2020

Fiscal Year

ASML's fiscal year ends on December 31, 2020

Investor Relations

ASML Investor Relations supplies information regarding the company and its business opportunities to investors and financial analysts. Our annual reports, quarterly releases and other information are also available on our website.

Appendix - ASML worldwide contact information

Corporate Headquarters

De Run 6501
5504 DR Veldhoven
The Netherlands

Mailing Address

P.O. Box 324
5500 AH Veldhoven
The Netherlands

United States Main Office

2650 W Geronimo Place
Chandler, AZ 85224
U.S.A.

Asia Main Office

Suites 3704-6, 37/F Tower Two, Times Square
1 Matheson Street
Causeway Bay, Hong Kong

Investor Relations

phone: +31 40 268 3938
email: investor.relations@asml.com

For additional contact information please visit www.asml.com.

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This document contains information required for the Annual Report on Form 20-F for the year ended December 31, 2019 of ASML Holding N.V. Reference is made to the Form 20-F cross reference table contained herein under 'Reference Table - 20-F'. Only the information in this document that is referenced in the Form 20-F cross reference table and this paragraph shall be deemed to be filed with the Securities and Exchange Commission for any purpose. Any additional information in this document which is not referenced in the Form 20-F cross reference table, or the Exhibits themselves, shall not be deemed to be incorporated by reference, shall not be part of the 2019 Annual Report on Form 20-F and is furnished to the Securities and Exchange Commission for information only.

Definitions

Name	Description
3TG	Tin, tantalum, tungsten and gold
AFM	Autoriteit Financiële Markten; Authority for the Financial Markets of the Netherlands
AGM	Annual General Meeting
ArF	Argon Fluoride
ArFi	Argon Fluoride Immersion
ASC	Accounting Standards Codification
ASML	ASML Holding N.V. and / or any of its subsidiaries and / or any equity method investments, as the context may require
ASML Foundation	The ASML Foundation supports projects in the regions where ASML operates. It's aim is to increase the self-sufficiency of disadvantaged youngsters (4 - 18 years old) through educational initiatives that develop their talents and unlock their potential
ASP	Average Sales Price, which is the reported revenue divided by the reported units
ASU	Accounting Standards Update
BEAT	Base Erosion Anti-Abuse Tax regime
BEPS	Base Erosion and Profit Shifting
BoM	Board of Management
Brion	Brion Technologies, Inc.
Business Principles	Business principles of ASML
Canon	Canon Kabushiki Kaisha
CCIP	Customer Co-Investment Program
CEO	Chief Executive Officer
CFO	Chief Financial Officer
Code	Dutch Corporate Governance Code
Code of Conduct	Code of ethics and conduct
Company	ASML Holding N.V.
CO ₂	Carbon Dioxide
Scope 1 CO ₂ emissions	Consists of the combustion of natural gas and purchased CO ₂
Scope 2 CO ₂ emissions	Calculated by multiplying electricity consumptions of the manufacturing locations by the local conversion factors
COO	Chief Operations Officer
CTO	Chief Technology Officer
Cymer	Cymer Inc., Cymer LLC and its subsidiaries
D&E	Development and Engineering
DAP	Development Action Plan
DRAM	Dynamic Random Access Memory (often called performance memory)
Dutch Central Bank	The Dutch Central Bank (De Nederlandsche Bank), which is the supervisor of all pension companies in the Netherlands
DUV	Deep Ultraviolet
EEA	European Economic Area
EGM	Extraordinary General Meeting
EHS	Environment, Health and Safety
EHS Competence Center	Defines EHS standards for ASML, gathers best-known practices and helps managers across the business to implement these
EMEA	Europe, the Middle East and Africa
ERM	Enterprise Risk Management

Name	Description
ESG score	Integrated scoring system on environmental, social and governance (ESG) factors for credit rating decisions
EURIBOR	Euro Interbank Offered Rate
Eurobonds	A bond that is denominated in Euro
Euroclear Nederland	Nederlands Centraal Instituut voor Giraal Effectenverkeer B.V.
Euronext Amsterdam	Euronext Amsterdam N.V.
EU	European Union
EUV	Extreme Ultraviolet
Exchange Act	US Securities Exchange Act of 1934
Fab	Fabrication plant (semiconductors)
FASB	Financial Accounting Standards Board
FAT	Factory Acceptance Test
FMSA	Financial Markets Supervision Act (Wet op het financieel toezicht (Wft))
Foundation	Stichting Preferente Aandelen ASML
Foundry	Contract Manufacturers of Logic Chips
FTEs	Full-time equivalents
GDPR	General Data Protection Regulation
GRI	Global Reporting Initiative
GRI standards	GRI Sustainability Reporting Standards
GILTI	Global Intangible Low-Tax regime
High-NA	High Numerical Aperture
HMI	Hermes Microvision, Inc.
Holistic Lithography	Adjusting the patterning process steps as a whole, in order to support optimization of the entire chip making process
IC	Integrated Circuit
IDM	Integrated device manufacturer
i-line	Lithography system with a mercury lamp as light source
IFRS	International Financial Reporting Standards as adopted by the European Union.
Imaging	Transferring the pattern structure on the wafer
imec	Interuniversitair Micro-Elektronica Centrum
Installed Base Management	Net service and field option sales
Intel	Intel Corporation
Internet of Things (IoT)	The internetworking of physical devices, vehicles, buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data
IRS	Internal Revenue Service
ISO	International Organization for Standardization
KPI	Key Performance Indicator
KPMG	KPMG Accountants N.V.
KrF	Krypton Fluoride
kWh	kilo Watt hour
LGBTI	Lesbian, gay, bisexual, transgender and intersex
LIBOR	London Interbank Offered Rate
Logic	Integrated Device Manufacturers and Foundries

Name	Description
LTI	Long-Term Incentive
Mapper	Mapper Lithography Holding By., Mapper Lithography By, and Mapper Lithography P B.V. (together "Mapper")
Memory	NAND-Flash Memory and DRAM Memory chip makers
mm	Millimeter (one thousandth of a meter)
MOU	Memorandum of Understanding
NAND	A binary operator composite of 'NOT AND' (often called storage memory)
NASDAQ	NASDAQ Stock Market LLC
New York Transfer Agent	J.P. Morgan Chase Bank, N.A.
Nikon	Nikon Corporation
Nikon Cross-License Agreement	The patent Cross-License agreement between Nikon and ASML related to lithography equipment used to manufacture semiconductor devices
nm	Nanometer (one billionth of a meter)
Node	The 'technology node' (also known as the 'process node' or simply 'node') is a common metric used in the semiconductor industry to describe and differentiate the technologies used in fabricating microchips. Generally, a smaller technology node means a smaller feature size, allowing the production of smaller transistors which are both faster and use less power. Marketing claims and discrepancies among chip producers (foundries) means that the numbers assigned to a node - such as 45 nm, 32 nm, 22 nm, 16 nm, 14 nm, or 10 nm - have lost the exact meaning they once held. The numbers now refer more to a specific generation of chips, made using a particular technology.
Non-GAAP	A numerical measure of a company's historical or future financial performance, financial position, or cash flows which are not calculated or presented in accordance with the most comparable Generally Accepted Accounting Principles (GAAP) measure
Non-Resident Holder	A holder of ordinary shares who is not, or is not deemed to be, a resident of the Netherlands for Dutch tax purposes
NXE	NXE platform; a new platform utilizing the concepts of the TWINSCAN platform with complete new technologies in three areas: light source, lens system, and vacuum body
NXT	TWINSCAN NXT systems; an improved version of the TWINSCAN systems, introducing new stages and stage position control technology, which enables improved imaging and overlay
OCI	Other Comprehensive Income
OECD	Organization for Economic Co-operation and Development
Overlay	The layer-to-layer alignment of patterning structures
Pattern Fidelity	Improving how accurately a structure is printed and transferred compared to the design by use of metrology solutions (e.g. ASML YieldStar), inspection solutions (e.g. HMI e-beam tools) and statistical modeling to guide inspection on the wafer
Pattern Fidelity Control	Measuring how good a structure is printed and etched compared to the structure on the reticle
Patterning	The interaction of lithography and resist with etching, deposition, cleaning and metrology in order to produce a pattern on the wafer
PME	Bedrijfstakpensioenfonds Metalektro
Preference Share Option	An option to acquire cumulative preference shares in our capital
R&D	Research and Development
RBA	Responsible Business Alliance
REACH	Registration, Evaluation, Authorization, and Restriction of Chemicals
Remuneration Policy	Remuneration Policy applicable to the Board of Management of ASML Holding N.V.
Reticle	Also known as Mask
ROAIC	Return on Average Invested Capital
RoHS	Restriction of Hazardous Substances
Reporting Unit ASML	Reporting Unit ASML (which is ASML excluding Reporting Unit Cymer Light Sources)
Samsung	Samsung Electronics Corporation

Name	Description
Sarbanes-Oxley Act	The Sarbanes-Oxley Act of 2002
SAT	Site Acceptance Test
SB	Supervisory Board of ASML
SDG	United Nations Sustainable Development Goals
SEC	The United States Securities and Exchange Commission
SEMI	Semiconductor Equipment and Materials International
SEMI S2	The SEMI S2 Safety Guideline, <i>Environmental, Health, and Safety Guideline for Semiconductor Manufacturing Equipment</i> , is intended as a set of performance-based EHS considerations for semiconductor manufacturing equipment.
SEMI S23	SEMI S23 Guide for Conservation of Energy, Utilities, and Materials Used by Semiconductor Manufacturing Equipment prescribes a method to collect, analyze, and report energy-consuming semiconductor manufacturing equipment utility data.
SG&A	Selling, General and Administrative
Shrink	Shrink is the process of developing smaller transistors on chips, using increasingly sophisticated lithography techniques
Silicon Valley	Silicon Valley Group, Inc. (SVG)
STEM	Science, technology, engineering and maths
STI	Short-Term Incentive
Transistor	The transistor is the fundamental building block of modern electronic devices, and is ubiquitous in modern electronic systems. A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semiconductor material usually with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals controls the current through another pair of terminals. Because the controlled (output) power can be higher than the controlling (input) power, a transistor can amplify a signal. Transistors are in general found embedded in integrated circuits.
Throughput	The number of wafers a system can process per hour
TJ	Terajoule, the unit of energy
Transfer Agent Agreement	Agreement about transfer, registrar and dividend disbursement
TSMC	Taiwan Semiconductor Manufacturing Company Ltd.
US	United States
US GAAP	Generally Accepted Accounting Principles in the United States of America
VAT	Value-added tax
VLSI	An independent industry research firm that surveyed customers representing 95.0% of the world's total semiconductor market
Wavelength	The frequency of light going through projection lenses; the shorter the wavelength, the smaller the line-width and the finer the pattern on the IC
Website	www.asml.com . Information on our website is not incorporated into, and does not form part of this Integrated Report.
Works Council	Works Council of ASML Netherlands B.V.
XBRL	Extensible Business Reporting Language
YieldStar	Advanced wafer metrology system

ASML Holding N.V. hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this Annual Report on Form 20-F on its behalf.

ASML Holding N.V. (Registrant)

/s/ Peter T.F.M. Wennink

Name: Peter T.F.M. Wennink

Title: President, CEO and member of the Board of Management

Dated: February 11, 2020

/s/ Roger J.M. Dassen

Name: Roger J.M. Dassen

Title: Executive Vice President, CFO and member of the Board of Management

Dated: February 11, 2020

Exhibit index

Exhibit index

Exhibit No	Description
1	Articles of Association of ASML Holding N.V. (English translation) (Incorporated by reference to Amendment No. 13 to the Registrant's Registration Statement on Form 8-A/A, filed with the SEC on February 8, 2013)
4.1	Agreement between ASM Lithography B.V. and Carl Zeiss, dated March 17, 2000 (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the fiscal year ended December 31, 2000) ¹
4.2	Agreement between ASML Holding N.V. and Carl Zeiss SMT AG, dated October 24, 2003 (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the year ended December 31, 2003) ¹
4.3	Form of Indemnity Agreement between ASML Holding N.V. and members of its Board of Management (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the year ended December 31, 2003)
4.4	Form of Indemnity Agreement between ASML Holding N.V. and members of its Supervisory Board (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the year ended December 31, 2003)
4.5	Form of Employment Agreement for members of the Board of Management (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the fiscal year ended December 31, 2003)
4.6	Nikon-ASML Patent Cross-License Agreement, dated December 10, 2004, between ASML Holding N.V. and Nikon Corporation (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the fiscal year ended December 31, 2014) ¹
4.7	ASML/Carl Zeiss Sublicense Agreement, 2004, dated December 10, 2004, between Carl Zeiss SMT AG and ASML Holding N.V. (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the fiscal year ended December 31, 2004) ¹
4.8	ASML Performance Stock Plan for Members of the Board of Management (Version 1) (Incorporated by reference to the Registrant's Registration Statement on Form S-8 filed with the SEC on July 5, 2007 (file No. 333-144356))
4.9	ASML Performance Stock Option Plan for Members of the Board of Management (Version 2) (Incorporated by reference to the Registrant's Registration Statement on Form S-8 filed with the Commission on July 5, 2007 (file No. 333-144356))
4.10	ASML Board of Management Umbrella Share Plan (Incorporated by reference to the Registrant's Registration Statement on Form S-8 filed with the SEC on April 13, 2015 (file No. 333-203390))
4.11	Partnership and Joint Venture Agreement, among Carl Zeiss AG, ASML Holding N.V. and Carl Zeiss SMT Holding Management GmbH, dated 29 June 2017 (Incorporated by reference to the Registrant's Annual Report on Form 20-F for the fiscal year ended December 31, 2017)
4.12	Settlement and Cross License Agreement, dated February 18, 2019, among Nikon Corporation, ASML Holding N.V. and Carl Zeiss SMT GmbH and, with regards to Sections 3(b) 2.2.1, 3.8, 6.3.3, 6.6, 10.6, 10.8, 10.14 and 10.15, Carl Zeiss AG ^{2,3}
8.1	List of Main Subsidiaries ²
12.1	Certification of CEO and CFO Pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934 ²
13.1	Certification of CEO and CFO Pursuant to Rule 13a-14(b) of the Securities Exchange Act of 1934 ²
15.1	Consent of Independent Registered Public Accounting Firm ²
101.INS	XBRL Instance Document ²
101.SCH	XBRL Taxonomy Extension Schema Document ²
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document ²
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document ²
101.LAB	XBRL Taxonomy Extension Label Linkbase Document ²
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document ²
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101) ²

1. Certain information omitted pursuant to a request for confidential treatment filed separately with the SEC.

2. Filed at the SEC herewith.

3. Portions of this exhibit have been omitted because they are both (i) not material and (ii) would be competitively harmful if publicly disclosed

ASML is party to 4 debt instruments under which the total amount of securities under each debt instrument does not exceed 10% of the total assets of ASML and its subsidiaries on a consolidated basis. Pursuant to paragraph 2(b) (i) of the instructions to the exhibits to Form 20-F, ASML agrees to furnish a copy of such instruments to the SEC upon request.